

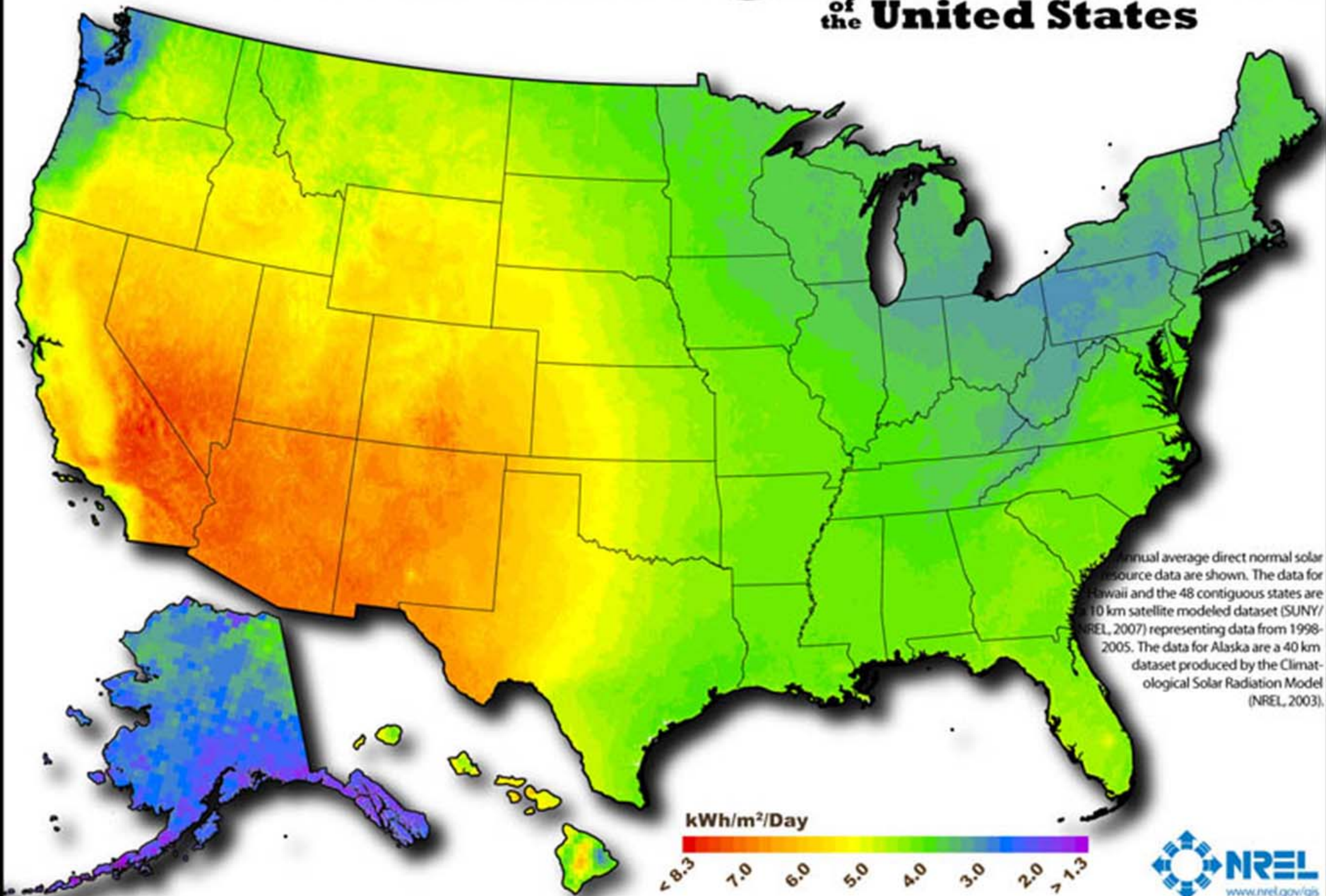


ASU Solar Summit 2012

March 27, 2012

Phoenix, AZ

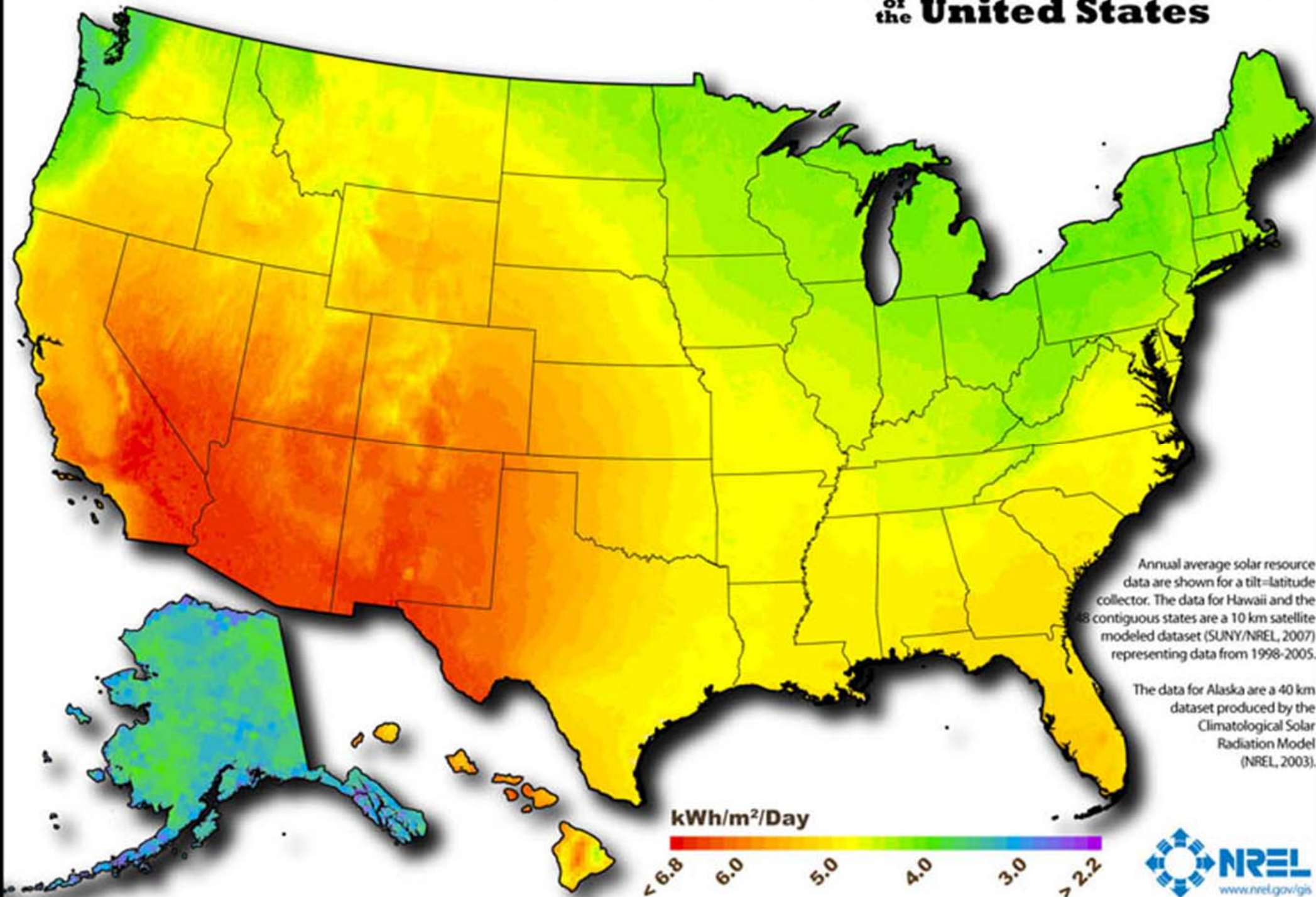
