



The Stella Group, Ltd.

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Presentation by Scott Sklar, President, The Stella Group, Ltd.

State of Virginia: Solar Regulatory Advisory Panel

Tuesday, June 29, 2010

The Stella Group, Ltd. is a strategic marketing and policy firm for clean distributed energy users and companies which include advanced batteries and controls, combined heat and power, energy efficiency, fuel cells, geo-exchange heat pumps, heat engines, minigeneration (natural gas), microhydro/power, modular biomass, photovoltaics, small wind, and solar thermal (including daylighting, water heating, industrial preheat, building air-conditioning, and electric power generation). The Stella Group, Ltd. blends distributed energy technologies, aggregates financing (including leasing), with a focus on system standardization. Scott Sklar serves as Steering Committee Chair of the Sustainable Energy Coalition, composed of the renewable energy and energy efficiency trade associations and analytical groups, and sits on the national Boards of Directors of the non-profit Business Council for Sustainable Energy, Renewable Energy Policy Project, and the Sustainable Buildings Industry Council.

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Energy Investments 2009

'Investments in renewable energy
increased from \$39.24 billion in
2001 to \$336.78 billion in 2009 at a
AGR of 30.8% during this
period. (5\11\10)

RE 2007 GLOBAL CONTRIBUTION AND INVESTMENT

From Financial Times today (6\30\08), p.2: "Renewable energy still provides only a small portion of the world's energy, at about 5 per cent last year, but it accounted for 23 percent of new generating capacity added in the year 2007"
>

Global Investments in Clean Energy Technology - Global investments in solar, wind and other clean energy technologies topped \$148 billion last year (2007), up 60% from 2006 according to New Energy Finance. See the press release at: http://www.newenergyfinance.com/NEF/HTML/Press/2008-02-28_PR_Total_Investment_In_Clean_Energy_Final.pdf or <http://tinyurl.com/38ewht>
New Energy Finance: <http://www.newenergyfinance.com/?n=13>



International Solar Electric Capacity Rankings

New Capacity in 2009

2009 New Capacity (MW)	
1	Germany 3,800
2	Italy 700
3	Japan 484
4	United States 481*
5	Czech Republic 411
6	Belgium 292
7	France 285
8	Spain 180
9	China 125
10	Korea 100
Total 6,932**	

Cumulative Capacity in 2009

2009 Cumulative Capacity (MW)	
1	Germany 9,677
2	Spain 3,595
3	Japan 2,628
4	United States 2,108*
5	Italy 1,158
6	Czech Republic 465
7	France 465
8	Korea 458
9	Belgium 362
10	China 125
Total 21,537**	

- Top 10 countries ranked four ways:
- US does well on measures of capacity.
 - US is doing less than other countries on a per capita basis.

Megawatts

2009 New Capacity (W per Capita)	
1	Germany 46.2
2	Czech Republic 40.2
3	Belgium 28.0
4	Italy 12.0
5	France 4.4
6	Spain 4.4
7	Japan 3.8
8	Canada 2.2
9	Korea 2.1
10	United States 1.6*
Average 2.8**	

Watts per Capita

2009 Cumulative (W per Capita)	
1	Germany 117.5
2	Spain 88.7
3	Czech Republic 45.5
4	Belgium 34.8
5	Japan 20.7
6	Italy 19.9
7	Korea 9.4
8	France 7.3
9	United States 6.9*
10	Portugal 6.4
Average 8.7**	

* Country rankings include off-grid estimates for US.

** Includes estimates for several other countries; not a global figure.

Clean Energy Reports

1. [GREENPEACE/DLR](#)

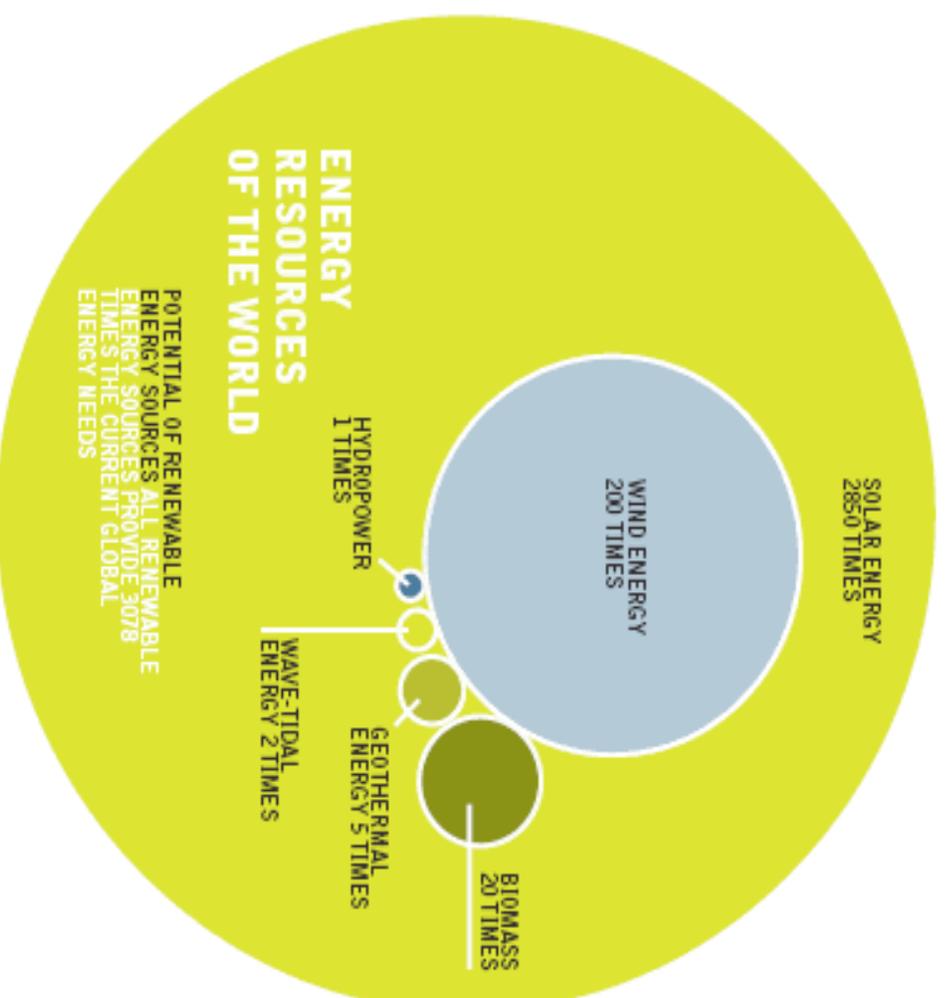
The world could eliminate fossil fuel use by 2090 by spending trillions of dollars on a renewable energy revolution, the European Renewable Energy Council (EREC) and environmental group Greenpeace said. The 210-page study is one of few reports -- even by lobby groups -- to look in detail at how energy use would have to be overhauled to meet the toughest scenarios for curbing greenhouse gases outlined by the U.N. a Climate Panel. "Renewable energy could provide all global energy needs by 2090," according to the study, entitled "Energy (R)evolution." EREC represents renewable energy industries and trade and research associations in Europe.

2. [ASES/NREL](#) U.S. Energy Experts Announce Way to Freeze Global Warming

On January 31, 2007 at a press conference in Washington, D.C., ASES unveiled a 200-page report, Tackling Climate Change in the U.S.: Potential Carbon Emissions Reductions from Energy Efficiency and Renewable Energy by 2030. The result of more than a year of study, the report illustrates how energy efficiency and renewable energy technologies can provide the emissions reductions required to address global warming. U.S. Carbon Emissions Displacement Potential from Energy Efficiency and Renewable Energy by 2030 - 57% Energy Efficiency, 43% Renewables

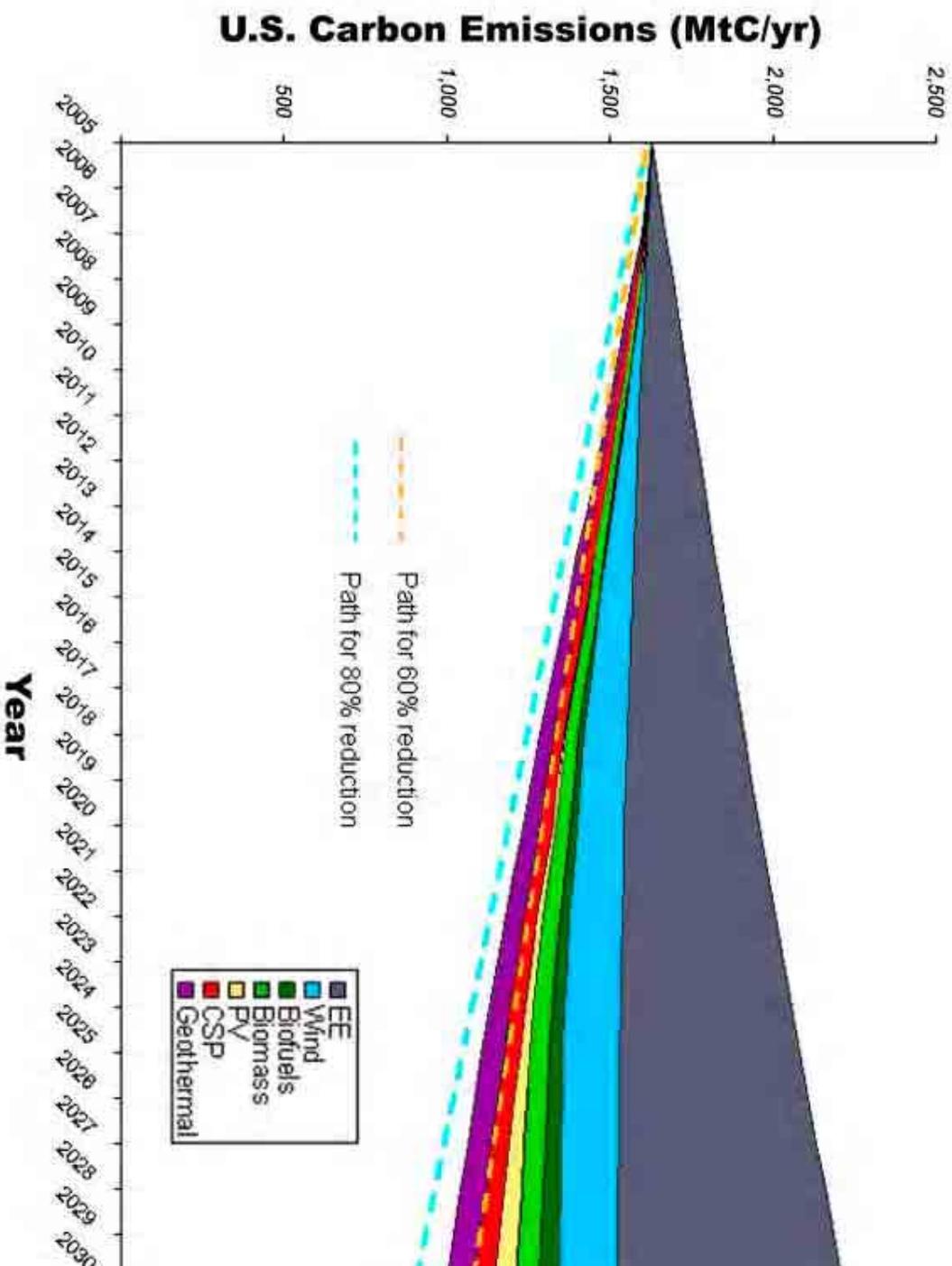
3. [GOOGLE](#) Google.org, the philanthropic arm of the search giant, has unveiled a plan to move the U.S. to a clean-energy future. The vision: In 2030, electricity will be generated not from coal or oil but from wind, solar, and geothermal power. Energy demand will be two-thirds what it is now, thanks to stringent energy-efficiency measures. Ninety percent of new vehicle sales will be plug-in hybrids. Carbon dioxide emissions will be down 48 percent. Getting there will cost \$4.4 trillion, says the plan -- but will recoup \$5.4 trillion in savings. The Clean Energy 2030 plan would require ambitious national policies, a huge boost to renewables, increased transmission capacity, a smart electricity grid, and much higher fuel-efficiency standards for vehicles.

