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Tucson Electric Power Company

4350 E. Irvington Road, Post Office Box 711
Tucson, Arizona 85702

April 13, 2006

Docket Control
Arizona Corporation Commission
1200 West Washington Street
Phoenix, AZ 85007

Re: Compliance Filing due pursuant to A.A.C. R14-2-1618, paragraph D
Docket No. **RE-00000C-00-0377**, Decision No. 63486

Docket Control:

Tucson Electric Power Company is required by A.A.C. R14-2-1618, paragraph D to file reports on sales and portfolio power demonstrating the output of portfolio resources, the installation date of portfolio resources, and the transmission of energy from those portfolio resources to Arizona consumers. Please find enclosed an original and thirteen copies of the required reports for the year ending 2005. Also enclosed is an additional copy of the filing that the Company requests you date-stamp and return in the self-addressed, stamped envelope for our files.

If you have any questions, please do not hesitate to contact me at 520-884-3680.

Sincerely,

Jessica Bryne

Jessica Bryne
Regulatory Services

Cc: Brian Bozzo, ACC
Carmela Leon, ACC
Dave Couture, UNS

Arizona Corporation Commission
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Tucson Electric Power Company

ENVIRONMENTAL PORTFOLIO STANDARD FOR YEAR-END 2005

APRIL 2006

A UniSource Energy Company
P.O. Box 711
Tucson, Arizona 85702

ENVIRONMENTAL PORTFOLIO STANDARD PROGRAMS

EXECUTIVE SUMMARY

The ACC has mandated under the Environmental Portfolio Standard ("EPS"), R14-2-1618, that any Load Serving Entity shall derive a percentage of its total retail energy sold from new solar resources or environmentally-friendly renewable electricity technologies whether that energy is purchased or generated by the seller. The percentage changes each year, increasing to a maximum of 1.1% in 2007 and remaining the same through the life of the standard. In 2005 the percentage is 1.0% of which at least 60% must be derived from solar electric generation.

At the ACC Staff meeting on January 6, 2004, the Commissioners directed Staff to hold a series of workshops to consider four issues related to the EPS Rules (A.A.C. R14-2-1618). The four issues identified by the Commissioners were:

1. A discussion of increasing EP funding levels.
2. Elimination of the EPS expiration Date.
3. Restoration of DSM funding.
4. Allocation of funding among various technologies.

Staff commenced the workshop series on March 5, 2004. The last and 5th Workshop was held on June 25, 2004. A Staff report proposing changes to the EPS was issued January 21, 2005. A proposed draft EPS Rule was issued on April 22, 2005. Discussions and Commission review of the proposed draft rule and EPS programs continued throughout 2005. The EPS will likely be revised after an ACC rulemaking process in 2006.

Renewable Generating Capacity

This report covers TEP's progress for January 1, 2005 through December 31, 2005, and includes cumulative reporting from January 1, 1997. As of December 31 2005, TEP had installed or supported installation of a total of 10,985 kW of renewable generating capacity, which has generated 251,489,076 kWh of renewable energy and generated 398,928,948 kWh of renewable credits using the appropriate multiplying factors in the EPS since January 1, 1997.

EPS Program Results Summary

Since 1999, TEP has spent $32,477,547 on renewable energy development programs in support of developing renewable generation resources to meet the annual energy percentage goals of the EPS. In return, TEP has received revenues of $25,144,419 for these programs. Thus, TEP has spent $7,333,128 more than revenues received in our best effort to meet the annual solar energy percentage goals of the EPS. EPS surcharge collections effectively began in March 2001, and the annual retail energy reported for EPS purposes has been prorated to a ten-month year in 2001 for the purpose of this report.

TEP has successfully met the EPS requirement for "Other" credits every year of the EPS and carried a surplus of 137,010,530 kWh of "Other" credits into 2006. However, TEP was only able to meet 39.19% of its "Solar Electric" goals for 2005 and 45.17% of its "Solar Electric" credit goals for the 58-month period ending December 31, 2005, and carried a deficit of 76,211,219 kWh of Solar credits into 2006. Overall, TEP met 63.51% of its EPS renewable energy goals for 2005, and has met 71.23% of its total 58-month EPS renewable energy goals.

The implementation of a multi-year, pay as you build funded EPS allows for development of cookie cutter PV system designs in a size optimized to take advantage of partnering opportunities with the manufacturers of the major components of photovoltaic ("PV") systems to optimize Balance of System ("BOS") costs through both material and installation labor cost reductions. TEP has taken advantage of this intended feature of the EPS by using refined design techniques to effect cost reductions in electrical systems, support structures, inverters, site preparation, grid connection and data acquisition systems. The EPS, as adopted by the ACC, allowed TEP to be assured of multi-year funding and has provided TEP with certainty of financing essential to enter into long-term relations with specific makers of the primary components of PV systems (PV modules and inverters) to allow for partnering to optimize the BOS design and installation, resulting in BOS costs of less than $1 per DC watt of installed PV capacity in 2003, only the third year of the EPS. This BOS cost level meets a long-term goal of federal renewable energy programs. This benefit would not have been possible with year-to-year EPS funding.

Technical Requirements

In addition to the relatively high initial cost of solar electric generation, there continues to be some technical issues related to the reliability and annual energy production of smaller solar electric generation systems that are a slight hurdle to widespread commercialization of customer-based solar electric generation products. These issues of high initial cost, reduced reliability, and reduced annual energy performance are addressed in the Solar PV Resource Development section of this report.

SunShare & Net Metering

TEP offers the SunShare hardware buy-down program, with ACC approval, to its customers. Since the program was offered in 2001, 77 customers have purchased the Option 2 package, which is a solar kit offered by TEP at a pass through cost. This accounted for 135 kits delivered for installation, representing 203 kW DC. Ninety-seven customers qualified for, and joined, the SunShare Option 1 or Option 3 program through December 31, 2005 with a total installed DC capacity of 197 kWp for both Option 1 and 3. The net program total is 174 SunShare participants through December 31, 2005. There is currently 586 kW DC of customer sited, installed PV capacity as part of the SunShare or customer partnering programs. TEP requested, and received on February 10, 2004, ACC approval for changes in the SunShare program for 2004 to allow more customers to qualify for the program while retaining high standards for safety, reliability and performance of systems in the SunShare program. The ACC also approved a revision in the Option 3 subsidy payment from $2 per DC watt to $3 per DC watt in August 2004.

In 2001, TEP offered, with ACC approval, a net metering option for owners of PV systems of less than 5 kW AC in size. TEP requested, and the Commission approved in March 2003, an increase in the maximum size of a PV generation system qualifying for net metering to 10 kW AC and expanded the eligible technologies to include wind generation up to that size. As of December 31, 2005, 68 PV customers have qualified and enrolled in the net metering

program. No wind customers have yet enrolled in net metering. These PV customers have a combined installed solar generation capacity of about 167 kW DC.

GreenWatts

GreenWatts is an ACC approved TEP green power purchase program that enables interested supporters to pool funds and invest directly in the creation of green power. Each GreenWatt is sold in "blocks" of 20 kWh per month. Revenues from GreenWatts are used for installing more community based solar generation. At the end of December 31, 2005, TEP has commitments from 1,543 residential customers, amounting to adoption of 3,200 blocks and 33 commercial customers who have adopted 706 total blocks of green energy.

Total revenues produced to date are $58,954 from commercial customers and $253,196 from residential customers for total revenue of $312,150. All of these funds have been or soon will be applied to installation costs of additional community based PV systems installed in the Tucson area, such as at the Tohono Chul Museum, the City of Tucson's Hayden Udall Water Treatment Facility, Reid Park Zoo, Hohokum Middle School, Tucson Botanical Gardens, Safford Middle School, Palo Verde High School, TUSD's Project MORE and Davidson Elementary School and Vail School District's Empire High School, among others. The number of GreenWatts adopters more than tripled after a membership campaign featuring "Sunny" the GreenWatt was rolled out in spring of 2002, combined with bulk mailing to all TEP customers. Another membership campaign in November of 2003 increased membership by more than 32%. However, a similar publicity campaign in November 2004 resulted in addition of less than 100 new GreenWatts participants. However, total membership after six years of program offering is just over 0.41% of all TEP customers, as compared to a national average of about 0.75% where green power purchase options have been offered for nine years or more. The program has experienced a higher rate of customers leaving the program in 2005 than in prior years. A membership campaign using bill stuffers will be used in March 2006 after a fairly successful targeted newsletter and radio campaign in late 2005.

Solar Generation Educational Outreach Efforts

The year 2005 saw TEP involved in a range of public events focusing on GreenWatts and SunShare and providing general outreach about solar and renewable energy. TEP was present at events such as the Earth Day Celebration at the Museum and at the Sustainable Building and Solar Tour, which featured several SunShare solar installations. Sunny, TEP's GreenWatts' mascot, remained active calling attention to clean, green renewable energy for children and families, encouraging energy conservation and stimulating questions about energy.

Sunny the GreenWatt is featured monthly as the Energy Efficiency "spokesperson" in ads in Bear Essential News (a statewide school-focused news magazine for children and teachers) talking about energy conservation, solar and renewable energy and the environment. Sunny is also prominent on TEP's education Web page, where he introduces students and teachers to programs designed to involve youngsters in saving energy at their schools. Several activities on the TEP education Web site are focused on learning more about solar energy.

Once again, TEP co-sponsored and participated in a week-long Solar Electric Institute (SEI) installation training offering partial registration scholarships to potential SunShare participants, many of whom are able to afford solar energy by installing the system themselves. In addition, TEP personnel provided trainings and informational presentations at the Tucson Botanical Gardens, through the Arizona-Sonora Desert Museum education department and elsewhere in the community – homeowner association meetings, civic organizations and breakfast clubs.

As in the past, the dedication of facilities at TEP's Community Solar Program recipients provided opportunities for public education. Community PV installations, funded by GreenWatts contributions, remain highly prized by TEP's local school districts and non-profit agency partners. Dedications of the facilities are celebrations for these partners. For example, Ken Clark, Director of the Arizona Energy Office, joined other dignitaries to celebrate the installation of 15 kW of solar at Project MORE, a TUSD alternative high school. Later in the year, a new classroom solar education project was piloted for teachers and students at Project MORE to capitalize on the presence of the school's solar energy. Empire High School, a new addition to the Vail School District and its first high school, opened in 2005, with solar panels as part of its original design.

Other visible community solar projects include the City of Tucson's Clements Recreation Center on the east-side of town, and the Tucson Botanical Gardens midtown. Tucson's first solar powered parking garage, the Pennington Street Garage, was dedicated in the fall at a gathering of state and local dignitaries and several hundred interested supporters of solar and renewable energy. The 60 kW atop the structure, provided by TEP, continue to attract attention and accolades, and to send a positive message to the community about the value of solar energy. Plans are on the drawing boards for community solar installations at the Tucson International Airport, the University of Arizona Visitors Center, and schools in the Amphitheatre and Flowing Wells Districts as well as the Jewish Federation and the Tucson Zoological Gardens, all visible locations that provide excellent educational opportunities.

TEP continues to support the Arizona Solar Center, a renewable energy Web site dedicated to providing renewable energy information specific to Arizona. TEP was also an underwriter of the Solar Adventure put on by the Coalition for Solar, and of the University of Arizona Solar Car. The Luminarias del Pueblo, a project presented by the Tucson Pima Arts Council, provided city-wide visibility for 35 original sculptures – Luminarias – featuring solar lighting provided by TEP and Global Solar Energy, Inc. as primary sponsors. After having been on display around the community during the first months of 2005, the Luminarias were auctioned at a Gala event in May. As a result, some of the Luminarias remain in public locales around the community, a nightly reminder of the possibilities of solar energy. Work has begun on the next Luminarias del Pueblo. Again, the lighted sculptures will be illuminated by solar energy systems provided by TEP in a project that illustrates the value, flexibility and durability of solar energy to a completely different audience.

The GreenWatts.com Educational Programs Web site expanded its offerings immensely during 2005 and continues to grow. In addition to its "SunSite-FunSite," an interactive Web presentation for youngsters and teachers, work began on an in-depth resource for teachers surrounding solar energy, renewables and energy efficiency. Classroom presentations to go along with the site have been piloted, and the site itself will launch early in 2006. And interest remains high in local classrooms for the "real time" solar tracker at GreenWatts.com. The Solar tracker, which is updated every two minutes, shows actual energy output from the Springerville Generating Station ("SGS") Solar Array, and has been a consistent draw to TEP's Web site.

In 2005, members of the TEP solar group made numerous presentations to civic, educational and neighborhood groups ranging from 15 to 250 people on topics that focused on TEP's solar and renewable programs. These appearances included high-level presentations by Tom Hansen to groups ranging from the Natural Resources and Energy Committee ("NARUC") to classroom lectures/demonstrations, as well as a presentation to the Northern Arizona Council of Governments and at the Rocky Mountain Electric League. Also in 2005, Mr. Hansen made renewable energy presentations at the Arizona State Legislature, as well as the Arizona Corporation Commission. Others on the TEP team spoke at community gatherings, providing more general presentations about solar and renewable energy.

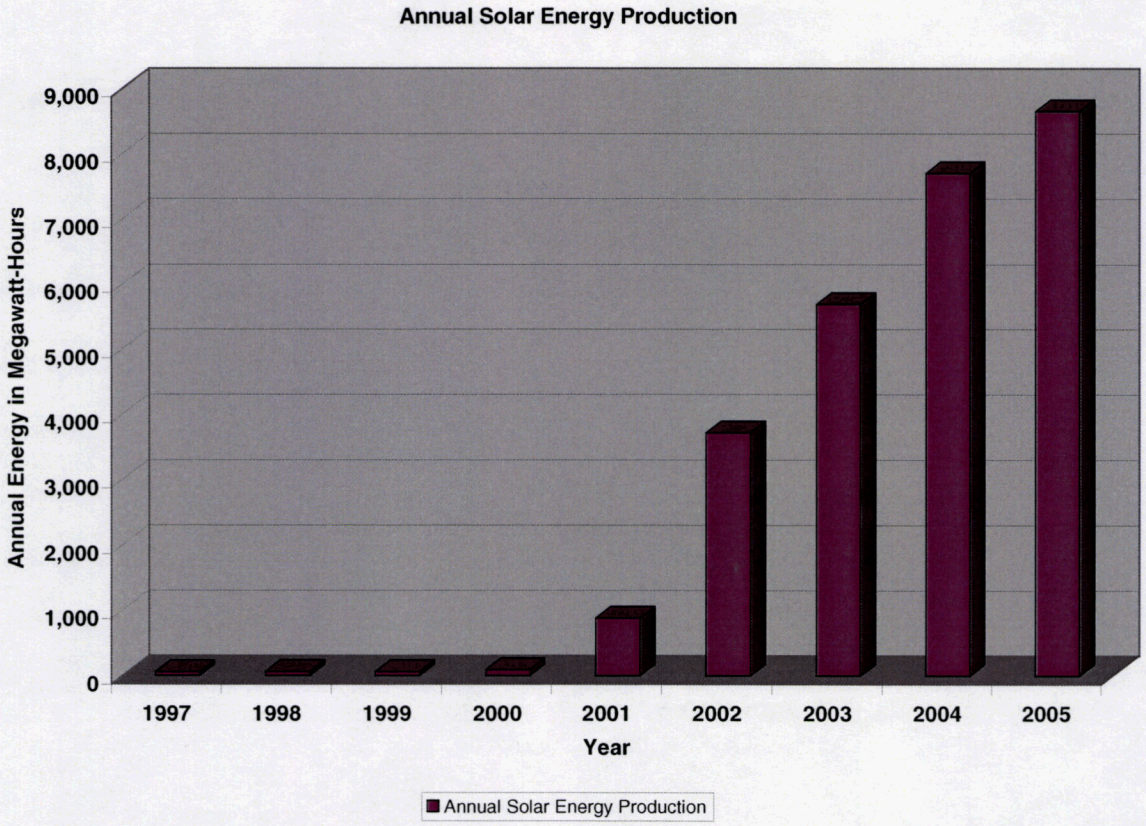
TEP has also been working with the City of Tucson in developing PV Model Plans to help streamline the development review and permitting process for local PV installers. These model plans were completed in 2005, and have enabled local installers to perform an expedited walk through process for new customer installations.

TEP also supplied a PV system to enable four University of Arizona seniors to develop a solar test program. While TEP supplied the hardware to the group, they are designing the system, picking the components, installing it and developing the test program around design boundaries we prescribed. Although it is physically in the solar test yard at TEP's Operating Headquarters location, it is a partnership that not only assists industry developments, but also yields valuable knowledge for our future projects.

Renewable Energy Resources and Renewable Resource Survey Systems

TEP continues to operate a system of 15 renewable resource survey systems. This system includes eight, 40-meter high fixed wind survey towers at locations in Arizona. This data is provided to Northern Arizona University for public domain application. TEP continues to evaluate a wide range of renewable energy options for the future, including landfill gas, biomass, wind, digester gas, geothermal and solar thermal electric conversion.

TEP installed 236 kWp DC of solar PV electric generation in 2005, including additions of 2.4 kW at the Springerville Generating Station Solar System ("SGSSS"), 3.0 kW DC of solar electric generation at Operating Headquarters in Tucson and 140 kWp DC rating of SunShare systems. TEP's annual solar energy electricity production has increased with each year of the EPS program per the graph below. In 2005, 0.097% of annual retail electricity was produced by solar PV generation.



Past Environmental Resource Development Goals

TEP reached its goal of having 5 MW of renewable generating capacity by the end of the year 2000, which was derived from the ACC's 1992 Integrated Resource Planning Procedures.