Concentrating Solar Resource of the United States



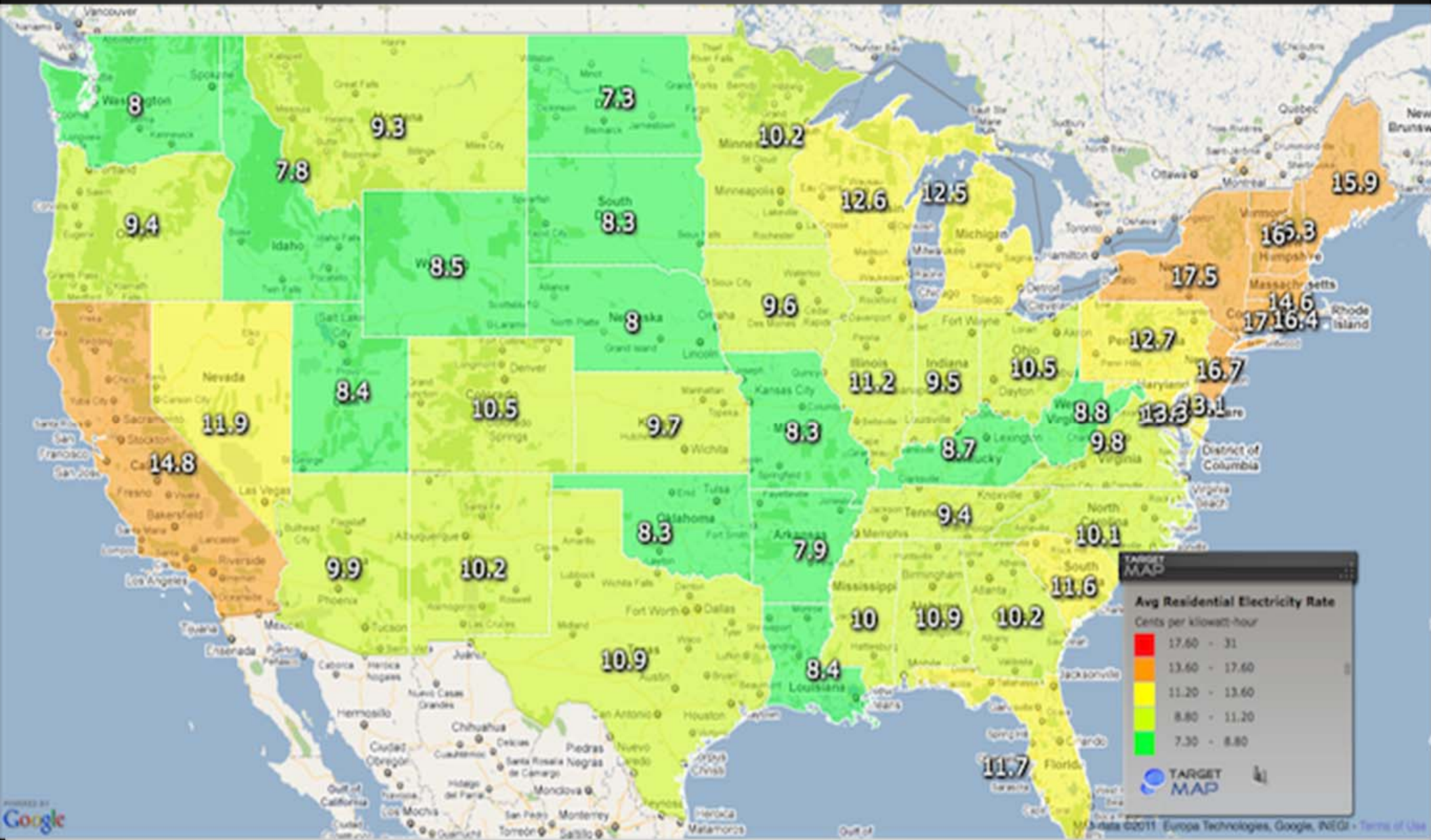
This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy.