figure 30: energy resources of the world



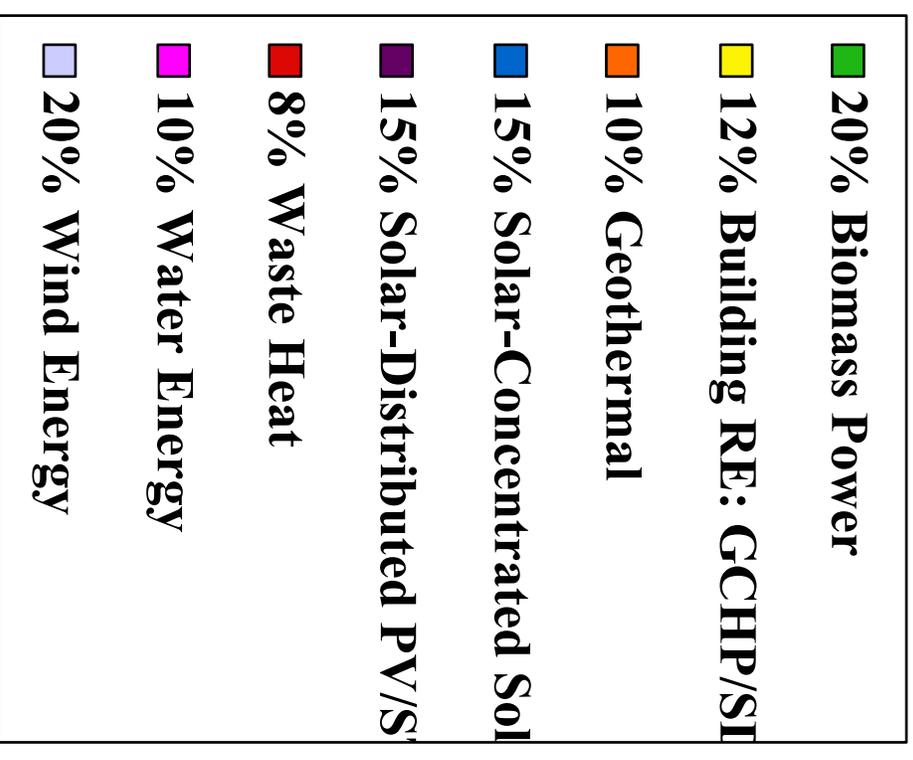
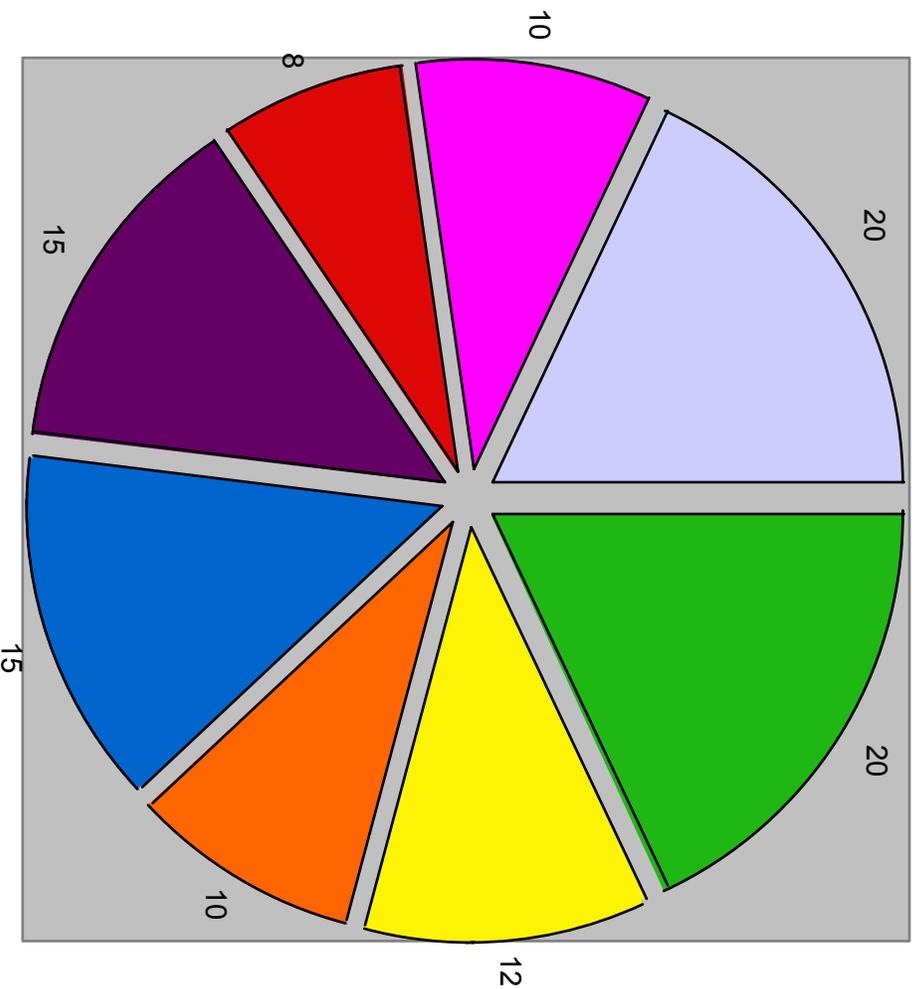
Institute DLR, Institute of Technical Thermodynamics, Department of Systems Analysis and Technology Assessment, Stuttgart, Germany Ecofys BV, P.O. Box 8408, NL-3503 RK Utrecht, Kanaalweg 16-G

U.S. Carbon Emissions Displacement Potential from Energy Efficiency and Renewable Energy by 2030



57% Energy Efficiency, 43% Renewables

Percentage of Clean Energy in 21st Century



TWO MORE STUDIES

INSTITUTE FOR LOCAL SELF RELIANCE (October 2009) report by David Morris
"SELF RELIANT STATES" -- Excerpted Executive Summary Conclusion:

"All 36 states with either renewable energy goals or renewable energy mandates could meet them by relying on in-state renewable fuels. Sixty-four percent could be self-sufficient in electricity from in-state renewables; another 14 percent could generate 75 percent of their electricity from homegrown fuels. Indeed, the nation may be able to achieve a significant degree of energy independence by harnessing the most decentralized of all renewable resources: solar energy. More than 40 states plus the District of Columbia could generate 25 percent of their electricity just with rooftop PV. In fact, these data may be conservative. The report does not, for example, estimate the potential for ground photovoltaic arrays – although it does estimate the amount of land needed in each state to be self-sufficient relying on solar – even though common sense suggests that this should dwarf the rooftop potential..... It is at the local level that new technologies like smart grids, electric vehicles, distributed storage, and rooftop solar will have their major impact." (www.ijsr.org)
Contact for David Morris at: cell 612-220-7649 or dmorris@ijsr.org

National Research Council Renewables Report (June 2009)

Renewable energy resources in the U.S. are sufficient to meet a significant portion of the nation's electricity needs says a new report from the National Research Council. Press and link to report at:
<http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12619> or <http://tinyurl.com/neka69>

Global Capacity of Renewable Energy Technologies

Total global capacity for wind-generated power reached 100 GW in 2007. Germany, by far, has the most installed wind capacity at about 22 GW. The U.S. is second with about 17 GW. Spain comes in third with about 15 GW. China, however, had the most installed new wind capacity in 2007, adding 3.4 GW in just one year.

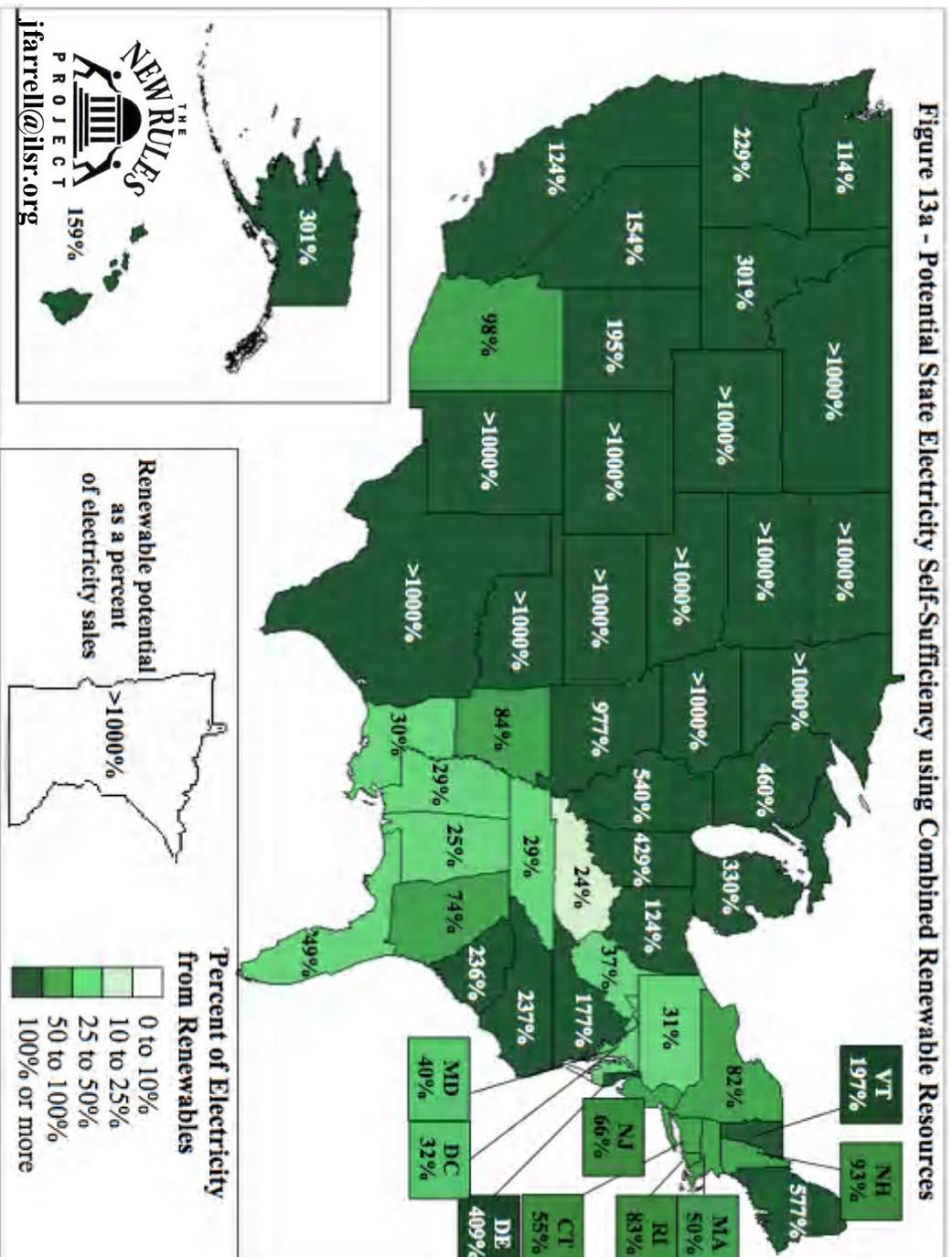
Solar PV, for its part, reached 11 GW of total installed global capacity. About 8 GW of that is grid-tied capacity with the remaining 3 GW coming from off-grid applications.

Globally, about 240 GW of renewable energy are installed. Small hydro and wind lead that mix with about 70 GW each. But biomass, solar and geothermal are quickly gaining traction.

The fact China has more installed gigawatts (50 GW) than the U.S. (~30 GW) and China also installed 75% of the world's new solar hot water capacity in 2006. The U.S. had about 0.4% of that capacity.

