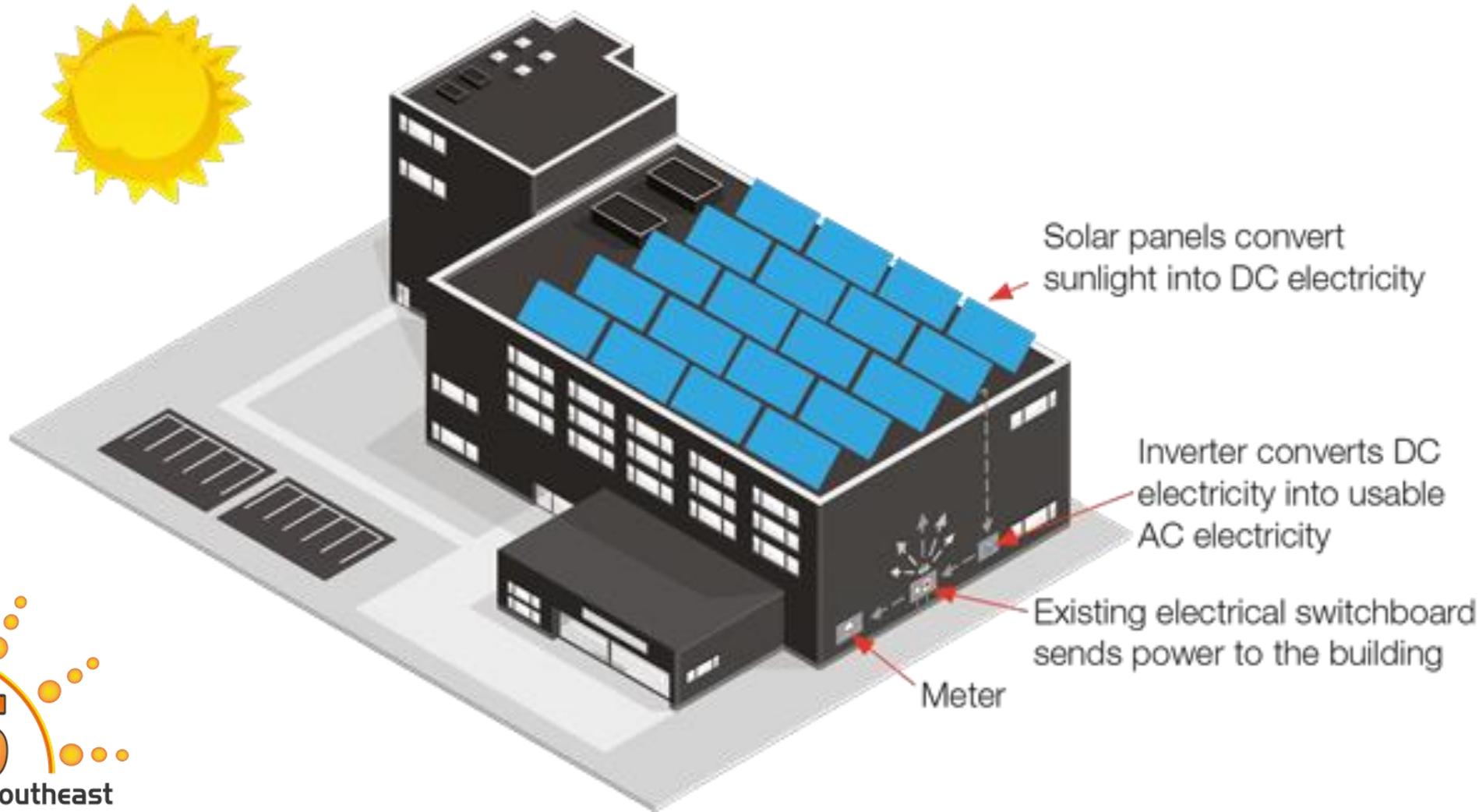


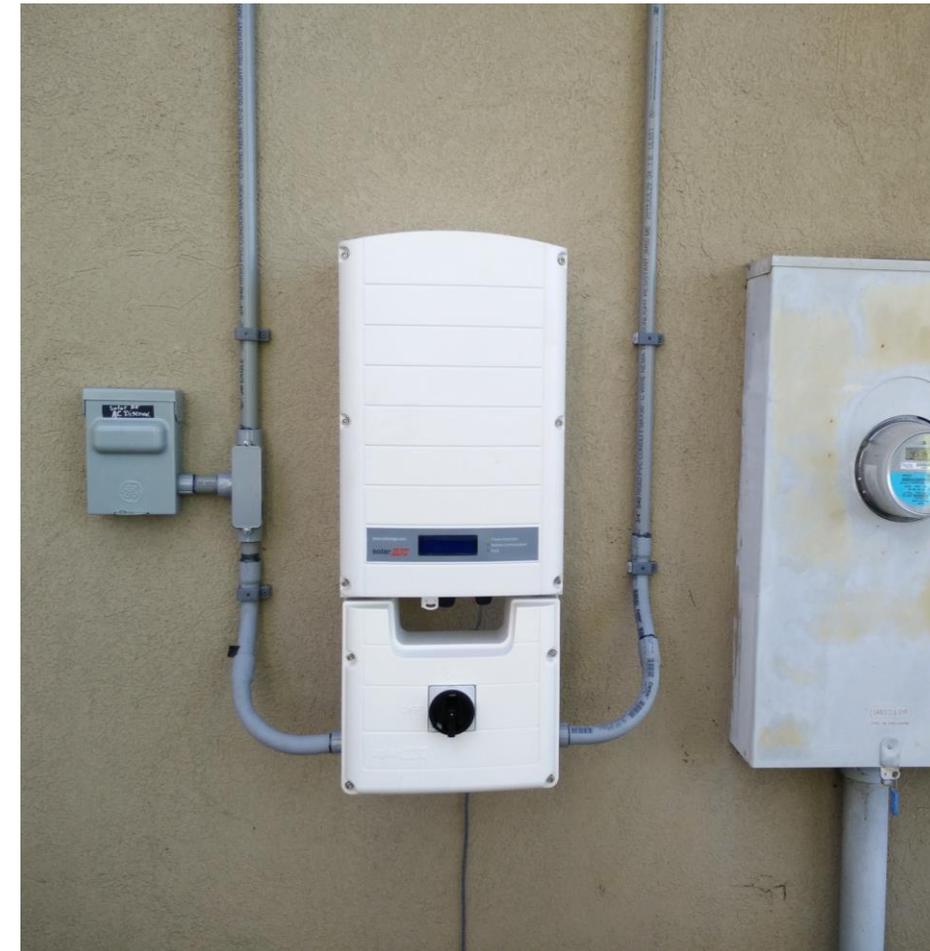
# IMPLEMENTING RENEWABLE TECHNOLOGIES: GEORGIA FOCUS

By: Montana Busch, Master Electrician, Certified Solar Expert, &  
President of Alternative Energy Southeast

# TECHNICAL OVERVIEW



# MAJOR COMPONENTS OF SOLAR PV SYSTEMS - INVERTERS



# MAJOR COMPONENTS OF SOLAR PV SYSTEMS – SOLAR PANELS

- Poly-Crystalline (blue)
- Mono-Crystalline (black)
- White/black/clear backsheet
- Laminate



# MAJOR COMPONENTS OF SOLAR PV SYSTEMS – RACKING

- Ground mount
- Roof mount
- Pole mount
- Sun Tracking
- Parking Canopy
- Float-o-voltaics
- Pergola
- Breezeway
- Awning
- BIPV (Building integrated)



# DESIGNING A COMMERCIAL SCALE SYSTEM

- Power bills
- Annual cycle of building occupancy
  - Roof orientation & pitch
  - Potential shade issues
- Which mounting method would be best?
- Power company's net-metering policy
  - Structural Integrity of the building
- Alternative rate plans to increase savings



# THE INSTALLATION PROCESS

- Planning, engineering & permitting
- File Agreement w/ Power Co.
- Order materials
- Work begins
- Inspections
- Train customer on monitoring



# MAKING A BUILDING SOLAR READY

- Pre-install proper raceway from solar location to electrical room
- Optimal orientation for max benefit
- Long lasting roofing material
- No plumbing stacks, satellites, skylights etc... where the solar needs to be
- Building Efficiency



