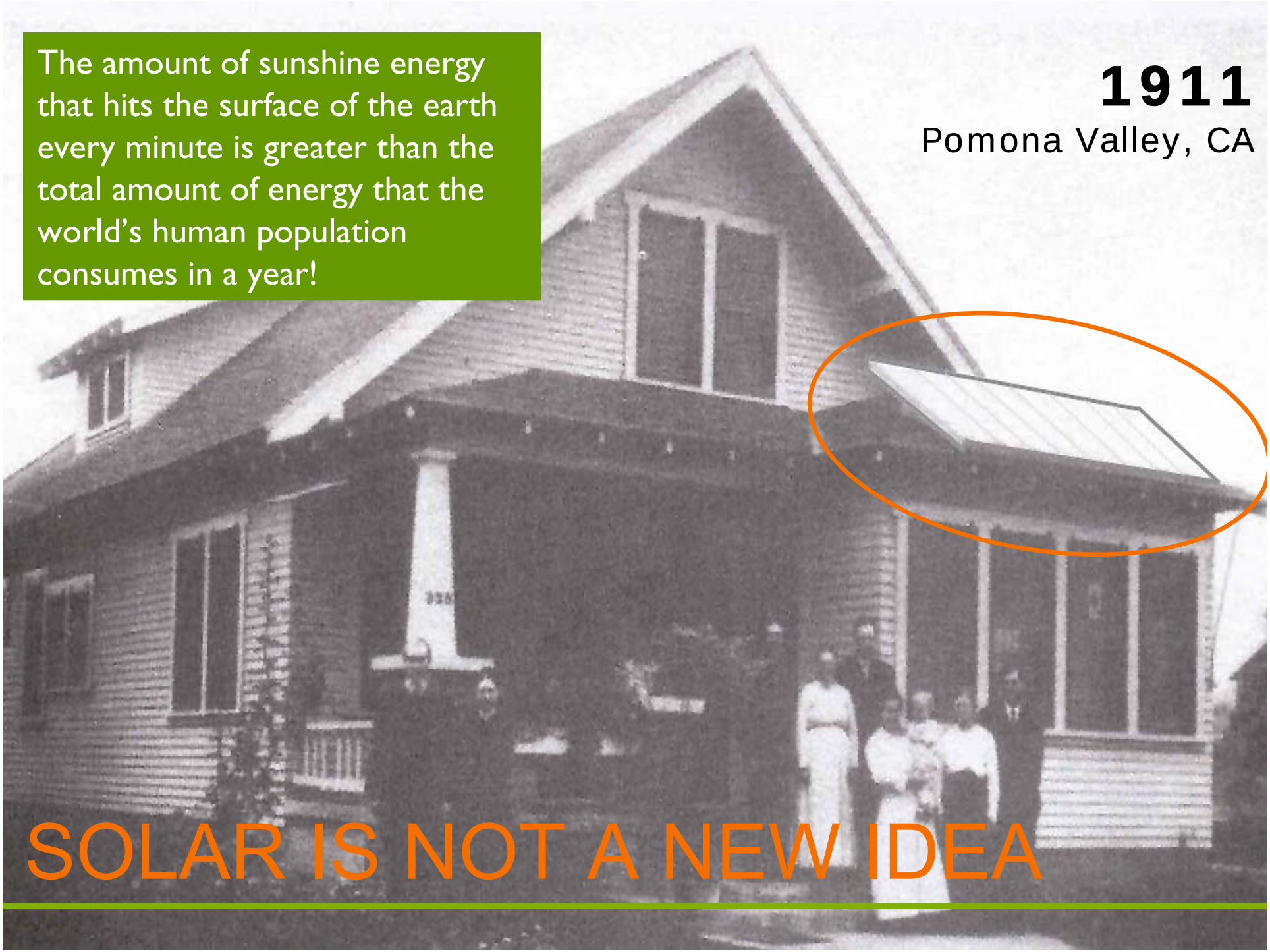
The amount of sunshine energy that hits the surface of the earth every minute is greater than the total amount of energy that the world's human population consumes in a year!

1911

Pomona Valley, CA



SOLAR IS NOT A NEW IDEA

WE MAKE SOLAR EASY

Founded in 2001, with offices in Raleigh and Charlotte and is rapidly expanding throughout the state.

Tri-state regional sales coverage (NC, SC, and VA)

Provider of 50 high-quality green collar jobs, including engineers, building scientists, and solar technicians.

To have a real, long term impact, we are moving sustainable energy into the mainstream by:

- Reducing greenhouse gases in our communities, state and country

- Creating a sustainable company that takes care of people, planet and profit

It’s not just what we do, but how we do it.

- Employee ownership for ALL team members.
- Balance of home and work life.
- Create an environment of cooperation.
- Major focus throughout organization on lean processes and efficiency to reduce time and cost, which saves our clients money.

We love what we do, and it shows.

ENERGY STAR AWARD 2009
PARTNER OF THE YEAR

ENERGY STAR AWARD 2008
PARTNER OF THE YEAR

ENERGY STAR AWARD 2007
PARTNER OF THE YEAR

2008 Sustainable North Carolina Awards
"Triple Bottom Line" Finalist

State Energy Office
ENERGY

2007 NC Energy Efficiency Leadership Award

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SEM RESIDENTIAL & COMMERCIAL SERVICES

Energy Efficiency Services	Solar Thermal	Solar Photovoltaic
• ENERGY STAR • Green Programs • Design Review • Moisture Mgt • Diagnostics • Commercial High-Performance Bldg Services	• Residential Hot Water • Pool Heating • Process Heat	• PV Engineering • PV Installation • Battery Back-up

SOUTHERN ENERGY MANAGEMENT

We partner with more than 275 residential and commercial builders and developers across NC, helping them build energy efficient and green buildings that save money and resources.

In the past year, SEM engineered and installed over 10,000 ea solar panels for NC homeowners, builders and businesses.

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What's the Demand for Solar?

- 78% of consumers agreed that, if their builders had recommended solar water heating for their new homes, they would have seriously considered it…

(NAHBRC 2007 National Consumer study)

Why Homebuyers Buy Solar?

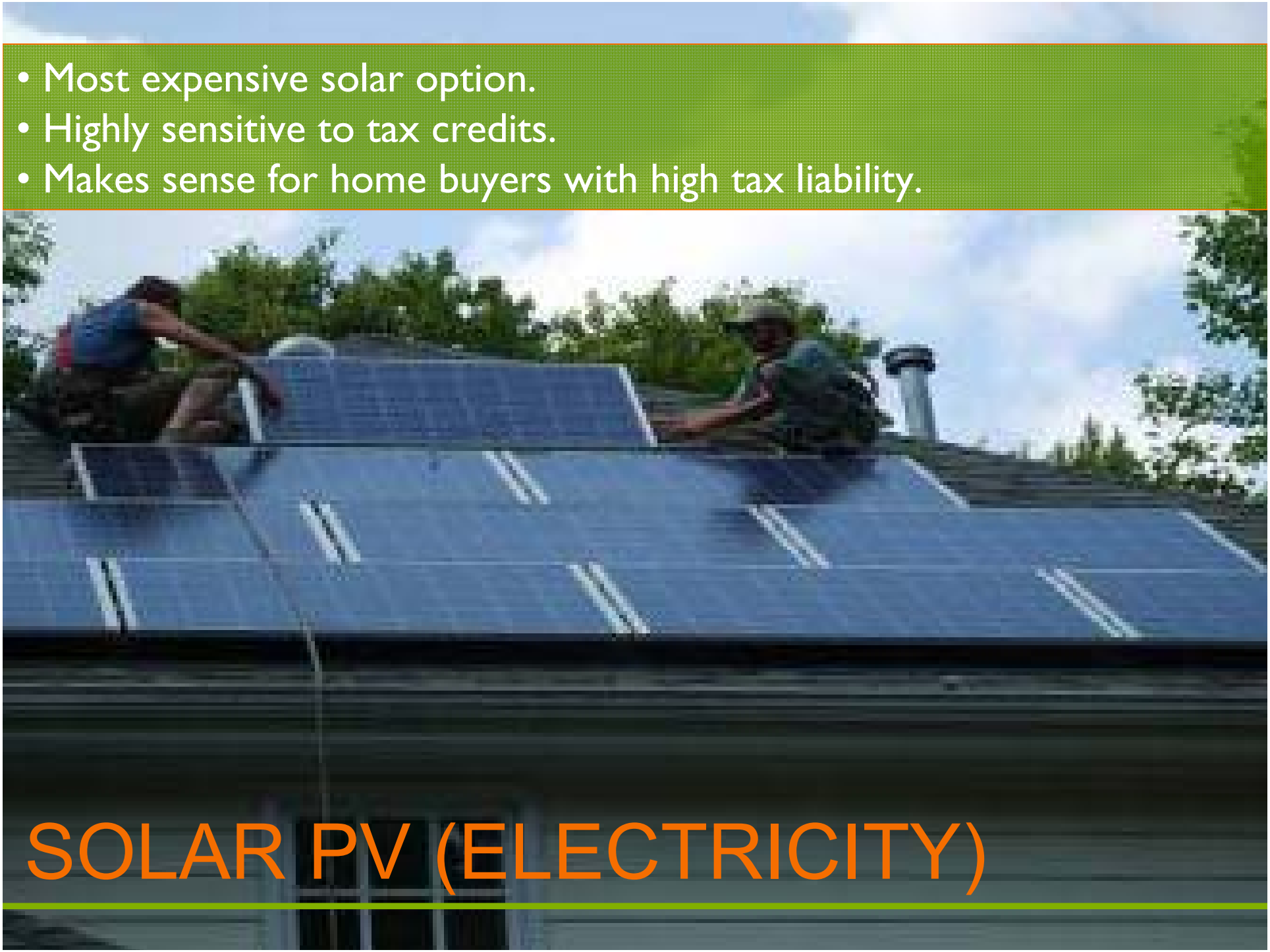
- Save money now and over the long-term
- Save energy
- Smart investment
- Great tax credits
- Adds resale value
- Reduce carbon footprint

- Best value for home buyer.
- Easy to integrate into building.
- Makes builder $.