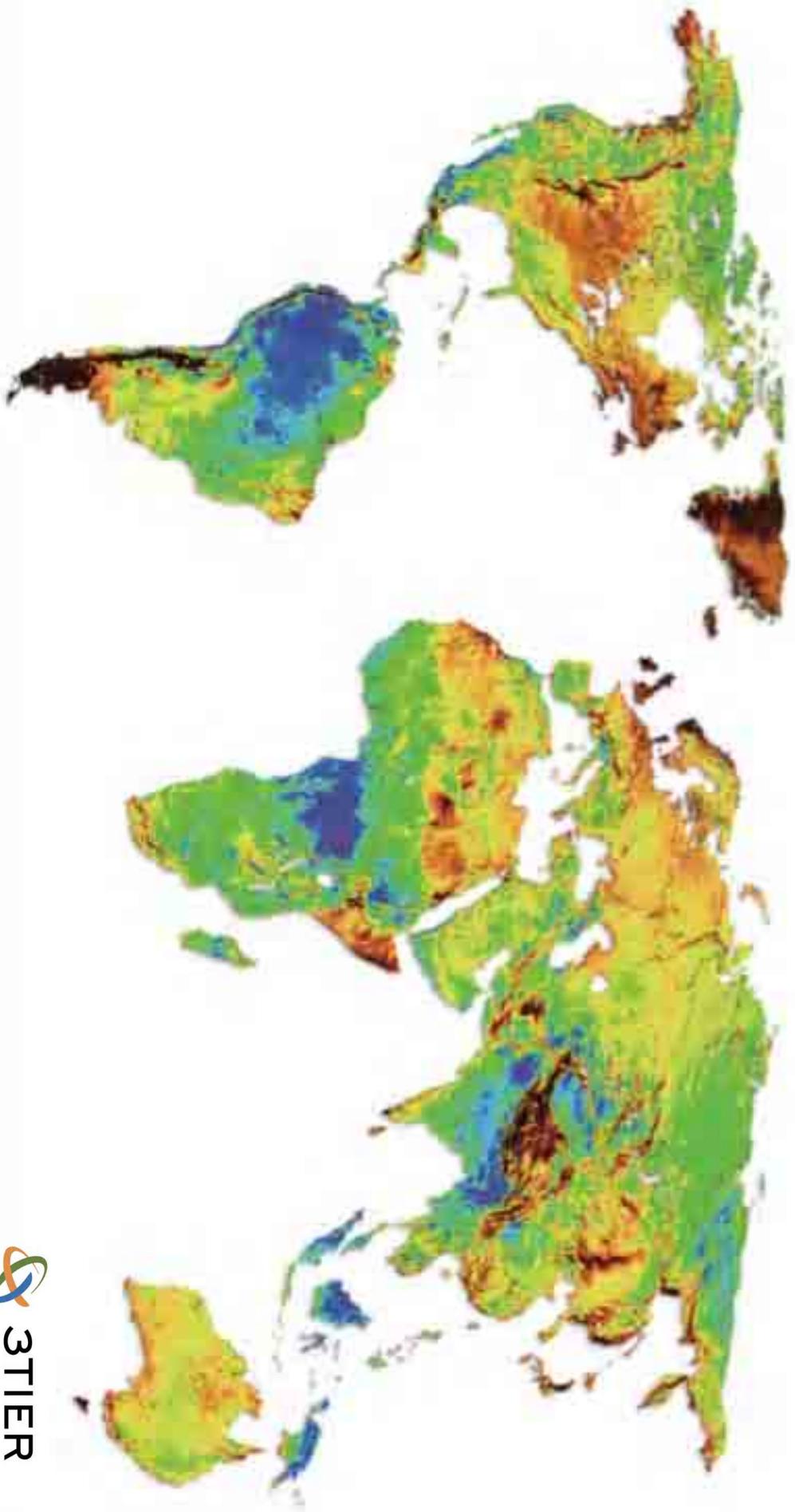
32 States can be Self-Sufficient

Figure 13a - Potential State Electricity Self-Sufficiency using Combined Renewable Resources

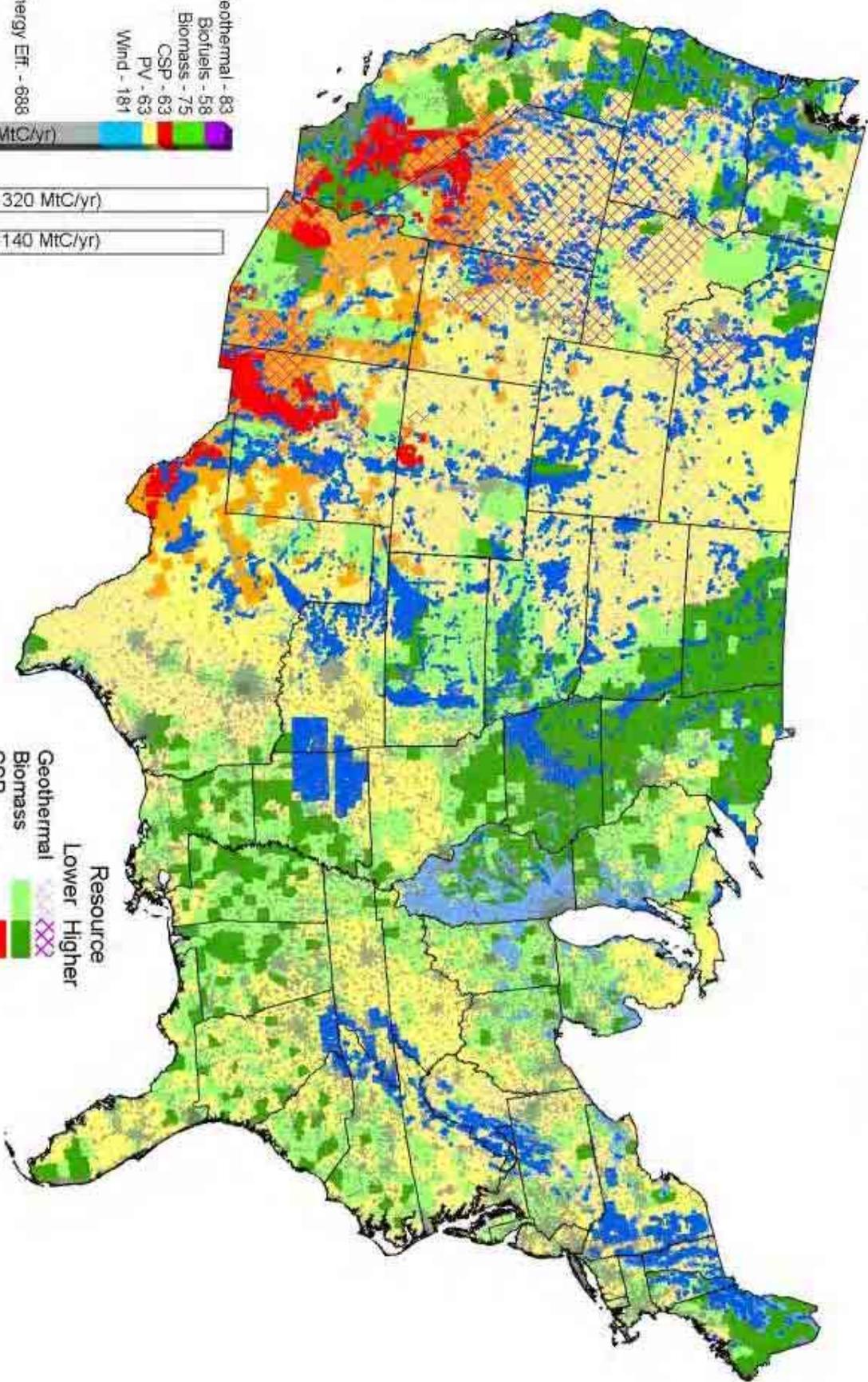


www.3tiergroup.com

Global Wind Map 2008



Potential Reduction in U.S. Carbon Emissions



- Geothermal - 83
- Biofuels - 58
- Biomass - 75
- CSP - 63
- PV - 63
- Wind - 181

Energy Eff. - 688

(1211 MtC/yr)

CO₂ Reduction Potential (MtC/yr)

80% (1320 MtC/yr)

60% (1140 MtC/yr)

CO₂ Reduction Goals

Resource

Lower Higher

- Geothermal
- Biomass
- CSP
- PV
- Wind
- Energy Eff.



003/45/7844

ISSAT Geostar 45
23:15 EST 14 Aug. 2003



Why Distributed Generation

1. **Remote energy** — where you need it, when you need it
2. **Back-up energy** — critical functions when the electric grid goes down
3. **Power quality** — no surges or swells or transients damaging digital and other sophisticated equipment — not a problem 20 years ago
4. **Cost reduction** — offsetting demand charges, peak power rates, and even ratchet rates — heightened value with time-of-day metering and "smart" meters
5. **Consumer values** — independence and control, green energy, and/or a technical leader or trendsetter

Early adopters of fuel cells are driven by the need for uninterrupted, high quality power.

Power Disruption Events per Month

Event	Median	Average	Worst
Interruptions	1.0	1.3	10.0
Sags / undervoltages	4.1	27.9	1,860
Swells / overvoltages	3.4	13.9	1,450
Transients	15.7	63.5	1,166

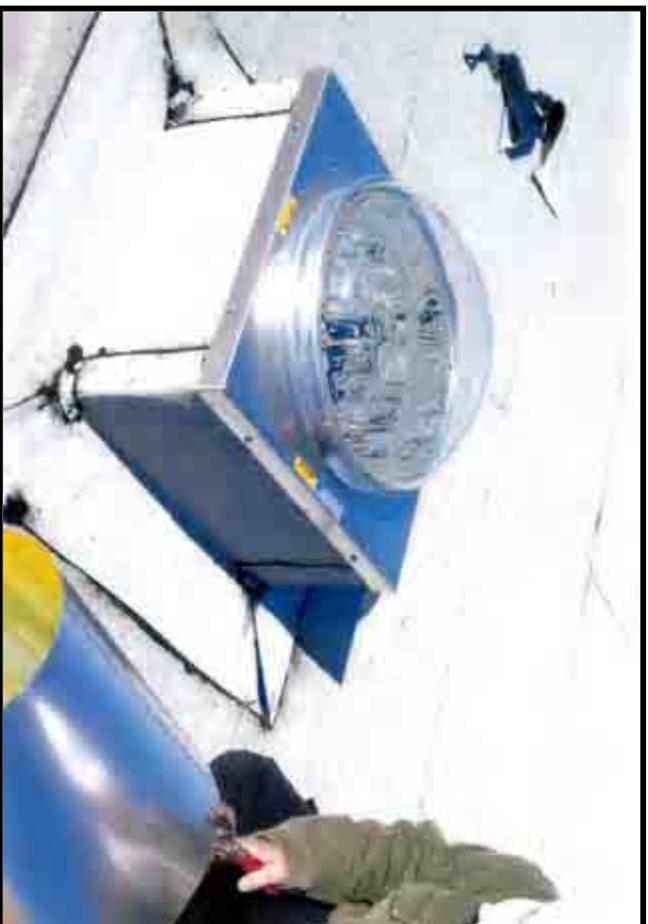
Source: Duke Power, Sandia National Laboratories

- Power disruptions may cause sensitive equipment to fail.
- As a result, organizations face potential for significant losses – lost data, lost materials, lost productivity, and lost income – as well as risks to public safety.
- A study by Sandia National Laboratories estimates losses from power disruptions at more than \$150 billion per year in the U.S.
- In response, more and more organizations are turning to on-site generation to boost power availability.



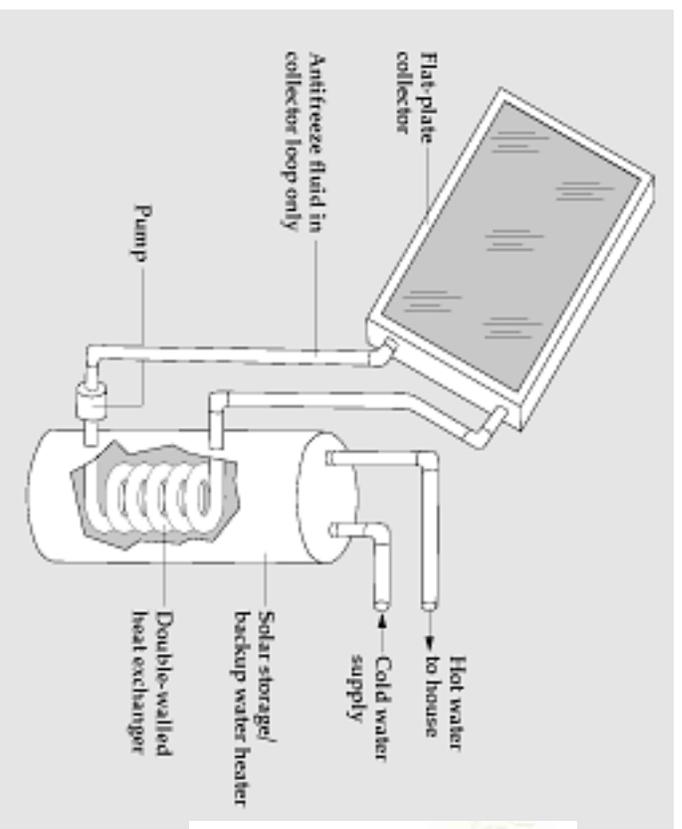
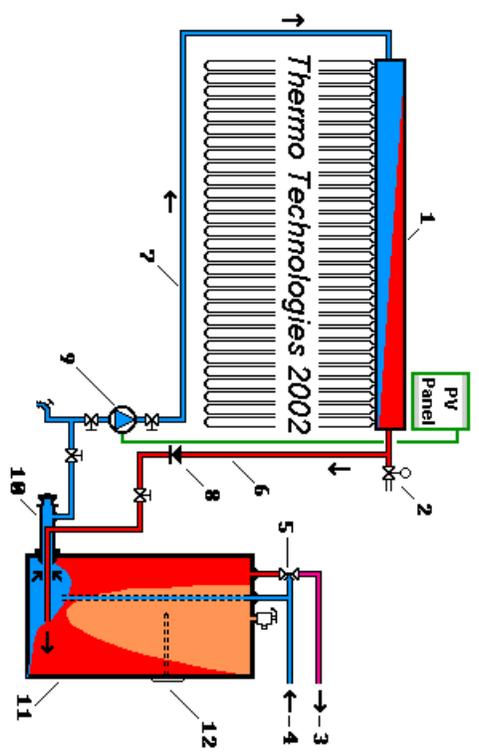
Fuel Cells & Energy Institute, Inc.