SUMMARY OF RENEWABLE GENERATION AND CAPACITY

Type of Generation	kW Capacity	Cumulative Generation, kWh	Cumulative Extra Credits, kWh	Cumulative Renewable Credits, kWh
Landfill Gas	5,500	224,170,784	110,535,209	334,705,993
Solar PV	5,485	27,318,292	36,904,663	64,222,955
Solar Trough	0	0	0	0
Small Hydro-Electric	0	0	0	0
Wind Generation	0	0	0	0
Total Other	5,500	224,170,784	110,535,209	334,705,993
Total Solar Electric	5,485	27,318,292	36,904,663	64,222,955
Total Solar Electric & Other	10,985	251,489,076	147,439,872	398,928,948

SUMMARY OF EPS REQUIREMENTS

Description	Cumulative Through 12/31/04	Reporting Period 01/01/05 - 12/31/05	Cumulative Through 12/31/05
Retail Sales, kWh	31,669,029,074	8,910,551,567	40,579,580,641
TEP EPS Requirement (1.0% of retail sales for 2005), kWh	163,539,045	89,105,516	252,644,561
"Other" Credits Needed To Meet EPS Requirements(40% in 2005)	78,470,447	35,642,206	114,112,653
"Solar Electric" Resource Credits Needed to Meet EPS Requirements.	88,603,915	53,463,309	142,067,225
Landfill Gas Project "Other" Credits	302,905,081	30,917,193	333,822,273
"Solar Electric" Resource Credits	44,190,474	19,975,696	64,166,170
Wind Credits Purchased	14,427	3,354	17,781
"Other" Credits Purchased	0	0	0
"Solar Electric Manufacturing" Credits Obtained from Global Solar, kWh	690,329	978,442	1,668,771
Sales of "Other" Credits, kWh	-75,254,036	-7,462,835	-82,716,871
Purchases of "Solar Electric" Credits	21,065	0	21,065
Total "Solar Electric" Credits	44,901,868	20,954,138	65,856,006
Total "Other" Credits	227,665,472	23,457,712	251,123,183
Excess "Solar Electric" Credits Above Meeting EPS Requirements, kWh	-43,702,047	-32,509,172	-76,211,219
Excess "Other" Credits Above Meeting EPS Requirements, kWH	149,195,025	-12,184,495	137,010,530

SUMMARY OF PROGRAM EXPENDITURES

Program	Program Costs		
	Through 12/31/2004	Period 01/01/05 – 12/31/05	Life of Program
Solar Electric	$31,612,251	$712,777	$32,325,028
Solar Thermal	$0	$0	$0
Geothermal	$0	$0	$0
Wind	$152,519	$0	$152,519
Hydro	$0	$0	$0
Other Technologies	$0	$0	$0
Marketing **	$236,641	$31,169	$267,810
Hardware Buydown Program - Option 1,3 **	$255,376	166,323	$421,699
SunShare Option 2 Revenue **	$182,300	$358,839	$541,139
SunShare Materials Cost **	$1,029,639	$479,984	$1,509,622
Total TEP Renewables Program	$31,764,770	$712,777	$32,477,547

** These expenditures included in Solar Electric expenditure data.

SUMMARY OF PROGRAM REVENUES

Description	Through 12/31/04	Period 1/01/05 – 12/01/05	Life of Project	Y-T-D Retail Energy Sales MWh
GreenWatts Total	$232,784	$79,366	$312,150	-
Allocation of SBC Total	$10,190,000	$2,460,000	$12,660,000	-
Residential Surcharge Total	$4,726,510	$1,307,077	$6,033,587	3,633,226
Small Commercial Surcharge Total	$4,709,488	$1,293,437	$6,002,925	3,449,059
Large Commercial Surcharge Total	$112,343	$23,414	$135,757	1,792,700
Renewables Surcharge Total*	$9,548,341	$2,623,928	$12,172,269	8,874,985
Total EPS Program Revenues	$19,971,125	$5,173,294	$25,144,419	-

INSTALLATION PROGRESS

Project	Install Date	kWp DC Capacity	kWh, AC Output - Thru 12/31/05	Initial Costs	Total Operating Cost Through 12/31/05	$/kWh for Project
Community Projects						
Reid Park Zoo ASE/TR 840w Xtal	Mar-00	0.84	3712.59	7,400	$6,669	N/A
Pima Air Museum ASE/TR 1200w Xtal	Jun-00	1.20	7805.9	7,099	$400	0.0689
UofA Agriculture Station	Jan-02	5.62	39,121	$120,000	$529	0.1944
Hayden/Udall # 1 ASE/TR 21.6 KW Xtal	2002	21.60	119,417	$142,975	$898	0.0677
Hayden/Udall # 2 ASE/TR 21.6 KW Xtal	2002	21.60	118,497	$142,050	$841	0.0657
3131 S. Naco Vista	Apr-99	0.75	8096.49	6944	$400	0.0702
Tohono Chul BPSX140U/SB - 2800w Xtal	Dec-02	2.80	14,566	$23,286	$400	0.0835
Civano Vail School MST50/TR 3000w Xtal	2004	3.00	6,460	$15,990	$600	0.0645
Hohokam TUSD BP3160Q/FR 4480w Xtal	2004	4.48	8,679	$21,584	$650	0.0498
Ft Huachucha Solar ASE/OMN 30 KW Xtal	1997	30.00	248,857	$180,000	$3,400	0.0701
Tucson Audubon Society	2005	1.50	1,640	$8,412	$100	0.0865
Tucson Botanical Gardens	2005	3.00	3,870	$16,576	$500	0.0735
Clements Center - City of Tucson	2005	6.00	5,160	$28,928	$100	0.0938
Project MORE - TUSD	2005	15.00	19,058	$55,214	$100	0.0484
Pennington St. Garage - City of Tucson	2005	60.00	30,561	$420,000	$0	0.2291
Vail Empire High School	2005	7.50	1,980	$38,860	$0	0.3271
SunShare						
Sun Share Installed Systems in 1999	1999	6.20	53,841	$50,000	$200	0.0940
Sun Share Reported 2000	2000	4.80	15,160	$25,000	$200	0.1237
Sun Share Reported 2001	2001	7.20	50,606	$79,110	$2,500	0.1595
Sun Share Reported 2002	2002	66.75	239,999	$294,332	$8,900	0.0620
Sun Share Reported 2003	2003	68.00	220,407	$340,460	$10,405	0.0586
Sun Share Reported 2004	2004	110.61	279,704	$849,611	$15,450	0.0932
Sun Share Reported 2005	2005	122.75	146,121	$725,755	$8,500	0.0837
Utility (TEP)						
SGS-125C-1 ASE/XN 135 KW Xtal	Jul-01	135.00	957,650	$1,125,637	$4,359	0.0854
SGS-125C-2 ASE/XN 135 KW Xtal	Jul-01	135.00	998,595	$848,927	$4,359	0.0629
SGS-125C-3 ASE/XN 135 KW Xtal	Aug-01	135.00	951,524	$779,470	$4,602	0.0585
SGS-125C-4 ASE/XN 135 KW Xtal	Aug-01	135.00	941,604	$885,503	$4,359	0.0664
SGS-125C-5 ASE/XN 135 KW Xtal	Nov-01	135.00	912,494	$891,576	$4,359	0.0675
SGS-125C-6 ASE/XN 135 KW Xtal	Nov-01	135.00	927,888	$830,314	$4,359	0.0615
SGS-125C-7 ASE/XN 135 KW Xtal	Oct-02	135.00	774,033	$896,984	$3,971	0.0666
SGS-125C-8 ASE/XN 135 KW Xtal	Oct-02	135.00	789,535	$896,332	$3,971	0.0652
SGS-125C-9 ASE/XN 135 KW Xtal	Oct-02	135.00	776,013	$900,199	$5,426	0.0676
SGS-125C-10 ASE/XN 135 KW Xtal	Oct-02	135.00	779,267	$910,976	$5,426	0.0661
SGS-125C-11 ASE/XN 135 KW Xtal	Jun-02	135.00	830,824	$899,885	$5,426	0.0655
SGS-125C-12 ASE/XN 135 KW Xtal	Jun-02	135.00	770,221	$901,081	$5,426	0.0675
SGS-125C-13 ASE/XN 135 KW Xtal	Jun-03	135.00	577,157	$866,453	$3,404	0.0642
SGS-125C-14 ASE/XN 135 KW Xtal	Jun-03	135.00	573,555	$866,190	$3,404	0.0644
SGS-125C-15 ASE/XN 135 KW Xtal	Aug-03	135.00	558,747	$867,159	$3,404	0.0645
SGS-125C-16 ASE/XN 135 KW Xtal	Aug-03	135.00	566,464	$860,732	$3,404	0.0632
SGS-125C-23 ASE/XN 135 KW Xtal	Jul-04	135.00	325,519	$813,735	$970	0.0602
SGS-125C-24 ASE/XN 135 KW Xtal	Jul-04	135.00	322,306	$799,027	$970	0.0601
SGS-125C-25 ASE/XN 135 KW Xtal	Jun-04	135.00	340,737	$843,527	$1,128	0.0621
SGS-125C-26 ASE/XN 135 KW Xtal	Jun-04	135.00	353,455	$840,998	$1,128	0.0619

Project	Install Date	kWp DC Capacity	kWh, AC Output - Thru 12/31/05	Initial Costs	Total Operating Cost Through 12/31/05	$/kWh for Project
SGS-125C-27 ASE/XN 135 KW Xtal	Jun-04	135.00	352,991	$762,344	$1,128	0.0561
SGS-125C-28 ASE/XN 135 KW Xtal	Jun-04	135.00	340,230	$835,890	$1,128	0.0633
SGS-125C-29 ASE/XN 135 KW Xtal	Nov-03	135.00	498,326	$849,606	$1,128	0.0633
SGS-125C-30 ASE/XN 135 KW Xtal	Nov-03	135.00	498,010	$724,018	$1,128	0.0535
SGS-125C-31 ASE/XN 135 KW Xtal	Aug-03	135.00	551,042	$856,574	$3,404	0.0633
SGS-125C-32 ASE/XN 135 KW Xtal	Aug-03	135.00	538,285	$856,552	$3,404	0.0641
SGS-125TF-1 FS/XN 134.4 KW Cd-Tl	Sep-01	135.00	945,743	$737,815	$16,801	0.0557
SGS-125TF-2 FS/XN 134.4 KW Cd-Tl	Sep-01	135.00	868,211	$620,396	$15,555	0.0471
SGS-125TF-3 FS/XN 134.4 KW Cd-Tl	Jun-03	135.00	577,901	$759,114	$1,899	0.0584
SGS-125TF-4 FS/XN 134.4 KW Cd-Tl	Jun-03	135.00	596,357	$759,122	$1,899	0.0555
SGS-125TF-5 BP/XN 129 KW a-si	Oct-01	135.00	860,149	$760,802	$2,217	0.0663
SGS-125TF-6 BP/XN 129 KW a-si	Oct-01	135.00	904,633	$760,717	$2,217	0.0643
SGS-125TF-7 BP/XN 129 KW a-si	Oct-01	135.00	868,996	$736,514	$2,217	0.0635
SGS-125TF-8 BP/XN 129 KW a-si	Oct-01	135.00	871,611	$741,162	$2,217	0.0634
SGS-GT3-GS	Jun-05	2.50	1,565	$30,732	$0	0.3273
OH ASE/SB - 1200w Xtal	Jul-01	1.20	6,571	$8,563	$200	0.0800
OH ASE/TR - 1200w Xtal	Aug-01	1.20	9,046	$8,369	$200	0.0577
OH BPMST-50/TR - 1500w a-si	Sep-01	1.50	8,059	$6,666	$1,040	0.0677
Solar Trailers ASE/TR 5000w Xtal	Jun-05	5.00	37,826	$70,000	$590	0.2062
OH Gate 2A Solarex/TR - 2500w Xtal	Mar-00	2.50	20,067	$10,250	$558	0.1301
OH3 20KW ASE/TR 21.6 KW Xtal	Sep-00	20.00	160,287	$146,342	$1,152	0.1888
OH4 20KW ASE/TR 21.6 KW Xtal	Oct-00	20.00	185,121	$110,534	$576	0.0569
OH 5KW BP/MST50/Beacon a-si	Feb-04	7.50	11,742	$29,574	$200	0.1383
St Johns Test	Sep-00	0.00	3,512	$11,517	$0	N/A
SGS 20 KW ASE/TR 21.6 KW Xtal	Oct-00	21.60	157,002	$135,060	$3,794	0.1346
DMP 1 ASE/OMN 108 KW Xtal	Dec-00	108.00	854,189	$589,020	$2,802	0.0592
DMP 2 ASE/OMN 108 KW Xtal	Dec-00	108.00	835,641	$527,199	$1,220	0.0539
Test Trees	Jun-01	0.00	8,214	$1,500	$0	N/A
OH Global Solar Test/TR - 1440w CIGS	2002	1.40	5,810	$13,447	$631	0.1305
OH Global Solar Slimline/TR 1656w CIGS	2004	1.66	2,394	$18,720	$200	0.1552
OH BP SX140U/TR-1400w Xtal	2002	1.40	6,622	$8,237	$200	0.0654
OH Sharp 165/SB - 1320w Xtal	Mar-03	1.32	3,648	$7,476	$648	0.1192
OH Sharp 165/TR - 1320w Xtal	Mar-03	1.32	4,949	$8,223	$558	0.0974
OH Kyocera 158/TR - 1422w Xtal	Apr-03	1.42	5,486	$8,236	$200	0.0715
OH Sanyo 167HIT/SB - 1336w Xtal/a-si	May-03	1.34	5,615	$8,962	$794	0.0798
OH Unisolar 64/Trace - 1536w Xtal/a-si	Jun-03	1.54	6,773	$10,228	$200	0.0682
OH BP SX150U/TR-1500w Xtal	May-03	1.50	5,652	$8,714	$200	0.0677
OH Sanyo 180HIT/SB - 1440w Xtal/a-si	Jul-03	1.44	6,114	$8,955	$200	0.0631
OH Shell 40/Tr-1440w a-si	Sep-03	1.44	5,820	$9,244	$497	0.0695
OH Shell 150/Sharp-3000w Xtal	Sep-03	3.00	9,119	$16,991	$200	0.0735
OH Shell 150/TR - 1500w Xtal	Feb-04	1.50	4,300	$8,414	$200	0.0623
OH AstroPower/TR - 1500w Xtal	May-04	1.49	4,084	$8,532	$200	0.0598
OH Xantrex GT3.0/BP4170 - 3000w Xtal	Sep-06	3.00	1,240	$12,500	$100	0.1694
TOTALS		5484.96	27,319,857	$33,727,123	$209,290	0.0651

* Portion installed after January 1, 1997.
** Includes customer expenses for these systems
*** Estimated after grant removal.

Renewable Generation Option Analysis

TEP has analyzed a number of possible options of renewable generation resources available to meet the implementation of a 10% renewable energy portfolio standard. The scenarios assume that all new renewable generation would be pure, that is not a mix of different resources. The scenarios are based on the actual 2005 hourly retail loads in the TEP service territory, modeled 2005 hourly wholesale electric prices at Palo Verde based on actual daily peak and off peak prices, actual hourly solar electric generation at Springerville and Tucson sites and hourly wind resources at a northern Arizona monitoring site applied to a Vestas wind turbine. For comparison, the average wholesale electric price at Palo Verde in 2005 was $56.40 per MWh.

The results of the pure Wind and pure Solar PV cases are summarized in the following table:

	All Fueled Generation	Apache County Wind Generation with Fueled Generation	Springerville Solar Generation with Fueled Generation	Tucson Solar Generation with Fueled Generation
Installed Renewable Energy Capacity - MW	0	501	583	583
Installed Renewable Cost at 2005 Prices - $M	$0	$601	$2,913	$3,058
Maximum Hourly Renewable Generation Capacity during 2005 - AC MW	0	501	540	500
Annual Renewable Energy Production - MWh	0	952,544	952,775	908,954
Renewable Energy Production Wholesale Energy Value - $	$0	$53,456,220	$58,109,835	$55,613,252
Average Renewable Energy Value - $/MWh	$0	$56.12	$60.99	$61.18
Annual TEP System Load Required Fueled Generation Minimum Demand - MW	640	170	346	397
Annual TEP System Load Required Maximum Fueled Generation Demand - MW	2,171	2,123	2,163	2,052
Effective System Capacity Support from Renewables - MW	0	48	8	119
Percent of Annual System Energy from Renewable Energy Resources	0%	10.00%	10.00%	9.54%

SOLAR THERMAL ELECTRIC GENERATION

PROGRAM DESCRIPTION

The purpose of the Solar Thermal Electric Generation Development Program is for technology review and economic assessment of the use of large scale solar thermal electric generators both in combination with existing thermal generating stations and in stand alone generating station applications. This includes solar resource assessment at a couple of possible solar trough sites in Arizona.

TEP reviewed the addition of Thermal Solar Trough produced heat to the condensate cycle of Springerville Generating Station Unit #1 ("SGS #1") and Unit #2 ("SGS #2").

In addition, during 2002, TEP received and evaluated a proposal for installation of a solar dish generation system and an opportunity to install a stand alone solar trough generation system.

There has been no significant testing activity in this area in 2005, but interest from private developers for a large solar thermal generation project in Arizona or a neighboring state has been increasing based on a number of contacts with potential developers.

PROGRESS AND PARTICIPATION

Testing has been performed on the extraction heaters of SGS to determine the steady state response to additional heat input in the condensate cycle. The test results were successful and subsequent review indicates that the installation of a solar trough system for SGS #1 and SGS #2 should be technically feasible. Detailed economic and constructability was reviewed in 2004 given the solar resource data taken at the site since 1999. It is not clear, at this time, that solar trough integration into SGS has a life cycle cost advantage over large-scale PV installations. This is primarily due to the temperature and wind extremes of the Springerville area, coupled with the general type of cloud patterns native to the area that do not support tracking concentrator type solar technologies. They do, however, support fixed plane PV applications. The solar trough system concept was reviewed again in 2005 and will again be reviewed for economic viability in 2006 as an option for installation at a southern Arizona location.