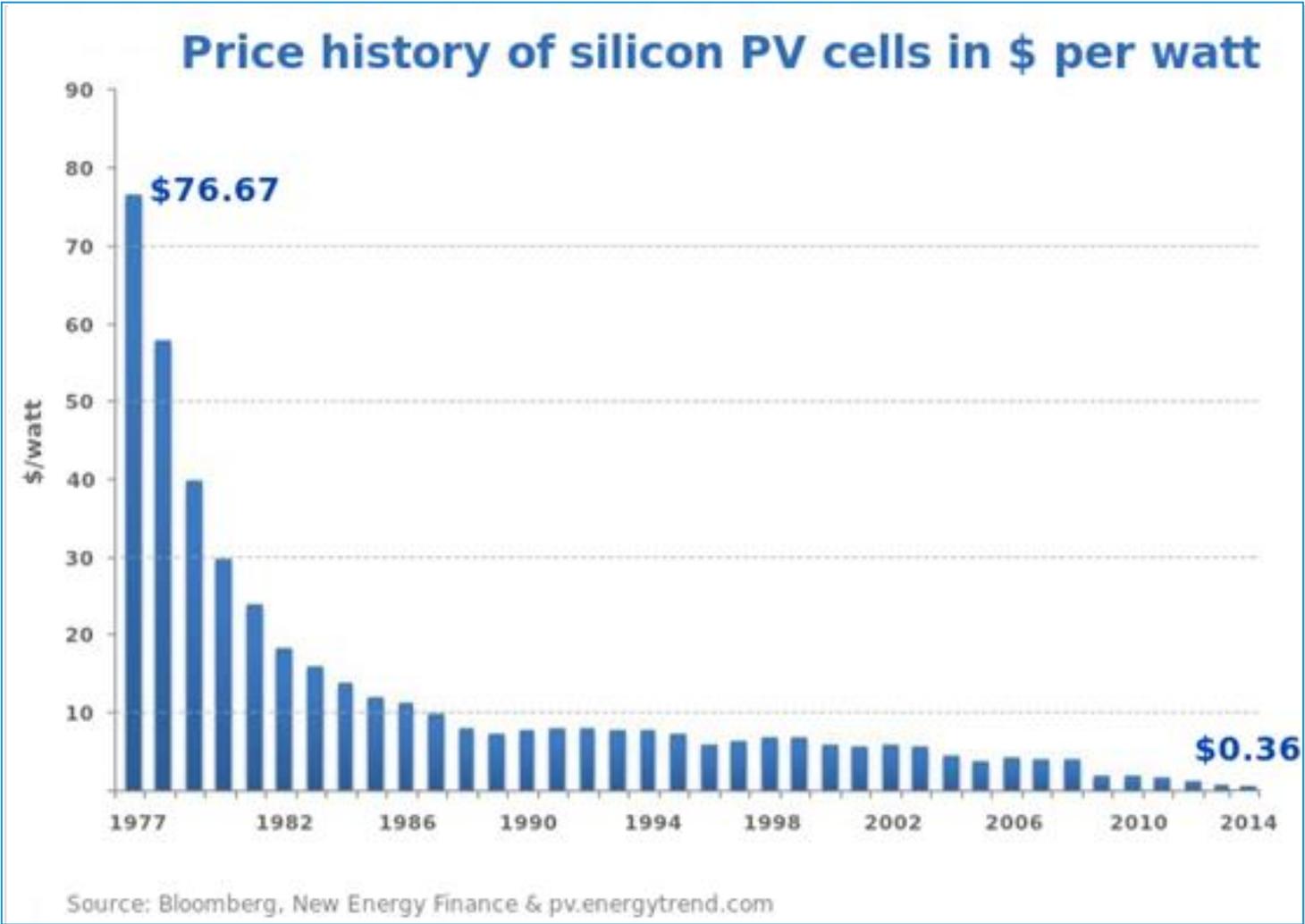
# COMMON CONCERNS

- Lightning
- Hail
- Endangering utility workers
- Longevity
- Obsolescence
- And of course... “Does it really work?”
- Affordability



# MAKING THE ECONOMIC CASE

The price of solar components has dropped *dramatically*.