HUWCO Daylighting Solutions™



NSA Visitors Center, Ft. Meade, MD

Use of 21” tubular skylights, with 2’x2’ diffuser to bring free, pure, healthy natural light into the space.



Sklar Home PV and SWH



CHINA – IEA – SOLAR THERMAL

10 November 2004. The International Energy Agency's Solar Heating and Cooling Programme and major solar thermal trade associations publish new statistics on the use of solar thermal energy. The new data – expressed for the first time in GWth, rather than in square meters of installed collector area – shows the global installed capacity to be 70 GWth (70.000 MWth).

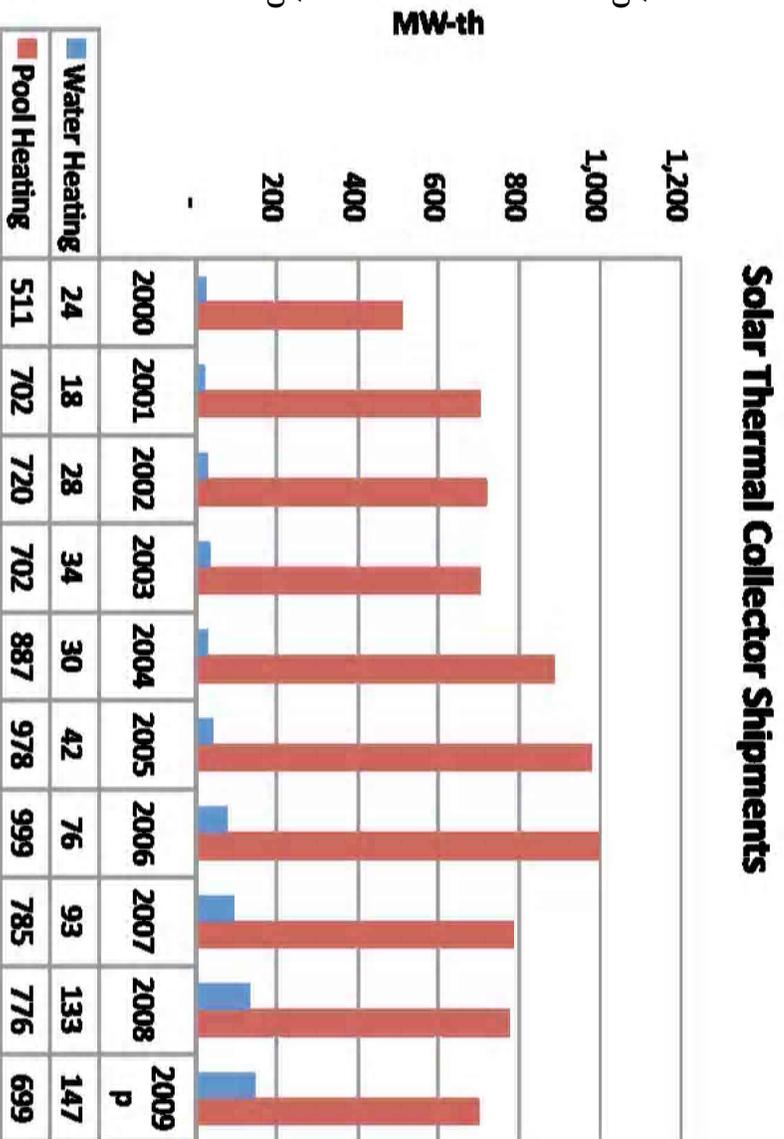
Solar Heating and Cooling Annual Shipments

CAGR 2000-2009

- Total: 5%
 - Solar Water Heating: 22%
 - Solar Pool Heating: 4%

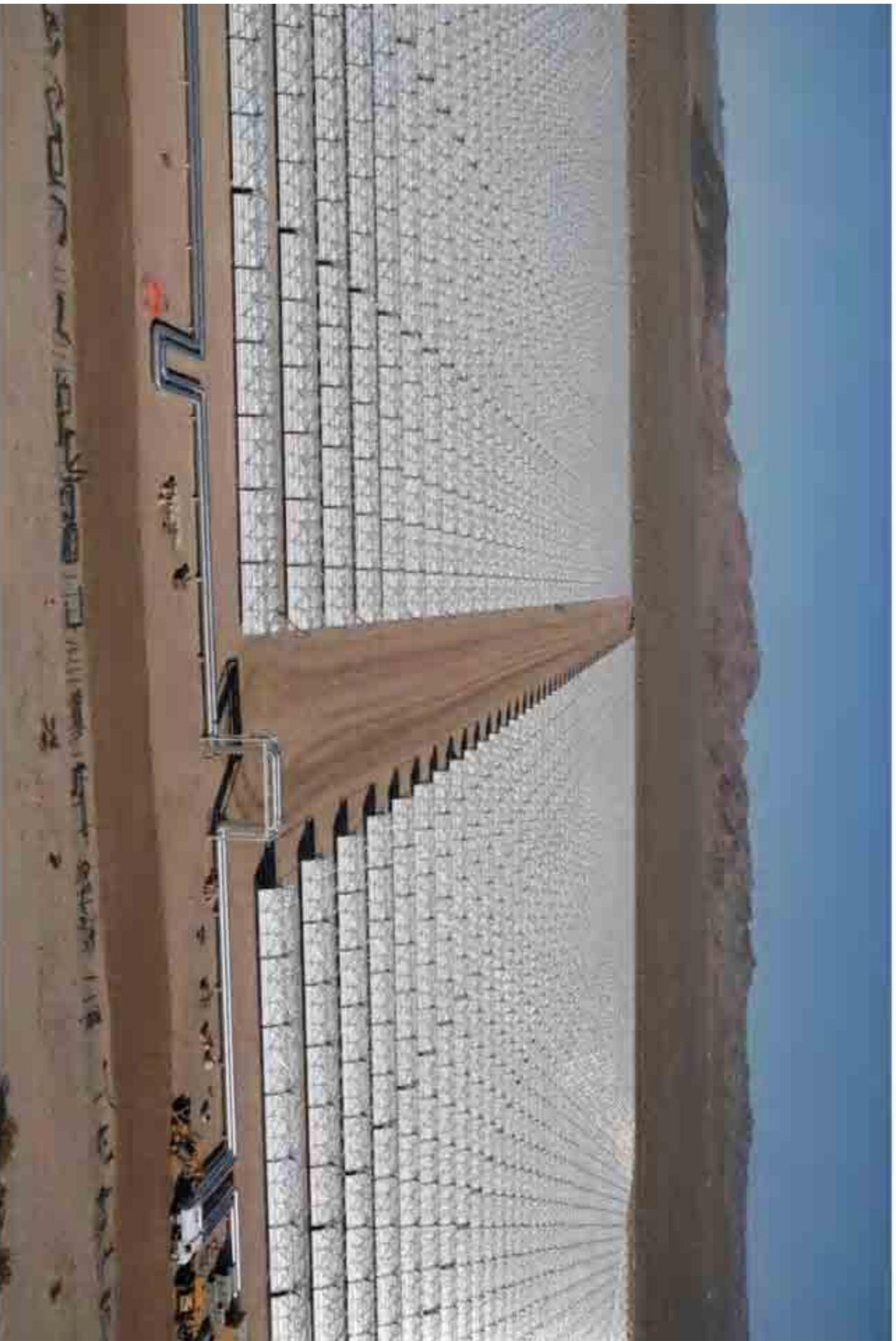
CAGR 2006-2009

- Total: -8%
 - Solar Water Heating: 25%
 - Solar Pool Heating: -11%



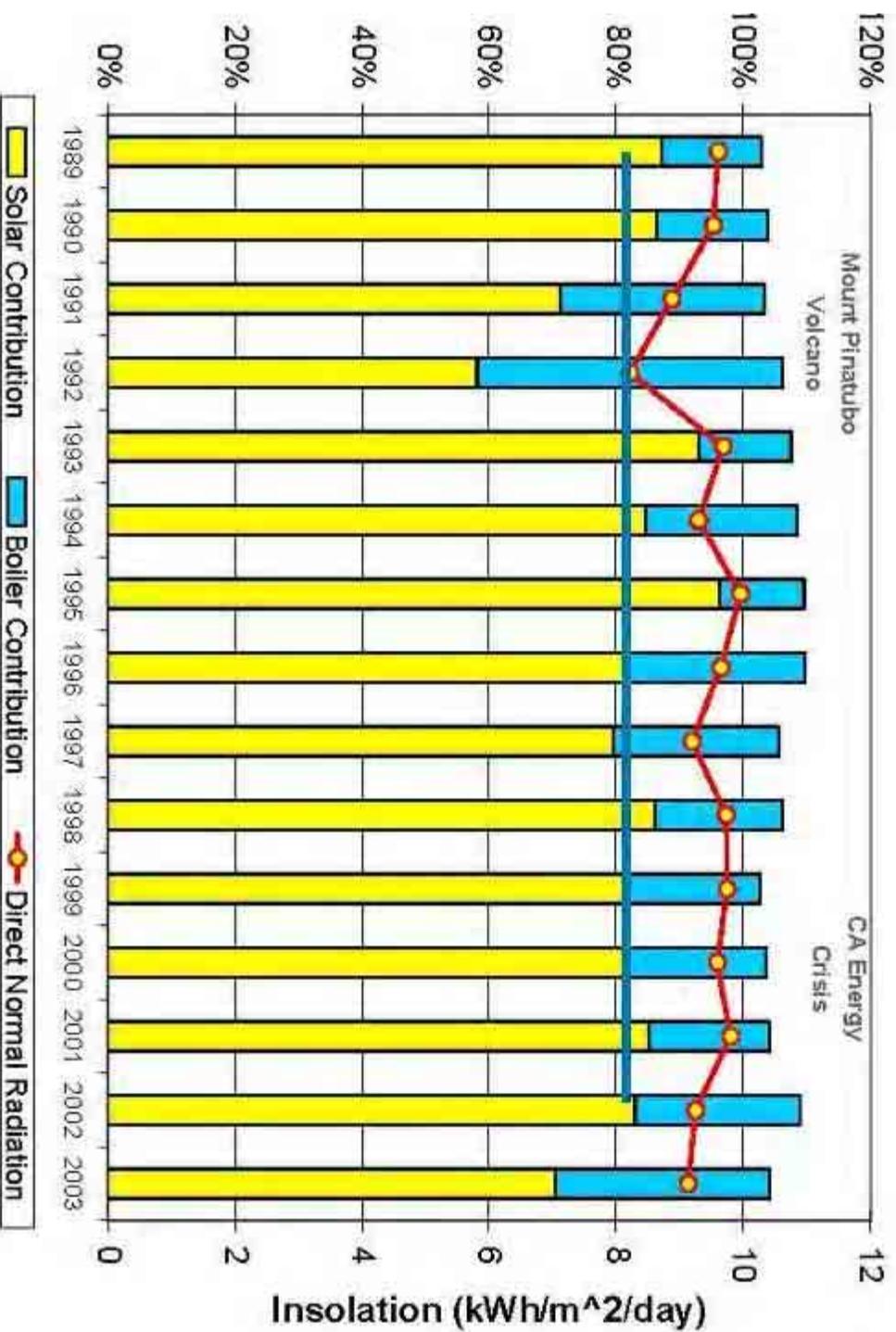
Source: EIA, SEIA*

* Water heating figures include collectors for combined water heating and space heating applications.