Detailed evaluation of the solar dish system for the Springerville site indicated the life cycle cost economics of the system being proposed was not yet competitive with the life cycle cost economics of large scale PVs in systems of capacity smaller than 20 MW. To a large degree, long-term operating costs were the driving force on the economics, but it was also found that the installed cost of a small solar dish system is not competitive with PV installations of a similar size. Performance history considerations were also part of the evaluation. Additional solar dish installations are proposed by other utilities both in Arizona and outside Arizona. This data will be essential for evaluations of future solar dish proposals. The opportunity for installation of this type system was declined in 2003 and sufficient operating reliability and energy production data was not provided to make an informed decision for the 2004, 2005 or 2006 installation phase. The full detailed evaluation material was provided to the vendor proposing this project for its use in reducing the costs that have a strong influence on life cycle economics.

High level evaluation of the installation of a stand alone solar trough proposal indicated the initial cost was competitive with large scale PV installations. However, long-term operating costs adversely influenced the life cycle cost economics of single, relatively small, stand alone solar trough systems, which result in a higher life cycle cost than large scale PV systems. Consequently, this system opportunity was not chosen for installation in 2003, 2004, 2005 or 2006. The high level economic evaluation of this system was not provided to the vendor.

Solar resource assessment at the SGS indicates that while the cool, windy site is ideal for solar generation from fixed plane PVs, the same factors are not beneficial to economic production of solar thermal electricity, where tracking concentrators are required. The gathering of solar thermal support data will continue at Springerville. Data is also being gathered from sites in Tucson as a possible future location of a thermal trough electric generation system.

CHALLENGES/BARRIERS

The installation of a new Digital Control System to include condensate, feedwater, boiler and turbine controls, and associated modeling and tuning was completed at SGS. Given the results of the solar resource and climate review at Springerville, and the general incompatibility with solar concentrating technologies, this project analysis will not continue.

Both solar dish and solar trough generation technologies find it difficult to compete with the more "mature" technology of PV in small-scale installations. Small scale is being defined as less than roughly 20 MW. It is also difficult to raise the capital needed to install a large scale thermal solar generation system, given the somewhat poor reliability and performance history of that technology in Arizona. Also, thermal concentrator electrical generation technologies do not readily transfer to customer sited distributed generation applications as does the development of large scale PV. Other utilities are helping to overcome this barrier by assuming the technical and financial risk of installing additional solar dish and solar trough generation systems. TEP will include thermal solar electric generation in its generation resource portfolio when those technologies are economically competitive with PV in the appropriate size increments.

No problems were encountered during this period.

PROGRAM CHANGES FOR 2006

There are no changes planned for 2006. Resource and system economics evaluation will continue.

LANDFILL GAS AND BIOMASS / BIOGAS PROJECT

PROGRAM DESCRIPTION

The purpose of the Landfill Gas and Biomass Project program is to develop existing landfill gas and biomass / biogas resources into reliable, cost effective environmentally sensitive electric generation fuel sources. The program's purpose is also to find and economically use existing biomass / biogas resources to produce electric energy.

PROGRESS AND PARTICIPATION

In August 1999, TEP and the city of Tucson started electric production from the installation of a nominal 5 MW Landfill Gas System at the Los Reales Landfill in Tucson, Arizona. The landfill gas is piped from the landfill to the Irvington Unit 4 Generating Station where it is co-burned with coal and/or natural gas. During the very dry year of 2003, the average energy produced from landfill gas was 3,741 kW, in 2004 the average energy production from landfill gas was 3,679 kW and in 2005 the average energy production from landfill gas was 3,615 kW. However, based on previous generating performance exceeding a monthly average of 6,000 kW during periods of normal atmospheric moisture, and an expectation that repairs and improvements to the landfill gas collection system will be made by the landfill gas vendor in 2006, TEP is claiming 5,000 kW of landfill gas capacity in the Executive Summary.

To date (1999 through December 31, 2005) the project has displaced the use or production of the following:

Tons of Coal Not Burned	102,329
Tons of CO2 Not Produced	150,082
Tons of SO2 Not Produced	901

There were no costs beyond those expected of normal fueled generation from the operation of the landfill gas to energy system in 1999, 2000, 2001, 2002, 2003, 2004 or 2005. Thus, there are no expenses against the EPS surcharge or other sources of renewable generation revenue. EPS credits produced have been reported by TEP to meet EPS annual credit requirements, sold to other utilities providing additional revenue for solar generation development or banked for the future. The current status of EPS landfill gas generation production credits are reported in the EPS Programs Executive Summary.

In 2005 alone, landfill gas production displaced the use of 14,078 tons of coal, 20,647 tons of CO2 and 124 tons of SO2.

2005 Landfill Gas Generation Summary

	January	February	March	April	May	June	July	August	September	October	November	December	Year to Date
Landfill Gas Burned-Mscf From Operating Summary	52	46	58	41	59	57	58	56	57	55	57	47	643
Landfill Gas Ave Btu/scf From Operating Summary	487	503	523	500	511	494	484	451	467	472	482	454	486
Landfill Gas Heat Input-MMBtu Calculated From Op Summary	25,324	23,138	30,334	20,500	30,149	28,158	28,072	25,256	26,619	25,960	27,474	21,338	312,322
Unit 4 Net Heat Rate From Operating Summary	10,878	10,442	9,704	10,293	10,158	10,521	10,460	10,712	10,752	10,439	10,351	10,322	10,419
MMBtu of Landfill Gas From Invoice	25,334	23,154	30,024	20,489	30,123	28,153	28,098	25,246	26,634	25,945	27479	21350	312,029.00
Cost of Landfill Gas From Invoice	$33,939.22	$30,723.04	$39,838.85	$27,186.85	$39,970.21	$37,356.22	$37,283.24	$33,498.92	$35,340.65	$34,426.42	$36,461.89	$28,329.32	$414,354.82
Landfill Gas Generation in kWh Calculated From Data Above	2,328,921	2,217,391	3,093,982	1,990,576	2,965,446	2,675,886	2,686,233	2,356,796	2,477,121	2,485,391	2,654,719	2,068,398	30,000,861
Monthly U4 Service Hours From Operating Summary	744.00	669.37	744.00	476.43	744.00	720.00	744.00	708.93	720.00	700.05	720.00	608.40	8,299
Average Landfill Generation Capacity in kW - Calculated	3,130	3,313	4,159	4,178	3,986	3,717	3,611	3,324	3,440	3,550	3,687	3,400	3,615
Cumulative 2005 Landfill Gas Generation in kWh - Calculated	2,328,921	4,546,312	7,640,294	9,630,870	12,596,316	15,272,202	17,958,436	20,315,232	22,792,352	25,277,744	27,932,463	30,000,861	30,000,861
Unit #4 Coal Heat Value HHV in Btu/lb - Operating Summary	11,187	11,189	11,295	11,295	9,942	11,345	11,338	11,213	11,038	11,156	11,236	11,099	11,111
Coal Displaced by Landfill Gas, in Tons, Calculated	1,132.3	1,034.7	1,329.1	907.0	1,514.9	1,240.8	1,239.1	1,125.7	1,206.5	1,162.8	1,222.8	961.8	1,173
2005 Cumulative Coal Displaced By Landfill Gas in Tons	1,132.3	2,167.0	3,496.1	4,403.1	5,918.0	7,158.8	8,397.9	9,523.6	10,730.1	11,892.9	13,115.7	14,077.5	14,078
CO2 Emissions Deferred by Burning Coal in Tons - 40% Fixed Carbon	1661	1518	1949	1330	2222	1820	1817	1651	1769	1705	1793	1411	1,721
2005 Cumulative CO2 Emissions Deferred by Burning Coal - Tons	1661	3178	5128	6458	8680	10500	12317	13968	15737	17443	19236	20647	20,647
SO2 Emissions Deferred by Burning Coal in Tons - 0.44% Sulfur	10	9	12	8	13	11	11	10	11	10	11	8	10
2005 Cumulative SO2 Emissions Deferred by Burning Coal - Tons	10	19	31	39	52	63	74	84	94	105	115	124	124
Period Hours Available	744	672	744	720	744	720	744	744	720	744	720	744	8,760
On Line Availability (Service) Hours	744	669.37	744	476.43	744	720	744	708.93	720	700.05	720	608.4	8,299
Percentage on Line	100.00%	99.61%	100.00%	66.17%	100.00%	100.00%	100.00%	95.29%	100.00%	94.09%	100.00%	81.77%	94.74%

CHALLENGES/BARRIERS

The output of the Landfill Gas declined from 46,445,118 kWh in 2001 to 31,661,430 kWh in 2002, to 27,742,486 kWh in 2003, and increased slightly to 30,598,027 kWh in 2004 and declined a bit to 30,000,861 kWh in 2005.

1. The gas production rate is strongly related to the moisture in the landfill as well as the moisture introduced through atmospheric purge air - the wetter the season, the greater the gas production. The years 2002, 2003, 2004 and 2005 have been four of the driest years in recent history. Because of the drought, the gas output of the system was reduced.
2. Some of the gas capture wells and collection piping have been damaged due to bulldozers and other large vehicles running over the wells and collection piping resulting in no or low gas output from those wells. Repairs to some damaged items were made during 2005, and eight new wells were placed in the existing landfill cells in 2005. Additional landfill enhancement opportunities will continue to be reviewed in 2006.

Generation of electricity from forest waste and numerous other biomass/biogas sources is being investigated with a number of interested Arizona based parties. Samples of various biomass sources have been collected and sent to selected companies for experimental gasification. Results of these tests indicate that while the materials tested are capable of being gasified by a small number of different processes, some materials are more prone to plug the new technologies than other materials. While these technical issues are a concern, they also increase the cost of production and economic considerations are currently the primary impediment to effective use of this resource. Harvesting costs alone for forest waste, if unsubsidized, are about four cents per kWh. Biomass transportation costs can add another two to three cents per kWh, depending on the material and distance of transport. There is a concern that there is not an adequate long-term supply of biomass materials to support significant amounts of biomass generation in Arizona. Discussions with potential biomass providers will continue in 2006.

ANALYSIS AND EVALUATION

Optimization of landfill methane production is ongoing. During one month in 2001, the system produced an average of more than 6.5 MW. However, lower atmospheric moisture and rainfall levels in 2002, 2003, 2004 and 2005 have reduced the moisture introduced to the landfill from inlet purge air. Consequently, waste decay rates have reduced along with output of landfill gas and methane. As moisture introduced to the landfill through purge air is varied by atmospheric conditions, adjustments in purge air rates and landfill gas removal rates will be made to maintain a constant methane content percentage of about 50%. This adjustment will continue for the life of the landfill gas extraction.

A number of beneficial meetings to discuss landfill gas production issues, both short and long term, were held during 2005 with the landfill gas vendor US Energy, the City of Tucson and TEP. Information on long-term needs and opportunities was presented, landfill operational constraints noted and more specific plans for future development of additional landfill gas resources introduced. Dialogue between the three parties will continue in 2006 to address landfill gas capacity enhancement projects to be implemented in the future.

PROGRAM CHANGES FOR 2006

TEP continues to review additional landfill gas to energy projects as well as a number of biomass/biogas waste-to-energy opportunities. An ongoing technology search continues to find efficient technologies to convert a number of Arizona based biomass products into electricity in a safe, reliable, cost-effective manner. The search will continue to locate technically feasible, economically advantageous and environmentally appropriate methods for converting forest waste, biogas and agricultural by-products into electricity. Landfill gas production enhancements have been installed in 2005 at the Los Reales Landfill in Tucson.

WIND RESOURCE DEVELOPMENT

PROGRAM DESCRIPTION

The purpose of the Wind Resource Development Program is for wind resource information gathering, technology review and economic assessment of the use of wind energy for electric generation both in combination with existing generating stations and in stand alone generating station applications.

Wind monitor stations have been installed by TEP throughout Arizona. As of December 31, 2005, TEP was receiving data from eight, 40 meter survey towers and ground level wind data at an additional five fixed and two mobile monitor installations. While initial plans were to develop sites for an additional six monitor stations, results of the wind data collected from the existing monitor sites has left some doubt about the economic viability of the wind in the vicinity of the monitor sites, so the planning for development of additional monitor sites continues to be on hold pending receipt of more wind data from the existing sites. The bulk of the monitoring is being performed in eastern Arizona around Springerville Generating Station ("SGS"). However, as customers have indicated an interest in development of wind resources in their area, TEP has monitored those showing signs of promise.

TEP participated with APS and SRP in funding, through Northern Arizona University in collaboration with National Renewables Energy Laboratories ("NREL"), the development of a new high-resolution wind model for Arizona. The final wind model was issued for public use in August 2003. The model indicates that wind capacity in the state of Arizona is likely to be viable in a few selected areas in the eastern and northern part of the state and on ridges and mountaintops, generally a great distance from Arizona's primary population centers. TEP provided NREL with wind data from all but one of its monitoring stations to use in verifying the wind model prior to public issue. The past 19 months of wind resource monitoring activities in one of the areas predicted by the model to be a Class 5 wind regime have indicated the wind resource is likely closer to a Class 3 regime. However, the data taken to date indicates the site is better than any other TEP has monitored in Arizona. In general, Arizona's potential wind resource is not as plentiful or as geographically widespread as the Arizona solar resource. The wind in northern Arizona does have a positive correlation with the loads in Arizona population centers in that the wind tends to blow in Northern Arizona when the sun is shining in central and southern Arizona. That correlation of wind and electrical load does not exist for the site monitored in southern Arizona. Per the final wind model, the potential magnitude of the Arizona wind resource is significant at 25,000 MW of Class 3 and above wind capacity. Harvest of the Arizona wind resource must be given serious technical, economic and policy review. The next step in this review is to gather additional information for the installation of a planned grid of wind monitor towers. Development of additional transmission resources to move the wind energy to the population centers is a high priority once the locations of the economically viable wind resources are accurately determined. To serve this end, in mid 2005 TEP shared its wind resource data with Northern Arizona University to be put into the public domain. This data will provide potential wind developers with additional information to allow more intelligent siting of new wind monitor towers in Arizona by using the existing data as a baseline.

PROGRESS AND PARTICIPATION

In 1997, TEP completed its first two-year monitoring period for wind and solar resources at seven locations in Arizona. Since that time an additional twenty two sites have been chosen for monitoring. These sites have not yet included locations such as high ridges and mountain tops upon which the installation of wind turbines could have a scenic impact from the construction of roads to allow access to the ridges and mountaintops and the transmission lines that will need to be added to move the electricity to market and the operation of the wind turbines themselves.

One site a short distance west of Springerville, Arizona, has wind of very marginal economics, about 11% annual capacity factor. One site located northeast of Springerville had wind of even less economic value, as did a site in southern Arizona near Rain Valley. All three monitoring sites located on the property of SGS completed five years of data monitoring at the end of 2005, and monitor of the fourth site was discontinued in 2003 as it did not show promise as a successful wind farm location. Of these sites, the best location has exhibited at best a 20% annual capacity factor, when corrected for elevation and temperature, not normally considered sufficient for development of a commercially viable wind farm. These are sites 0301, 0302 and 0304.

Three other sites completed a two-year monitor period at the end of July 2003, at which time the data was analyzed to determine the economic viability of wind generation at those sites. Data indicates one of those sites with a marginally economic level of wind resource at roughly 20% annual capacity factor, when corrected for elevation and temperature, given the newer models of wind turbines capable of operation at lower wind speeds. Two valley type sites that have been monitored for a year or more do not have an economically viable wind resource as compared to other sites. The monitor towers at both of these sites were relocated to new sites. The second monitor site in southern Arizona has exhibited a poor wind resource and its proximity to a canyon yielded a very shallow wind with little overall energy content during most hours of the year. This tower was relocated in late 2003 to another southern Arizona location, which the new wind model indicates may have promise. The two years of data collected in 2004 and 2005 does show a wind regime of marginally viable economics at this location.

Two survey sites, 0602 and 0603, are located a great distance west of Springerville, Arizona. Numbered data from these locations show a site of potential interest for a commercially viable wind farm. Another year of data will be taken to determine optimal locations for up to an additional 12 wind survey sites in Arizona. These towers would be planned for installation in the first half of 2007. TEP will need to plan time for site permits to be issued as these sites are on state land. To date, TEP has spent $152,519 on wind survey tower installation and data analysis.

Below are shown the basic wind speed and forecast capacity factor information for the eight wind monitor sites. The 2004 data for sites 0602 and 0603 include only seven months of data, the other sites and all 2005 data reflects a full year of data. The 2005 wind duration frequency curve is also shown for each of the full year of data sites. Note the higher capacity factor values for peak daylight hours and generally for peak summer hours. Site 0513 is located in southern Arizona, the others are in northern Arizona. The 40 meter wind speed sensor of 0513 was disabled by lightning after two months of operation. The wind power frequency plots assume an installed wind generation capacity sufficient to generate 10% of TEP's 2005 retail energy at each site using wind generators with a hub height of 70 meters.

