SOLAR ENERGY POWERS THE WORLD!

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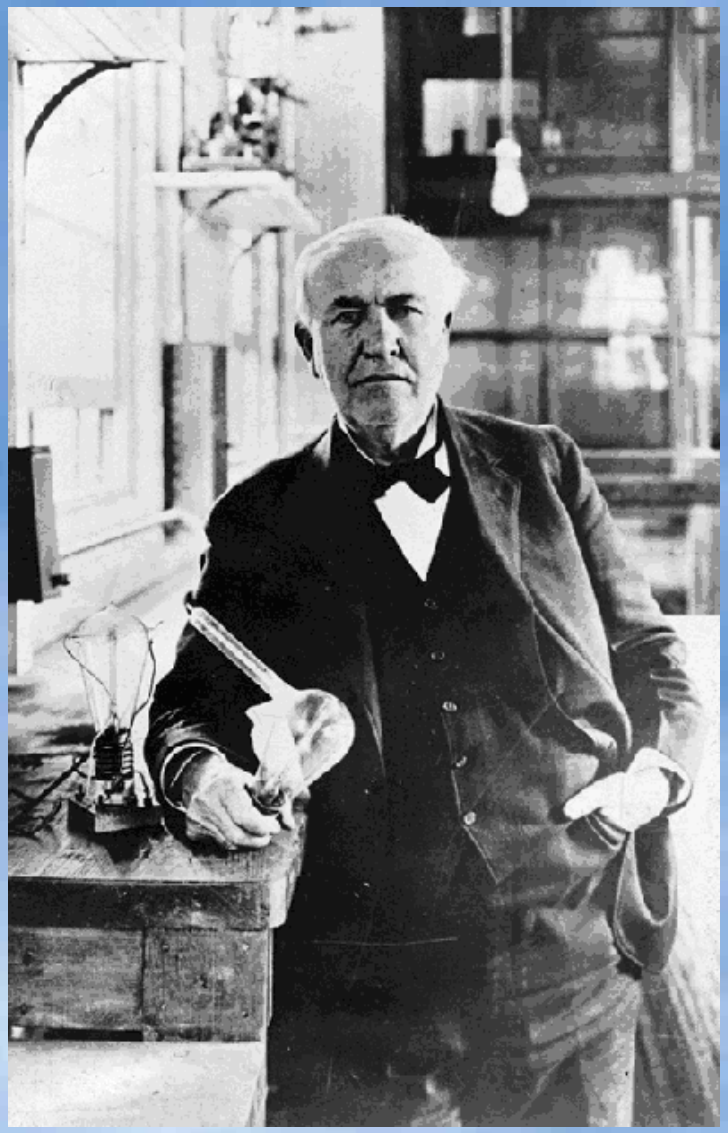
“I'd put my money on the sun and solar energy. What a source of power! I hope we don't have to wait till oil and coal run out before we tackle that.”

Thomas Edison



Types of Solar Energy Systems

- **Solar Electric** – converting the sun's energy into electricity:
  - Photovoltaic or "PV" – typically used for homes or businesses;
  - Concentrating Solar Power – typically used for large "power plant" installations;
- **Solar Thermal** – converting the sun's energy into heat
  - Solar domestic hot water (SDHW);
  - Interior space hearing;
  - Industrial *process heat*;
  - **Special Case– Passive Solar:** no mechanical or electrical systems – typically for interior space heating).

How a PV System Works

Solar modules produce DC power that is inverted into AC power for use in the home.

Residential Grid-Tied Solar Electric System

Net Metering

- During daytime, a PV solar electric system may produce more electricity than is needed in a home or business.
- This surplus electricity travels back out through the electric utility meter and onto the utility grid, helping to power the neighborhood.
- When this happens, the meter will run **BACKWARDS**, and the home or business will be given full credit for the electricity supplied to the grid!

PV and the Optimal Installation

Roof Orientation:

180º True South (also called Solar South or Geographical South) is optimal, but generally anywhere from due East to due West can work.