NEVADA SOLAR ONE – ACCIONA SOLAR POWER

CSP Has Been a Reliable Resource for California

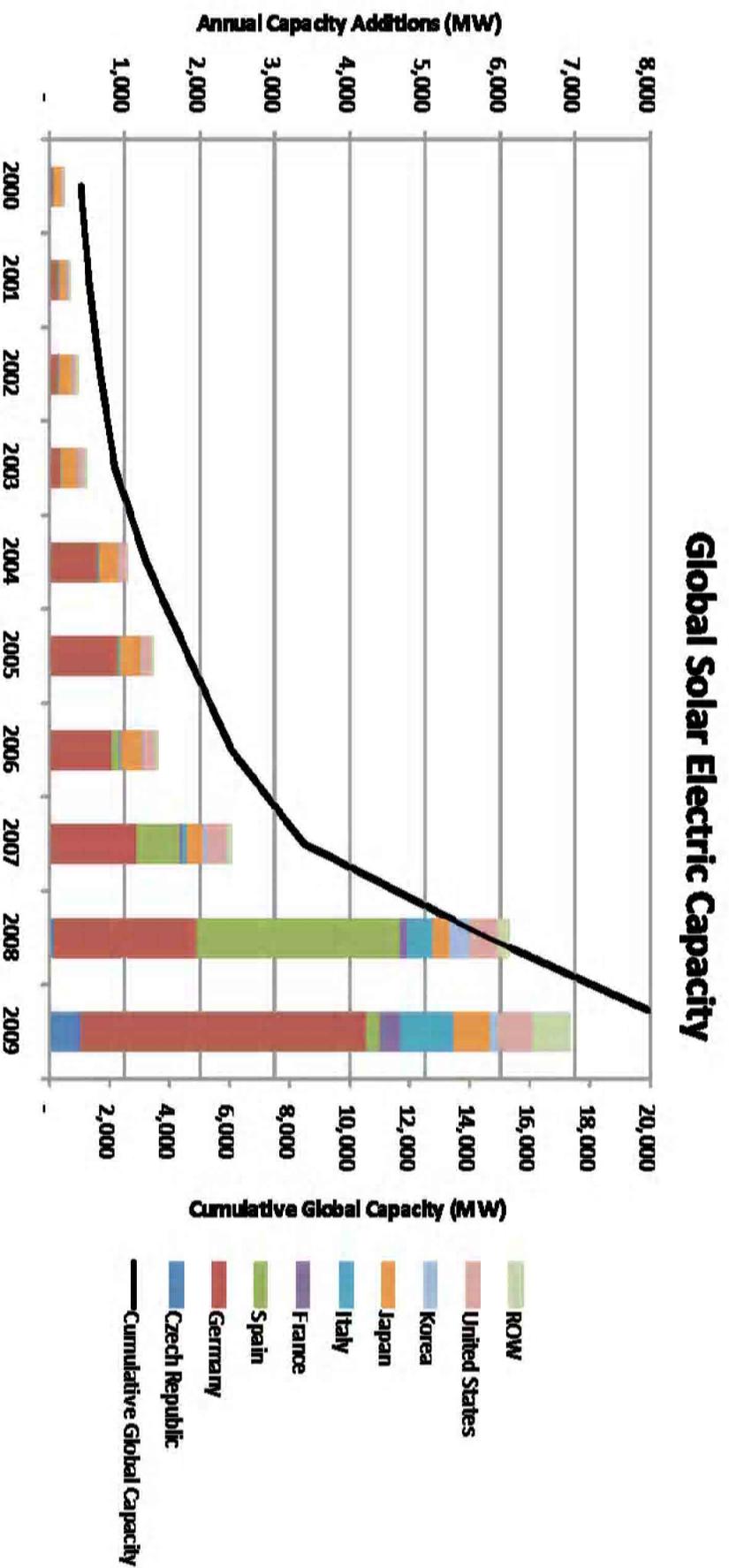


- Averaged 80% on-pe capacity factor from solar
- Over 100% with foss backup
- Could approach 100% from solar with the addition of thermal energy storage.

SCE Summer On-Peak
Weekdays: Jun - Sep
12 noon - 6 pm

Global Solar Electric Capacity

- Global solar electric capacity has passed 21 GW.
- Germany has nearly half the cumulative global capacity.



Mass Maritime Academy

– Solar Powered LED Lighting – SolarOne® Solutions

SolarOne®

62 Systems

Street (Basic)

Parking (Shoe Box)

Pathway (Decorative Flare)

Offsetting...

~20,000 kWh/yr

~36,000 lbs of green-house gases

~ 1 mile of re-wiring

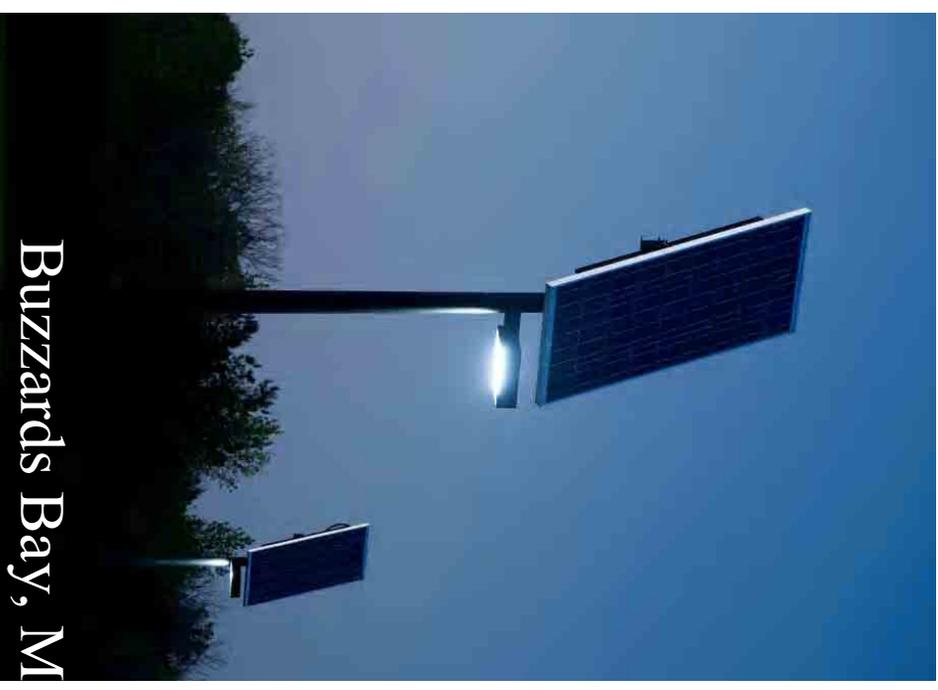
Delivering..

Improved Lighting Characteristics

Enhanced Safety

Reduced Operation Costs

SolarOne®



Buzzards Bay, M

SO BRIGHT™
TECHNOLOGY

On-Site Generation Utilization List

- **Lighting** (outside area, motion detector and remote lighting) — Security lighting systems attached to buildings, light poles, or specialized for safety
- **Monitoring and/or Surveillance** (cameras, motion detectors, sensors) — Low power operation — primarily fuel cells, solar and small wind.



ELEVATED SECURITY



The ZeroBase ReGenerator is:

Portable

Environmentally-sealed, marine-grade housing

Hybrid

Manages up to 10kW of production & storage

Power Generation

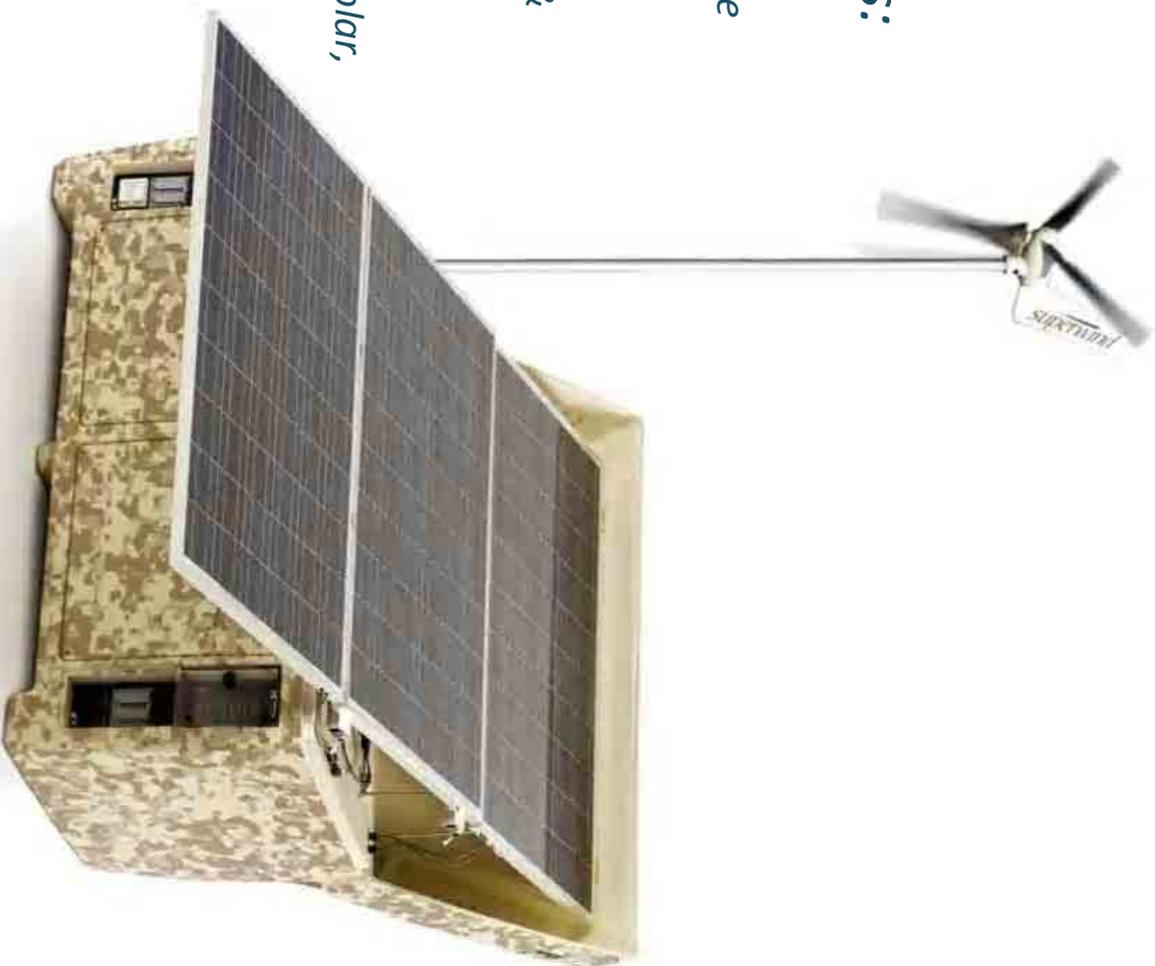
Distributed power generation from solar, wind & fossil-fuels

Storage

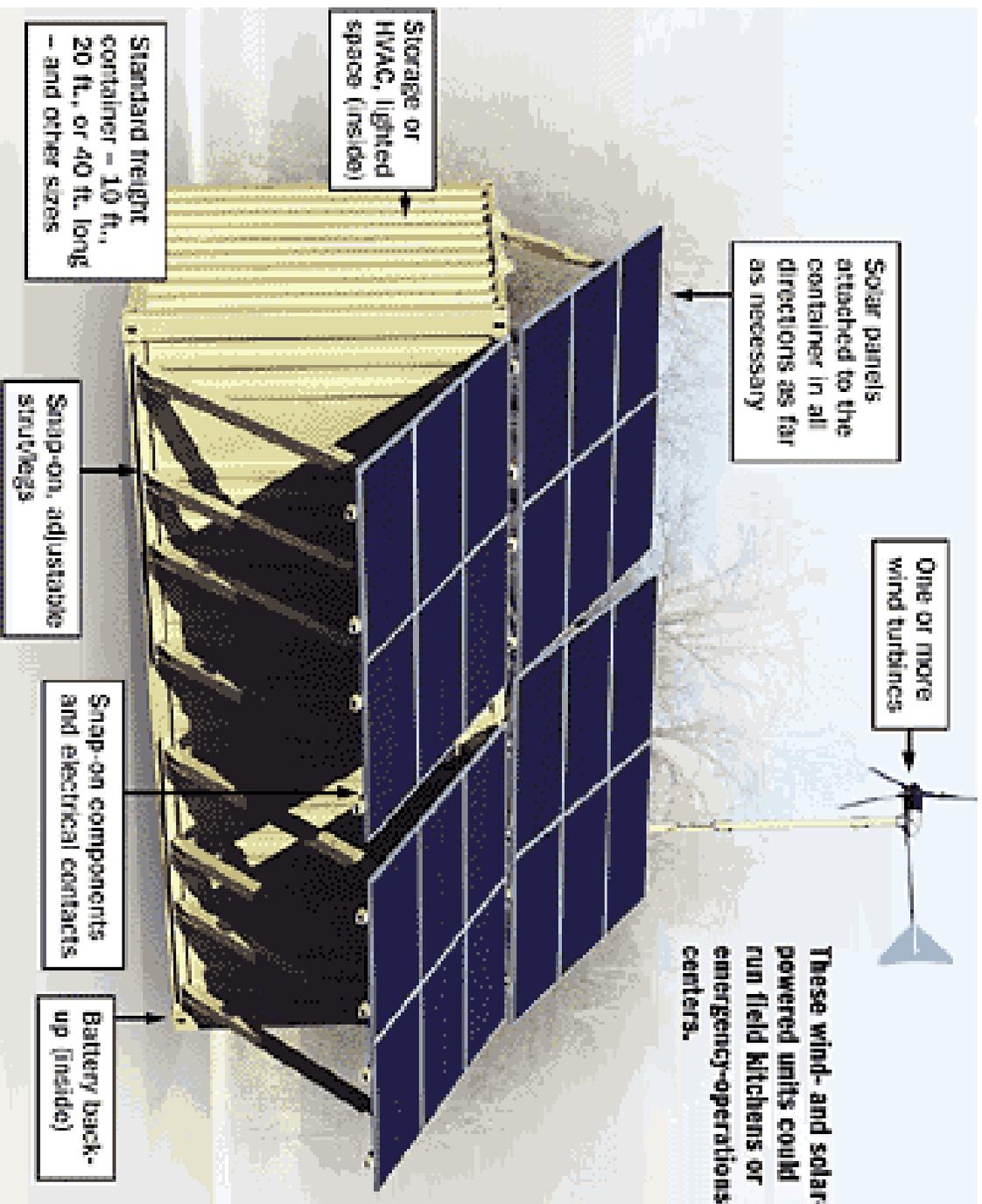
Stores up to 43kWh in sealed AGM batteries

