

Solar 101: How to “Go Solar” Now

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Presented by
The Green Needham Collaborative
and
Needham Community Education



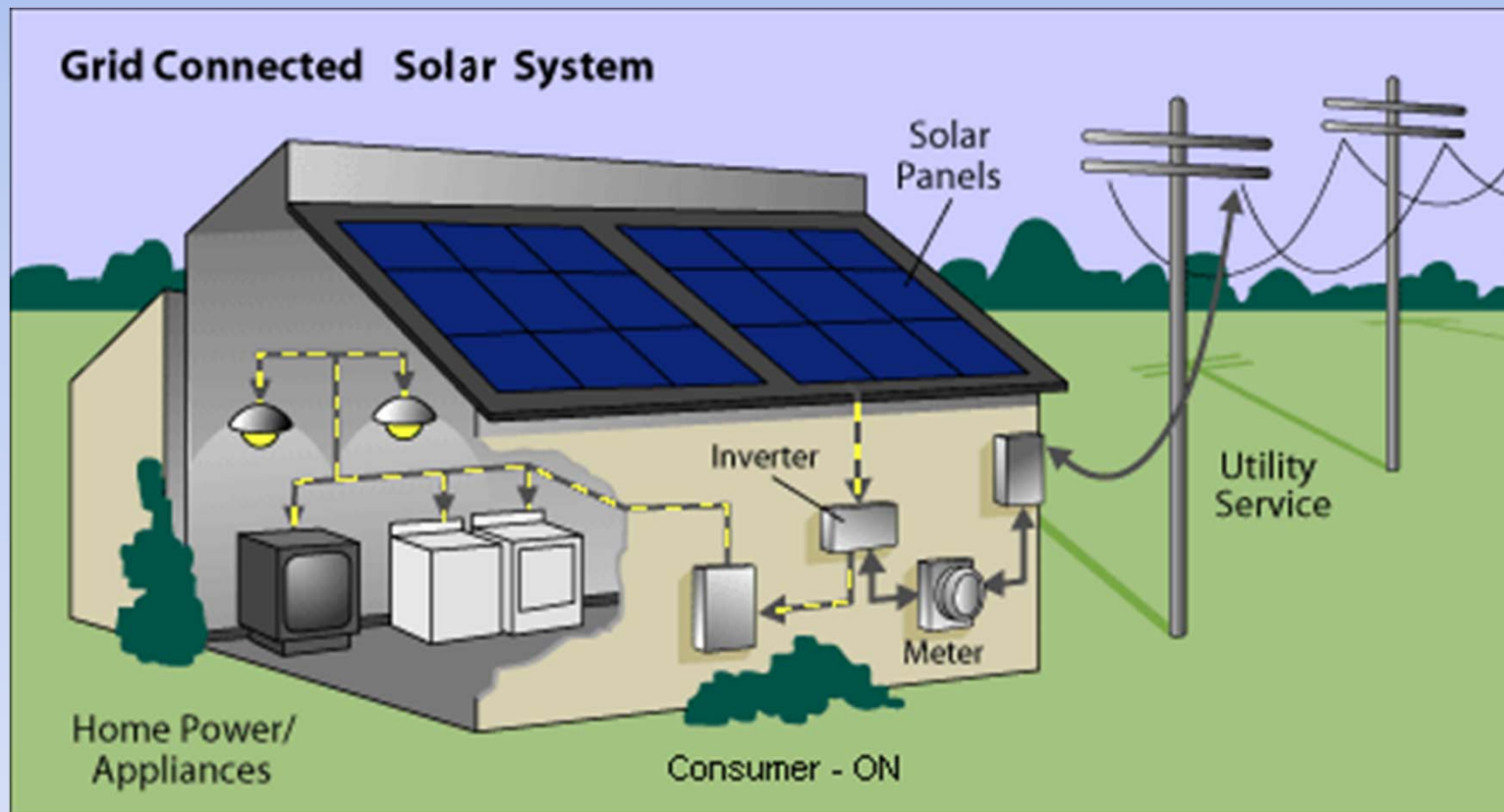
Introduction

- Solar Basics
- Is my home a good candidate for solar?
- Payback and Savings
- Incentives
- Things to Think About
- Ready, set, GO! (Resources)
- Questions, Answers & Discussion