Author : Billy Roberts - October 20, 2008

Photovoltaic Solar Resource of the United States



This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy.



Average electricity cost

Total Installed PV System Prices and Costs of Electricity (Global Avg)

Year	System Price (\$/w)	LCOE Range (cents/kwh)
2007	\$7.20	28 - 47
2008	\$7.00	27 - 45
2009	\$5.12	20 - 34
2010	\$4.55	18 - 30
2011	\$3.47	14 - 23
2012*	\$2.69	11 - 19
2013*	\$2.43	10 - 17
2014*	\$2.19	9 - 15
2015*	\$2.02	8 - 14
2016*	\$1.87	7 - 14
2017*	\$1.73	7 - 13
2018*	\$1.60	6 - 12
2019*	\$1.48	6 - 11
2020*	\$1.37	6 - 10
2021*	\$1.28	5 - 10

LCOE – Levelized Cost of Electricity

Source: Clean Edge, Inc. 2012 (*estimated)

U.S. SOLAR INDUSTRY INDICATORS
FOR THE FIRST QUARTER OF 2011

SOLAR SYSTEM PRICE



(VS. Q1 2010)

NEW SOLAR PV INSTALLATIONS



INSTALLED SOLAR

2.85GW ENOUGH TO POWER 570,000 CUMULATIVE TYPICAL HOMES



UNDER CONSTRUCTION

1.1GW CONCENTRATING SOLAR POWER

ENOUGH TO POWER 220,000 TYPICAL HOMES



TOTAL GROWTH

OF U.S. SOLAR MARKET FROM '09-'10 (BY REVENUE)



100,000 U.S. SOLAR INDUSTRY JOBS

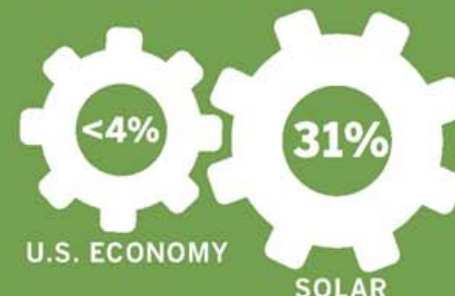
MORE JOBS THAN U.S. STEEL PRODUCTION

(ACCORDING TO SOLAR ENERGY INDUSTRIES ASSOCIATION; BUREAU OF LABOR STATISTICS)



MANUFACTURING GROWTH

(YEAR-OVER-YEAR; THE FEDERAL RESERVE)



TOP 10 SOLAR STATES

	Q1 2011	Q1 2010	CHANGE IN RANK
CA	1	1	—
NJ	2	2	—
AZ	3	3	—
PA	4	8	▲4
CO	5	5	—
NY	6	7	▲1
MA	7	9	▲2
MD	8	16	▲8
OR	9	13	▲4
TX	10	15	▲5

greentechmedia:



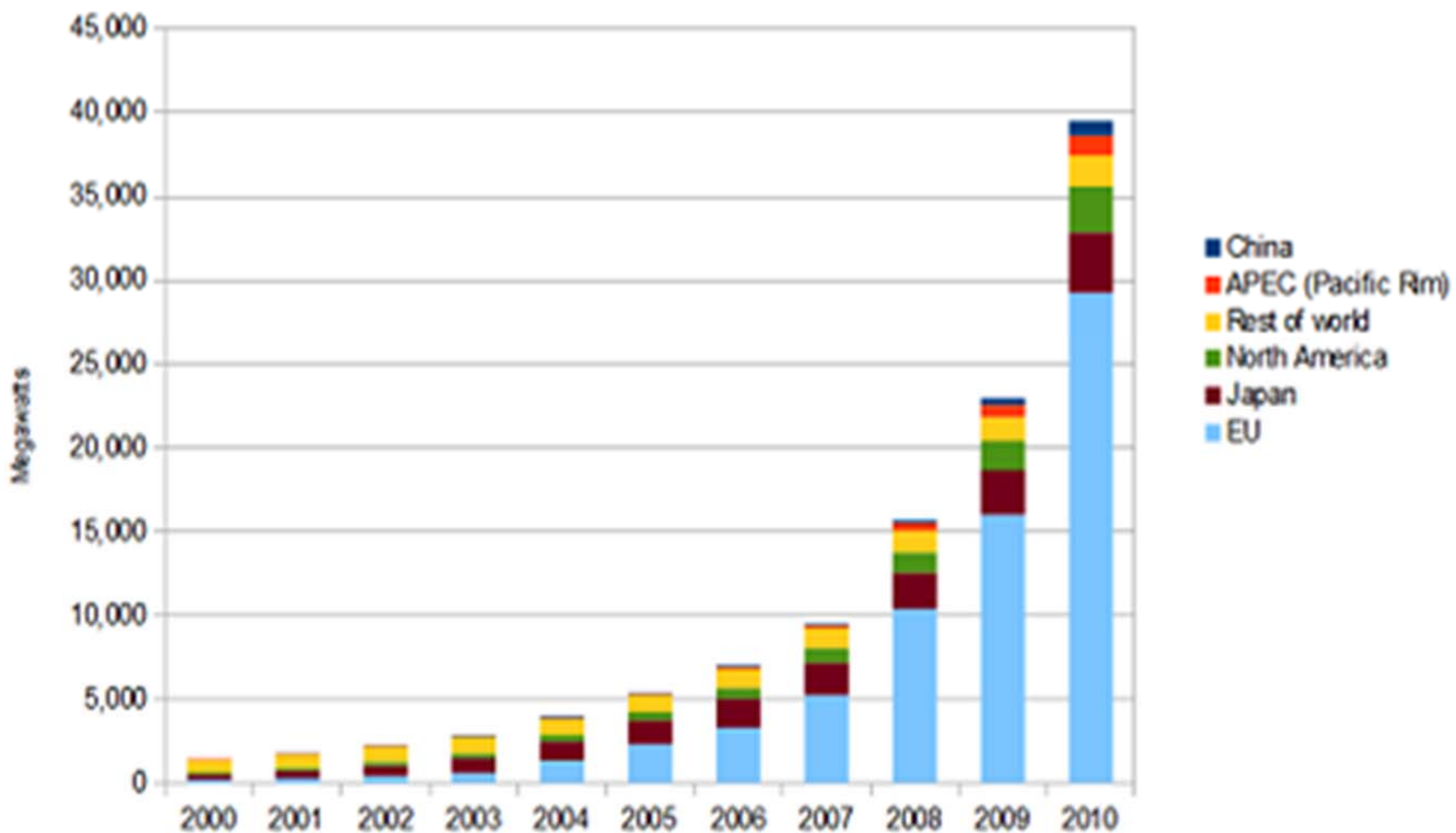
Q1 2011 vs. Q1 2010

Global Clean Energy Market Size 2000-2011

Year	Solar PV Global Market Sz. (in \$Billions)	Wind Power Global Market Sz. (in \$Billions)	Biofuels Global Market Sz. (in \$Billions)
2000	\$2.5	\$4.0	N/A
2001	\$3.0	\$4.6	N/A
2002	\$3.5	\$5.5	N/A
2003	\$4.7	\$7.5	N/A
2004	\$7.2	\$8.0	N/A
2005	\$11.2	\$11.8	\$15.7
2006	\$15.6	\$17.9	\$20.5
2007	\$20.3	\$30.1	\$25.4
2008	\$29.6	\$51.4	\$34.8
2009	\$36.1	\$63.5	\$44.9
2010	\$71.2	\$60.5	\$56.4
2011	\$91.6	\$71.5	\$83.0

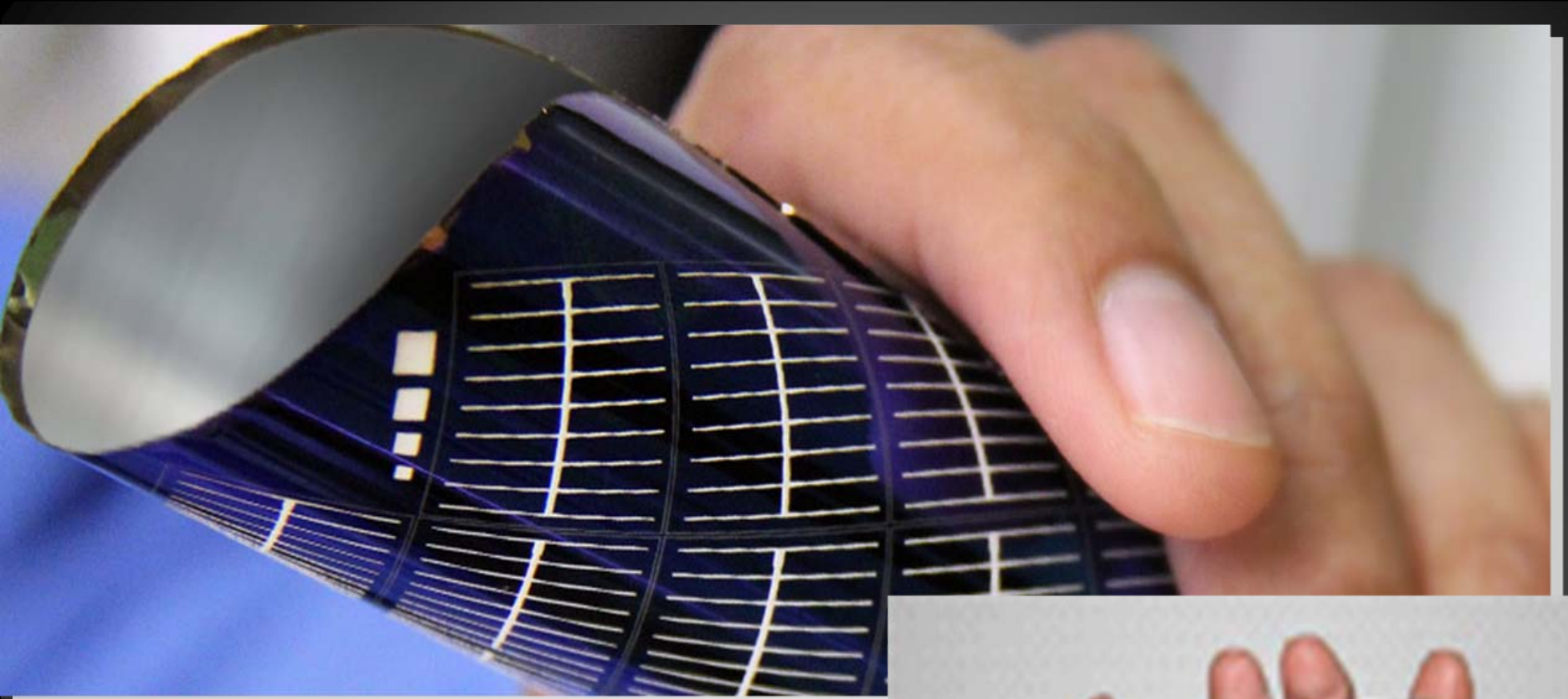
Global Cumulative Installed PV Solar Capacity