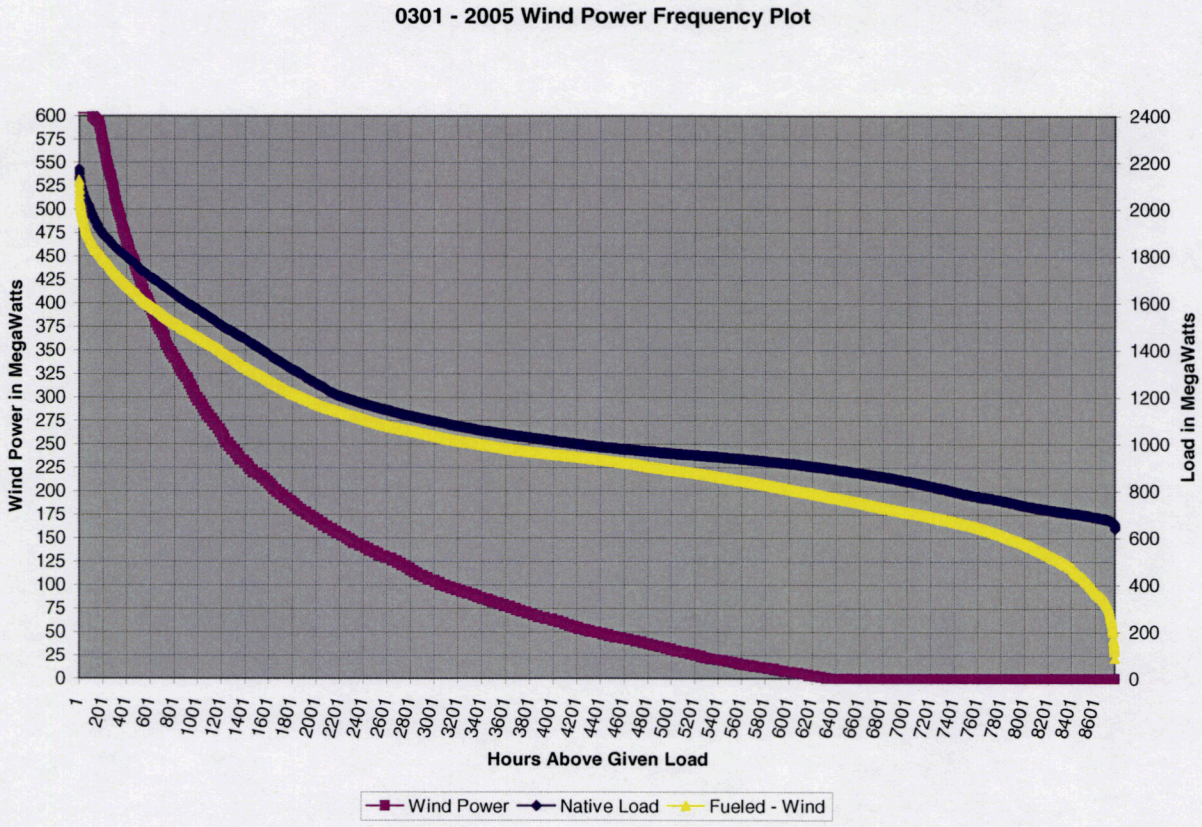
2004 Wind Survey Data Summary in MPH

Site:	40 M	30 M	20 M	10 M
0301	11.53	10.88	10.41	9.34
0302	11.21	10.12	9.73	8.73
0304	11.53	9.81	10.09	8.43
0501	12.01	9.59	8.62	9.20
0513	BAD	11.27	10.97	10.04
0601	12.71	12.64	11.86	9.62
0602	13.14	13.05	12.68	12.49
0603	13.50	13.18	12.62	11.83

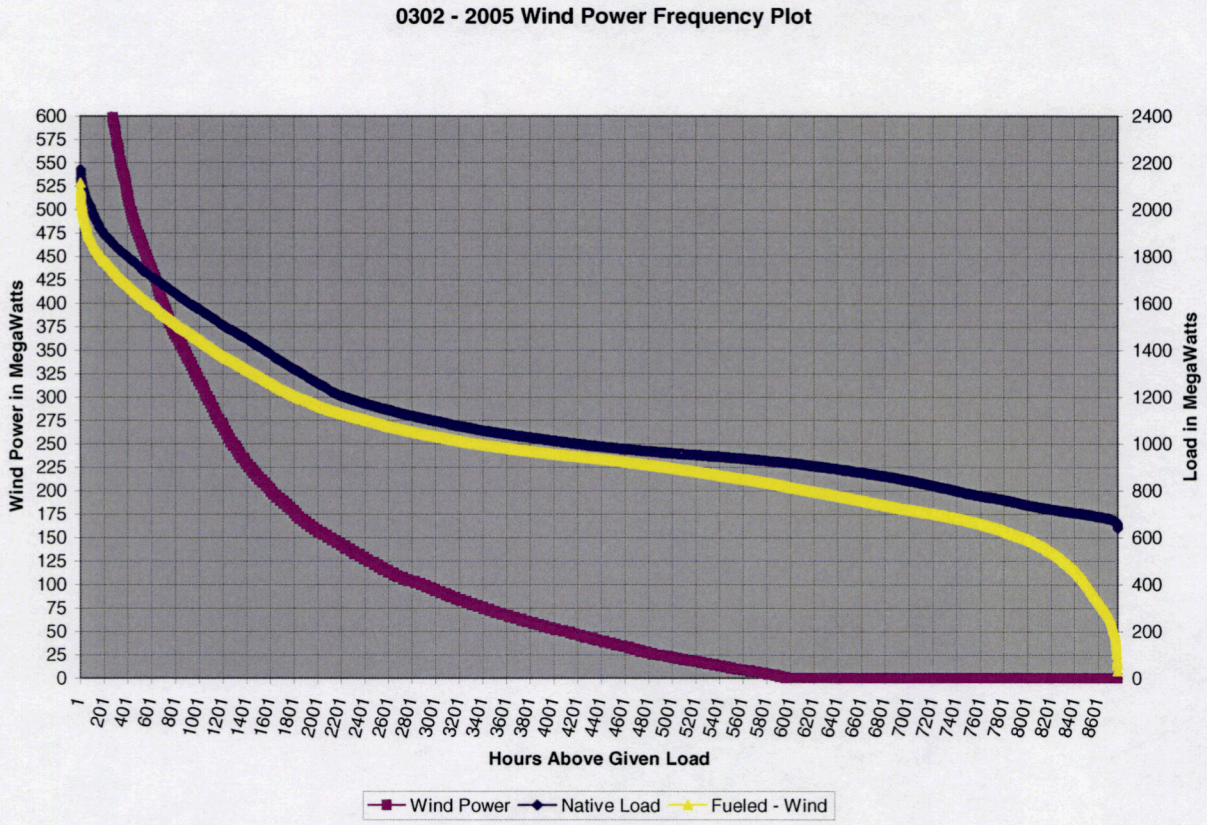
2005 Wind Survey Data Summary in MPH

Site:	40 M	30 M	20 M	10 M
0301	11.73	11.12	10.64	9.36
0302	11.17	10.14	9.92	8.84
0304	11.57	9.49	9.99	8.43
0501	12.11	11.04	10.31	9.37
0513	BAD	10.82	10.28	9.68
0601	12.72	12.41	11.67	9.28
0602	12.81	12.58	12.38	11.27
0603	13.41	13.08	12.92	11.56

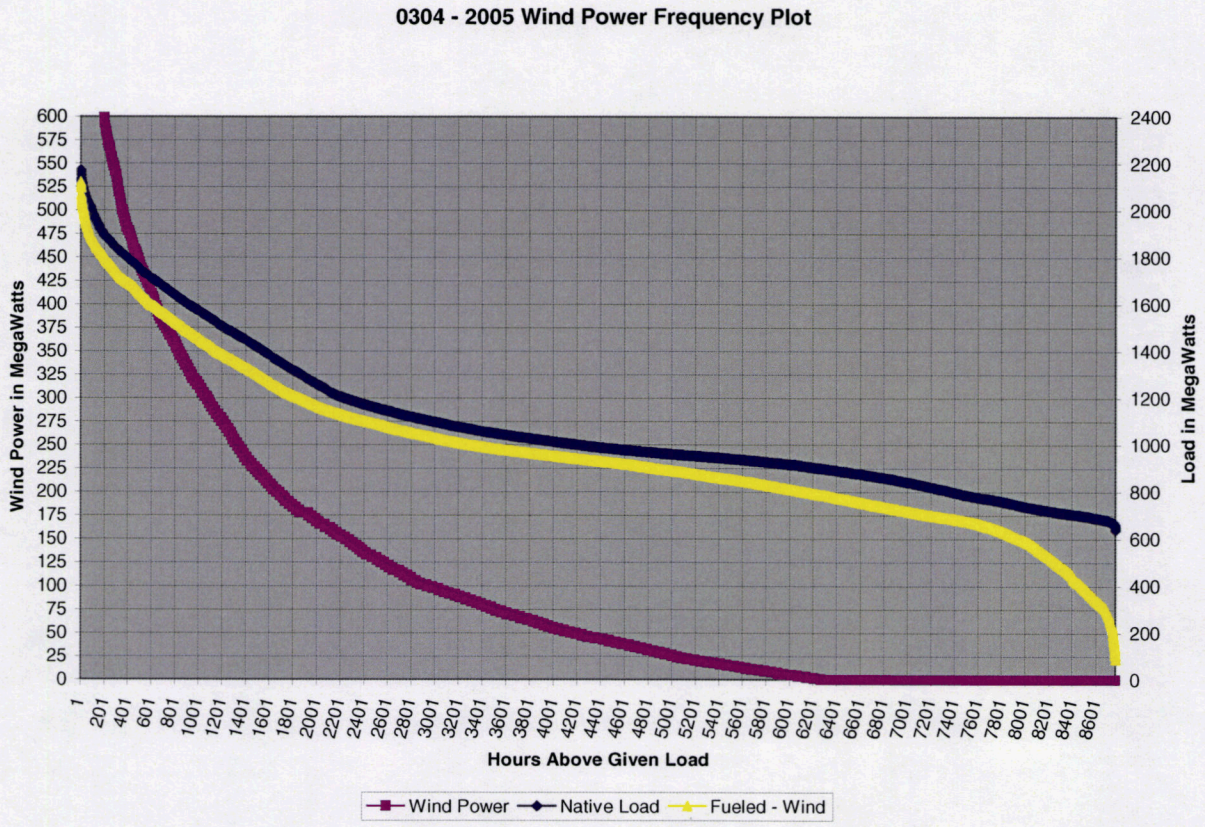
603 MW	Site 0301 Capacity Factors		
	All Hours	Peak Hours	Summer Peak Hours
Average	18.03%	26.43%	28.26%
Max MW	603.00	603.00	603.00
Min MW	0.00	0.00	0.00



662 MW	Site 0302 Capacity Factors		
	All Hours	Peak Hours	Summer Peak Hours
Average	16.43%	25.00%	29.01%
Max MW	662.00	662.00	662.00
Min MW	0.00	0.00	0.00

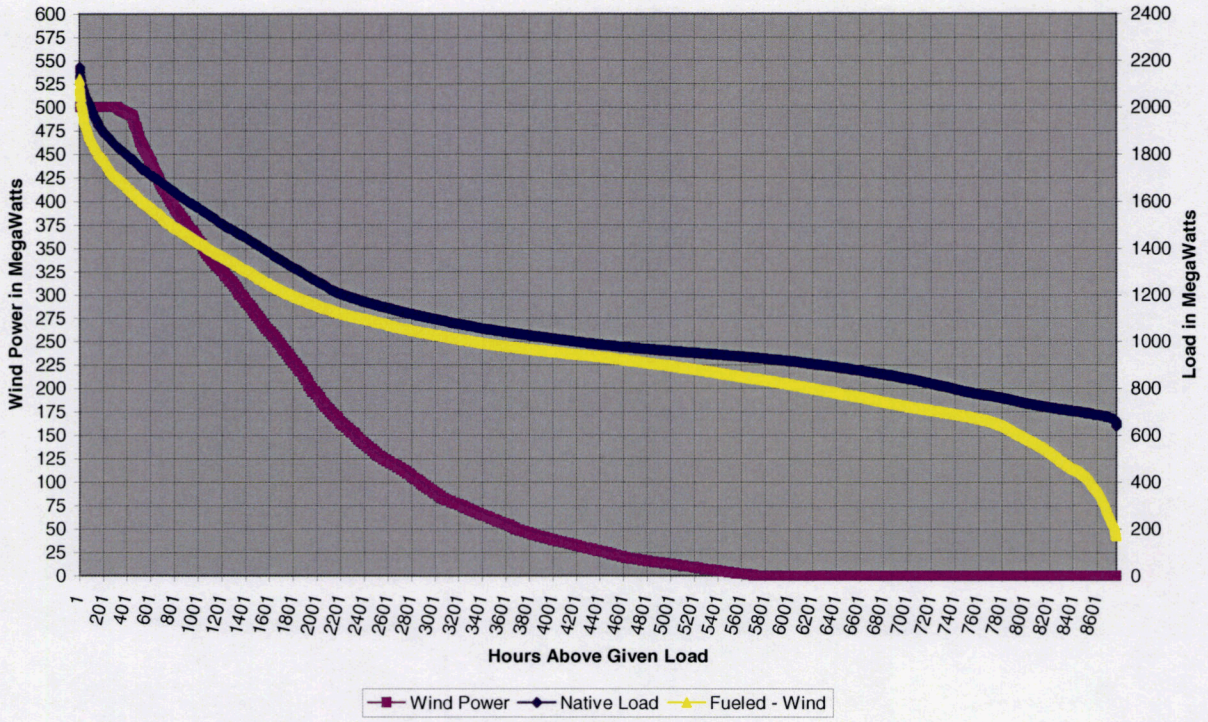


622 MW	Site 0304 Capacity Factors		
	All Hours	Peak Hours	Summer Peak Hours
Average	17.47%	26.15%	26.07%
Max MW	622.50	622.50	622.50
Min MW	0.00	0.00	0.00

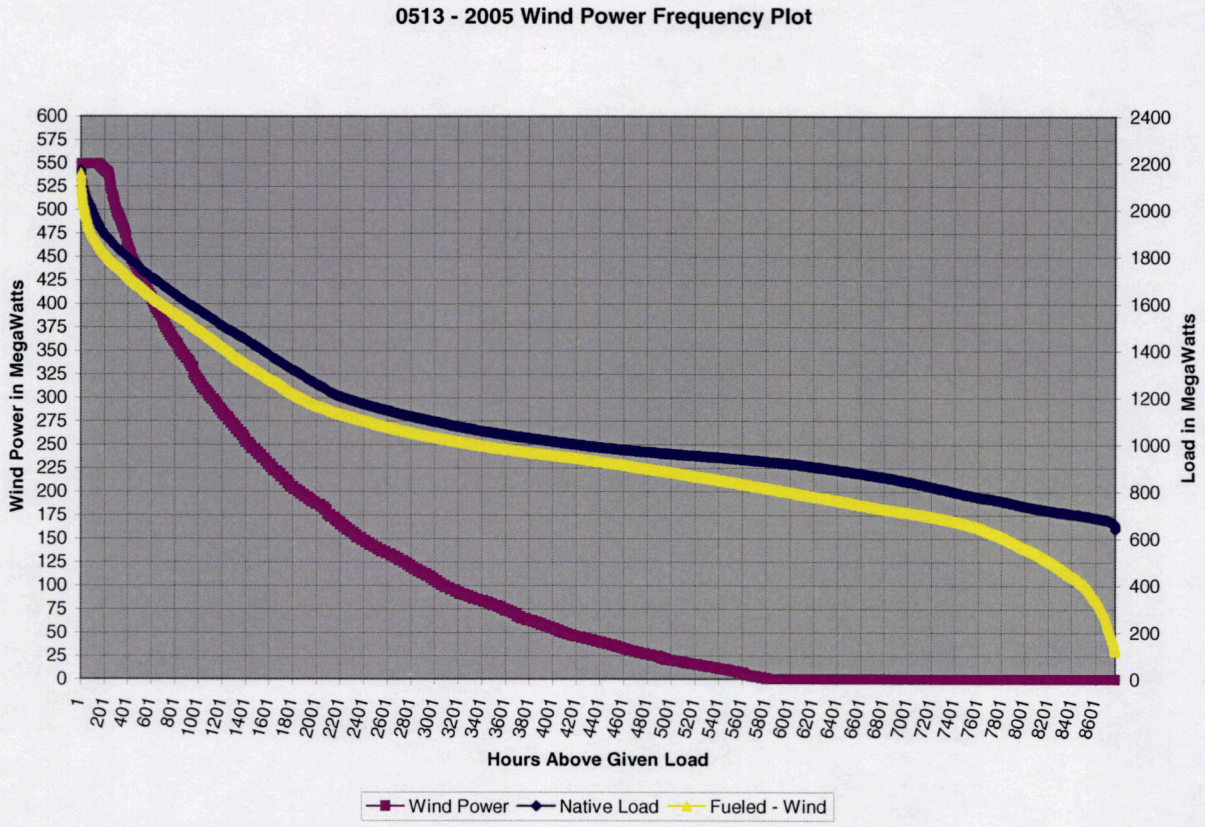


500 MW	Site 0501 Capacity Factors		
	All Hours	Peak Hours	Summer Peak Hours
Average	21.73%	33.49%	37.18%
Max MW	500.50	500.50	500.50
Min MW	0.00	0.00	0.00