Meet and Greet with neighbors and their installers



Solar PV Basics



Going Solar: Your Next Home Improvement

Your Solar Contractor is your Guide:

They're with you through every step

Getting Quotes and making choices

- Evaluate your design options
 - panel types aesthetics, efficiency;
 - inverter – micro-inverter vs larger
- Choose your design/build team

Financing

- Now that you have a plan, how do you pay for it?
- Lease vs. Purchase

Doing the work

- Permits & Approvals - Installer handles both Town & Eversource Permits



Why Choose Solar?

Reduce your carbon footprint with a clean, renewable source of energy

- Proven technology with long warranties
- Low maintenance

Financially attractive

- Usually pays for itself in 6-7 years
- Flexible options - purchase or pay for power (no upfront cash)
- Federal and state incentives
- Reduce or eliminate impact of electric price increases over 10 – 20 years



Is my Home a Good Candidate for Solar?

Once again, your solar installer is your guide

Orientation of the roof

- Faces south-ish (doesn't have to be due south!)

Obstructions from trees and structures

- As many hours of sun as possible to maximize production

Condition and expected life of your roof

- Solar PV has 20 – 25+ year life – **make sure your roof is in good shape!**
- Rule of thumb: If your roof is less than 10 years old, you should be fine. Older? Maybe.

Your home's electrical system

- “Modern” – 100 Amp or greater; circuit breakers
- Still have fuses or knob & tube wiring? Fix that first!



What Makes a Good Site?

- Minimal Shading from trees, neighbors, chimneys
- South-facing is best, but it doesn't have to be due south
- Anything but north
- Not always on your house!
 - In the yard (ground or canopy mount)
 - On the garage or porch (but only if they're strong enough!)
 - Check with your installer, contractor or engineer

Think Ahead

- Improve energy efficiency before going solar (especially electric)
- Will you be adding electric loads in the future?
 - Electric car
 - Heat pump for heating and cooling?
- Storage is coming

Building Code Considerations

The Installer works with the Building Inspector

Building Permit Required

- Structural report evaluates impact of added snow, wind & other loads on roof

Wiring Inspection Needed

Treated as a Quick Permit – Needham's Building Department is Solar-Friendly!

The installer will pull all permits and coordinate with the Town and Eversource



Things to Look for:

Installer training & certifications

- “Apples to Apples ” bids and quotes
- Warranty Language
- Don't sign anything you don't understand
- Work Schedule/Description of Work
- Price/Payment Schedule

Solar Incentives

- Tax Incentives:
 - Federal (30%)
 - State (up to \$1,000)
- Mass Solar Loan
- Net Metering
- SREC Sales
- Low/No money down options



Two basic financing options:

Purchase and PPA

Purchase

- Buy and own the solar PV system
- Unlike most “purchases”, solar has an investment value.
 - **Evaluate it as an investment** – consider return on investment (ROI), not just payback
- “Own” all the financial benefits

Enter into a Power Purchase Agreement (PPA)

- Pay for the electricity the system generates
- A 3rd party owns & maintains the system on your roof
- Smaller financial benefit

The future price of electricity is key – increases of 2-3% per year are reasonable. - Be wary if a vendor says rates will increase by 4-5% .



Resources

Visit Green Needham's Going Solar page

greenneedham.org/going-solar

- Material from today's session
- Selected Resources from MassCEC and others
- More to come...