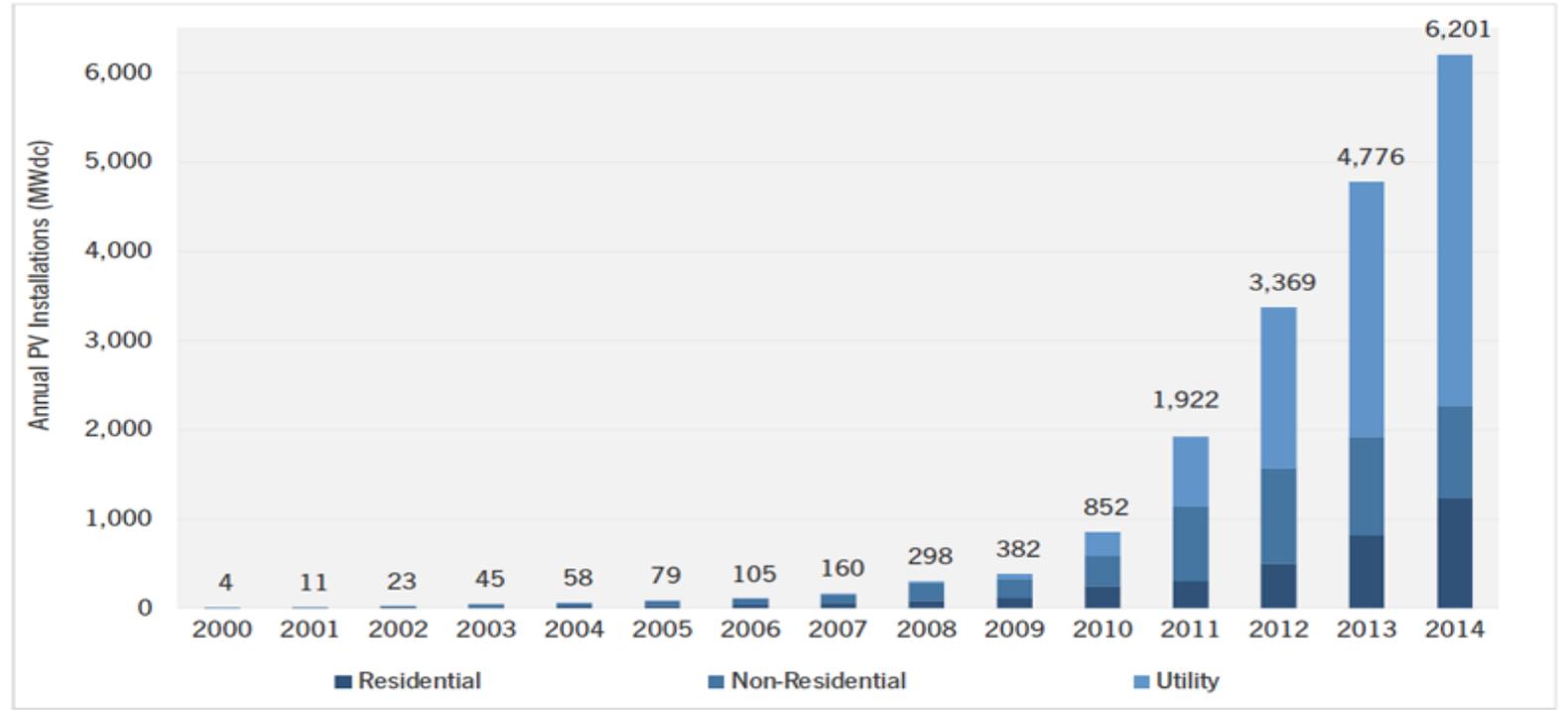


# MAKING THE ECONOMIC CASE

The number of Installations has increased exponentially!