SOLAR WATER HEATING

- Great value if home owner is going to heat pool.

SOLAR POOL HEATING



- Most expensive solar option.
- Highly sensitive to tax credits.
- Makes sense for home buyers with high tax liability.

SOLAR PV (ELECTRICITY)

SEM Sales Process

- FREE Email with basic economics. FREE Phone consulting for customer specific goals.
- $85 -$125 Site Survey – 2 hours of both of our time
  - Educate on technical, financial and site specific requirements
  - Firm proposal to meet your needs.
  - Follow up consulting with next questions.
- Signed proposal and timeline to install.
- NC gets another Happy Renewable Energy Power generator

Solar Water Heating Often Best Choice

- Lower up-front cost
- Smart investment
- Easy integration into construction process
- Environmental benefits

Solar Water Heating – The Payback Question

– What is the payback on a granite countertop?

Solar Water Heating – The Payback Question

– Why do we look at solar differently?

Solar Water Heating Tax Incentives Cover a Big Chunk of Upfront Cost

Installed Cost	**($6,650)**
Federal Solar Tax Credit	**$1,995**
NC Solar Tax Credit	**$1,400**
Impact of NC Credit on Federal Taxes	**($392)**
Total Tax Credit $	**$3,008**
Net Cost (after taxes)	**($3,647)**

** Assumes 28% personal tax rate*

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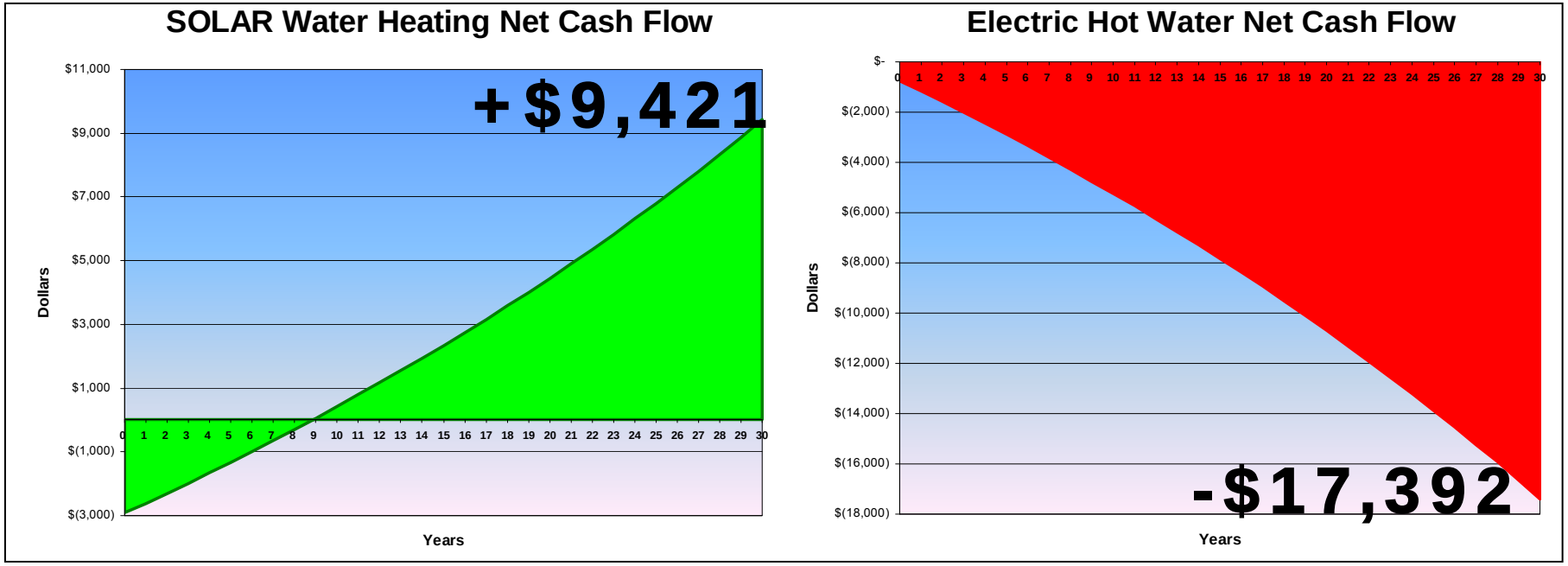
Compared to the Alternatives, a Solar Water Heater is SMART



SOLAR WATER HEATER **ELECTRIC WATER HEATER**

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The Payback Question

Payback = System Cost/Solar Savings

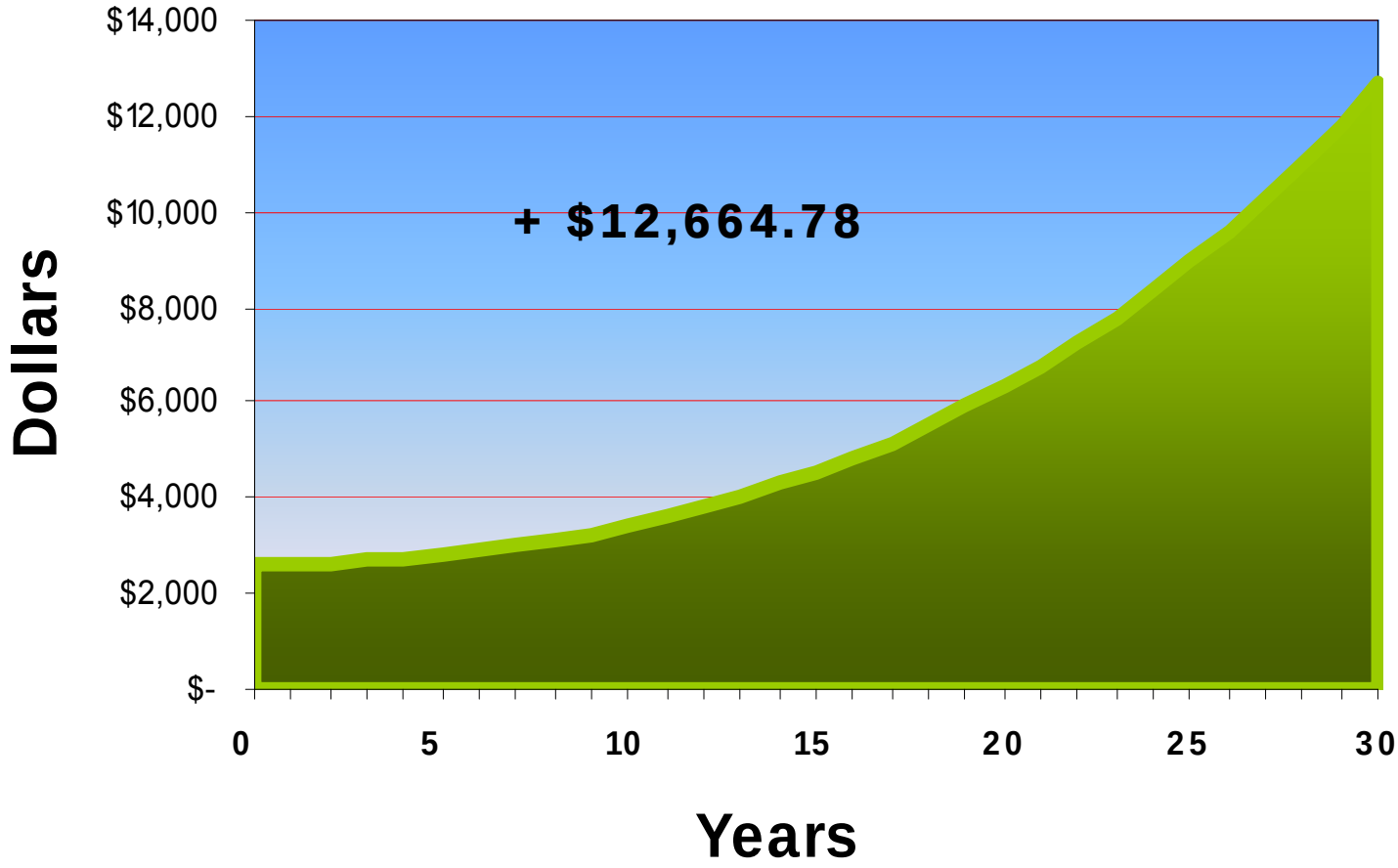
$$\frac{\text{System Cost}}{\text{Solar Savings}} = \frac{\$3{,}667}{\$425 \times 75\%}$$

Payback ≅ 9 Years

ASSUMPTIONS:

- $3,087 = estimated net cost of Solar Water Heating System
- $425 = estimated annual hot water bill
  - Based upon a family of four using 80 gallons of hot water each day.
  - Electric rates $.10/kWh of
- 75% = solar will provide 75% of your home's hot water needs
  - Assumes that electricity will be used 25% of the time to heat water.
- System designed for 20-30 years usage.

