



Solar RECs: A Market-Based Incentive Mechanism for Solar Production

Jan Pepper

Clean Power Markets, Inc., *an Enerwise Company*

11th National Renewable Energy Marketing Conference

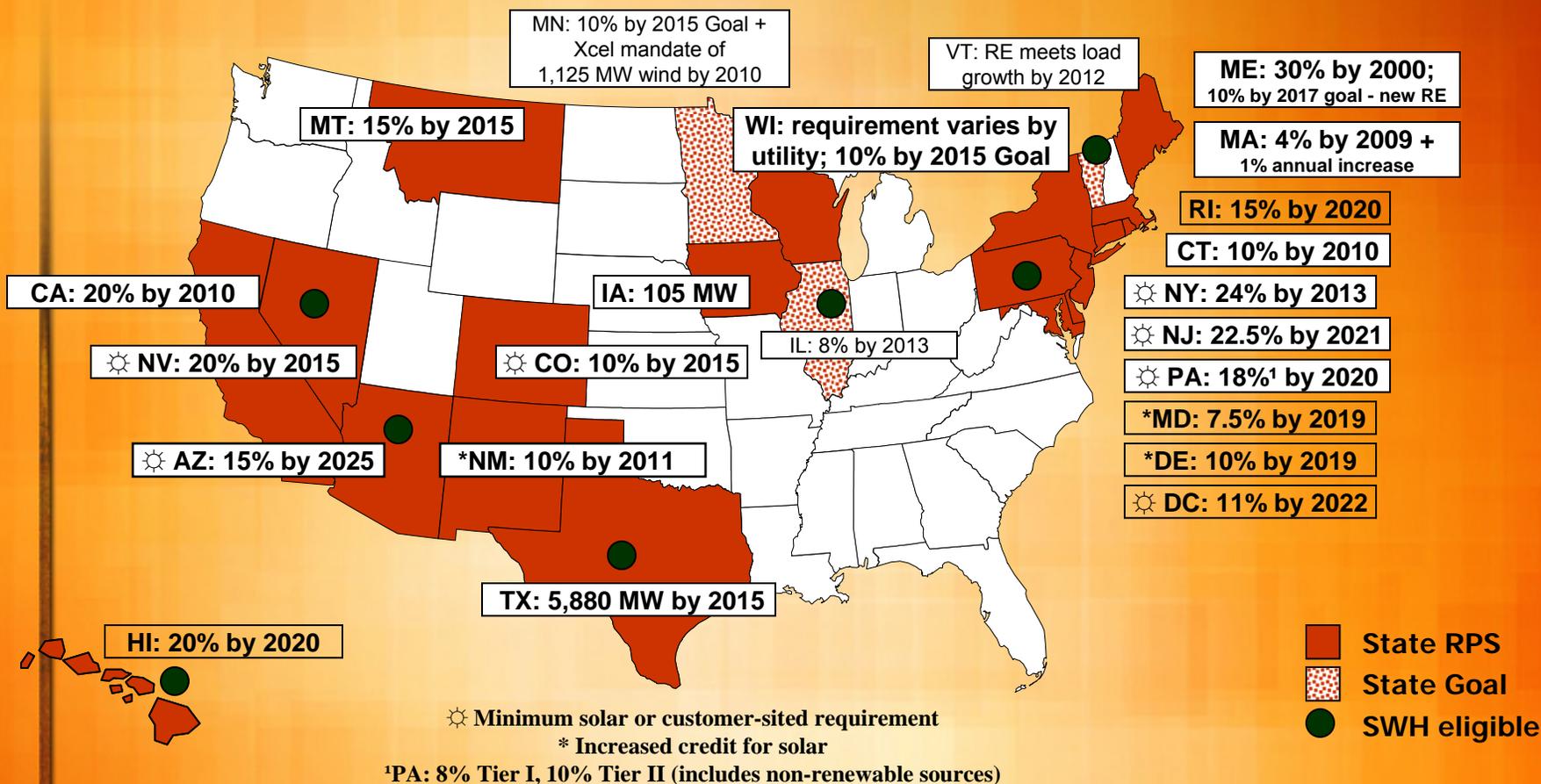
San Francisco, CA

December 5, 2006

Where are Solar REC “Markets”?