Appliance

*Easy set-up, simple to operate and maintain
COTS since 2007 – In-theater since 2008
Mounts to standard TQG trailers*



‘Plop and drop’ power center

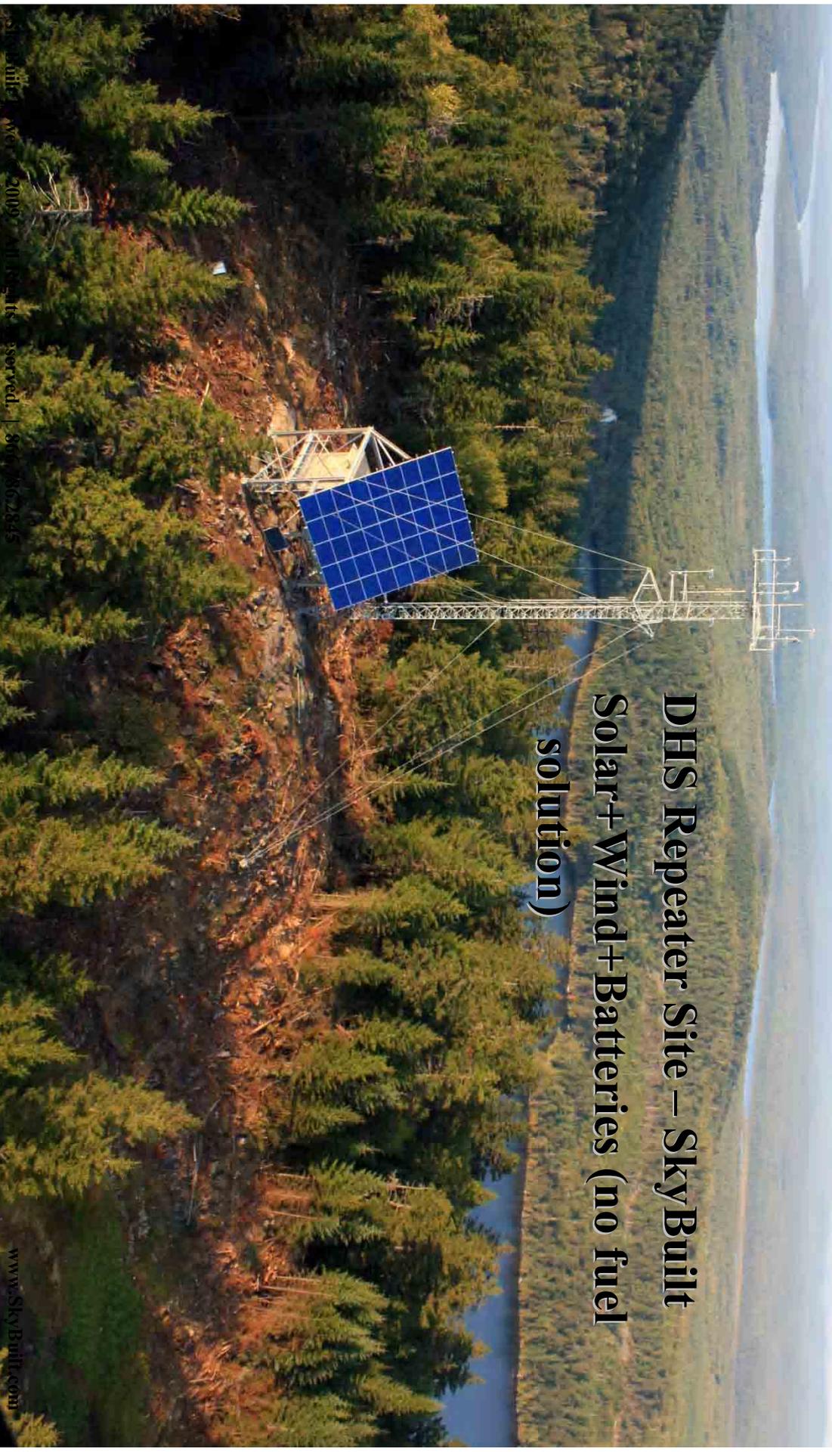


SkyBuilt Power



The Leader in Rapidly Deployable Renewable Energy Solutions

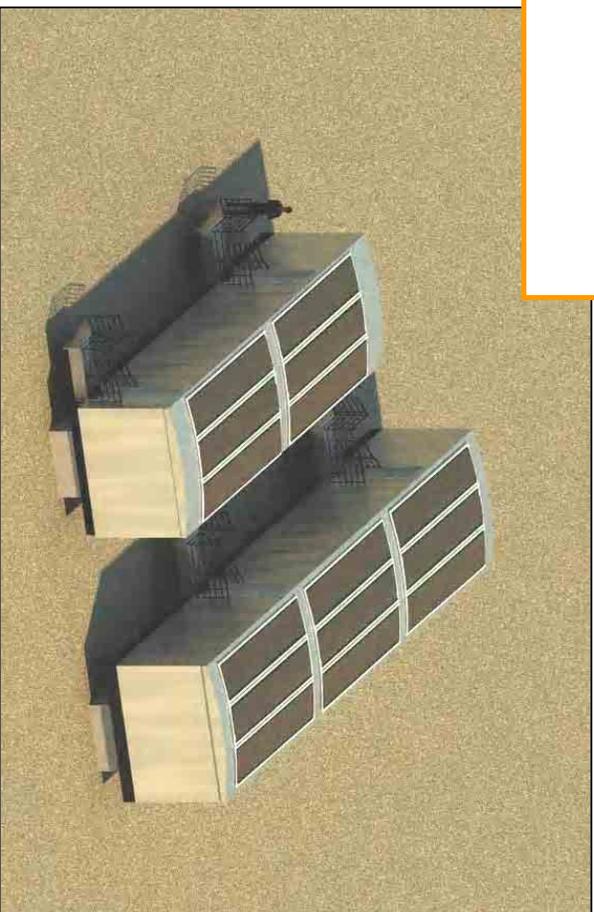
**DHS Repeater Site – SkyBuilt
Solar+Wind+Batteries (no fuel
solution)**



DG 24-7 Solar/Wind powered disaster and emergency water filtering unit also removes arsenic and lead

- **Ultrafiltration removes 99.99% of bacteria, viruses, cysts, pathogens, medical waste**
- **Filtration media removes 99.99% of arsenic, lead and other heavy metals**
- **Robust, scalable with a small footprint**
 - 6500 gallons per day on solar power, 13000 gallons per day with upscaled solar power
- **Minimal/Versatile power requirements**
 - 24-7 can be solar/wind powered or attached to power grid/generator
- **Rapid deployment**
 - Small size, 6x6x5ft, designed to fit 463L pallet
 - Air, surface or surface ship deliverable
 - Setup in less than 30 minutes
- **Simple and reliable components**
 - Proven water filtering capability in austere environments







WASH DC - STELLA GROUP: GRANGE BUILDING - 1.5 kw



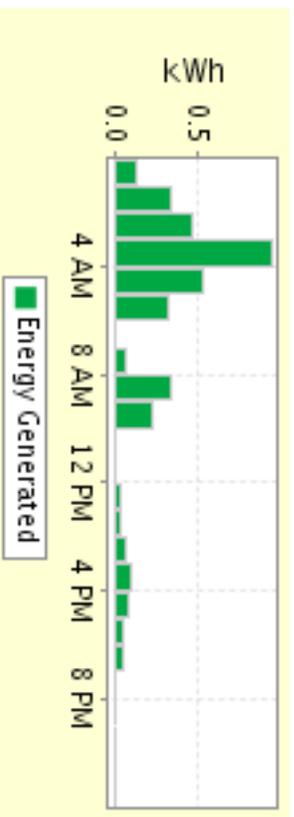
PV “Peal & Stick” Sklar Home



TSG VA Office



SkyStream - Fort Irwin May 2008



3.7 kW



8 homes - 528 lbs CO₂



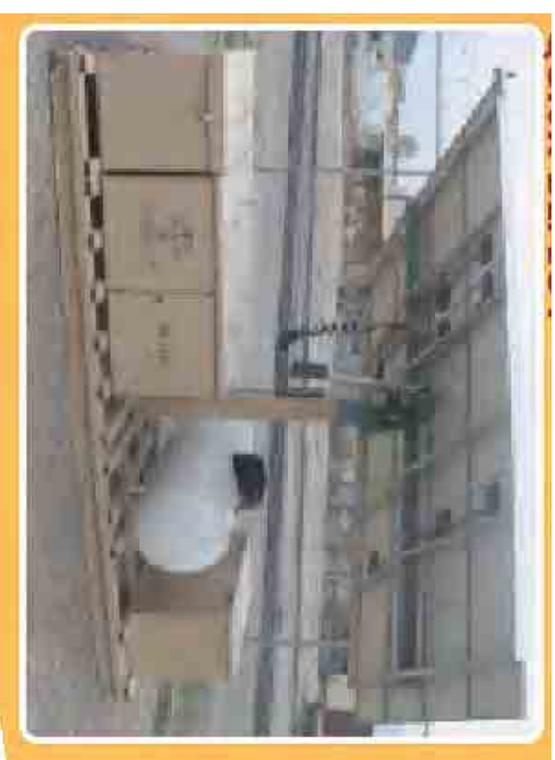
19 days of CO from one car

On-Site Generation Utilization List

- **Battery Bank - Augmentation or Displacement** — Adding storage, back-up power, power quality, and load shifting
- **Battery Charging** Electronics - on-site power - remote, building back-up, and power augmentation
- **Dedicated circuits** for critical functions in buildings