Financing a Solar Water Heater in a Mortgage Creates Positive Cash Flow from Day One



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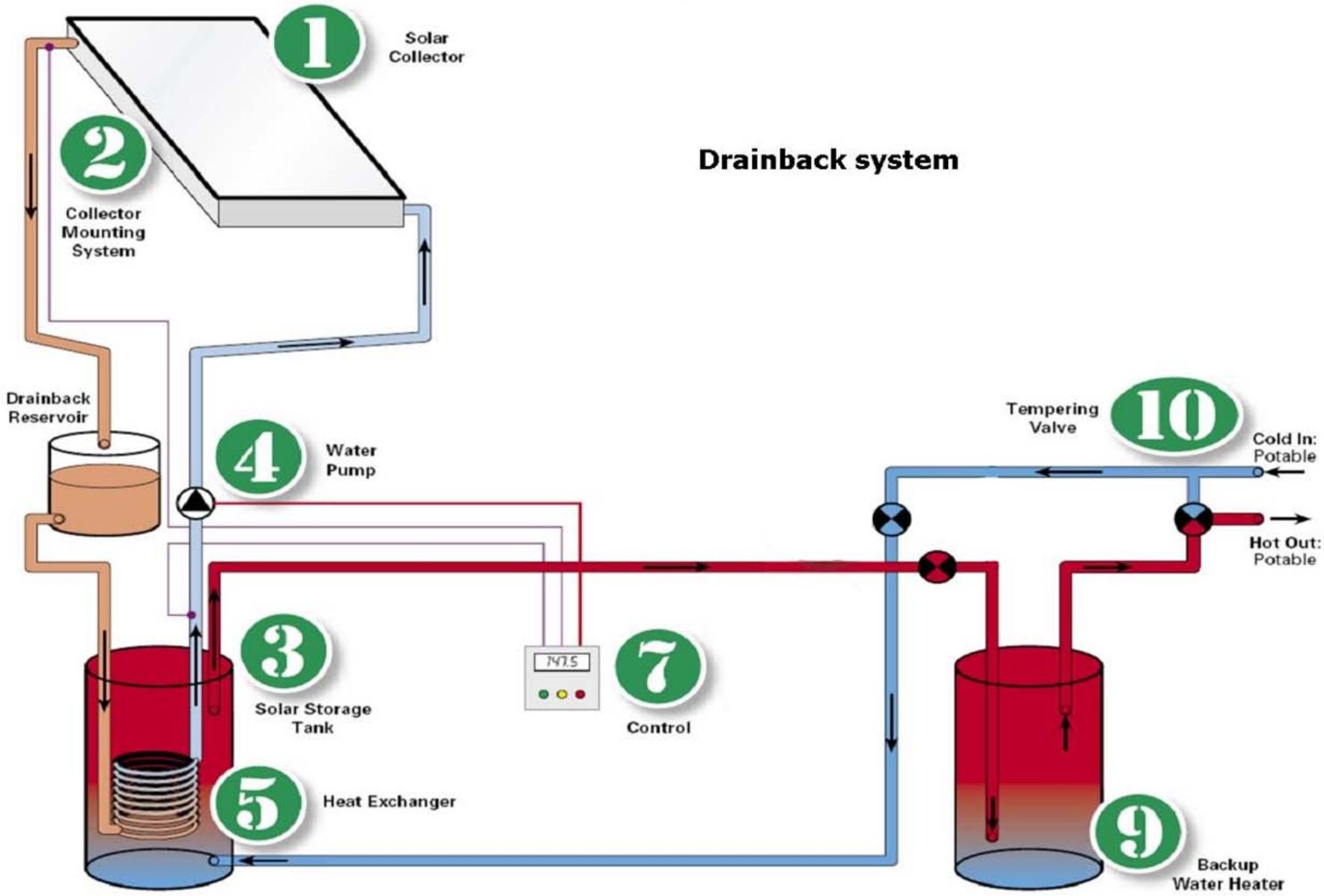
Solar Adds to Home Value

- Installing a solar water heater will increase a home's value by **$6,606** according to *The Appraisal Journal (*October 1998).
- With today's rising energy prices and desire for green home features, this number is likely much higher, though current research has not been released.
- Even with older $ value figures, this turns 9 yr payback to ~3 years.

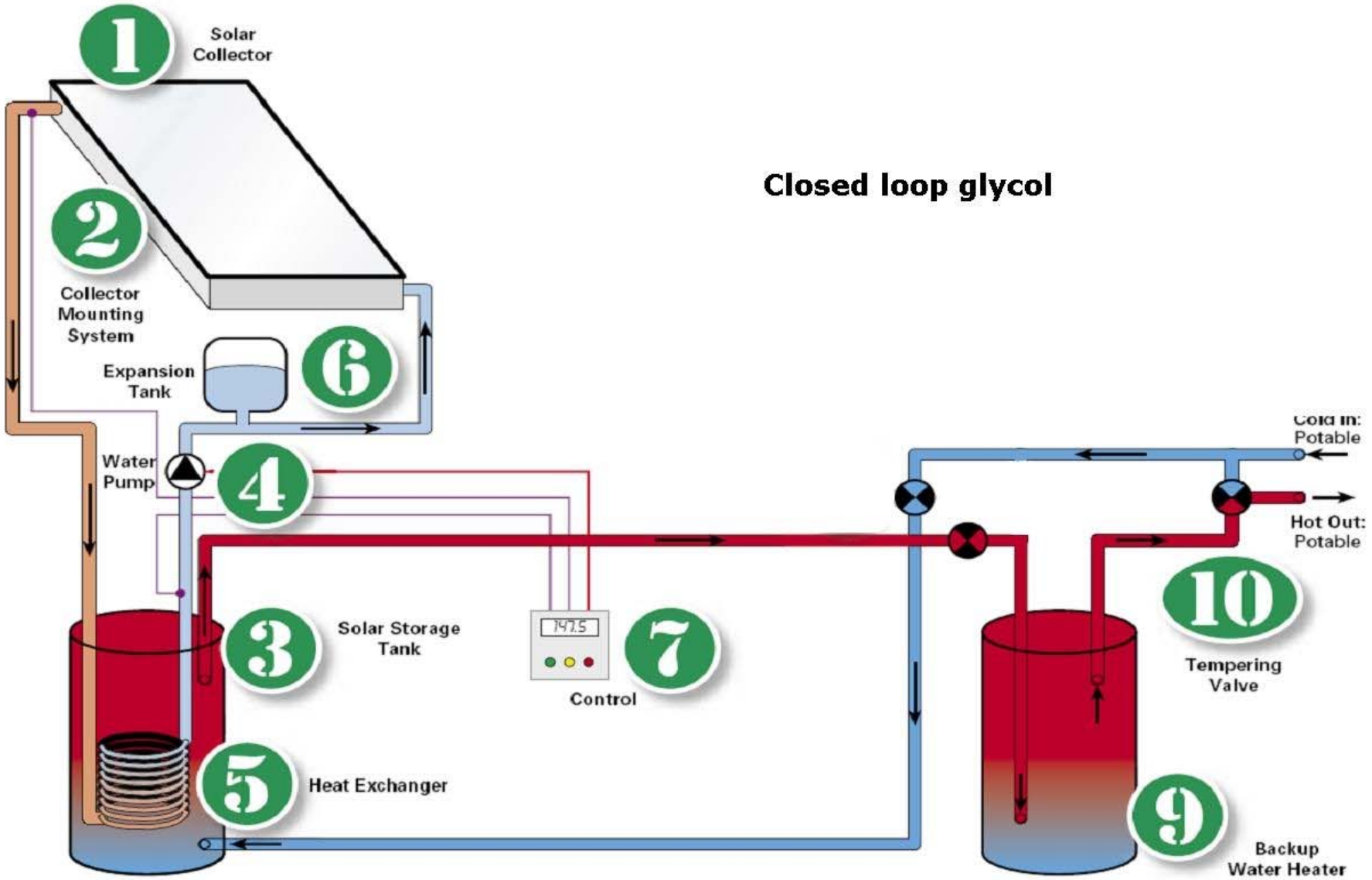
Design Options for Solar Water Heating

- Usually solar pre-heats into a back-up tank to provide maximum hot water at all times
- With this set up, solar will usually be designed to generate 60-75% of the home's total hot water load
- Several quality products on the market with time-tested technology, and improved efficiency & aesthetics

DRAINBACK SYSTEM OVERVIEW



PRESSURIZED SYSTEM OVERVIEW



An Installer Should Perform a Site Analysis to Determine Best System Design, Orientation, & Output

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Why We Do a Solar Siting?

- Solar collectors are engine of the system
- Ideally ~4 hours of sun on collectors
- Due South orientation with no shading best
- Facing collector 30-45 decrees West or East may be acceptable
- Best to mount collector flat for resale value