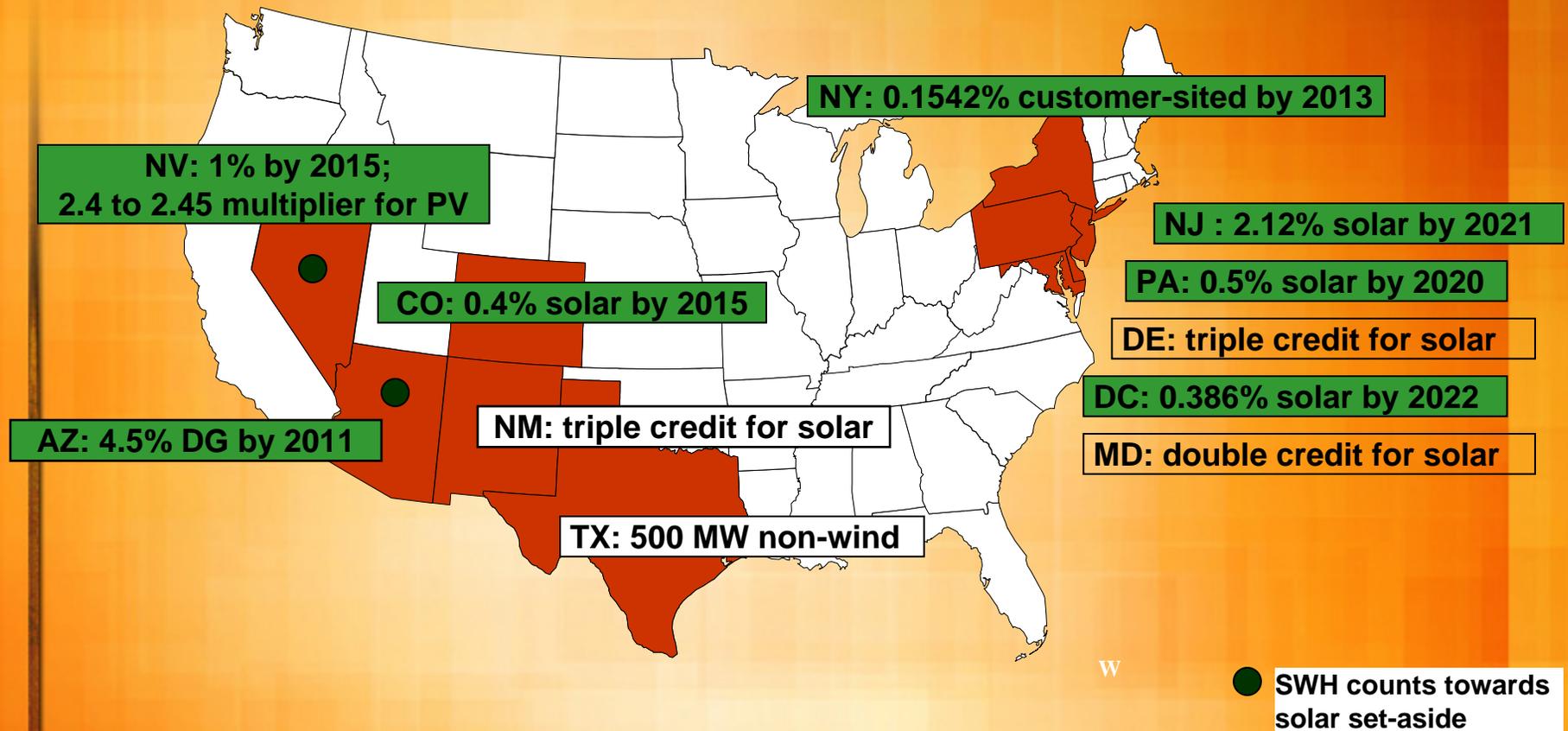
- Compliance-driven:
 - States with solar share in Renewable Portfolio Standard (RPS)
 - States without solar share in RPS
- Hybrid:
 - States with incentive programs
 - Utility Programs
- Voluntary Programs