GRIDPOINT (VA) www.gridpoint.com

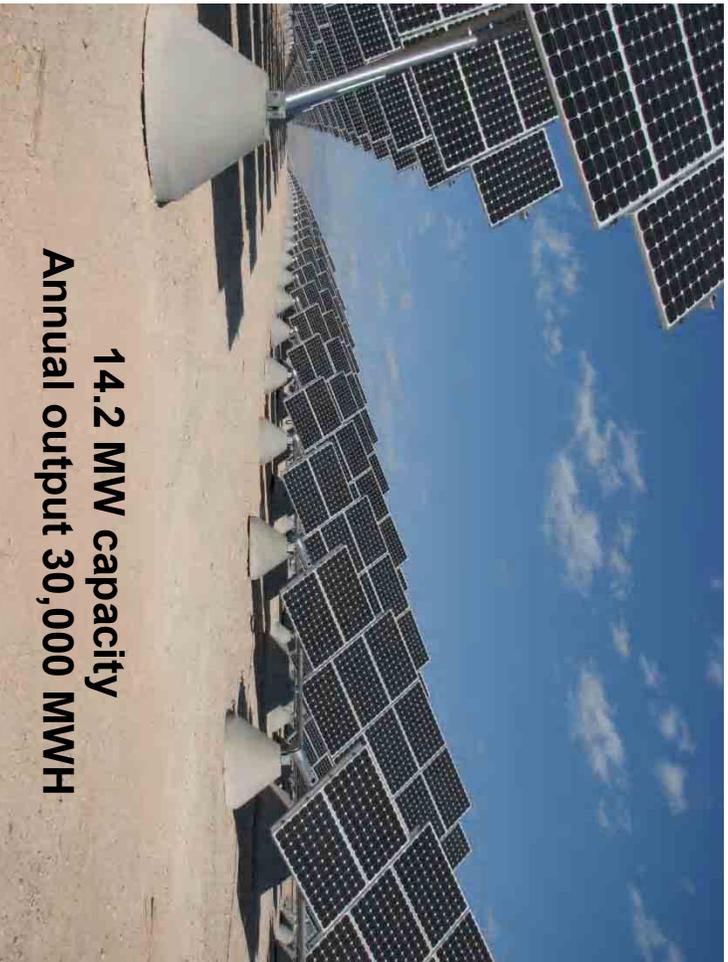
6/30/2010



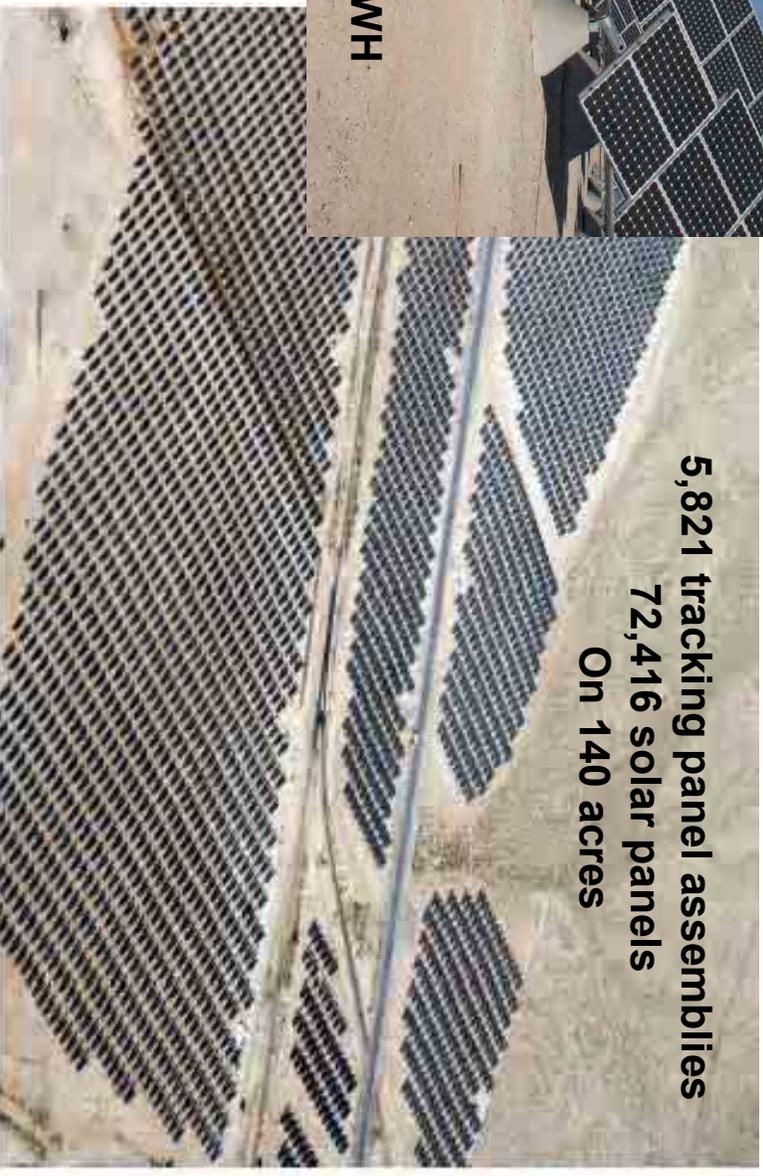
**SunPods Can Be Unloaded And Set Up
In About 10 Minutes**



Neilis AFB NV Solar Photovoltaic North America's Largest Solar PV System



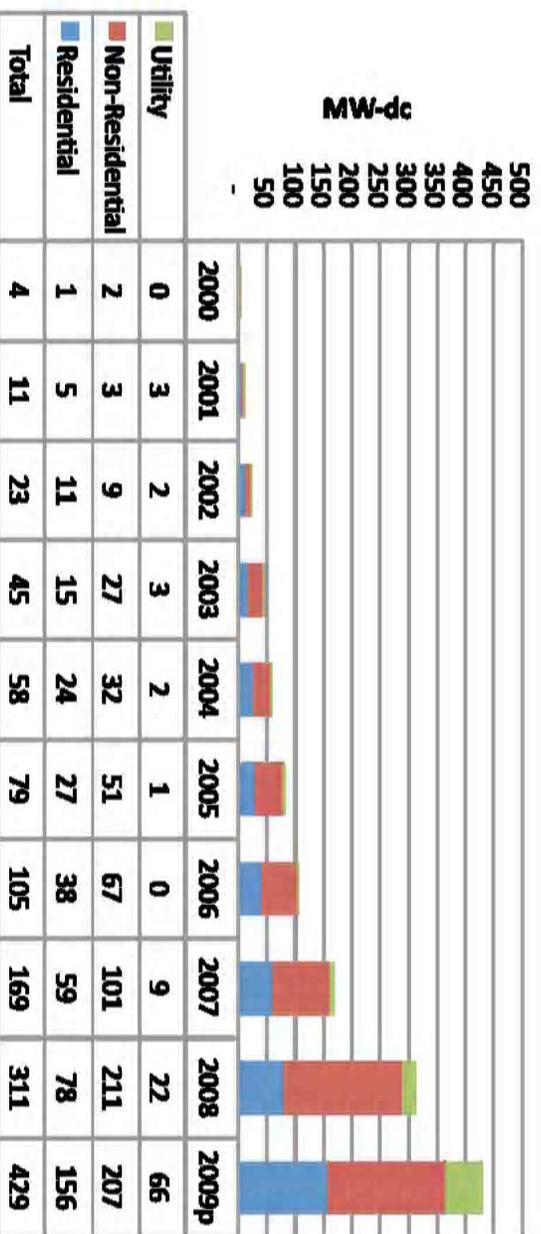
**14.2 MW capacity
Annual output 30,000 MWH**



**5,821 tracking panel assemblies
72,416 solar panels
On 140 acres**

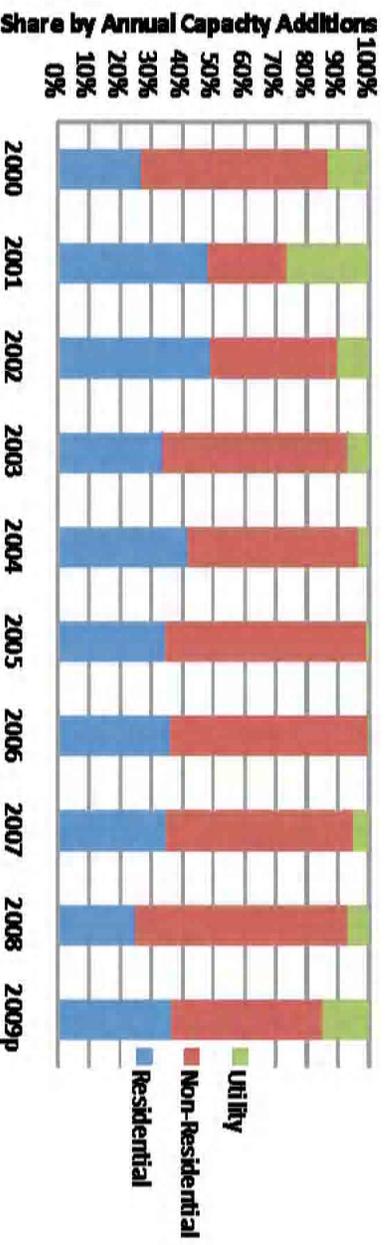
Grid-Tied PV Capacity Additions

Grid-Tied PV Installations



- Grid-tied PV grew by 38% in 2009
- Annual growth from 2000-2009: CAGR = 69%
- Shifting demand in each market segment.
- Notable increase in residential market share in 2009.
- Utility sector* nearly tripled in annual MW from 2008.

Grid-Tide PV Market Segments

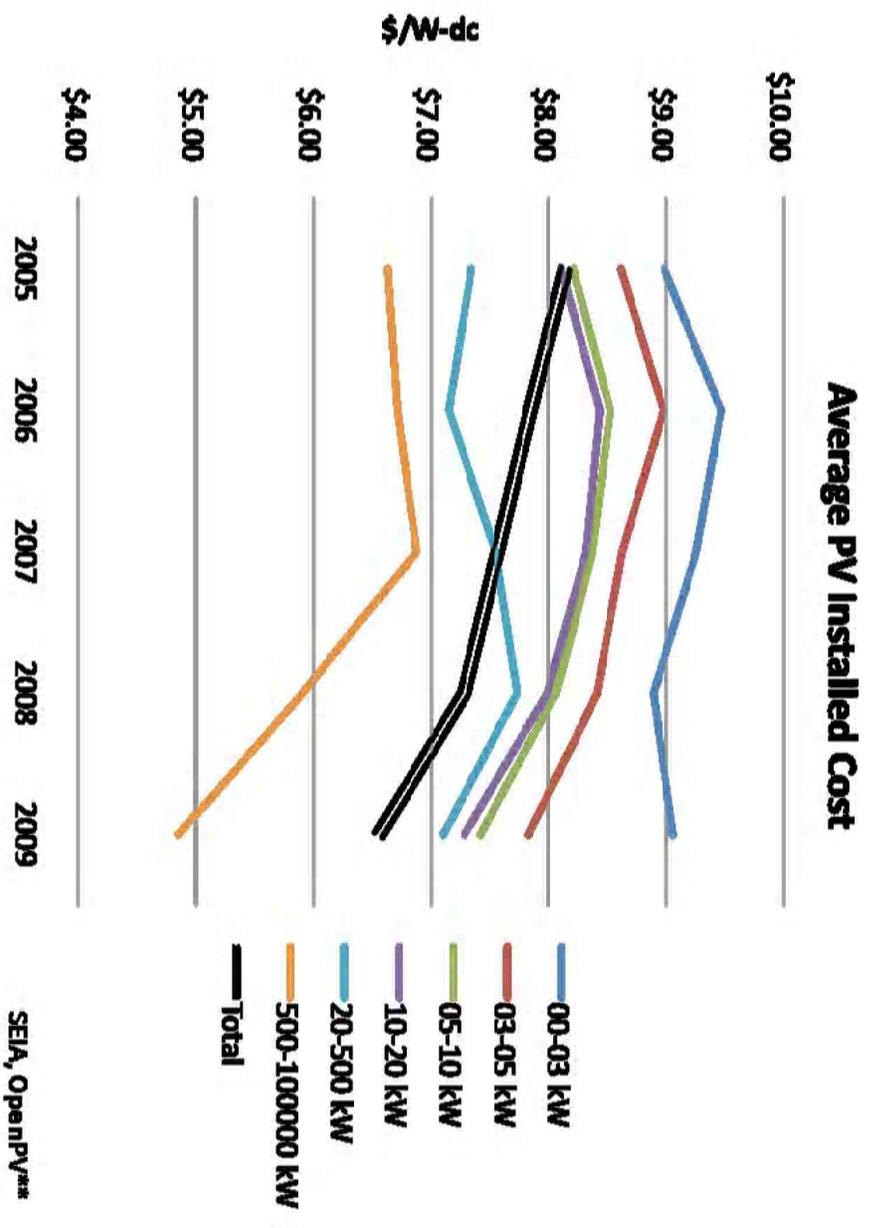


* "Utility sector" refers to all capacity that feeds electricity directly into the distribution grid or the transmission grid, rather than primarily serving on-site use. It includes utility-scale solar power plants, utility-owned distributed systems, and non-utility owned distributed systems located on customer property that connect to the grid on the utility side of the meter.



PV Nanotechnology - Light Sensitive Dyes

Average Installed Cost of PV

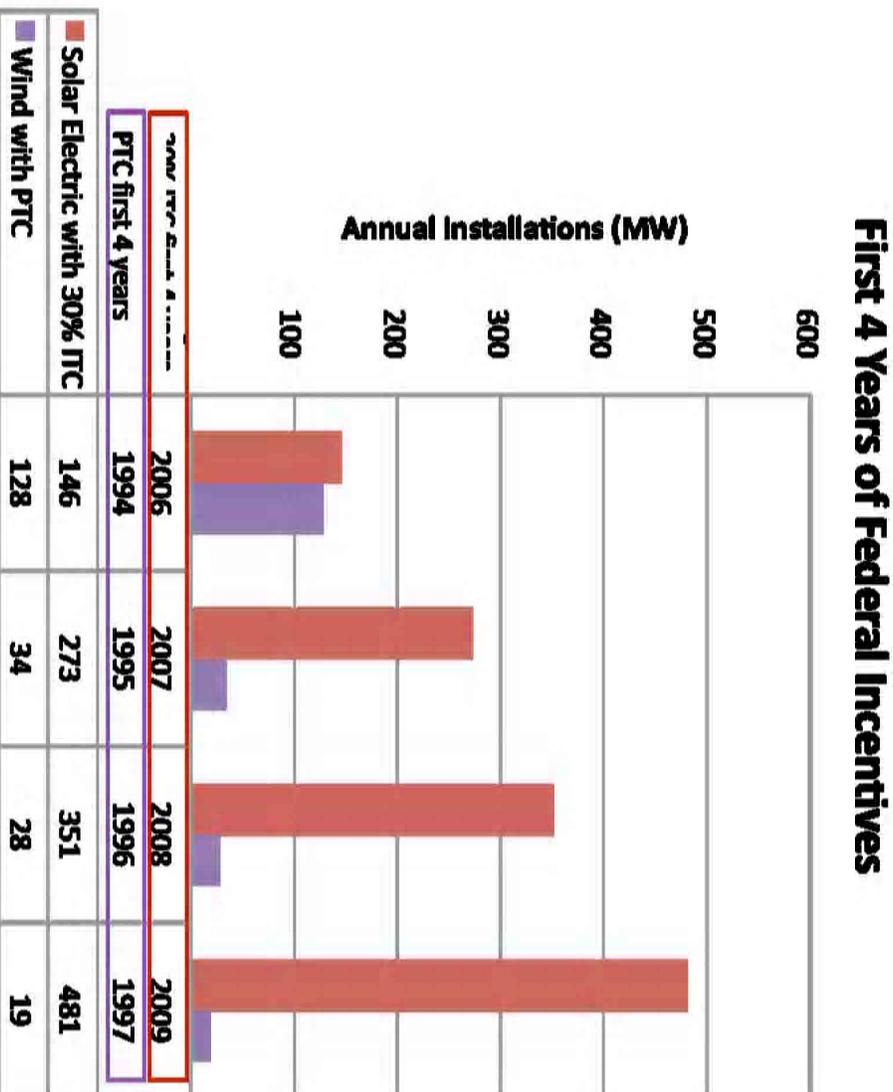


- This is beginning to

* Paula Mints, Navigant Consulting, Inc.
 ** Capacity-Weighted Average. Data from OpenPV.mrel.gov downloaded 3/30/10.