Sun Shines Bright for Solar in NC

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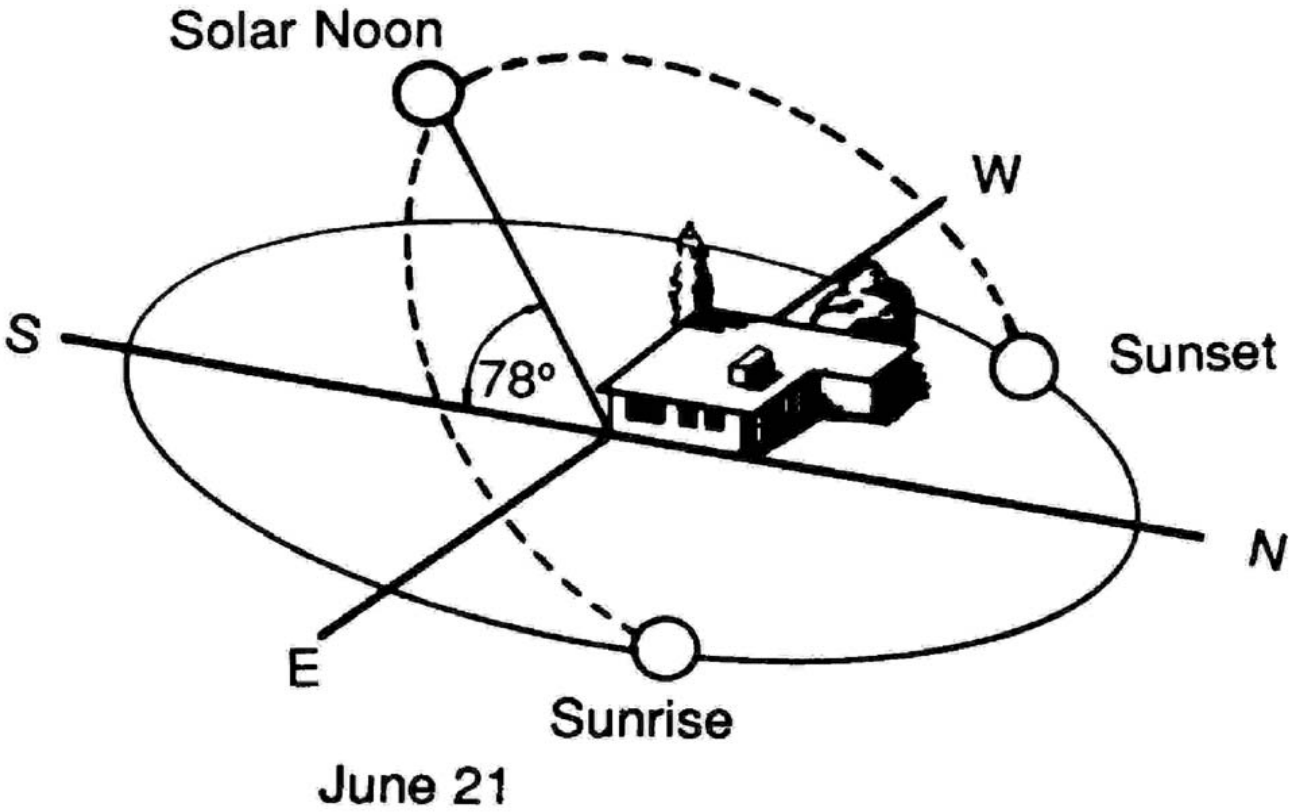
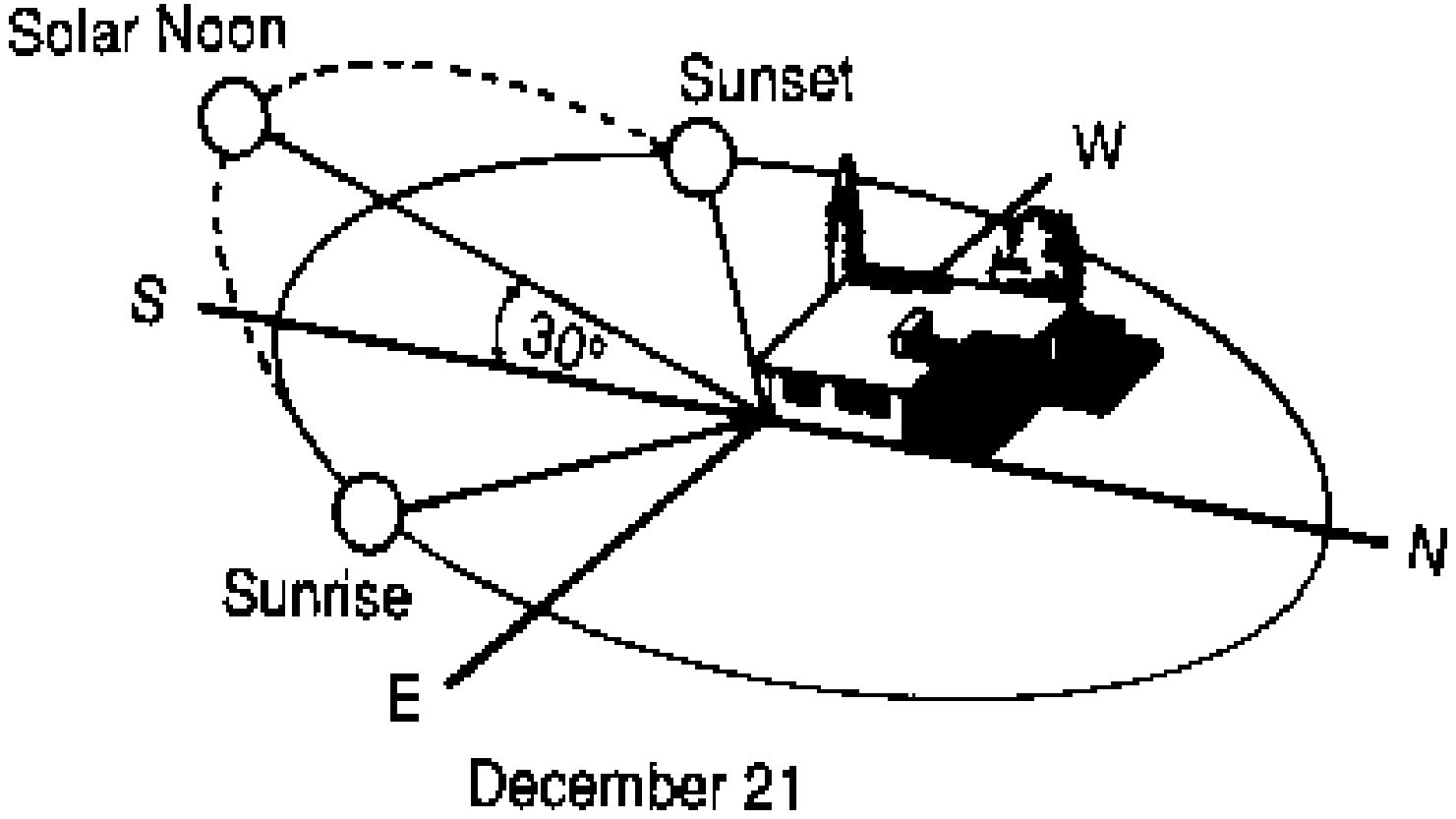
North Carolina Summer Sun Path



This high summer sun path usually has few obstructions (shading) that will reduce our total solar energy gain.

North Carolina Winter Sun Path



This low winter sun path is the one we look for obstructions (shading) that will reduce our total solar energy gain.

VELUX

- $7,850 installed
- Flashed exactly like VELUX skylights
- Great warranty
- Best looking = better resale value

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SYSTEM PARTS

VELUX INSTALLED

AET SYSTEM

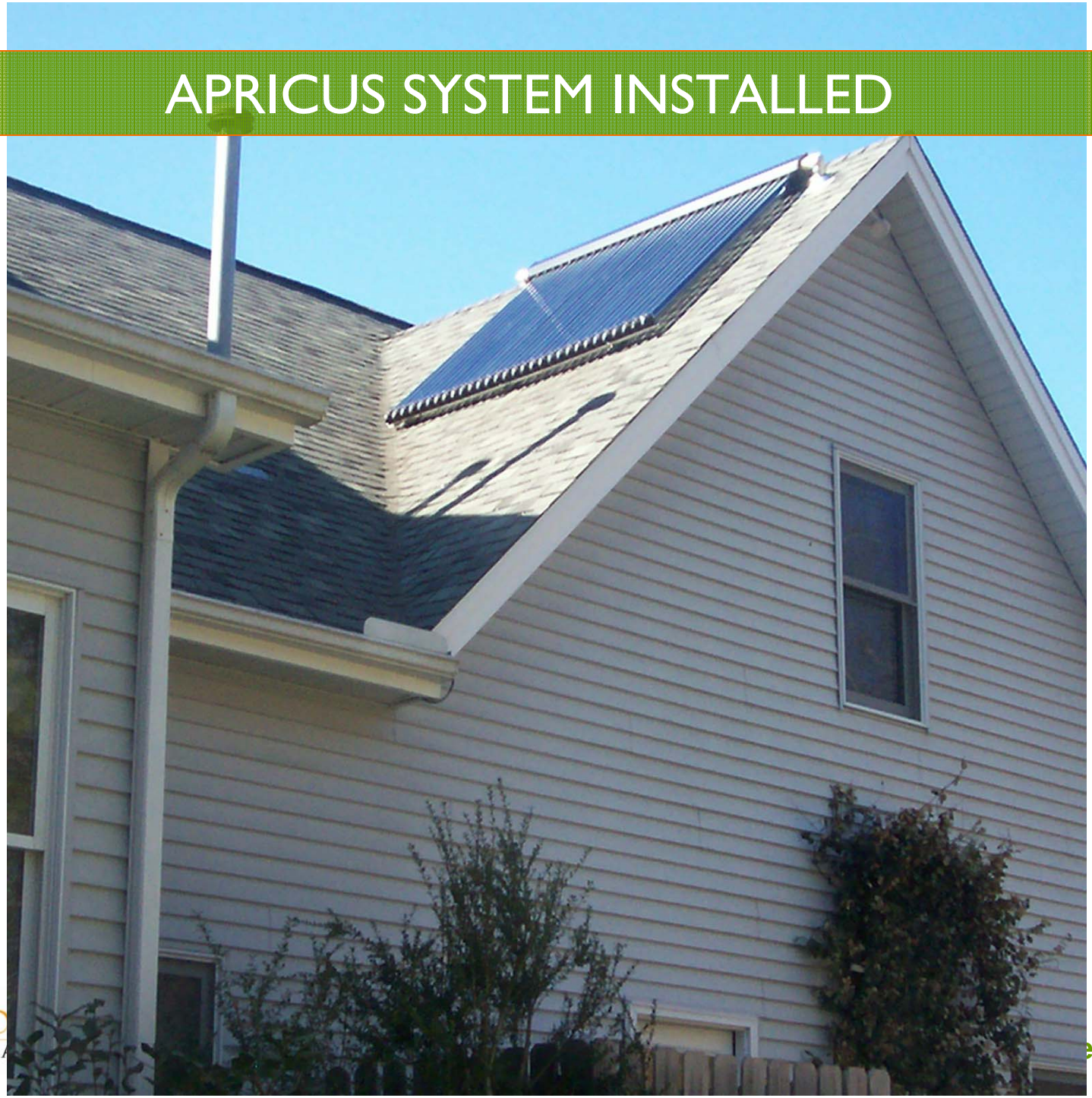
- $6,650 installed
- Time tested and proven technology
- Most common installed type