Renewable Portfolio Standards



Source: DSIRE: www.dsireusa.org, October 2006

Solar in RPS Programs



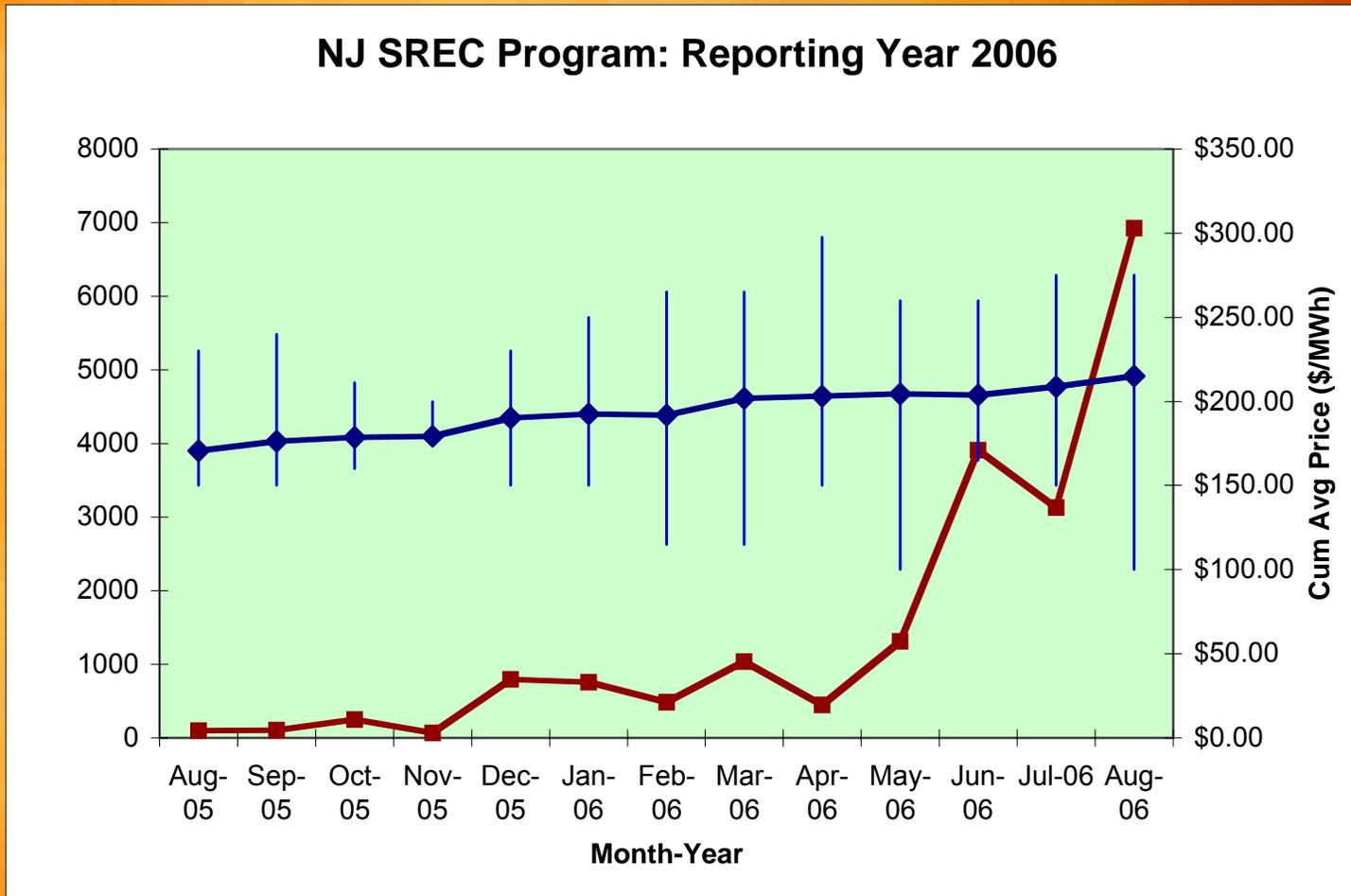
Source: DSIRE: www.dsireusa.org, October 2006

Solar in New Jersey's RPS

- New Jersey RPS includes a solar requirement - - > drives demand
- Purchases of SRECs by LSEs meet requirement
- Restricted to NJ-interconnected systems
- SRECs issued, based on:
 - Actual production (≥ 10 kW)
 - Engineering estimates (< 10 kW)
- NJ Solar Incentives = buy-down + SRECs price set by quasi-market
- Solar Alternative Compliance Payment = \$300/MWh (30 cents/kWh) - sets maximum value for SRECs
- CPM designed, built, & administers SREC registry, tracking, & bulletin board for NJ BPU, launched in June 2004