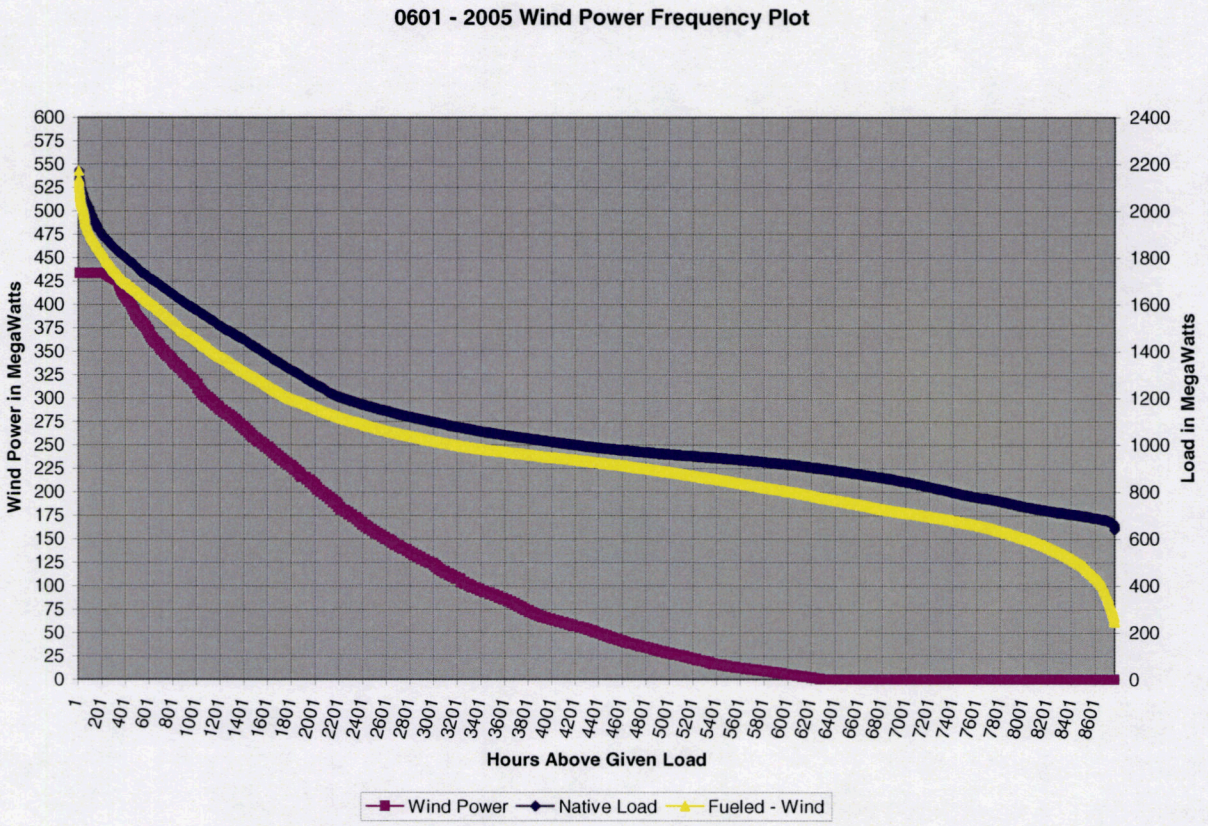
0501 - 2005 Wind Power Frequency Plot



549 MW	Site 0513 Capacity Factors		
	All Hours	Peak Hours	Summer Peak Hours
Average	19.81%	26.24%	22.14%
Max MW	549.00	549.00	549.00
Min MW	0.00	0.00	0.00

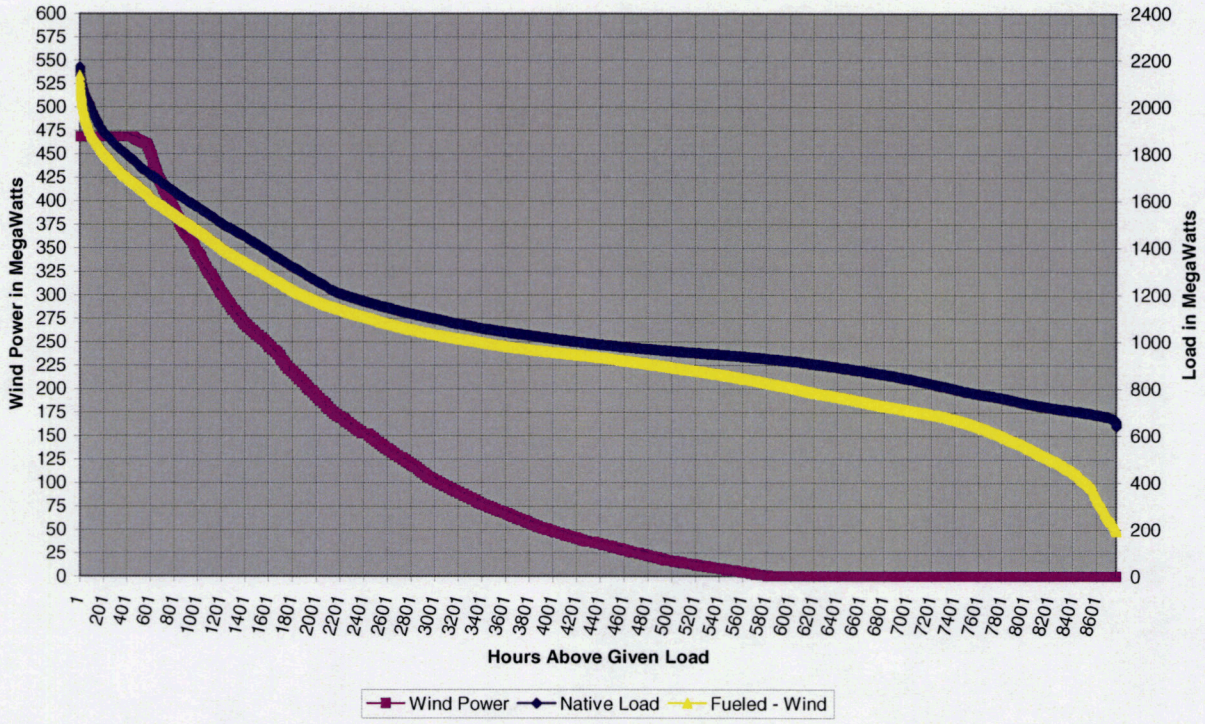


434 MW	Site 0601 Capacity Factors		
	All Hours	Peak Hours	Summer Peak Hours
Average	25.08%	31.43%	32.24%
Max MW	433.70	433.70	433.70
Min MW	0.00	0.00	0.00

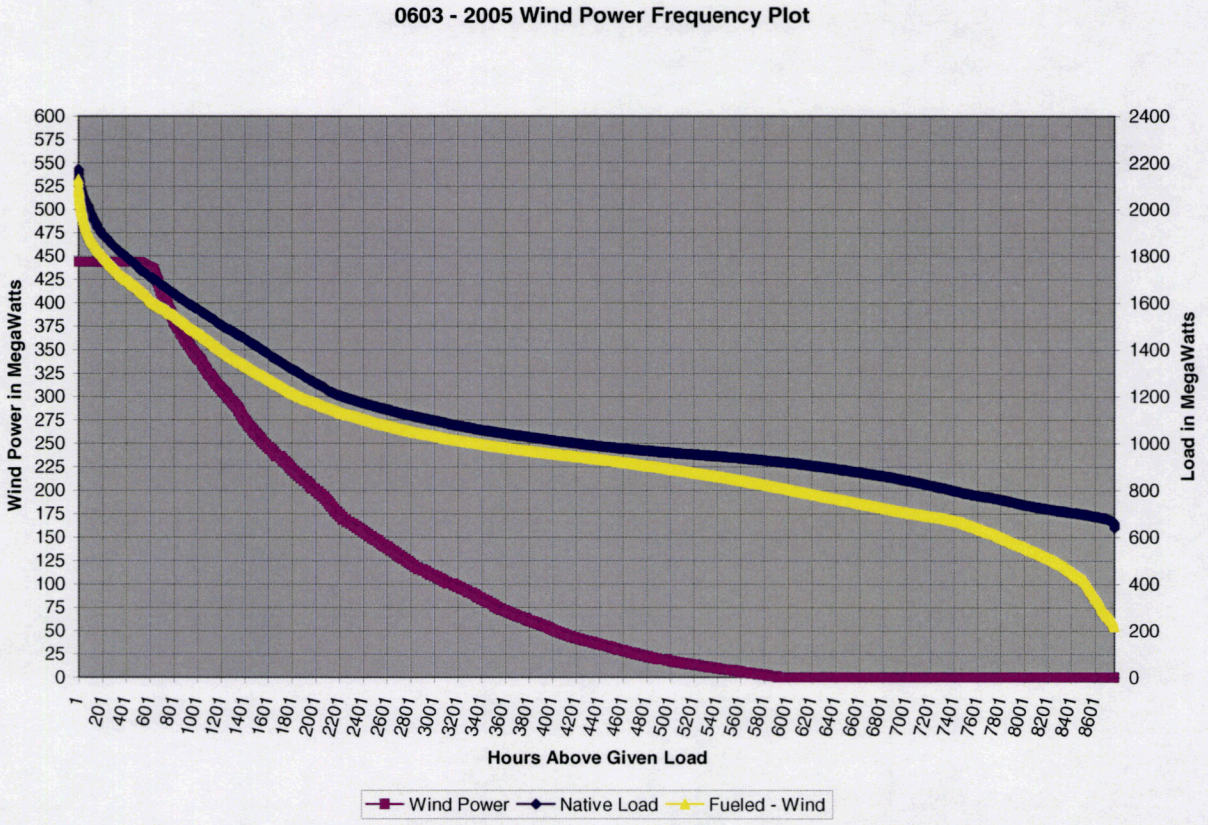


469 MW	Site 0602 Capacity Factors		
	All Hours	Peak Hours	Summer Peak Hours
Average	23.21%	27.72%	26.36%
Max MW	468.50	468.50	468.50
Min MW	0.00	0.00	0.00

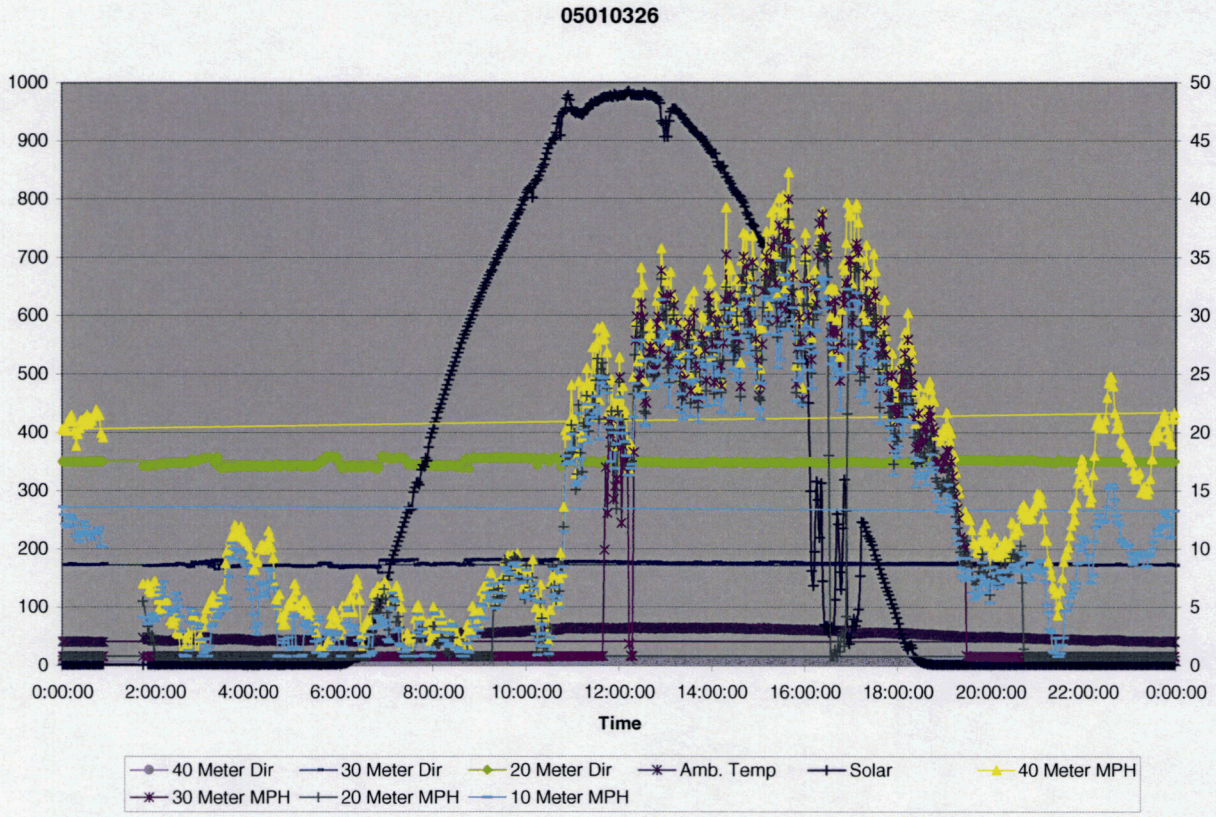
0602 - 2005 Wind Power Frequency Plot



444 MW	Site 0603 Capacity Factors		
	All Hours	Peak Hours	Summer Peak Hours
Average	24.53%	29.02%	26.96%
Max MW	443.50	443.50	443.50
Min MW	0.00	0.00	0.00



The wind is moderately to heavily turbulent in Arizona and has significant variability throughout the day. The graph below indicates a typical spring daily wind regime in northern Arizona. The points represent average two minute samples. The maximum daily standard deviation for one second samples within the two minute sample windows was 7.15 mph and the average one second standard deviation in the two minute windows for the day was 1.80 mph. This indicates a very variable wind regime.



CHALLENGES/BARRIERS

It is at times difficult to obtain permits for wind monitor tower erection in a timely manner. There have been times when TEP waited for more than a year for permits for survey tower installations on state land. However, discussions with the State Land Department have resulted in a better understanding of the permit process and procedures have been developed to streamline the process in the future.

Reliability of wind direction instrumentation used to be a problem on towers of heights greater than 20 meters. In addition to more than a dozen wind direction sensor failures in the past, TEP monitor towers have also experienced failure of seven anemometers. The manufacturer addressed these concerns with new sensor models, but two of the failures were with the new model anemometers. TEP now installs two anemometers at the 40 meter level to allow for failure of anemometers and wind direction sensors at all four instrumented elevations. No new sensor failures have been experienced in 2004 or 2005.

Just as there is a need to develop PV equipment that is well suited for operation in the Arizona climate, there is a need to develop wind generation machines that will operate reliably and efficiently in the Arizona climate. The low air density that results from high ambient air temperatures and/or high elevations must be considered in the selection of appropriate wind generators for use in Arizona as must the relatively high wind turbulence encountered at many times of the year. There is some good work being performed in developing low speed wind regime turbines at the national laboratory level. This work should result in commercial wind turbines appropriate for use in Arizona in the 2007 to 2010 timeframe.

The new Arizona wind resource map shows the best wind resources located on mountain ridges and tops. The citizens of Arizona have been protective of the scenic vistas of their mountain ranges. The proposed installation of wind turbines on Arizona mountain ranges may bring conflict with residents during the permitting phase, which TEP experienced in Huachuca City, Arizona. Preliminary data taken from survey sites on the gently sloping plains of eastern Arizona indicate that while wind generation is technically viable in those plain locations, due to lower average wind speed regimes in these locations the cost of electricity will be higher than if the wind generators were located on mountain ridges. The cost of developing these wind resources with needed transmission is still likely to be less than 10 cents per kWh, but more than seven cents per kWh. Preliminary evaluation of the scope of resources required for development of this large wind resource indicates the need for additional transmission capacity between northern Arizona and the population centers of Arizona. At this time, the necessary transmission capacity upgrades have not been quantified since the geographic scope of the best wind regimes has not been determined definitively.

The data that has been gathered over the past ten years indicates that the wind regime at the monitor sites in Arizona is not fully predictable and is highly variable with numerous periods of very high rates of change. Integration of generation from this variable wind regime will require the use of fueled generation and/or energy storage technology to offset the variations in wind generation to maintain compliance with the NERC CPS-2 grid Average Control Error reliability standard. TEP will continue to study and analyze wind data and wind integration studies of other utilities to determine tools for use in mitigating adverse effects to the stability and reliability of the electrical grid when using large amounts of wind generation in the future.

An informal request for wind turbine pricing in 2003 resulted in budgetary quotes that were 40% higher for the wind turbine machines alone than are reported as installed costs by wind developers for wind turbines installed in other states. In 2004, TEP issued Requests for Proposals ("RFP") for wind power from three wind developers, and at the end of 2004 had received only general proposals from two parties. TEP issued an RFP in early 2005 for the possible purchase of wind energy. Bid evaluation, which included valuation of environmental attributes of energy, found no bids to be economically viable as compared to other generation resources. However, the difference in price needed for wind energy to be economically viable was small and we expect to issue another RFP in mid to late 2006.

PROGRAM CHANGES FOR 2006

TEP plans to continue evaluating the data from existing wind survey sites, reviewing geographic information to predict new potential wind resource sites and licensing sites for installation of wind and solar resource monitor instrumentation. This data will be used for evaluation of possible wind generation locations and for evaluation of bids received in response to its wind energy RFP in 2006 and future years. The data will also be used to find tools and the expected range of costs for mitigating the effect on the reliability and stability of the electrical grid from the intermittency of wind generation. Summary wind speed and projected capacity factor data was presented in this report. Detailed wind speed data will continue to be provided to Northern Arizona University for placement in the public domain for use by all interested parties in developing Arizona's wind resource with out duplication of survey resources.