AET SYSTEM INSTALLED

APRICUS SYSTEM

- $7,050 installed
- Ideal for East and West-facing or partially shaded roofs
- Shorter solar gain window needed – highly efficient

APRICUS SYSTEM INSTALLED



No Matter Which Design You Choose – Installing a Solar Water heater Has a Big Impact on Your Carbon Footprint

– Installing ONE solar water heating system prevents 160,000 pounds of carbon dioxide from entering our atmosphere (this is roughly equal to the weight of 30 Ford Explorers)

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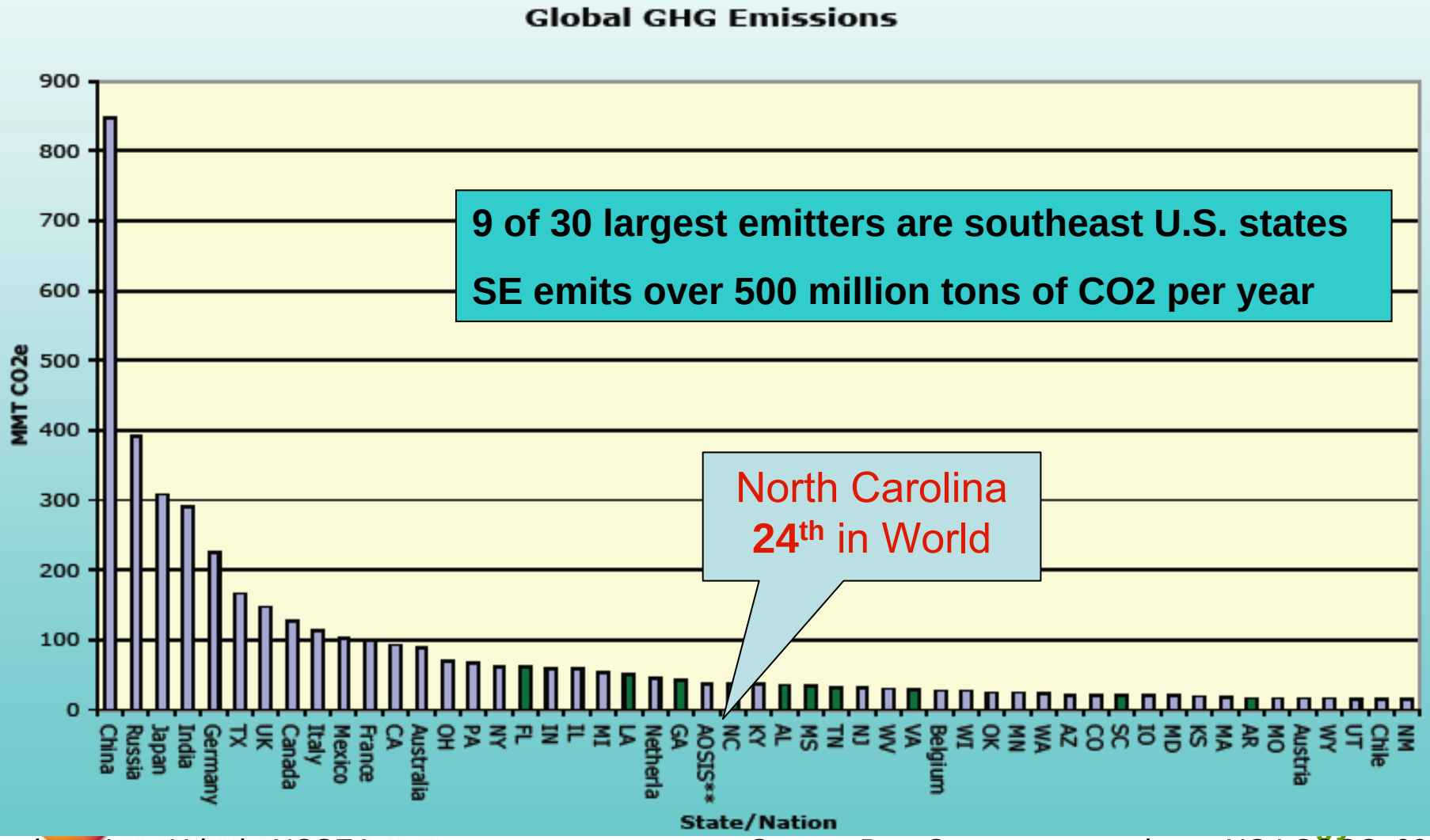
WORLD'S 50 TOP GHG PRODUCERS

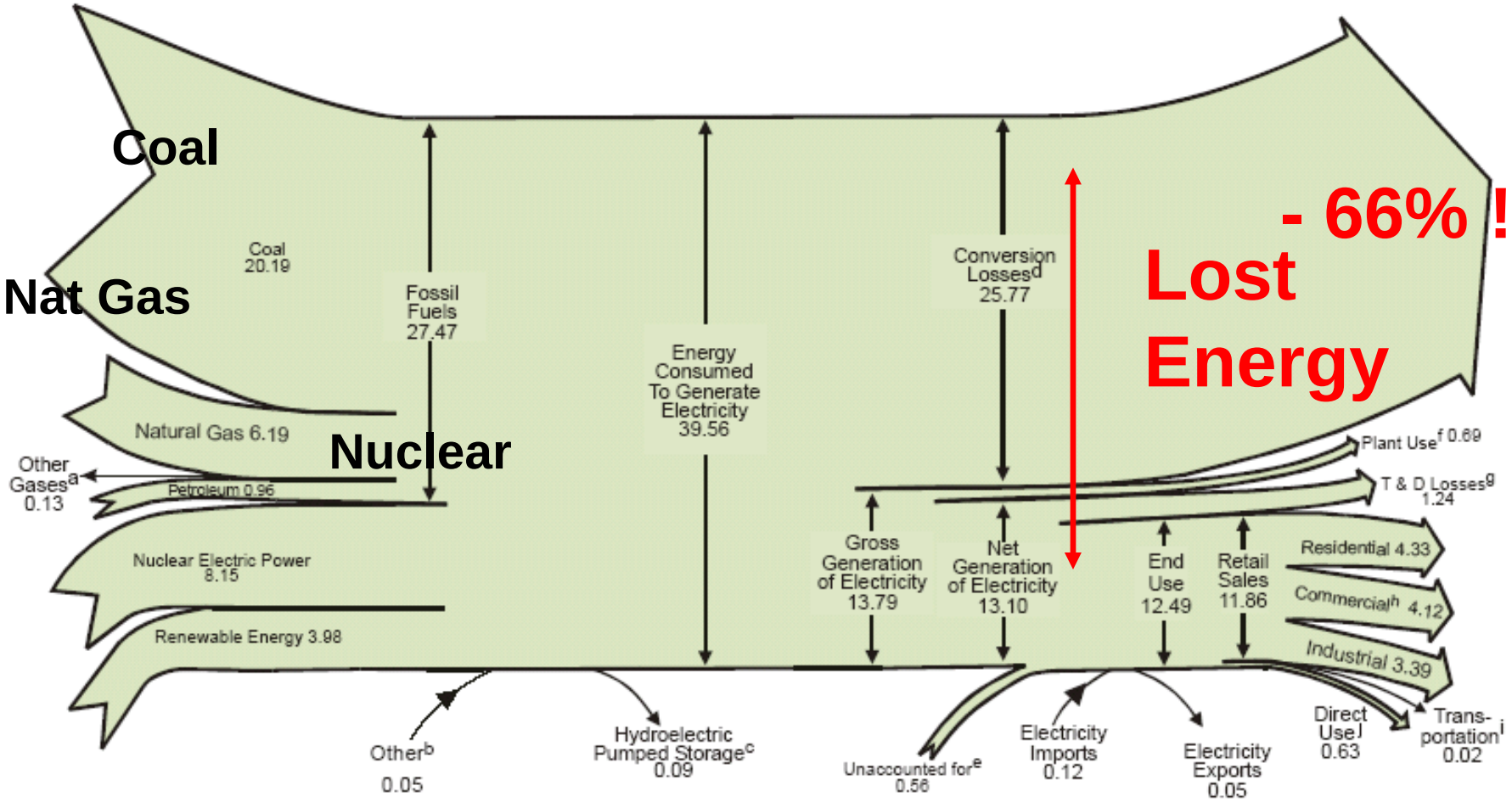
States = 34 of top 50 Global Emitters



Thanks to Ivan Urlaub, NCSEA

Source: Pew Center presentation to NC LCGCC, 2006.