Or, from our home page menu:

Our projects → Solar Team → Going Solar



Resources

Going Solar Selected resources include:

- Mass Clean Energy Center:
 - <http://www.masscec.com/solar-electricity>
 - <http://files.masscec.com/solar-loan/SolarElectricityResidentialGuide.pdf>
- MassSolarLoan.com
- EnergySage.com
- PV Watts Calculator <http://pvwatts.nrel.gov/>
 - (use the “Draw your System” option on screen 2)



Questions? Ideas?

The presentation slides and much more
information available at

www.greenneedham.org

Or contact one of us directly:

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Definitions

- SREC: Solar Renewable Energy Credits are certificates earned by producing solar energy. They are sold on a renewable energy market, kind of like the stock market. SREC's are an important part of solar's benefit package.
- Net Metering: If your system produces more than you need during the day, the meter "spins backwards" as it sends that power to the electric grid for others to use. At night, you can use power from the grid and only pay for the "net" energy use.
- Inverter: Solar panels produce DC (direct current) power, while your home runs on AC (alternating current) power. The inverter converts DC to AC, sort of like the power brick on a laptop.
- You can do a quick check of your potential using the US Department of Energy's PV Watts (www.PVWatts.nrel.gov)
- Your installer can do a preliminary investigation of how strong your garage or porch is. They may recommend a contractor or engineer to do a more detailed examination. The Town Building Department is also a resource.



Sample Bid Comparison

	Company A	Company B
Panel Quantity, Make, Model # & Size	12 Brand X #123 Panels @ 220 Watts	24 Brand Y #567 Panels @ 240 Watts
Inverter Quantity, Make, Model & efficiency	1 Acme Inverter XYZ (92% efficiency)	1 Acme Inverter JKF (97% efficiency)
System DC Rating	5280 Watts DC	5760 Watts DC
System AC Rating	4.858 Watts AC	5,587 Watts AC
System Output – kWh/year	5829 kWh/year	6,705 kWh/year
Total Cost	\$20,328	\$23,040
Cost per Watt – DC	\$3.85/Watt (AC)	\$4.00/Watt (AC)
Cost per Watt - AC	\$3.49/Watt (AC)	\$3.44/Watt (AC)



Homeowner's Solar Electricity Checklist

Preliminary Questions

- ☐ Do I know how much electricity I currently consume and how much it costs?
- ☐ Do I have a south, southeast, or southwest-facing roof? If not, do I have property with open space that might accommodate a ground-mounted solar electric system?
- ☐ Do I know where there is shading on my roof (or on my property) during different times of the day and at different times of year?
- ☐ Do I want to purchase and own the solar electric system, or do I want to work with a third-party company and either buy the electricity generated through a power purchase agreement or pay a monthly lease payment?
- ☐ Does the installer have any additional industry certifications, such as OSHA 40 or NABCEP?

Purchasing and Contracting

- ☐ Am I comfortable with the installer's knowledge and experience?
- ☐ Does the installer have credible references?
- ☐ Is the installer adequately insured to protect me, as well as the company's employees and subcontractors?
- ☐ Does the contract include performance specifications for the system being installed, including an estimate of the power that will be produced annually or under different conditions?
- ☐ Does the installation contract clearly lay out what is included and what is not included in the price?
- ☐ Do I want or need a DAS installed to measure, track and record power produced, or do I want to track system production manually?
- ☐ Does the proposed payment schedule protect me by allowing payment to be withheld until the system: 1) passes local code inspections, 2) receives utility interconnection approval and 3) is shown to be operating properly?
- ☐ Are all warranties clearly stated with information on how to exercise them?

- ☐ Has the installer tested and activated the system?
- ☐ Have all necessary inspections occurred?
- ☐ Has the installer left descriptive materials and equipment operating manuals as reference materials?
- ☐ Has the installer offered recommendations on aggregators or brokers who will work with me to participate in the SREC-II program?
- ☐ Has my chosen aggregator registered my system for SRECs?
- ☐ Am I aware of how my production is being reported to generate SRECs?
- ☐ If I plan to take advantage of state and federal tax credits, have I completed this when filing my taxes?

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