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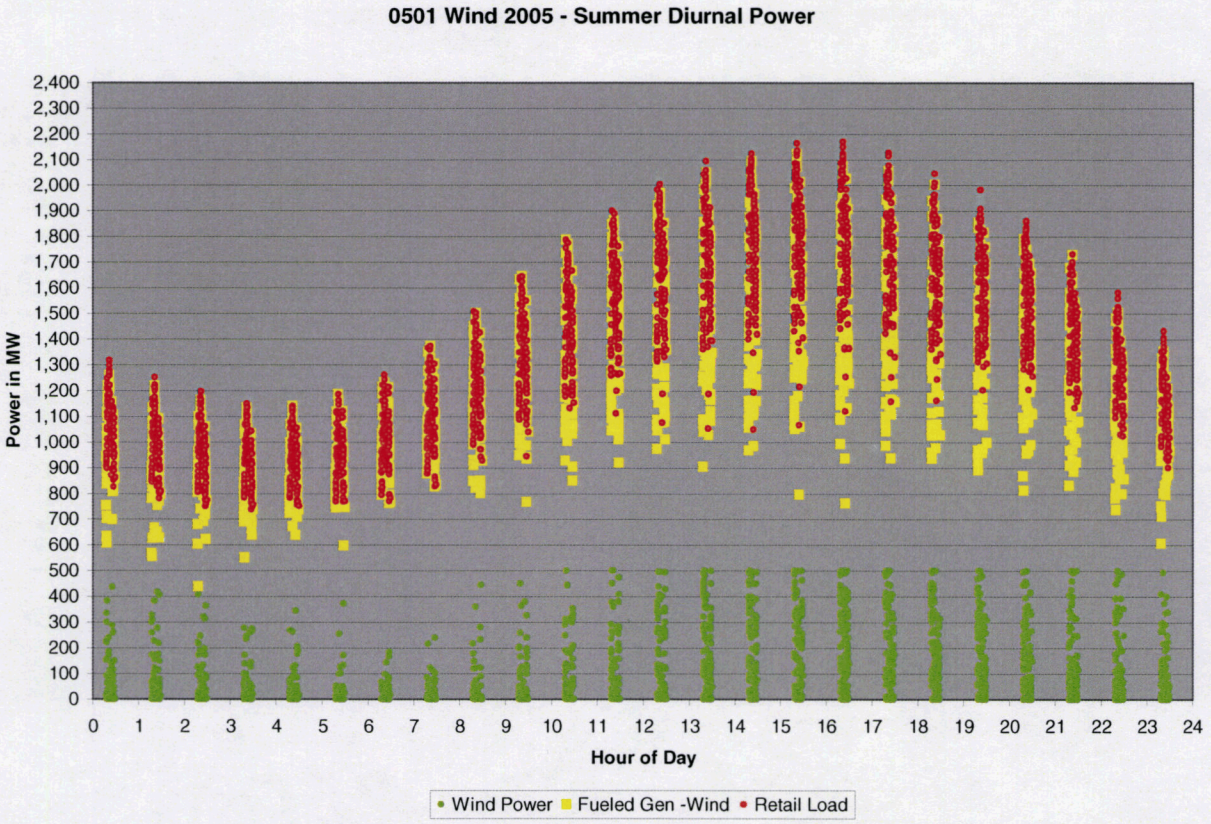
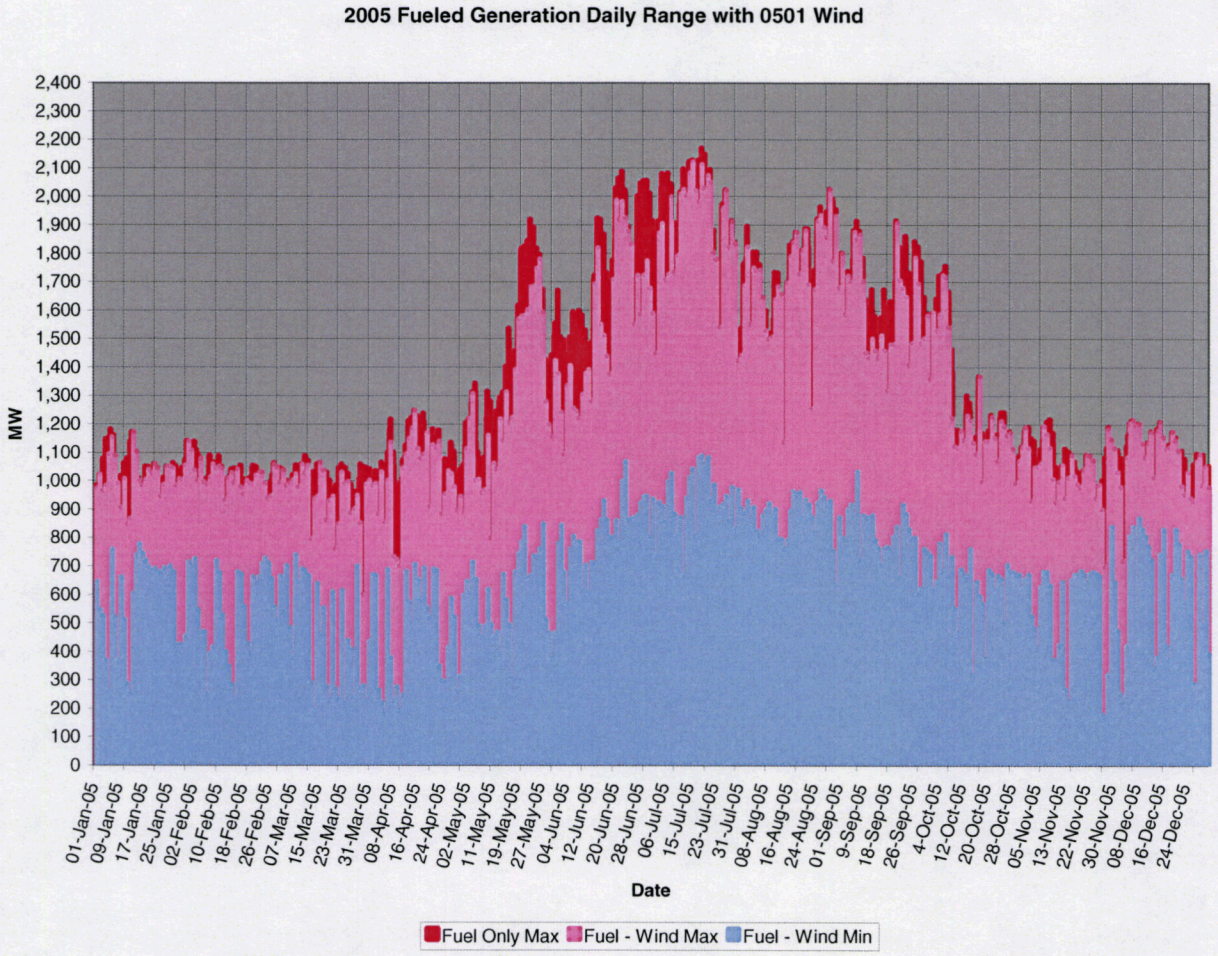
RESULTS AND FORECASTS

The following graph is TEP's 2005 hourly native retail load, overlaid by the hourly energy produced by 501 MW of hypothetical wind generation located at the area of one of the TEP monitor stations and the effect on fueled generation demand reduction (48 MW) from the application of 501 MW of wind capacity. The 501 MW of wind capacity was chosen as the level needed to produce 10.00% of the TEP annual retail energy sold from new renewable generation sources in 2005. The reduction of the need for fueled generation is shown by the displacement between the red points and the yellow points. Where they are coincident, there is no displacement of fueled generation from wind.



Below is a graph of the TEP 2005 hourly daily maximum and minimum native load generation demand as if provided by: 1. Maximum daily demand met by fueled generation only, in red; 2. Maximum daily demand met by fueled generation as reduced by 501 MW of wind generation, in pink; and 3. Minimum daily demand met by fueled generation as reduced by 501 MW of wind generation, in blue. Minimum daily loads are much more difficult to predict with a significant amount of wind generation as part of the generation resource base. Displacement of peak fueled capacity needs by wind energy is indicated where the red shows through the pink areas. Displacement of fueled generation by wind energy at minimum loads is indicated where the pink show through the blue areas.



SOLAR PV RESOURCE DEVELOPMENT

PROGRAM DESCRIPTION

The TEP Solar PV program is designed to develop large utility scale distributed PV generation systems in addition to providing incentives and support for TEP customers to install PV on their premises in a safe, economical manner, which maximizes electrical production from the sun. The large utility scale installations provide the opportunity to provide cost savings through long-term purchases from specific manufacturers and to reduce the cost of solar components through bulk purchasing for the customer based systems.

The goal of the program is to best meet the annual solar electric generation energy requirements of the EPS within the limited funding provided by the EPS while providing sufficient long-term PV demand to drive down PV component costs during the term of the EPS, and to provide feedback to PV component makers to help them improve the safety, reliability and performance of their products to help move the PV industry to product maturity.

PROGRESS AND PARTICIPATION

Large Utility Size Distributed Generation

Installation of large utility scale distributed generation PV systems totaling 4,871 kW DC were completed by December 31, 2005 in Tucson and at Springerville. These systems use PV array building blocks of 21.6 kW DC to 135 kW DC in size, and represented 87.6% of the TEP solar generation base at the end of 2005, while producing 91.8% of the solar electricity in 2005. Different PV module technologies have been used, including crystalline silicon, Cad-Tel, Copper Indium Gallium Selenide ("CIGS") and amorphous silicon. Testing of new module technologies is supported by TEP at the utility scale PV system sites. The results of daily energy production performance are shared with interested manufacturers, and used to identify and correct performance related problems. These systems are heavily instrumented and results are reviewed daily to ensure proper operation of the systems. Effective availability of the largest systems in 2002 was 99.43%, 99.78% in 2003, 99.72% in 2004 and 99.81% in 2005, a very high online operational record for any generating system. These have proven to be very cost effective installations using the opportunity provided by the EPS program to eliminate financing charges. Finance charges are a considerable portion of total costs in high capital, low operational cost projects such as PV. Elimination of finance charges to reduce life cycle ownership costs using the "pay-as-you-go" up-front funding concept inherent in the EPS mechanism adopted by the ACC has made a significant reduction in life cycle cost of energy generated with PV. Evaluation of life cycle costs given limited experience with long-term operating costs of large scale PV indicate that large utility scale distributed PV generation systems should produce EPS Solar credits at a cost less than produced by small solar generating systems.

In 2003, one partnering manufacturer retested PV modules that had been in service in Tucson for 28 months to test for dirt and time related output degradation. Modules were tested first without cleaning and then after cleaning. Results indicated less than 1% output degradation from dirt on modules that had not been cleaned in two years and overall time related degradation of clean modules much less than that expected.

Module reliability is very good, with replacement of only one ASE module, a number of first generation First Solar modules and 11 BP Solarex modules required at the Springerville Generating Site Solar System ("SGSSS") in 2004 and none of those types of modules in 2005. The most unreliable parts of the SGSSS are the data collection system and the step up transformers. However, changes were made in early 2004 to address the sensitivity to static of the data collection system and setpoint changes were made to limit the power output of the PV systems during sunsplash conditions to reduce the transformer overloading problem on SCL4. These changes resulted in the improvement of reliability in 2005 despite the system being hit in four places by lightning in July 2005.

Analysis was performed on the performance data of the SGSSS PV systems by installation date and module technology comparing 2001 data with 2005 to determine if there has been module performance degradation. The rate of degradation for all three module technologies was within the temperature variant noise in the data created by the Licor solar sensors. In other words, the modules are more stable than the sensors used to measure the solar input, and the data analyzed indicated the module performance of all three technologies had improved with time. Two new stable MSX-01 style solar sensors were installed in late 2003 and will be used for baseline data for the next long term performance review after 2006 annual data is available.

The units at Springerville experienced numerous failures of the distribution grid during 2005. Some planned, some not planned. In all cases all inverters met their IEEE-929 island detection requirements, even with 34 inverters in parallel on the line and some inductive pump motor load, and disconnected nearly instantaneously. Power factor and harmonic testing at numerous loads indicated all parameters were within specifications. As additional inverters are added and the installed capacity of PV approaches the installed load of the pumps and other loads on the radial line, it will be instructive to monitor the transient response of line faults as verification of correct IEEE-929 compliance. There were numerous events recorded where inverters in Tucson and at Springerville detected a transmission or distribution line disturbance and disconnected the inverter from the grid. In these cases the reasons recorded for disconnect by the inverters were not always consistent. Four events were recorded in 2004 where a grid disturbance in one area triggered a trip of an inverter in a remote area. For example, the loss of all three Palo Verde generators on June 14, 2005 resulted in nearly all Tucson based PV inverters, and one Springerville inverter tripping off line for the required five minutes before automatically reconnecting. Data and documentation of these events continues. TEP is working with one inverter manufacturer and the Sandia National Energy Lab to find and test solutions to this grid destabilizing effect that occurs because of the implementation of the IEEE-929 standard. New software was installed in the 34 inverters during 2005 to allow for wider IEEE-929 protection set points to prevent nuisance inverter trips during high voltage transmission line faults. It was found that a low voltage set point of 176 volts rather than the standard 183 volts, low frequency set point of 59.0 Hz rather than the standard 59.5 Hz and high frequency set point of 61.0 Hz rather than the standard of 60.5 Hz prevented any inverter trips during three high voltage transmission line faults in November and December 2005. This information was shared with the inverter

designer.

2005 ANNUAL SOLAR ENERGY PRODUCTION TO DATE

Category	Installed Capacity	Annual Energy	Energy %
SunShare Systems	**400 kWDCp**	**503 MWh**	**5.8**
TEP Community Customer Sited	**186 kWDCp**	**208 MWh**	**2.4**
TEP Utility Scale	**4,910 kWDCp**	**7,976 MWh**	**91.8**
TEP Solar Energy	**5,496 kWDCp**	**8,686 MWh**	**100.0**

TEP has sufficient numbers of PV systems of various sizes, locations and technology types to begin making comparisons of these factors on the annual energy production performance of PV systems. These comparisons are made by normalizing the annual energy output by the manufacturers rated power of the total power rating of the PV array modules as measured at the Standard Test Conditions ("STC") by a factory test. Some general trends observed based on 2005 specific annual energy production of systems that had a full year of operation:

- Utility scale PV systems have proven to be more productive than smaller PV systems.
- The cool, windy location of the SGSSS has proven more energy productive than Tucson for fixed tilt PV installations.
- Crystalline Silicon modules and some thin film modules have nearly equal specific annual energy production in the fixed tilt PV application at Springerville.
- The specific site characteristics including maximum and minimum temperatures, maximum wind speed and the type of clouds normally experienced will in very large part determine which type of solar generation technology is most appropriate for a given site. While fixed latitude tilt PV is an excellent choice for Springerville, tracking PV is more appropriate for a less windy location like Prescott, Ariz. and tracking thermal concentrator solar is more appropriate for the hot desert west of Phoenix, Ariz.

The concept of installing incremental amounts of solar generation at existing coal power plants to take advantage of existing transmission infrastructure and more effectively use the large amounts of property used as guard space around these plants is being developed as experience is gained in the design and operation of the SGSSS.

Results of the specific performance of the different categories of PV systems in 2005 that had a full year of operation:

2003, 2004 & 2005 ANNUAL SPECIFIC ENERGY OUTPUT IN KWH AC PER KWDCP @ STC

	2003	2004	2005
SunShare Option 2 Average:	1,347	1,316	1,416
SunShare All Options Average:	1,375	1,286	1,385
TEP Tucson Sited Small Systems Average:	1,429	1,503	1,298
TEP "Tucson" Sited Large Systems Average:	1,596	1,585	1,435
SGSSS Sited a-si Module Type Average:	1,602	1,567	1,510
SGSSS Sited CdTe Module Type Average:	1,664	1,722	1,668
SGSSS Sited C-si Module Type Average:	1,743	1,719	1,669

- SunShare Option 2 systems are all less than 10 kWDCp in size, amorphous, and crystalline silicon module technology systems, located on customer sites in Tucson.
- SunShare Option 1 and 3 systems are all less than 10 kWDCp in size of various module technologies (primarily crystalline silicon) located on customer sites in Tucson.
- TEP Tucson Sited Small Utility Systems are all less than 10 kWDCp in size of various module technologies (primarily crystalline silicon) located either on customer sites or TEP's Operating Headquarters solar test facility in southeastern Tucson.
- TEP Tucson Sited Large Utility Systems are all larger than 10 kWDCp in size, all of crystalline silicon module technology, located either on customer sites or TEP's property in Tucson and includes the single 22 kWDCp system at the Auto Shop at SGS and the single 30 kWDCp system at Fort Huachuca.
- SGSSS Sited Systems are the systems at the West Well field area of SGS. These systems are distinguished by differences in the module technology used in the various systems. Note that there were array enhancements made to the CdTe systems during late 2003, 2004 and during 2005, so the results are not fully comparable to the results of the other SGSSS technologies.

Small Utility Supported Distributed Generation

Installation of small Customer sited distributed generation systems throughout Tucson has been successful in providing energy in support of EPS solar credit goals and in developing public interest in solar energy. To date 186 kW DC of small TEP supported and maintained PV systems have been installed on customer premises. These systems represent 3.4% of the TEP solar generation base as of December 31, 2005, while producing 2.4% of the solar electricity in 2005. These systems do not provide the same economics for production of EPS solar credits as the large scale PV systems, but provide better solar program visibility. Some GreenWatts revenues are used for support of solar installations in the Tucson area, such as at

the Tohono Chul Museum, Pima Air Museum, Safford Middle School, Palo Verde High School, Hohokum Middle School, Tucson Botanical Gardens, Civano School, Empire High School, Davidson Elementary, Project MORE and Doolen Middle School among others.

Customer Partnering Distributed Generation

TEP has partnered with customers, notably the City of Tucson, to install medium sized customer owned and sited PV systems totaling 103 kW DC. These systems represent 1.9% of the TEP solar generation base at the end of 2005, while producing 1.19% of the solar electricity in 2005. These systems provide the opportunity for significant leverage of EPS funding and provide EPS Solar credits at the lowest life cycle costs. However, there are a limited number of customers with available funding to support these types of projects. Some GreenWatts revenues are used for support of these installations.

SunShare

TEP offers the SunShare hardware buy-down program, with ACC approval, to its customers. Since the program was offered in 2001, there have been more than 1,500 expressions of interest. To date, there have been 174 participants installing PV systems. Of these participants, 20 have chosen Option 1, 77 have chosen Option 2, and 77 have chosen Option 3. There were 53 customers who installed PV systems in 2005 as part of SunShare, representing 140 kW DC. There is currently 400 kW DC of customer sited, installed PV capacity as part of the SunShare program. These systems represent 7.3% of the TEP solar generation base at the end of 2005, while producing 5.8% of the solar electricity in 2005.

The SunShare program was developed to support EPS program goals with small customer based distributed generation PV systems through hardware buy down payments to customers installing any qualifying PV system of their choice (Option 1), and offer of a pre-qualified PV system at a significantly discounted price as compared to market rates (Option 2).