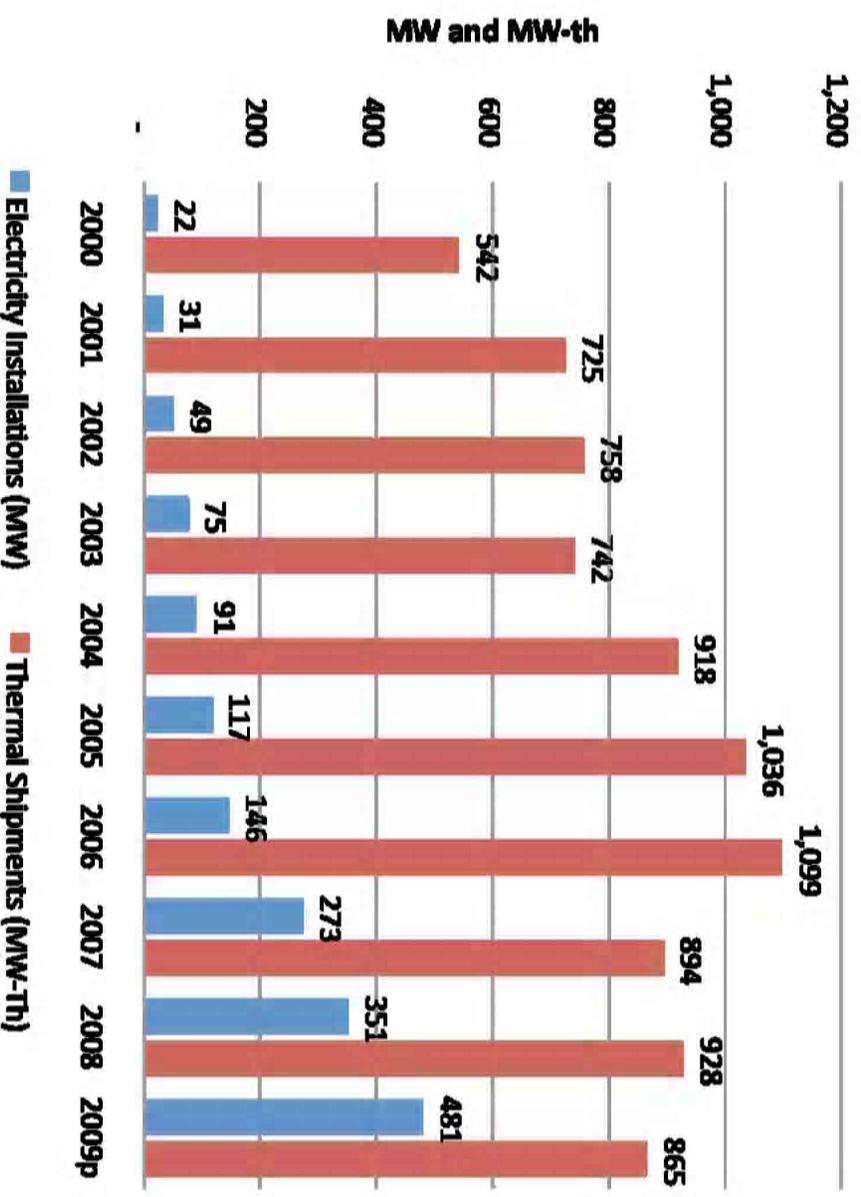
Solar On Track

- In 2009:



Annual Growth of US Solar Energy Capacity Additions

US Solar Energy Capacity Additions



CAGR 2000-2009

- Electric: 41%*
- Thermal: 5%**

CAGR 2006-2009

- Electric: 49%
- Thermal: -8%***

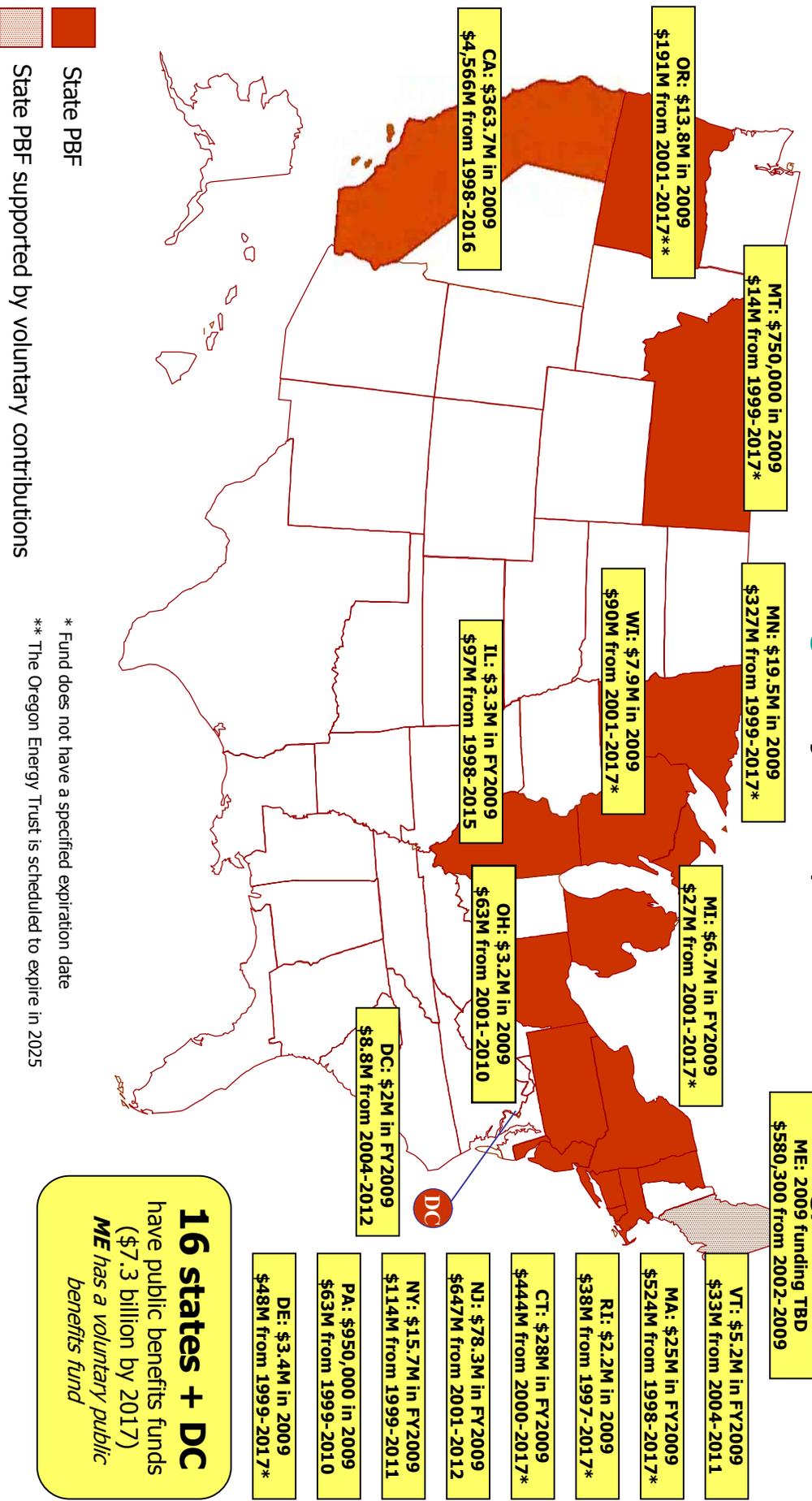
* Electric includes PV and CSP (including off-grid PV)

** Thermal includes solar water heating, solar pool heating, space heating and space cooling.

*** Decline in annual thermal shipments is due to a decline in pool heaters. Solar water heating grew over this period.

US State Public Benefit Funds

www.dsireusa.org / May 2009 (estimated funding)



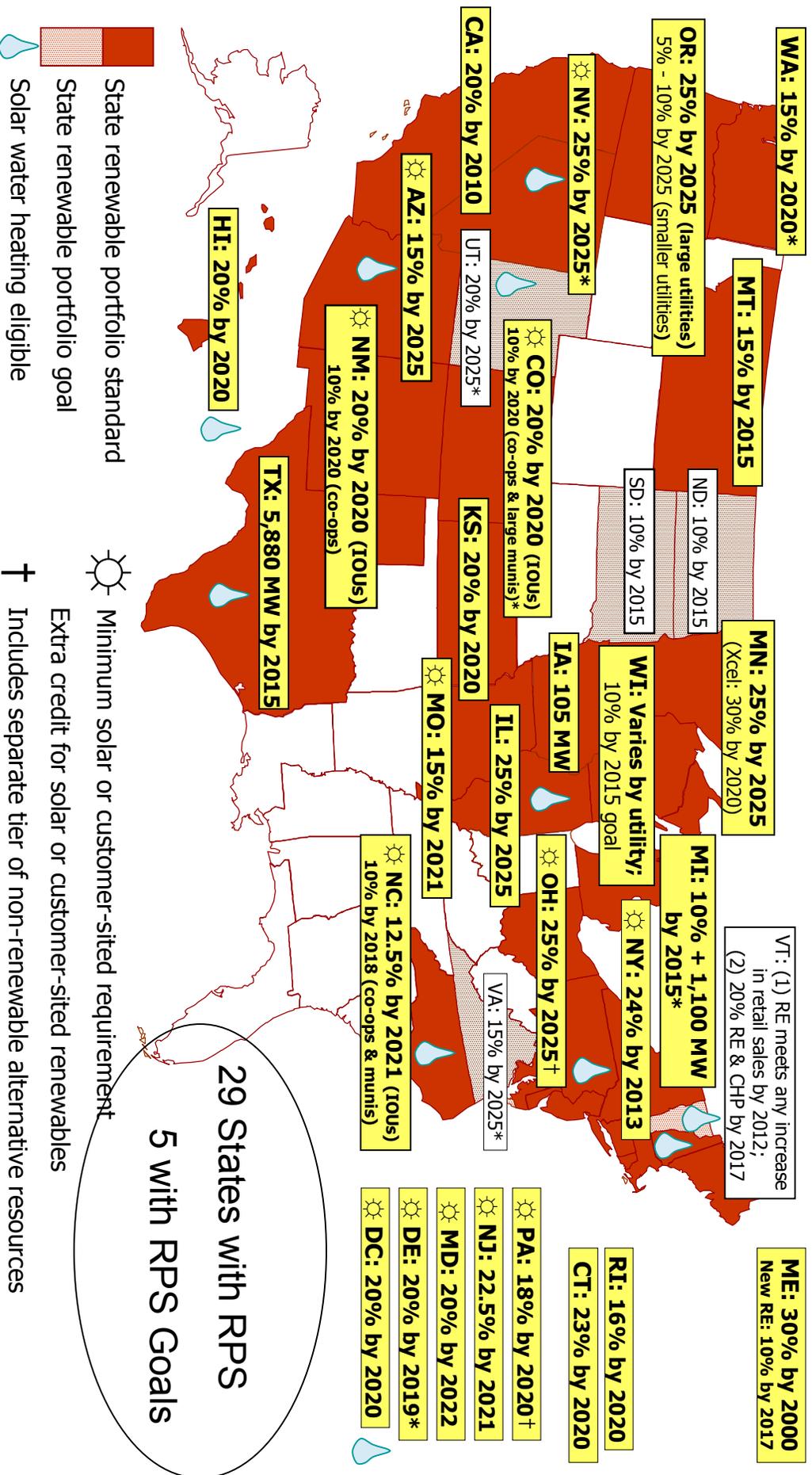
16 states + DC have public benefits funds (\$7.3 billion by 2017)
ME has a voluntary public benefits fund

State PBF
State PBF supported by voluntary contributions

* Fund does not have a specified expiration date
** The Oregon Energy Trust is scheduled to expire in 2025

US State RPS Policies

www.dsireusa.org / June 2009





SOLAR-LIT BIKE HOUSE

Union Station
Washington DC