Source: EPIA data

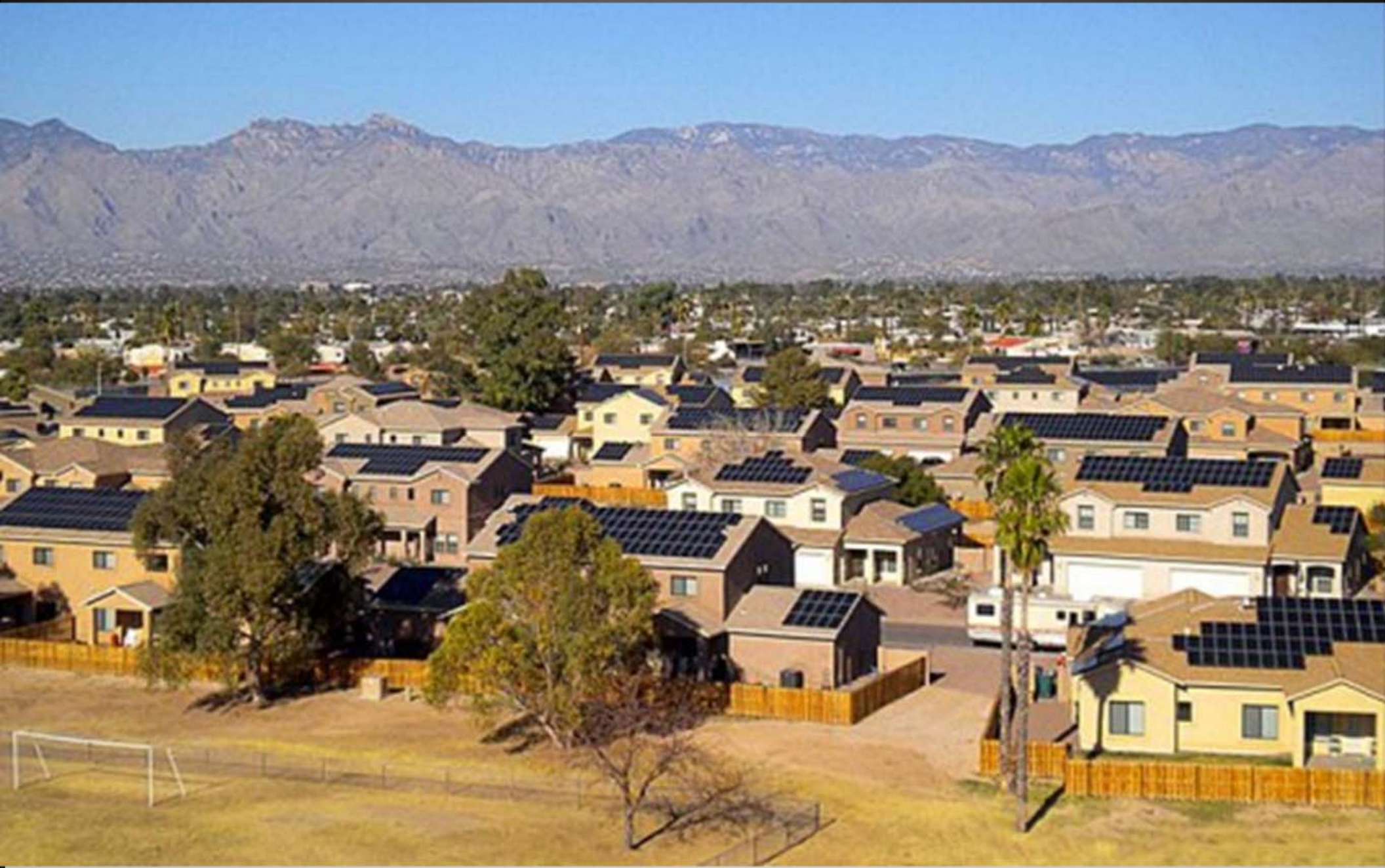




Source: NREL







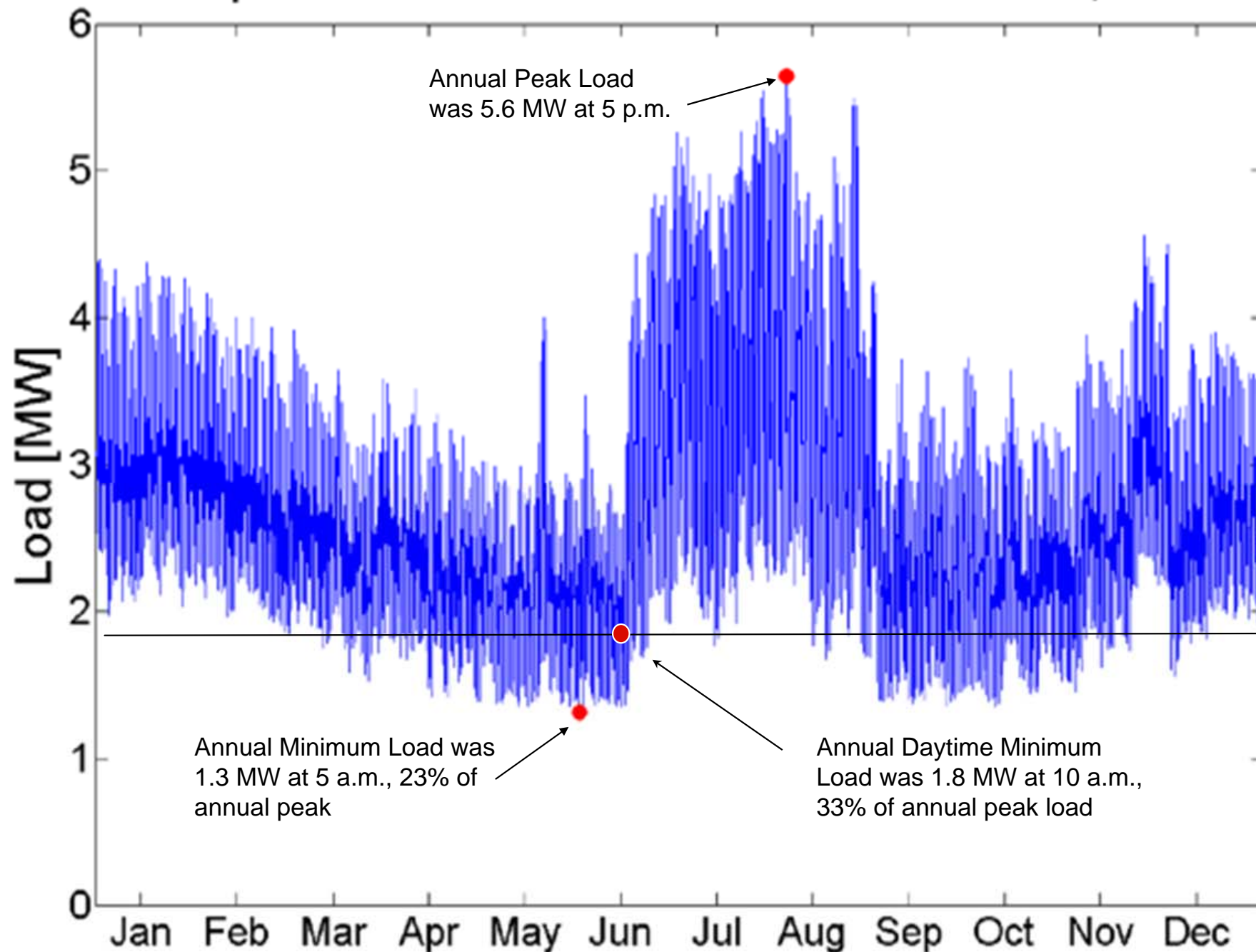
Source: AirForce Times

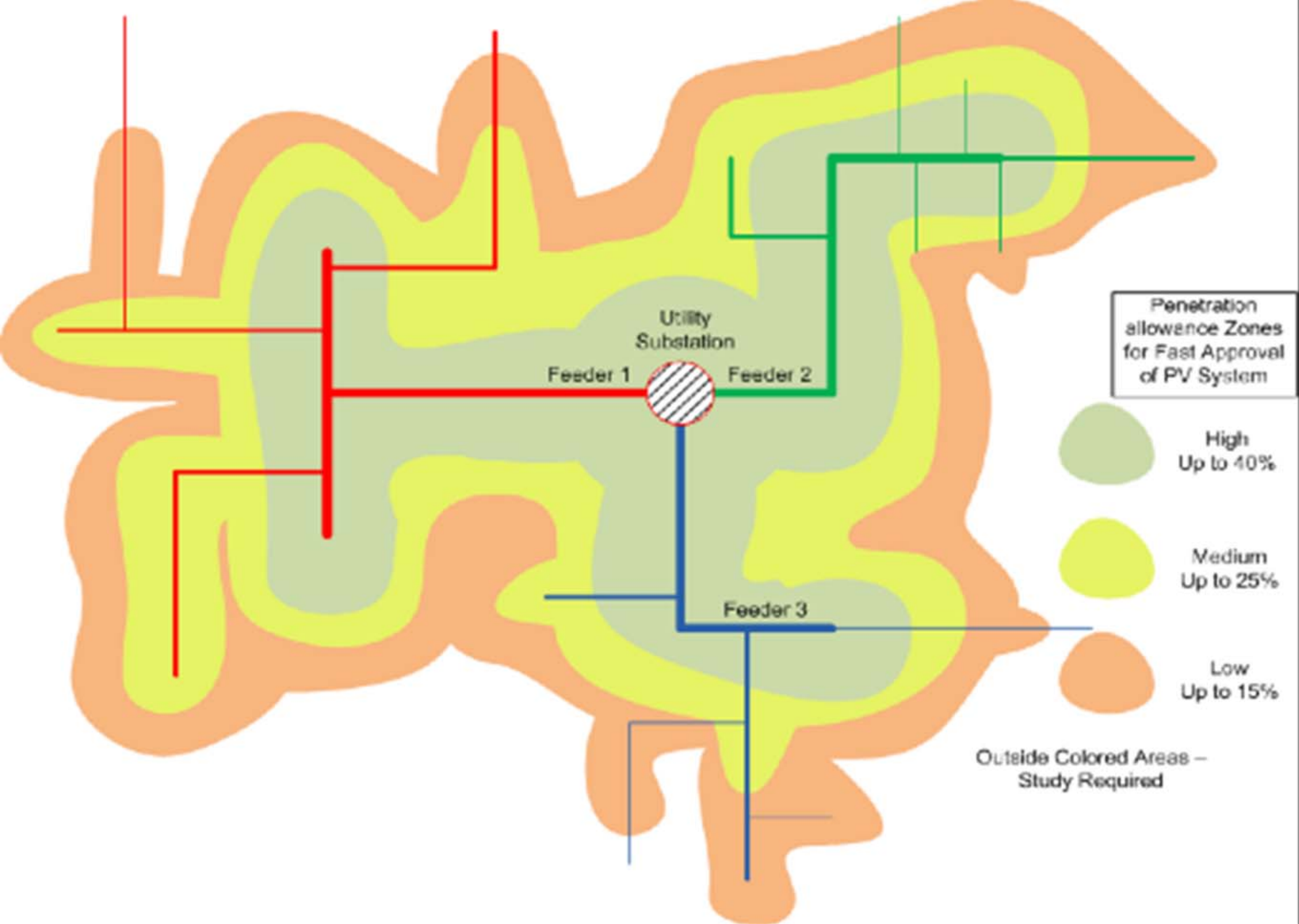




Source: CleanTechnica

Sample Commercial/Residential Load Profile, 2008









GRIDresponse
Intelligent Distributed
Energy Resources (I-DER)
Planning & Management