SREC Prices in NJ



RECs-only Proposals in NJ

- Underwriter - REC buyer of last resort
- Standard contracts - even playing field
- Tariff model - PBI credit on utility bill + RECs
- Auction - Set SREC rate over 5 years
- Multipliers - encourage long-term contracts
- Higher ACP - make-up for difference of no buy-downs

PA AEPS Program



- Open to systems in PJM region +
- SREC price set by market
- Maximum price (ACP) set at 200% of regional prices
- Solar share in RPS sets demand
- SRECs issued based on
 - Actual production (≥ 10 kW)
 - Engineering estimates (< 10 kW)
- Annual audit of performance

Drivers in REC-Based Programs

Program	RPS Type	Solar as Voluntary	Participation Rate (kW)	REC Multiplier	Long-Term Contract	Buy-down	Prod'n Monitoring	Participation funded
Xcel Energy (CO)	Solar %		13,000 MWh/yr goal		★	★		
CSI			122,000 MWh goal year 1				★	
NV RPS	Solar %			2.45				
NJ SREC	Solar %		29,000 + kW installed			★	★	
NM RPS/PNM	Tier 1			3	★			
ECAP (PA)	Solar %	★	35 systems; 109 MWh		★	★		
PECO SDF	Solar %	★	202.1 kW			★	★	
PP&L/Mass Energy	Tier 1	★	100 systems		★		★	
WA REPI		★		2.4 WA PV 1.2 WA inverters	★		★	
TVA Green Power Switch		★	9 systems		★		★	
Chelan PUD SNAP		★	39 systems		★		★	★
Okanogan PUD SNAP		★	3 systems		★		★	★
WE Energies		★	Max 500 kW		★		★	