INEFFIENCY of U.S. ELECTRIC GENERATION, 2002 (in quadrillion BTUs)



Source: U.S. Department of Energy, Energy Information Administration. *AEO 2004.*

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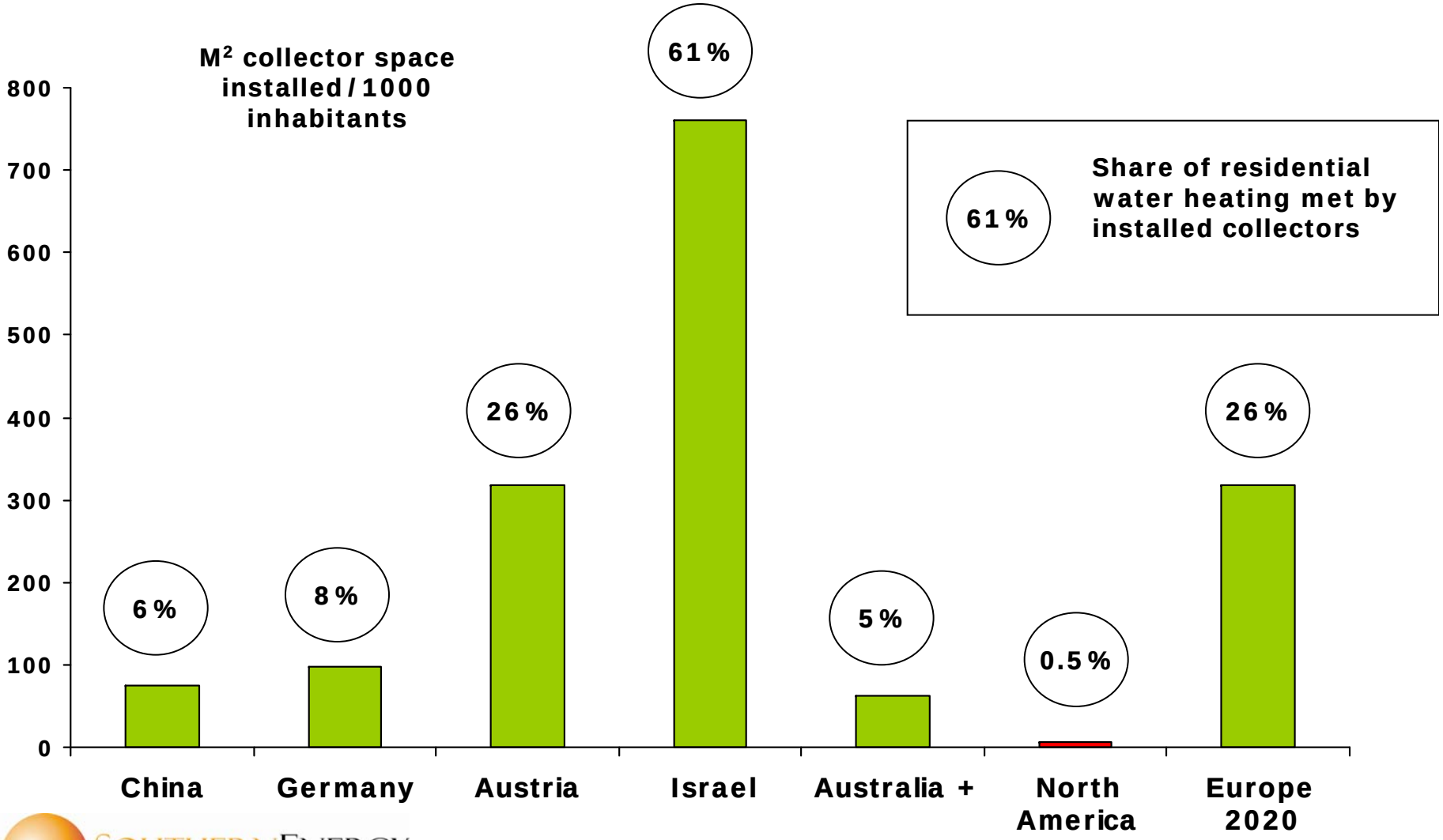
…BUT NORTH AMERICA TRAILS OTHER COUNTRIES IN THE USE OF SOLAR WATER HEATING



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…OTHER QUESTIONS about SWH?

- Parts and labor warranty?
- Is system maintenance needed?
- Can I offer space heating with solar?

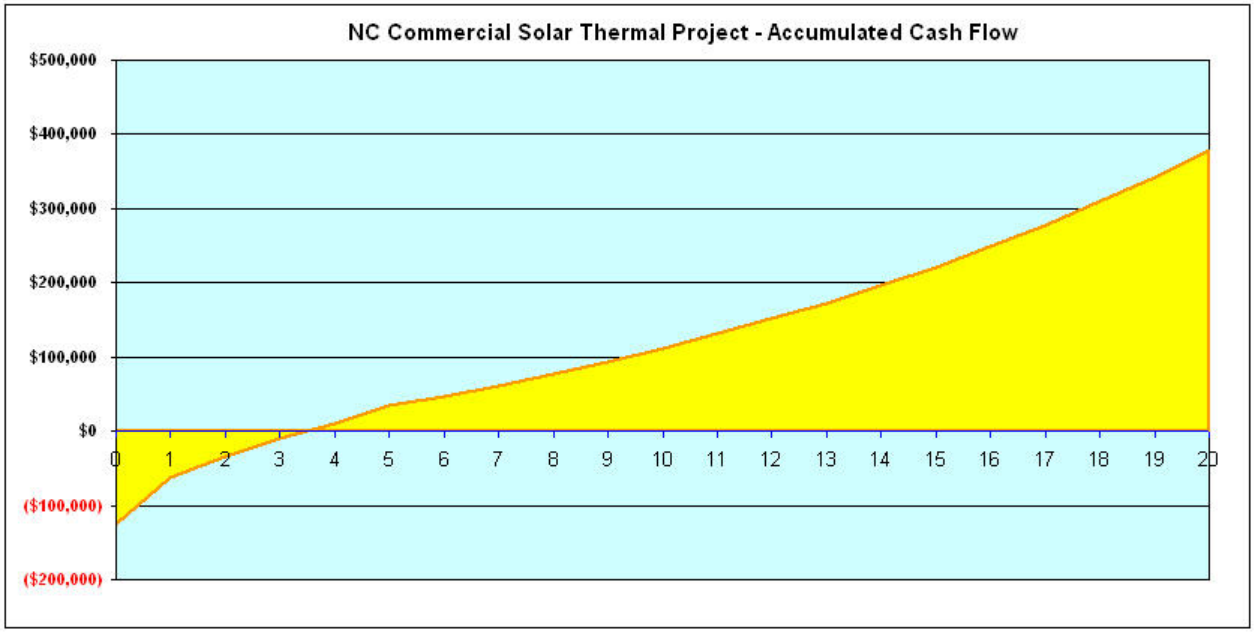
SEM Parts & Labor Warranty

- Solar collectors: 10 years
- Hot water storage tanks: 6 years with optional lifetime warranty available for some models
- Pumps and controls: 1 to 3 years

Commercial Solar Hot Water Example

Cash Flow/Financial Metrics:

Payback Period (yrs) < or =	4	Years
IRR % =	23%	
Return on Invest =	420%	
Carbon Displaced/Yr =	15.3	TCO2/Yr



Solar Water Heater Maintenance

- A 2-minute visual check of system's fluid level every two years. No cost, usually homeowner performs.

- Check of system fluid pH with litmus paper every 4 years. Usually solar technician performs and costs about $100.

- Yes, you can space heat with solar, but you'll need quite a few more panels.

Experience, Quality, Safety, OSHA Certified

Other Questions We Hear from Homeowners

How much can I save?
A lot. Homeowners typically see 50 to 80 percent savings on their water heating bills, depending on the size of their system and amount of hot water needed on a daily basis.

How do I finance a solar water heating system?
The best way to finance a solar energy system is to include it as part of your home investment. Working through your builder, you have the option to pay 10 percent down, while rolling the rest into your mortgage. Your monthly solar savings will in most cases be greater than the monthly mortgage payments for the solar system.

How long does it take to pay for itself?
Unlike most other home upgrades, in five to ten years your solar water heating system will have paid for itself through the savings it generates! By taking advantage of federal and state tax incentives, you can cut the payback period down to three to six years.

What steps are involved to take advantage of the tax credits?
Taking advantage of the state and federal tax credits for your new solar system should be done at your next tax filing. Forms and instructions are conveniently available on the NC Solar Center website: www.ncsc.ncsu.edu.

Do I have to change my habits to use a solar water heater?
No. Solar water heaters are always installed with a backup heating system in the storage tank to ensure hot water is available at all times.

Now Let's Talk PV…

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- **North Carolina**
  - Costs $8 -$10/watt
  - More than 70% of value in tax incentives
  - Under 10 KW buy all sell all is most common setup

Solar Photovoltaics (PV)

OVERVIEW
– Grid-tied solar power generation
– Off-grid

TYPES OF INSTALLATION
– Roof Mount, Ground Mount, Structure Mount

INTERCONNECTION & INVESTMENT OPTIONS
– Buy-All, Sell-All
– Net Metering
– Common Investment Model