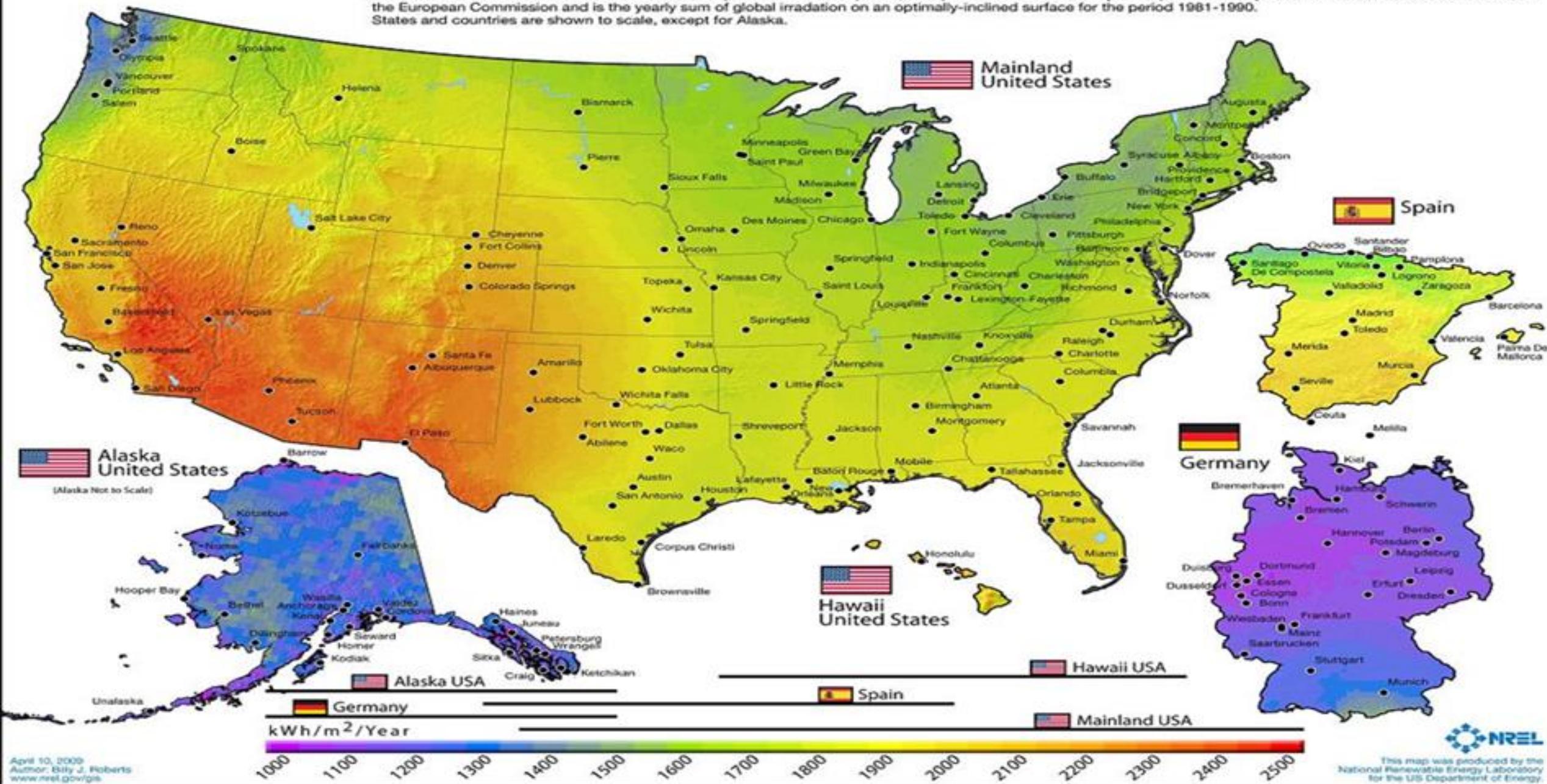


Figure 1.1 Annual U.S. Solar PV Installations, 2000-2014



# Photovoltaic Solar Resource: United States - Spain - Germany

Annual average solar resource data are for a solar collector oriented toward the south at a tilt = local latitude. The data for Hawaii and the 48 contiguous states are derived from a model developed at SUNY/Albany using geostationary weather satellite data for the period 1998-2005. The data for Alaska are derived from a 40-km satellite and surface cloud cover database for the period 1985-1991 (NREL, 2003). The data for Germany and Spain were acquired from the Joint Research Centre of the European Commission and is the yearly sum of global irradiation on an optimally-inclined surface for the period 1981-1990. States and countries are shown to scale, except for Alaska.



# MAKING THE ECONOMIC CASE

## Why go solar?

**There are  
time-sensitive  
incentives  
available!**

- ✓ 30% federal tax credit
- ✓ 50% bonus depreciation
- ✓ Accelerated depreciation
- ✓ 25% USDA REAP Grant
- ✓ 25-year warranty
- ✓ Reduced demand charges
- ✓ Increase public image by reducing carbon footprint.
- ✓ Freedom from future energy rate hikes
- ✓ Increased property value
- ✓ End monopolies and create a free-market in the energy sector

# CASE STUDY – COMMERCIAL SOLAR

Example: 100kW @ \$2/watt = \$200,000 | Georgia Power rate = \$0.13/kWh; 2.5% annual increase

Option # 1: Purchase	
Price	\$200,000
30% ITC:	(\$60,000)
Bonus dep:	<u>(\$33,000)</u>
Net down (after year 1):	\$107,000
Payback	5 years
ROI	17.45%
Net savings	\$567,956

Option # 2: Finance					
50% down			50% finance		
Gross down: \$100,000			Finance: \$100,000		
30% ITC: (\$60,000)			Terms: 5%; 10 years		
Bonus dep: <u>(\$33,000)</u>					
Net down (after yr. 1) : \$7,000			Payment: \$1,060/mo.		
Payment Schedule (yrs 1-5)					
Year	1	2	3	4	5
Savings	\$1,548	\$1,580	\$1,612	\$1,645	\$1,680
Debt Service	<u>\$1,060</u>	<u>\$1,060</u>	<u>\$1,060</u>	<u>\$1,060</u>	<u>\$1,060</u>
Cash Flow	\$488	\$520	\$552	\$585	\$620
Payback			2 years		
ROI			30.54%		
Net Savings (including loan payment)			\$435,000		



# CONTACT INFO

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