Generation Reduction (MW): **0.0000**
Total Dispatched (MW): **0.0000**

Demand Side Resources

DR-R **DR-C** **DG** **Storage**

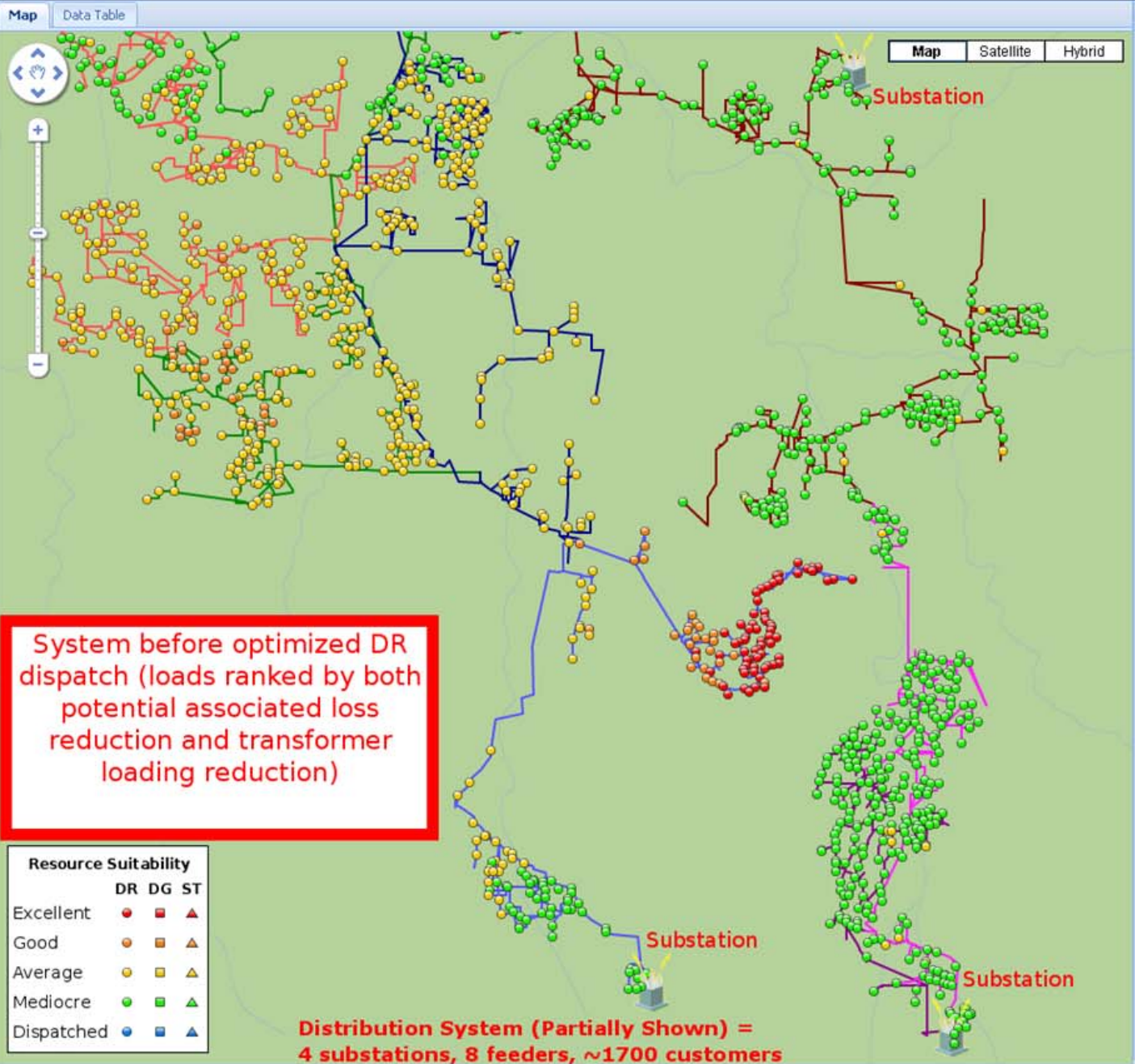
Dispatch Recall **Criterion**

DR Criteria: Losses Transformer Loading **Both**

Customer Impact

Frequency: Every
Max Duration (Hrs.): 6
Curtailment / Year: 10
Recall Mode: RSI

Type	Rank	ID	Load kW	ICAP kW	Total MW
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GRIDresponse
Intelligent Distributed
Energy Resources (I-DER)
Planning & Management