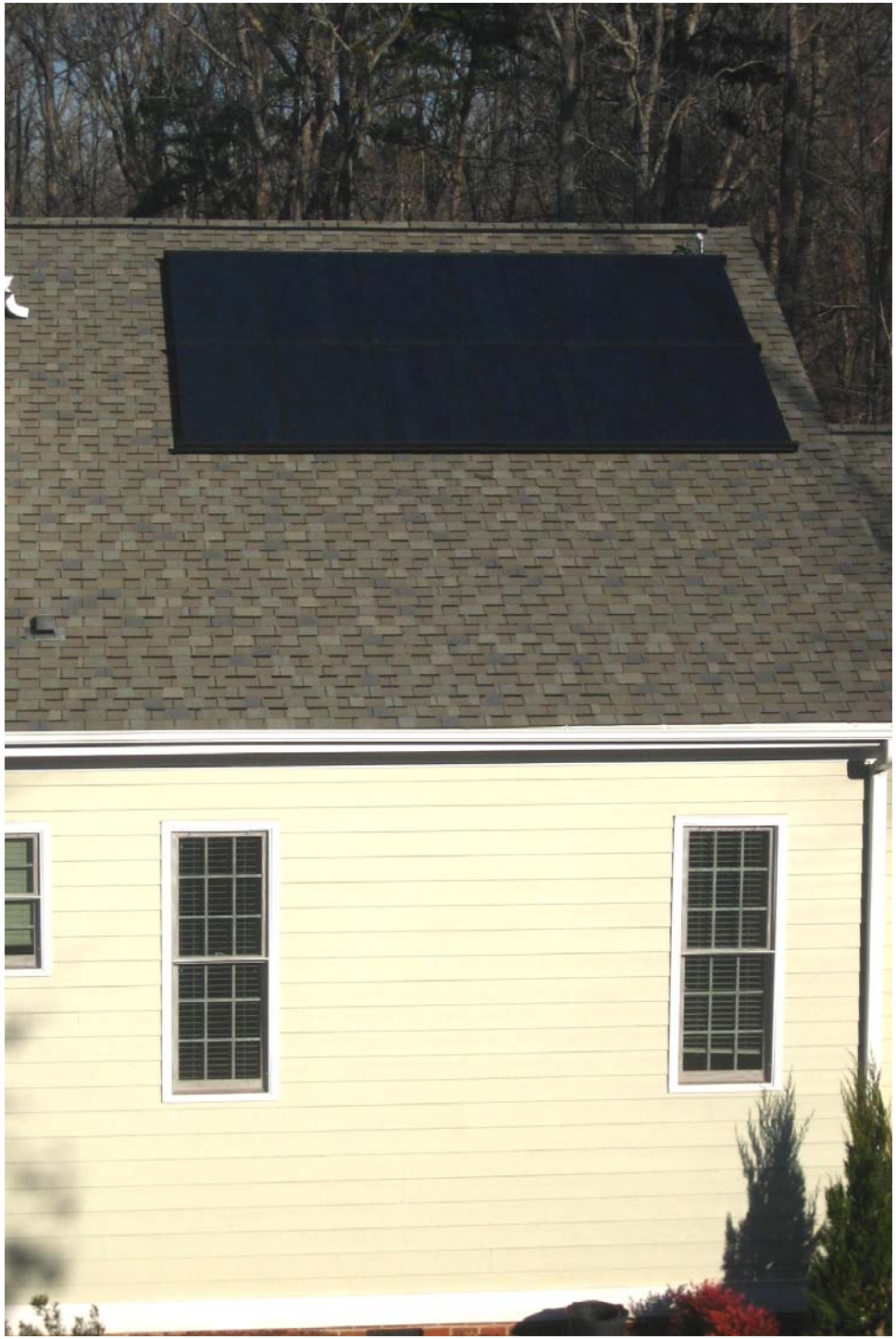
2 Basic PV System Types

– Grid-tied without batteries

– Grid-tied with battery back-up

GRID-TIED, NO BATTERIES

- Most common system type
- PV shuts down when utility grid goes down
- No backup power ability



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GRID-TIED WITHOUT BATTERIES
SYSTEM = PANELS + INVERTER

GRID-TIED, WITH BATTERIES

- Not as common
- Supplies power to grid during normal operation
- When utility power goes down, batteries power critical circuits
- Same PV panels on roof
- Commonly ~ 20 kWh total battery capacity
- Solar recharges batteries both when utility is operating and when utility grid is down

GRID-TIED WITH BATTERIES
SYSTEM = PANELS + INVERTER + BATTERIES

Panels on roof

Inverter and batteries in garage

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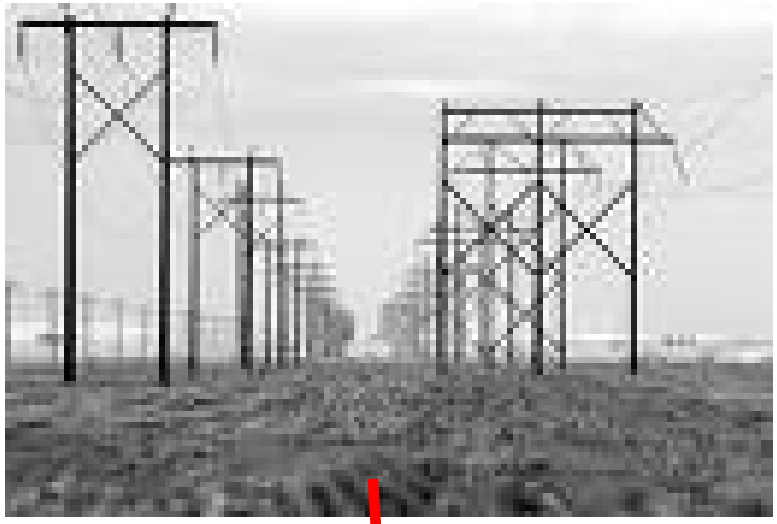
OFF-GRID
EXAMPLE: Solar Powered Well Pump

"BUY ALL"
CURRENT SET UP FOR ALL OF US

Homeowner buys power from utility.



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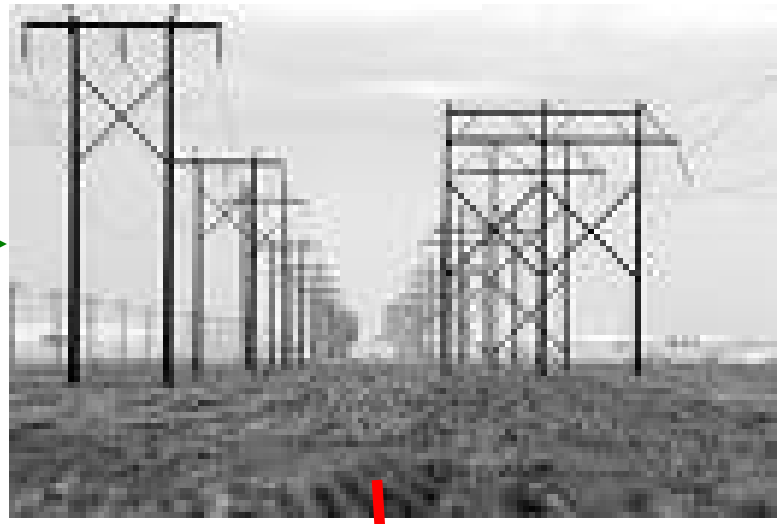
"BUY ALL, SELL ALL" SET UP FOR SOLAR



One meter sells for a profit

Second meter buys exactly as if the solar was not there.

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WAYS TO INSTALL "ROOF MOUNT"

WAYS TO INSTALL "GROUND MOUNT"

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OTHER WAYS TO INSTALL "STRUCTURE MOUNT"

PV System Components

- PV modules
- Mounting systems
- Inverter
- Balance of system = wiring, disconnects, meters, etc
- Batteries (if a battery back-up system)

What Percentage of Home's Electricity will be Provided by a 2-kilowatt PV system?