TEP requested in 2003, and received on February 10, 2004, ACC approval for changes in the SunShare program offerings for 2004, 2005 and 2006, including the offering of a new Option 3, to allow more customers to qualify for the program while retaining high standards for safety, reliability and performance of systems in the SunShare program. In August 2004, the ACC approved an increase in SunShare Option 3 funding from $2 per DC watt to $3 per DC watt with an annual reduction of $0.30 per DC watt.

The SunShare program changes include:

1. Adds Option 3, which provides for a $3 per DC watt subsidy payment instead of the $2 per AC watt (roughly $1.33 per DC watt) payment of Option 1 or Option 2. Maintenance is not included in this Option, but does include an annual inspection to ensure the equipment is functional and performs as designed. This Option offers more customer choice.

2. Adds a factor for off angle or shaded installations, reducing the subsidy payment by the percentage of the amount of expected annual energy output reduction from the off angle or shading condition. A table defining the percent reduction is included in program documents for easy prediction of the reduction percentage. The percentage reduction affects all three options. The system must face from 90 degrees east of north through south to 90 degrees west of north and have an angle of 10 degrees to 60 degrees from horizontal and be fully unshaded from three hours after sunrise to three hours before sunset to qualify. This should allow more installations to qualify, while retaining an annual energy based subsidy criteria.

3. A minimum of module clearance distance qualification has been added to ensure output is not reduced from overheating due to lack of natural convective cooling.

4. Increases the maximum qualifying PV system size from 5 kW AC to 10 kW AC, or what is typically about 15 kWDC. The minimum size remains at 800 watts AC or about 1,200 watts DC. All systems will still be metered, and TEP still supplies the meter and meter socket. This change should allow more systems to qualify and matches the maximum size of a net metered system.

5. Removes the 5 kW system from Option 2, as that system could never be offered due to lack of a qualifying inverter. Limits Option 2 kits to ten maximum per customer.

6. The program still has an annual cap of 200 kW of qualifying PV installations. The program will be offered in 2004, 2005 and 2006.

7. The Option 1 rating can now be determined either by test or by comparison to historical data of another "equal" system.

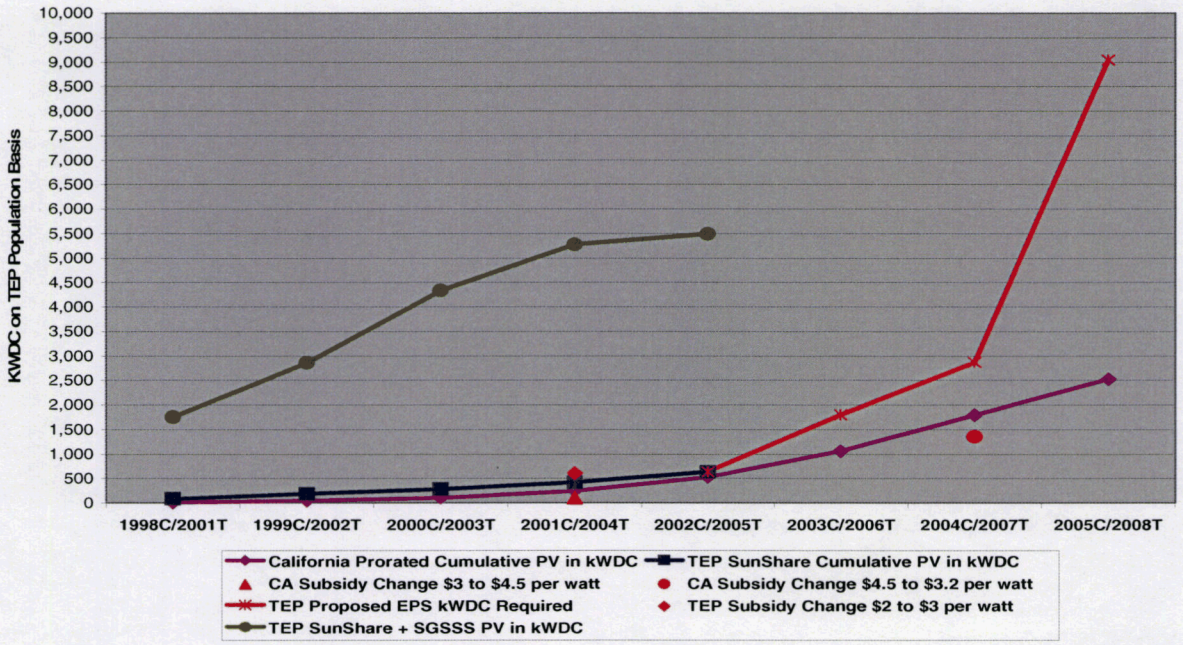
8. Revised the SunShare Annual Report filing date to April 15 to coincide with the DSM/Renewable Report filing date to simplify reporting requirements.

In 2004, a new program was added for UNS Electric, a subsidiary of UniSoure Energy Services, which provides the same rebate option as TEP's Option 3 program, with an annual cap of 50 kW. This program represents customers in Lake Havasu, Kingman and Nogales service territories.

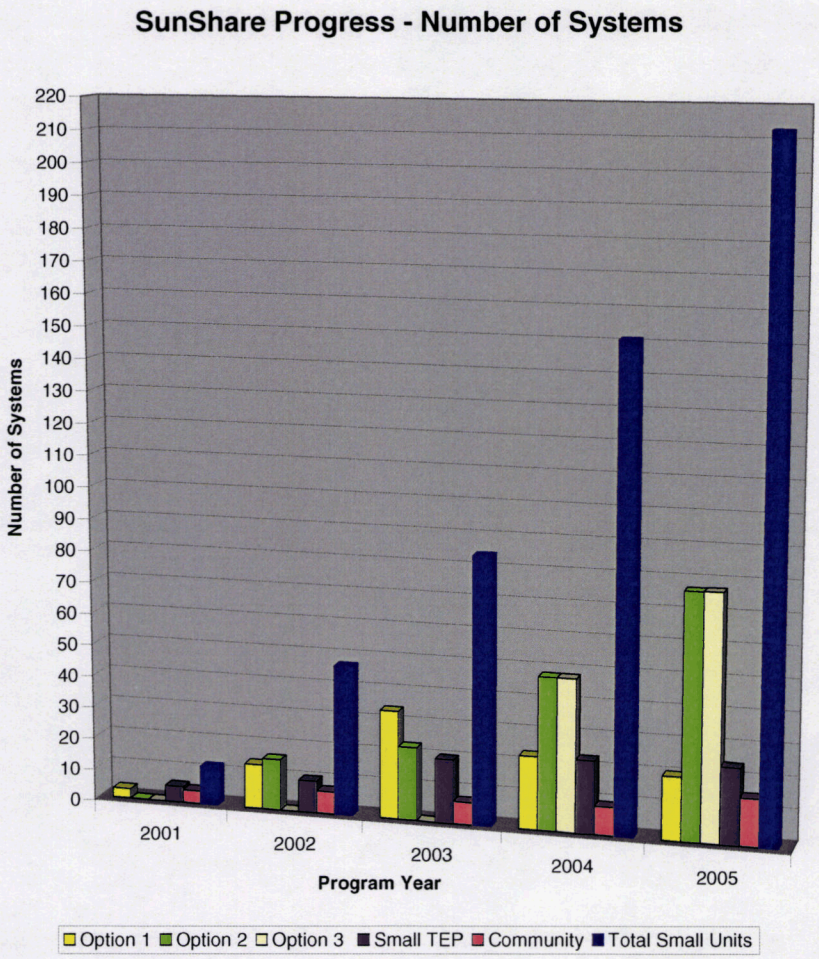
TEP provides extensive outreach and education about the benefits of solar energy, as described in the Executive Summary of this report, for promotion of the SunShare program. Because of the close coordination with customers to build confidence in solar technologies, the SunShare Program has shown steady participation gains in its four years of existence. The first four years of the SunShare program has been more successful than the first four years of the California Emerging Technologies solar programs on a per capita basis.

The graphs below demonstrate that progress. These include the capacity of the City of Tucson's Hayden/Udall Water Treatment Solar Generation system installed in 2002, since TEP does provide maintenance support of the system under a separate agreement similar to the SunShare program maintenance. The graph shows the level of SunShare participation needed to meet the goals in the proposed EPS rules for solar generation (orange line) in years after 2004 as compared to the similar years of the California solar support programs (magenta line), along with the level of solar installation per capita if the utility scale PV systems are included in the TEP totals (green line).

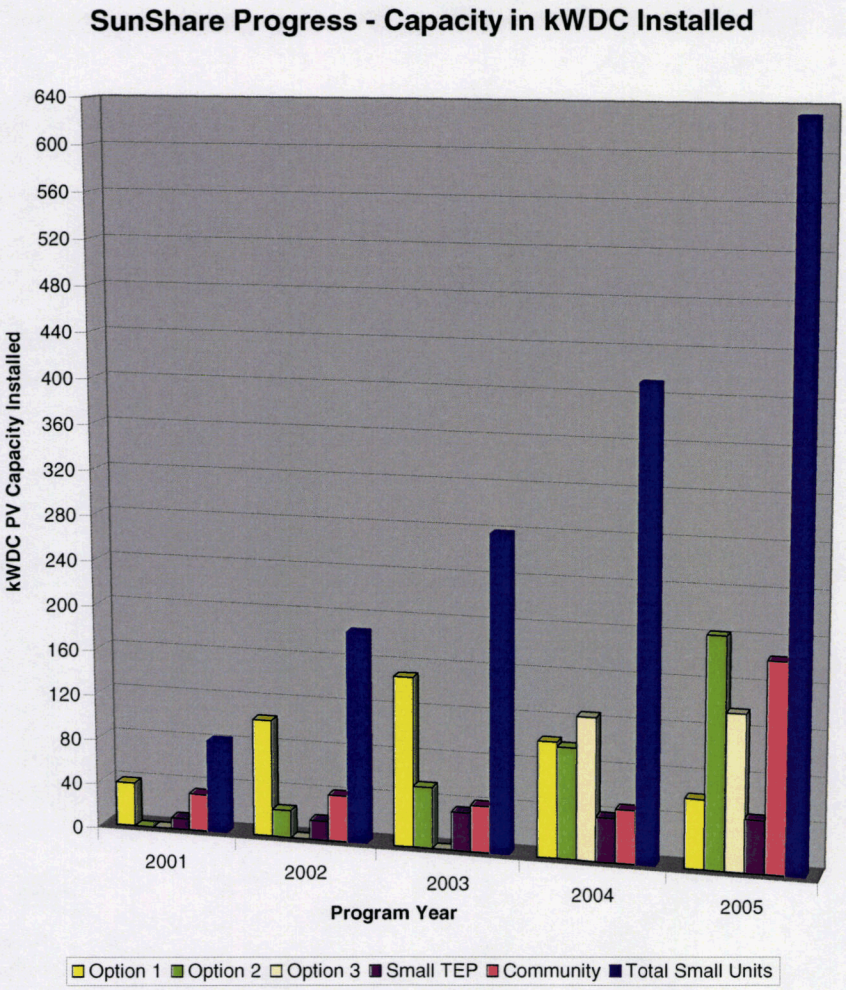
Comparison of California to Tucson Electric Power
Cumulative Distributed PV Generation Capacity Installed



PROGRESS BY YEAR FOR THE SUNSHARE PROGRAM – NUMBER OF PARTICIPATING CUSTOMERS



PROGRESS BY YEAR FOR THE SUNSHARE PROGRAM – INSTALLED PV CAPACITY



Net Metering

In 2001, TEP offered, with Commission approval, a net metering option for owners of PV systems of less than 5 kW AC in size. TEP requested, and the Commission approved in March 2003, an increase in the maximum size of a PV generation system qualifying for net metering to 10 kW AC and expanded the eligible technologies to include wind generation up to that size. As of December 31, 2005, 64 PV customers have qualified and enrolled in the net metering program, of which 25 customers qualified in 2005 alone. No wind customers have yet enrolled in net metering. These PV customers have a combined installed solar generation capacity of more than 100 kW AC. To further simplify customer sited PV and wind installations, in addition to net metering, TEP also offers simple interconnection requirements for small customer located PV and wind systems.

Solar Water Heating System Evaluation

In late 2004, TEP evaluated various domestic solar hot water systems with regard to economic and penetration feasibility in the Tucson service territory. Since there were hundreds of systems available for consideration, this review focused on a sampling of systems that would be most suited for the Arizona climate. The evaluation was conducted as a preliminary review of systems and programs, targeting the experience of local contractors and other existing utility programs in place. The intent of this review was to assist TEP in determining a course of action for possible implementation of a solar hot water system program for TEP.

TEP reviewed both open loop and closed loop systems, involving older batch, Integrated Collector Storage ("ICS"), recirculating, thermosiphon and other closed loop active systems. From the information available for Arizona systems, open loop recirculating and open loop thermosiphon systems are generally not used or have limited application due to their scaling problems, lack of freeze protection, or low efficiency. Contractors generally prefer ICS and various closed loop systems, active and passive, which have provided the best overall performance in the Arizona climate.

In order to adequately fund a domestic hot water program for TEP, DSM and/or other EPS incentives need to cover all expenses incurred by the utility for program costs. The experience of other programs surveyed indicated many utility programs have operated only partially funded, and have been forced to eliminate needed maintenance or inspection tasks, and have generally reduced any efforts that require significant employee time. Other impediments to program success consist of engaging the utility in extensive program management. It is the consensus of many utilities evaluated that a simple rebate program, with discount, loans or other incentive provisions, will provide an effective program.

Local solar domestic hot water ("SDHW") system contractors support the idea of TEP providing a targeted program for customers, and TEP will continue to review the feasibility of initiating a program possibly in 2007. TEP will perform a survey in early 2006 to access SDHW system performance in our Arizona climate, and will provide recommendations to the ACC for SDHW program development. This information and continued study of system applications, and O&M and life cycle costs, will need to be considered in the total cost of ownership for the customer when considering a new program for TEP.

Summary of PV Programs

In summary, the TEP Solar PV program, in response to ACC's EPS annual renewable energy production requirements, has effected the installation or assisted in the development of 5,485 kW DC of solar PV generating resources in Arizona.

Installations, capacity, energy production and costs of these systems are summarized below:

INSTALLATION PROGRESS

Project	Install Date	kWp DC Capacity	kWh, AC Output Thru 12/31/05	Initial Costs	Total Operating Cost Thru 12/31/05	$/kWh for Project
Community Projects						
Reid Park Zoo ASE/TR 840w Xtal	Mar-00	0.84	3,713	$7,400	$6,669	N/A
Pima Air Museum ASE/TR 1200w Xtal	Jun-00	1.2	6,913	$7,099	$300	0.0689
UofA Agriculture Station	Jan-02	5.62	34,382	$120,000	$279	0.1944
Hayden/Udall # 1 ASE/TR 21.6 KW Xtal	2002	21.6	102,279	$142,975	$698	0.0677
Hayden/Udall # 2 ASE/TR 21.6 KW Xtal	2002	21.6	100,963	$142,050	$641	0.0657
3131 S. Naco Vista	Apr-99	0.75	7,266	$6,944	$300	0.0702
Tohono Chul BPSX140U/SB - 2800w Xtal	Dec-02	2.8	12,276	$23,286	$300	0.0835
Civano Vail School MST50/TR 3000w Xtal	2004	3	4,350	$15,990	$500	0.0645
Hohokam TUSD BP3160Q/FR 4480w Xtal	2004	4.48	5,247	$21,584	$450	0.0498
Ft Huachucha Solar ASE/OMN 30 KW Xtal	1997	30	228,202	$180,000	$2,950	0.0701
Tucson Audubon Society	2005	1.5	785	$8,412	$100	0.0865
Tucson Botanical Gardens	2005	3	1,830	$16,576	$300	0.0735
Clements Center - City of Tucson	2005	6	1,290	$28,928	$100	0.0938
Project MORE - TUSD	2005	15	6,391	$55,214	$100	0.0484
Pennington St. Garage - City of Tucson	2005	60.00	30,561	N/A	N/A	N/A
Vail Empire High School	2005	7.50	1,980	$38,860	$0	0.3271
SunShare						
SunShare Reported 1999	1999	0	49,063	$50,000	$100	0.0940
SunShare Reported 2000	2000	0	14,230	$25,000	$100	0.1237
SunShare Reported 2001	2001	7.20	46,405	$79,110	$2,300	0.1595
SunShare Reported 2002	2002	66.75	203,104	$266,532	$6,400	0.0620
SunShare Reported 2003	2003	68.00	171,981	$295,820	$7,705	0.0586
SunShare Reported 2004	2004	110.61	207,214	$773,278	$9,550	0.0932
SunShare Reported 2005	2005	101	28,678	$307,174	$2,300	0.0837
Utility (TEP)						
SGS-125C-1 ASE/XN 135 KW Xtal	Jul-01	135	848,459	$1,125,637	$3,888	0.0854
SGS-125C-2 ASE/XN 135 KW Xtal	Jul-01	135	886,150	$848,927	$3,888	0.0629
SGS-125C-3 ASE/XN 135 KW Xtal	Aug-01	135	841,079	$779,470	$4,131	0.0585
SGS-125C-4 ASE/XN 135 KW Xtal	Aug-01	135	830,623	$885,503	$3,888	0.0664
SGS-125C-5 ASE/XN 135 KW Xtal	Nov-01	135	802,572	$891,576	$3,888	0.0675
SGS-125C-6 ASE/XN 135 KW Xtal	Nov-01	135	815,552	$830,314	$3,888	0.0615
SGS-125C-7 ASE/XN 135 KW Xtal	Oct-02	135	662,600	$896,984	$3,500	0.0666
SGS-125C-8 ASE/XN 135 KW Xtal	Oct-02	135	675,040	$896,332	$3,500	0.0652
SGS-125C-9 ASE/XN 135 KW Xtal	Oct-02	135	665,718	$900,199	$4,955	0.0676
SGS-125C-10 ASE/XN 135 KW Xtal	Oct-02	135	665,898	$910,976	$4,955	0.0661
SGS-125C-11 ASE/XN 135 KW Xtal	Jun-02	135	716,080	$899,885	$4,955	0.0655
SGS-125C-12 ASE/XN 135 KW Xtal	Jun-02	135	658,988	$901,081	$4,955	0.0675
SGS-125C-13 ASE/XN 135 KW Xtal	Jun-03	135	465,363	$866,453	$2,933	0.0642
SGS-125C-14 ASE/XN 135 KW Xtal	Jun-03	135	461,878	$866,190	$2,933	0.0644
SGS-125C-15 ASE/XN 135 KW Xtal	Aug-03	135	447,012	$867,159	$2,933	0.0645
SGS-125C-16 ASE/XN 135 KW Xtal	Aug-03	135	452,974	$860,732	$2,933	0.0632
SGS-125C-23 ASE/XN 135 KW Xtal	Jul-04	135	213,734	$813,735	$499	0.0602
SGS-125C-24 ASE/XN 135 KW Xtal	Jul-04	135	211,335	$799,027	$499	0.0601