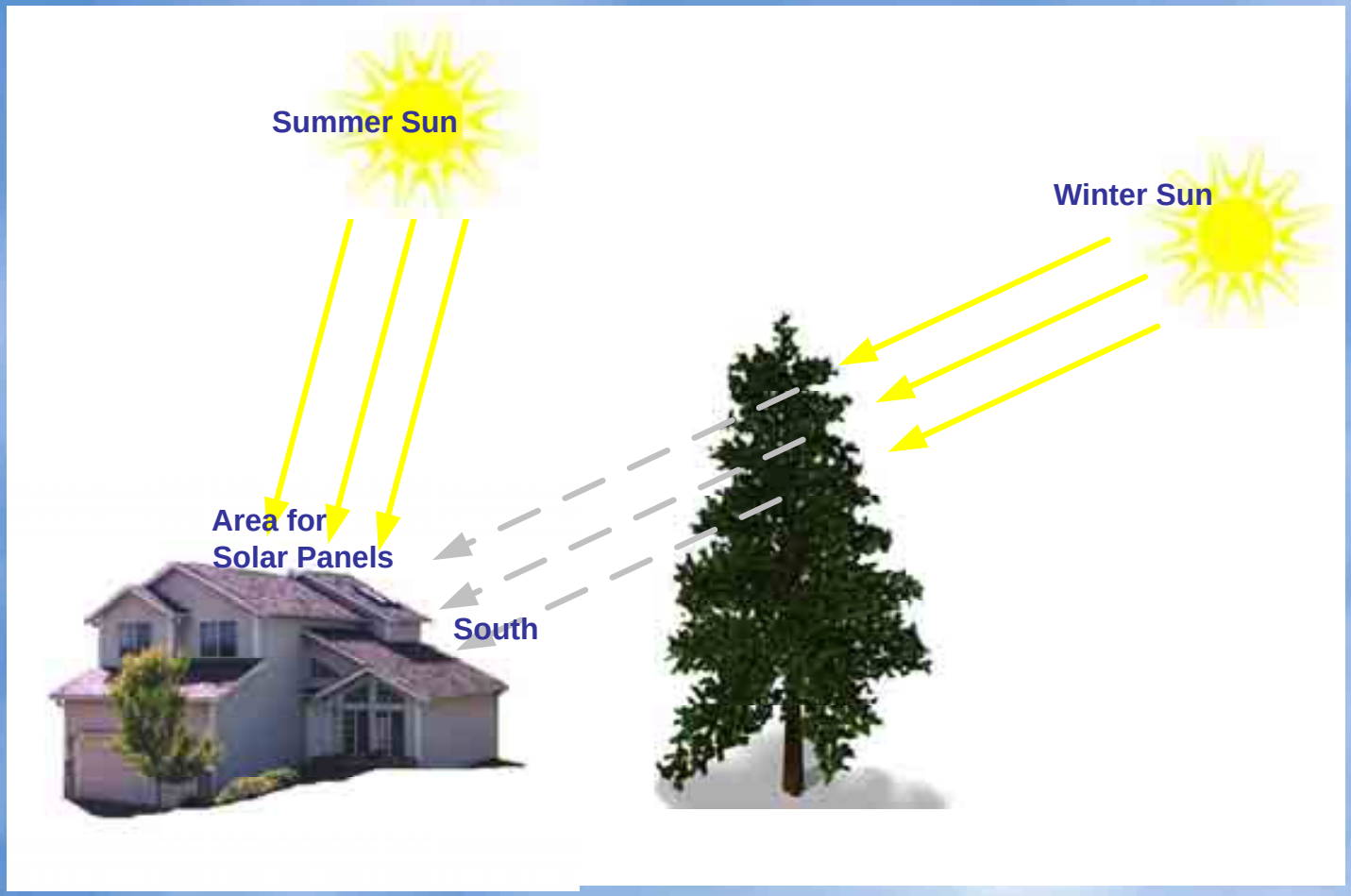
Pitch or Tilt Angle:

A tilt of 30 to 35 degrees is optimum for our latitude, but most roof pitches will do fine. On flat roofs the solar panels are usually tilted up about 10 degrees off of the roof.

Shading:

100% exposure is ideal, but down to about 75-80% shading can be acceptable.

The Sun's Path – Summer vs. Winter



Solar Pathfinder - Used to Analyze Shading

PV Systems – Economics

Example of a typical (5kW) Solar Electric System

Annual electrical production	~ 5,500 kWh
Total installed cost	$35,000
NYSERDA rebate	- $8,750
NY State Tax Credit	-$ 5,000
Federal Tax Credit	- $ 7,875
Net Cost to Homeowner	**= $13,375**

PV Systems – Economics

Example of a typical (5kW) Solar Electric System

Net Cost to Homeowner	**$13,375**
Electricity cost savings ($0.22/kWh)	**$ 1,210**
System will pay for itself in	**~ 10 Years**
10 year annual rate of return (*tax-free*)	**~ 10%**
Increased home value	**~ $25,000**

Thirty-Year Environmental Benefits

CO_2 avoided =	70 Tons
NO_x avoided =	262 lbs
SO_2 avoided =	410 lbs

It would take over *two acres* of trees
to absorb the CO_2 avoided by
a typical (5kW) solar electric system

4.725 kW in CT

6.3 kW in Upper Nyack

2.6 kW in Ardsley

9.35 kW ground mount

For more information on solar in New York, go to:
http://www.getenergysmart.org/AdvancedTech/Solar.aspx