System produces ~ 250 kWh per month

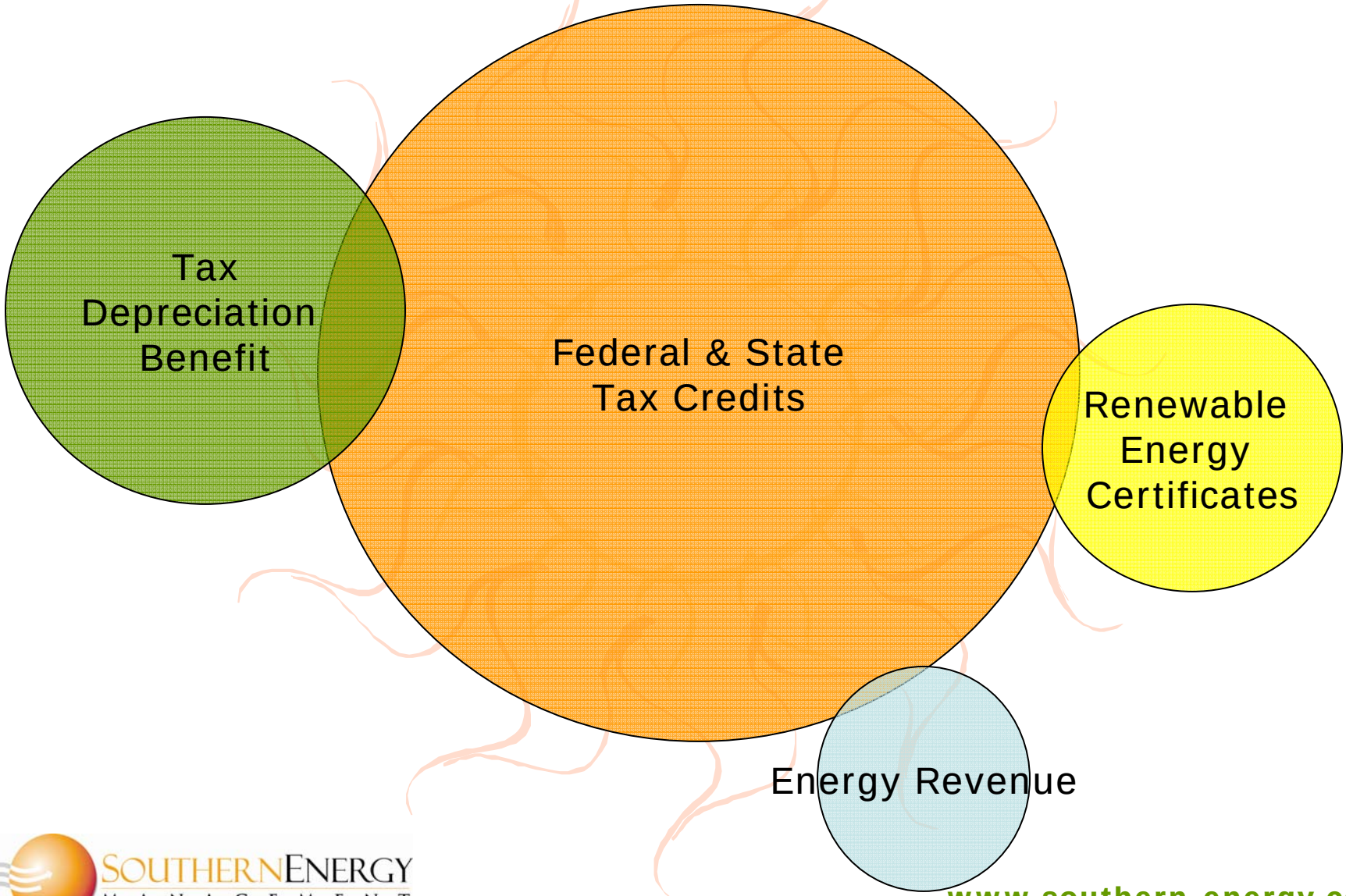
HOME USAGE & PERCENTAGE FROM SOLAR

500 kilowatt hours/month → 50%
1,000 kilowatt hours/month → 25%

PV Investment

- More than 70% of value is in the tax incentives
- Just like solar water heating, builder cannot take credit but gives homeowner great way to pay Uncle Sam less
- Costs $8-$10 per watt

SOLAR PV FINANCIAL FACTORS



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SOLAR PV TAX INCENTIVES

	Federal	NC State
Credit	*30%*	*35%*
Cap	*None*	*$10,500*
Timing	*Year 1*	*Year 1*
Carry Forward	*20 yrs forward*	*5 yrs forward*
Notes		*Max of 50% of tax liability every year*

SAMPLE CASH FLOW FOR 3-kW SYSTEM

Investment/Tax Incentive Component:

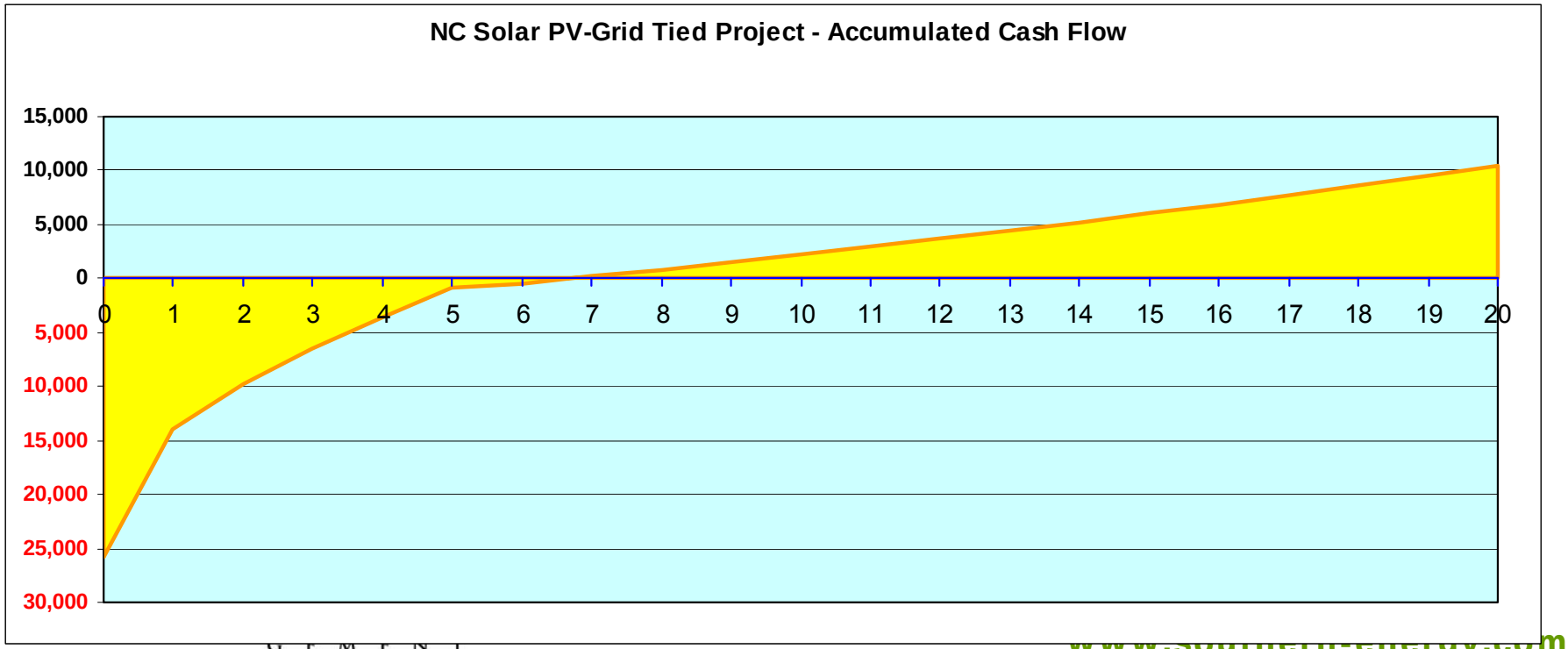
	0	1	2	3	4	5	6	7
Initial Cash Investment	25,800							
Federal Tax Credit		7,740						
State Tax Credit		1,806	1,806	1,806	1,806	1,806		
Fed. Tax Depreciation Tax Benefit		1,491	2,386	1,432	859	859	429	
State Tax Depreciation Tax Benefit		52	52	52	52	52	52	52
State Benefit Impact on Fed. Tax Liability			632	632	632	632	632	18
Insurance and Maintenance Expenses		39	40	40	40	40	40	40
Revenue from NCGP		638	638	638	638	638	0	0
Net Revenue from Utility		70	72	75	77	80	630	650
Total Cash Flow	**25,800**	**11,758**	**4,282**	**3,330**	**2,760**	**2,763**	**439**	**644**
Accumulated Cash Flow	**25,800**	**14,042**	**9,759**	**6,429**	**3,668**	**906**	**466**	**178**

Investment/Tax Incentive Notes:

- Must be able to take tax credits/depreciation benefits
- Most of tax benefits accrue in Year 1-6
- Must adjust for impact of NC solar credit on Federal taxes

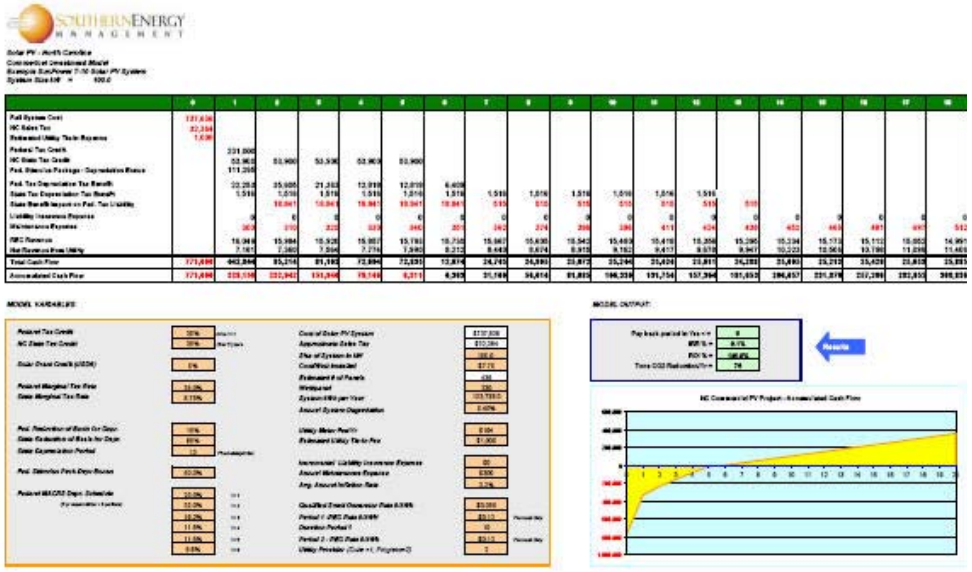
SAMPLE CASH FLOW FOR 3-kW SYSTEM

Pay back period in Yrs <	7
Return on Investment % =	140%
Internal Rate of Return % =	7.4%
Tons of CO2 Offset/Yr =	2.8



WANT MORE DETAILS ON SOLAR PV TAX INCENTIVES?

- We will generate custom models and help walk you through it
- We always recommend consulting with a tax accountant to maximize personal tax benefits of investing in solar



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Utility Scale Solar

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Installer Requirements

Company quoting you MUST

be a Licensed GC, plumber or electrician.

Their quote will have their plumbing/electrical license number.

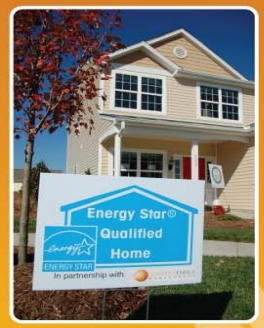
NABCEP certified preferred – national standard

Difficult to achieve.

The amount of sunshine energy that hits the surface of the earth every minute is greater than the total amount of energy that the world's human population consumes in a year!

WALK.

Partner with
Southern Energy Management
to get started on your personalized
path toward energy efficient design
and construction.



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JOG.

Increase the value and health of your
property, the community, and the
environment with our attractive and
efficient solar water heating systems
and custom green building solutions.

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RUN.

Move toward energy independence
and enhanced security with back-up
power, radiant floor heating, and
our state-of-the-art solar
photovoltaic systems.

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