Generation Reduction (MW): **1.3662**
Total Dispatched (MW): **1.0056**

Demand Side Resources

DR-R DR-C DG Storage

Dispatch Recall Criterion

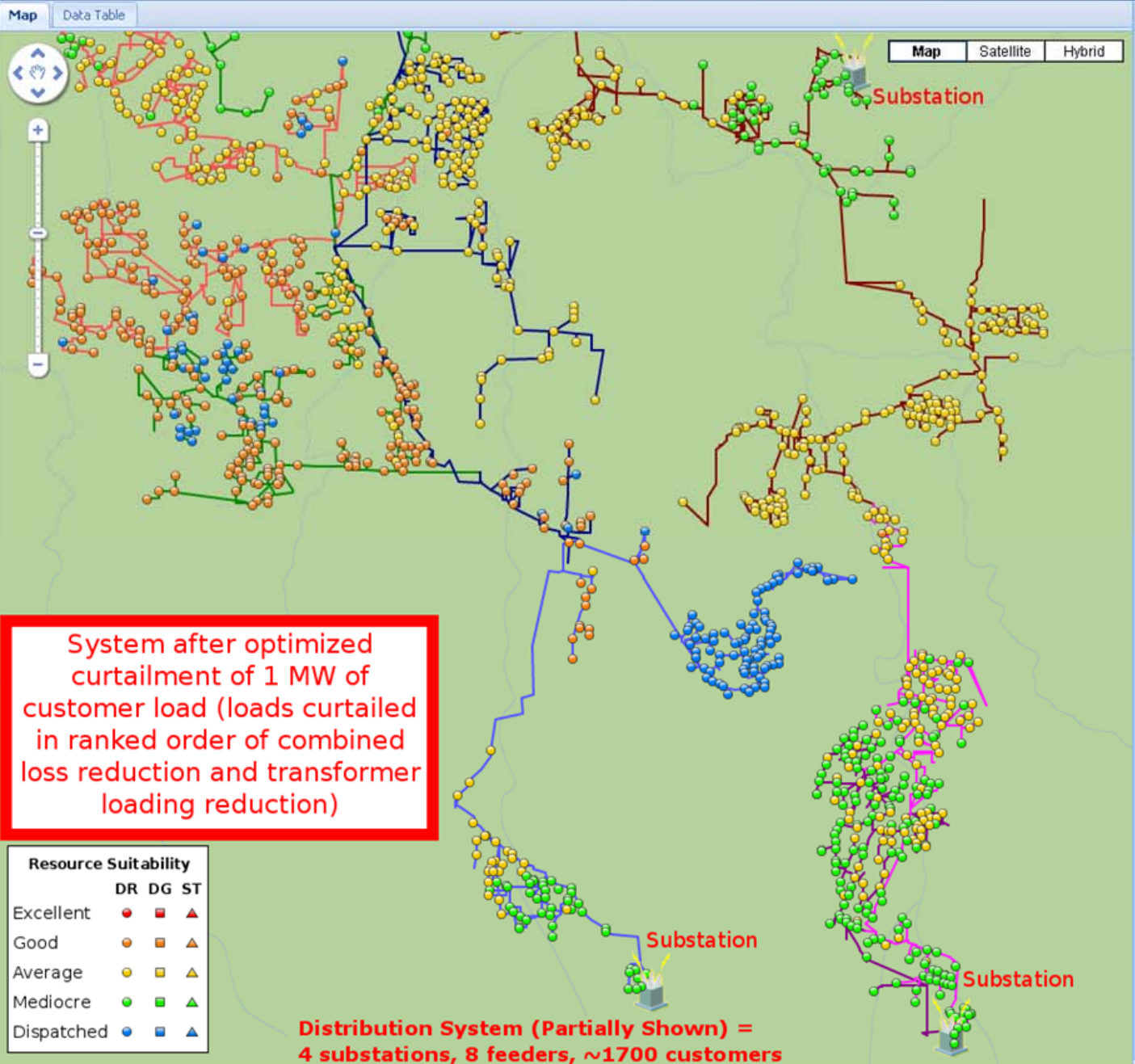
Automatic Manual Show All Clear Selections

System Generation (MW): 47.2840
Total Available to Dispatch (MW): 14.7373

Available to Dispatch per Resource Type (MW)

DR-R: 2.9973 DR-C: 2.9400 DG: 6.4000 Storage: 2.4000

Type	Rank	ID	Load kW	ICAP kW	Total MW	
<input type="checkbox"/>	DRC	8	TXB184393B	196.00	29.40	0.0294
<input type="checkbox"/>	DRC	10	TXB184385B	196.00	29.40	0.0588
<input type="checkbox"/>	DRR	12	TXB184814B	8.76	1.31	0.0601
<input type="checkbox"/>	DRR	14	TXB184446B	42.00	6.30	0.0664
<input type="checkbox"/>	DRR	15	TXB184460B	42.00	6.30	0.0727
<input type="checkbox"/>	DRR	16	TXB184450B	42.00	6.30	0.0790
<input type="checkbox"/>	DRR	17	TXB184448B	42.00	6.30	0.0853
<input type="checkbox"/>	DRR	18	TXB184732B	10.25	1.54	0.0869
<input type="checkbox"/>	DRR	19	TXB184447B	42.00	6.30	0.0932
<input type="checkbox"/>	DRR	20	TXB184459B	42.00	6.30	0.0995
<input type="checkbox"/>	DRR	21	TXB202722B	11.15	1.67	0.1011
<input type="checkbox"/>	DRC	22	TXB184401B	56.00	8.40	0.1095
<input type="checkbox"/>	DRR	24	TXB184441B	28.00	4.20	0.1137
<input type="checkbox"/>	DRR	25	TXB184456B	28.00	4.20	0.1179
<input type="checkbox"/>	DRR	26	TXB184454B	28.00	4.20	0.1221

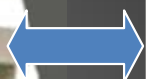
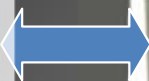


System after optimized
curtailment of 1 MW of
customer load (loads curtailed
in ranked order of combined
loss reduction and transformer
loading reduction)

Resource Suitability

	DR	DG	ST
Excellent	●	■	▲
Good	○	□	△
Average	●	■	▲
Mediocre	●	■	▲
Dispatched	●	■	▲

**Distribution System (Partially Shown) =
4 substations, 8 feeders, ~1700 customers**





Favorable Ratings: 2009, 2010, and 2011 Surveys

Concept	"Extremely" or "Very" Favorable		
	2009	2010	2011
Solar Energy	81%	79%	77%
Wind Energy	79%	75% ↓	71% ↓
Hybrid Vehicles	70%	64% ↓	61%
Electric Cars	62%	57% ↓	55%
Natural Gas Cars	N/A	N/A	51%
Clean Coal	52%	47% ↓	42% ↓
Nuclear Power	47%	42% ↓	40%
Biofuels	56%	47% ↓	39% ↓
Smart Meters	N/A	37%	38%
Smart Grid	47%	37% ↓	37%
Carbon Offsets/Credits	26%	24%	19% ↓
LEED Certification	16%	19%	18%
Cap and Trade	16%	15%	14%
Average Favorability	50%	45% ↓	43%

Arrows indicate a significant increase or decrease from the previous year, outside the +/- 3% margin of error for this survey.

(Source: Pike Research)

<i>More important energy priority</i>	March 2011	March 2012	Change
Developing wind, solar, & hydrogen	63%	52%	-11%
Expanding oil, coal & natural gas	29%	39%	+10%
Both/Don't know	<u>8%</u>	<u>9%</u>	
Pew Research Center Mar. 7-11, 2012	100%	100%	