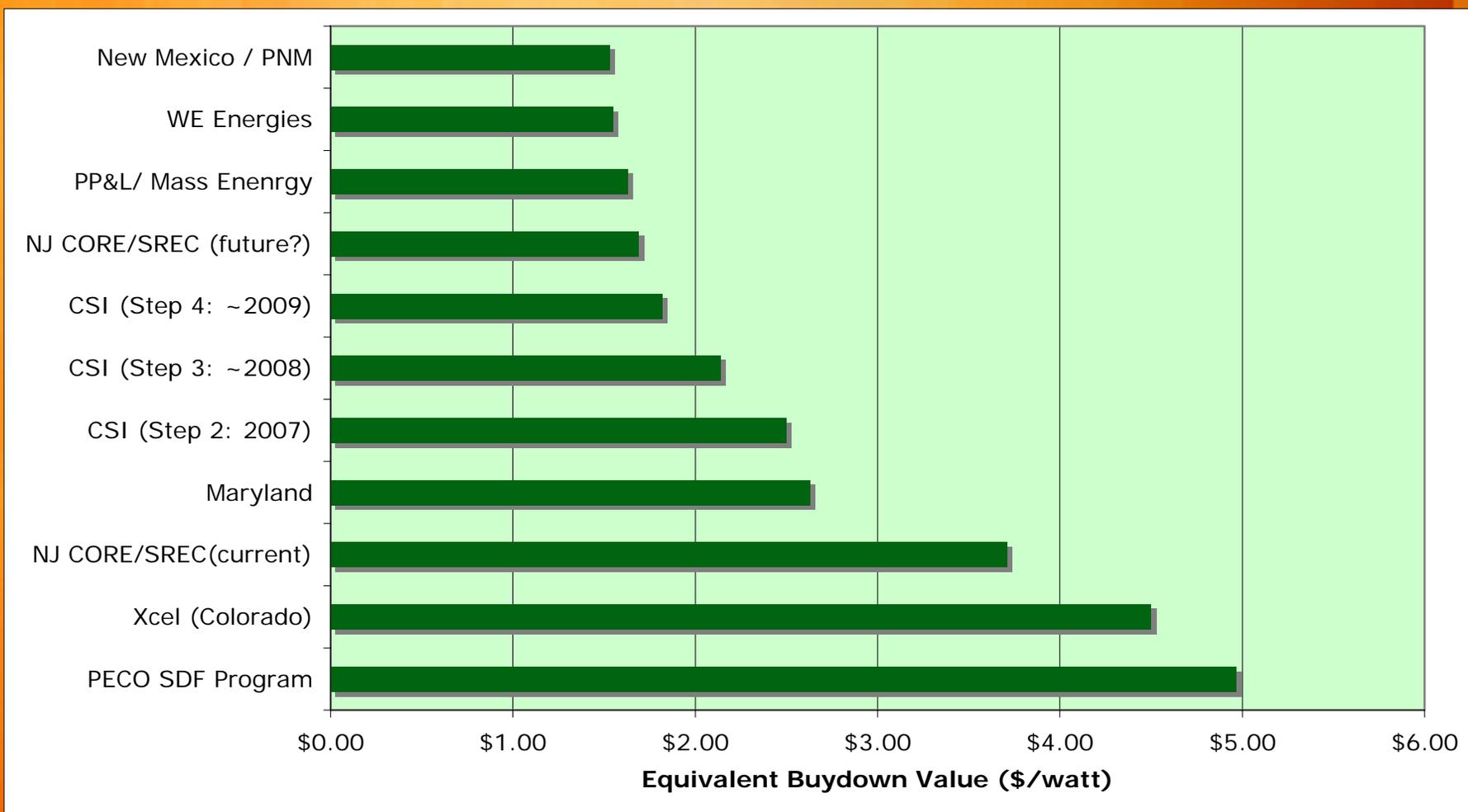
Comparisons of REC Programs

Program	Equivalent Buydown Value (\$/watt)(*)	Buydown (\$/watt)	REC or PBI (\$/kWh)	Number of Years (**)	Solar RPS?	Assumed kWh/kW
PECO SDF Program	\$4.97	\$4.00	\$1.00	1	Yes / Voluntary	1050
Xcel (Colorado)	\$4.50	\$2.00	\$2.50/watt	1	Yes	na
NJ CORE/SREC(current)	\$3.71	\$2.50	\$0.22	No limit	Yes	1050
Maryland	\$2.63	\$0.00	\$0.40	No limit	No	1225
CSI (Step 2: 2007)	\$2.50	\$0.00	\$0.39	5	No	1600-1700
CSI (Step 3: ~2008)	\$2.14	\$0.00	\$0.34	5	No	1600-1700
CSI (Step 4: ~2009)	\$1.82	\$0.00	\$0.26	5	No	1600-1700
NJ CORE/SREC (future?)	\$1.69	\$0.00	\$0.30	No limit	Yes	1050
PP&L/ Mass Energy	\$1.63	\$0.00	\$0.60	3	Yes / Voluntary	1050
WE Energies	\$1.55	\$0.00	\$0.23	10	Yes / Voluntary	1050
New Mexico / PNM	\$1.53	\$0.00	\$0.13	12	No	1750

* Assume 8% discount rate

** For programs where REC is of unlimited duration, assumed years 1-5 at full value & years 6-10 at 50% value

Comparisons of Incentive Values



Prices in Markets

Bid / Ask on November 16, 2006

	State	Quantity	Vintage	Bid	Ask	Source
Voluntary Markets	CA	1500	2005	None	\$25	Evolution Markets
Compliance Markets	NJ	1 to 50	RY 2007	\$185 / 190	\$210 / \$280	NJ SREC Bulletin Board

Can Solar RECs be Driven Solely by Market?

- Industry perceives cost of solar as too high to undertake without incentives
- Long-Term Goal: Need market model that works without regulation / government intervention
 - Remove regulatory uncertainty
 - Shorter-term paybacks
 - Business is quarter-to-quarter on Wall Street
 - Owner receives full value of benefits:
 - RECs, Avoided CO2, Fuel Price Stability, etc.
- REC ownership must remain with solar owner to reach long-term goal

Thank you



- Clean Power Markets, Inc., *an Enerwise Company*
 - Incorporated in 2000
 - Mission: to provide the infrastructure that allows renewable energy to compete cost-effectively and efficiently
 - Operates tracking systems for NJ Behind-the-Meter, Wisconsin RPS, CT CCEF
 - Became wholly-owned subsidiary of Enerwise Global Technologies in Oct 2006
- Jan Pepper
President, Clean Power Markets
650-949-5719
pepper@cleanpowermarkets.com
www.cleanpowermarkets.com