Project	Install Date	kWp DC Capacity	kWh, AC Output Thru 12/31/05	Initial Costs	Total Operating Cost Thru 12/31/05	$/kWh for Project
SGS-125C-25 ASE/XN 135 KW Xtal	Jun-04	135	228,250	$843,527	$657	0.0621
SGS-125C-26 ASE/XN 135 KW Xtal	Jun-04	135	241,438	$840,998	$657	0.0619
SGS-125C-27 ASE/XN 135 KW Xtal	Jun-04	135	240,408	$762,344	$657	0.0561
SGS-125C-28 ASE/XN 135 KW Xtal	Jun-04	135	232,376	$835,890	$657	0.0633
SGS-125C-29 ASE/XN 135 KW Xtal	Nov-03	135	386,978	$849,606	$657	0.0633
SGS-125C-30 ASE/XN 135 KW Xtal	Nov-03	135	386,136	$724,018	$657	0.0535
SGS-125C-31 ASE/XN 135 KW Xtal	Aug-03	135	438,594	$856,574	$2,933	0.0633
SGS-125C-32 ASE/XN 135 KW Xtal	Aug-03	135	427,605	$856,552	$2,933	0.0641
SGS-125TF-1 FS/XN 134.4 KW Cd-Tl	Sep-01	135	833,505	$737,815	$16,262	0.0557
SGS-125TF-2 FS/XN 134.4 KW Cd-Tl	Sep-01	135	756,591	$620,396	$15,016	0.0471
SGS-125TF-3 FS/XN 134.4 KW Cd-Tl	Jun-03	135	470,186	$759,114	$1,428	0.0584
SGS-125TF-4 FS/XN 134.4 KW Cd-Tl	Jun-03	135	482,665	$759,122	$1,428	0.0555
SGS-125TF-5 BP/XN 129 KW a-si	Oct-01	135	762,607	$760,802	$1,678	0.0663
SGS-125TF-6 BP/XN 129 KW a-si	Oct-01	135	804,392	$760,717	$1,678	0.0643
SGS-125TF-7 BP/XN 129 KW a-si	Oct-01	135	770,348	$736,514	$1,678	0.0635
SGS-125TF-8 BP/XN 129 KW a-si	Oct-01	135	772,047	$741,162	$1,678	0.0634
SGS-GT3-GS	Jun-05	2.50	1,565	$30,732	$0	0.3273
OH ASE/SB - 1200w Xtal	Jul-01	1.2	5,671	$8,563	$100	0.0800
OH ASE/TR - 1200w Xtal	Aug-01	1.2	7,823	$8,369	$100	0.0577
OH BPMST-50/TR - 1500w a-si	Sep-01	1.5	7,149	$6,666	$940	0.0677
Solar Trailers ASE/TR 5000w Xtal	Jun-05	5	35,064	$70,000	$490	0.2062
OH Gate 2A Solarex/TR - 2500w Xtal	Mar-00	2.5	18,682	$10,250	$458	0.1301
OH3 20KW ASE/TR 21.6 KW Xtal	Sep-00	20	159,801	$146,342	$952	0.1888
OH4 20KW ASE/TR 21.6 KW Xtal	Oct-00	20	166,832	$110,534	$226	0.0569
OH 5KW BP/MST50/Beacon a-si	Feb-04	7.5	11,106	$29,574	$150	0.1383
St Johns Test	Sep-00	0	3,512	$11,517	$0	N/A
SGS 20 KW ASE/TR 21.6 KW Xtal	Oct-00	21.6	153,246	$135,060	$886	0.1346
DMP 1 ASE/OMN 108 KW Xtal	Dec-00	108	770,971	$589,020	$2,702	0.0592
DMP 2 ASE/OMN 108 KW Xtal	Dec-00	108	754,348	$527,199	$1,120	0.0539
Test Trees	Jun-01	0	8,214	$1,500	$0	N/A
OH Global Solar Test/TR - 1440w CIGS	2002	1.4	4,921	$13,447	$531	0.1305
OH Global Solar Slimline/TR 1656w CIGS	2004	1.66	1,595	$18,720	$100	0.1552
OH BP SX140U/TR-1400w Xtal	2002	1.4	5,572	$8,237	$100	0.0654
OH Sharp 165/SB - 1320w Xtal	Mar-03	1.32	3,287	$7,476	$548	0.1192
OH Sharp 165/TR - 1320w Xtal	Mar-03	1.32	4,451	$8,223	$458	0.0974
OH Kyocera 158/TR - 1422w Xtal	Apr-03	1.422	4,524	$8,236	$100	0.0715
OH Sanyo 167HIT/SB - 1336w Xtal/a-si	May-03	1.336	4,613	$8,962	$694	0.0798
OH Unisolar 64/Trace - 1536w Xtal/a-si	Jun-03	1.536	5,452	$10,228	$100	0.0682
OH BP SX150U/TR-1500w Xtal	May-03	1.5	4,587	$8,714	$100	0.0677
OH Sanyo 180HIT/SB - 1440w Xtal/a-si	Jul-03	1.44	4,941	$8,955	$100	0.0631
OH Shell 40/Tr-1440w a-si	Sep-03	1.44	4,670	$9,244	$397	0.0695
OH Shell 150/Sharp-3000w Xtal	Sep-03	3	7,200	$16,991	$100	0.0735
OH Shell 150/TR - 1500w Xtal	Feb-04	1.5	3,157	$8,414	$100	0.0623
OH AstroPower/TR - 1500w Xtal	May-04	1.485	2,882	$8,532	$100	0.0598
OH Xantrex GT3.0/BP4170 - 3000w Xtal	Sep-06	3.00	1,240	$12,500	$100	0.1694
TOTALS	5484.96	27,319,857	$33,307,123	$209,290	0.0651	5484.96

CHALLENGES/BARRIERS

Initial Cost

The current high cost of PV modules and inverters is the primary barrier to use PV as a widespread generating technology. This high initial cost also raises those operating costs associated with value, such as property taxes and insurance. While PV module costs were very high in 2001 and 2002, due in some part to excessively high subsidies for PV in neighboring states, the costs had been decreasing in late 2002 and continuing into 2003. However, the high demand for PV in Germany and other parts of Europe during 2004 and 2005 has resulted in price increases and long delivery times for PV modules.

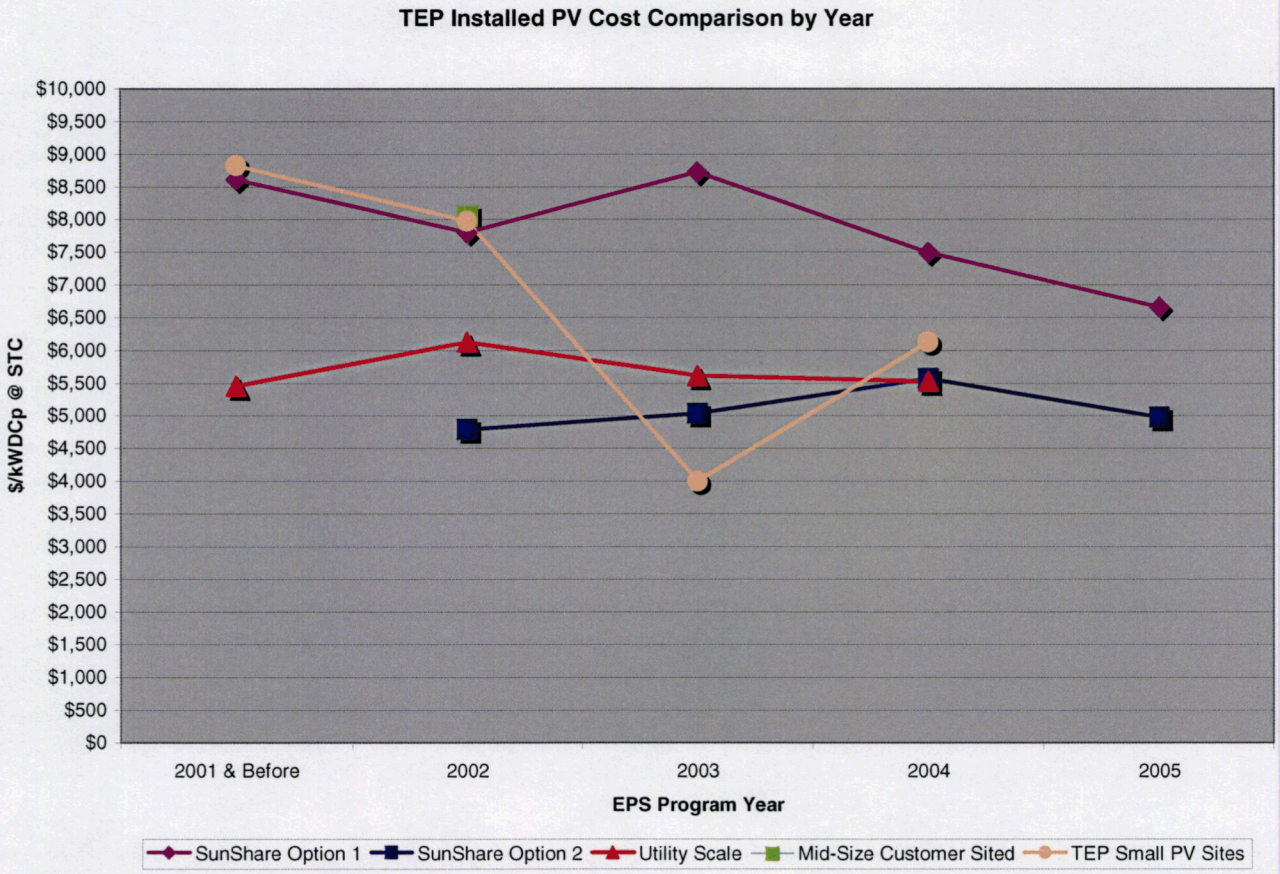
Competition in the inverter market is driving improvements in quality, reliability and price, which are reducing the life cycle cost of PV ownership through reduced initial and maintenance costs as well as increased energy output. However, based on information presented at the DOE Inverter Workshop in October 2004, much work remains to produce residential size PV inverters with the same reliability, performance and low cost per watt factors as utility scale PV inverters.

The implementation of a multi-year, pay as you build funded EPS allows for development of cookie cutter PV system designs in a size optimized to take advantage of partnering opportunities with the manufacturers of the major components of PV systems to optimize BOS costs through both material and installation labor cost reductions. TEP has taken advantage of this intended feature of the EPS by using refined design techniques to effect cost reductions in electrical systems, support structures, inverters, site preparation, grid connection and data acquisition systems. The EPS, as adopted by the ACC, allowed TEP to be assured of multi-year funding and has provided TEP with certainty of financing essential to enter into long- term relationships with specific makers of the primary components of PV systems – PV modules and inverters – to allow for partnering to optimize the BOS design and installation, resulting in BOS costs of less than $1 per DC watt of installed PV capacity in 2003, only the third year of the EPS. This BOS cost level meets a long-term goal of the federal government renewables programs. This benefit would not have been possible with a "year-to-year" type of EPS.

TEP PV program cost and customer PV cost trend data is shown below. These costs assume that no subsidies or grant funds were used to reduce the cost to the customer. In reality, customers did effectively pay less than this as a result of TEP subsidies, federal tax credits, state tax credits and grants from a number of sources.

SMALL PV CUSTOMER INSTALLED COST BEFORE SUBSIDY IN $/KWDCP @ STC

Average SunShare Option 1 & 3 Cost 2001 through 2005:	$7,569
Average SunShare Option 2 Cost 2001 through 2005:	$5,098
Average TEP Small PV System Cost 1999 through 2004:	$6,797



Performance & Reliability

While the TEP fleet of large scale PV systems had a very high percentage of effective availability in 2002 through 2005 (more than 99.4% when only PV related factors are included), there are challenges remaining in maintenance of PV systems, both large and small. There were 49 separate incidents in 2005 requiring some level of human response to restore the large PV systems to full operation. A part of those responses were to resolve data collection issues, not PV related items. These incidents were only identified because of the instrumentation and communications that is economically viable on large scale systems. The software of the data collection system was updated near the end of 2003 to allow a grid power failure to be reset automatically instead of requiring human intervention, which eliminated the need for 12 trips to the station. These upgrades included changes to allow the data collection system to resolve its own problems, in most cases, without on-site human intervention. The system now also allows remote reset of an inverter to resolve a transitory nuisance problem.

The Hayden/Udall Water Treatment Solar Generation system required a number of visits by TEP personnel in 2004 to fix inverter problems and a data collection battery problem. The amount of corrective visits in 2005 was reduced considerably due to corrections made in 2004. However, the inverters installed at this location are reaching the five-year installation period, and will need to be monitored closely in 2006.

During 2005, TEP personnel made 35 visits to small utility, community sited, and TEP utility scale PV systems for corrective maintenance. Most of the repairs required subsequent visits for replacement of inverters or PV modules. In some cases the inspection was a performance check prior to SunShare program acceptance and the repair work was completed by the PV system installer. The 2005 annual specific energy production of the small PV systems in the SunShare program was 34% less than the large SGS crystalline systems, to a certain degree because a SunShare system failure was generally not found until TEP made an inspection. One customer with an inoperative 7 kW DC system for nearly eight months was a large part of the lower annual energy performance of the smaller systems. The problem was discovered during the TEP annual inspection. Small systems need to have the capability to notify the customer when attention is needed, without adding any significant cost to the price of the system.

Two problems with community customer sited locations occurred in the Tucson service territory in 2005 that involved inverter replacement due to failure. At TEP's Irvington Test Yard site, a 20 kW system was out of service for the last quarter of 2005 due to inverter problems. At Springerville, the 20 kW system four-year-old inverter failed and was replaced with a spare that failed two months later.

SunShare equipment in service has exhibited relatively few incidents in 2005, relative to the quantity of systems in service. A table of SunShare, Community and Tucson based Utility-scale corrective maintenance occurrences are shown below:

2005 Corrective Maintenance – Tucson Service Territory

System	Inverter Problems	Pane Problems	Meter Problems	Wiring/Misc. Problems
SunShare	5	10	0	2
Community	6	0	1	2
Small Scale Utility	3	0	0	1
Large Scale Utility	3	0	2	0

In all cases above, equipment was either replaced or repaired and returned to service.

The Future

In 2003, TEP installed two additional systems of 2,688 First Solar modules. TEP believes that the issues found with the pre-production modules are being resolved. The 2003 systems are also test units, but have two additional years of development behind them and a much stronger performance standard to meet than the initial two units. Specific annual energy production of the First Solar arrays was actually better than the crystalline arrays in 2004. There are no plans to install any more a-si units at SGS. TEP also installed eight ASE systems in 2004. TEP installed a CIGS system at SGS in 2005. There are two CIGS systems

in test in Tucson, alongside similarly sized a-si and crystalline systems. In 2005, two additional test installations, in the 1000+ AC watt size, were installed in Tucson. These systems are made up of various combinations of manufacturer's components and are testing the equipment tolerances to the manufactures performance specifications. This side-by-side testing will provide accurate, comparable data, in Tucson's climate. Five additional test systems will be installed during 2006.

TEP will continue to evaluate the reams of solar production data taken during the five years of our solar development program. By this time next year, with more stable solar sensors, TEP should have additional insight into some of the items raised on voltage response with respect to temperature for all thin-film and crystalline materials in test. This data will be shared with inverter and PV module manufacturers and other interested solar industry participants to provide needed feedback for use in developing mature, reliable, predictable and low cost solar consumer products in the future.

PROGRAM CHANGES FOR 2006

The 2006 renewable program includes planned installation of 15 kWp DC at Operating Headquarters in Tucson and an expected minimum of 130 kWp DC in SunShare systems and customer partnering opportunities. TEP will use 2005 to evaluate the new PV offerings while waiting for a temporary increase in PV module prices to decline as manufacturing capacity increases to meet the world wide demand for PV systems fueled in part by the German solar feed in tariff. Revisions to the current EPS are also under review, which will likely affect the PV installed capacity requirements in 2006 and beyond.

SUNSHARE PROGRAM DETAILS

In 2005, TEP acquired 53 SunShare customers representing 140 kW DC. This amounted to approximately 93, 1.5 kW DC systems. Of those, 30 customers purchased a total of 63 TEP systems under Option 2. Option 3 customers totaled 53 in 2005. Of the original 33 Option 1 systems, 14 did not initially qualify due to inverter, wiring or module problems. After repairs, the 14 were retested and qualified for the SunShare program. Thirteen Option 1 customers converted to TEP's new Option 3 program during 2004 and 2005. All together, there has been a total of 174 customers representing 400 kW DC installed in the Sunshare program to date.

SYSTEM PERFORMANCE TESTING

TEP has developed a test program for different manufacturers' small PV systems to gather performance data on their operation in the Tucson environment. This is a two-fold effort: 1) develop operating experience of the different systems to pass on to solar installers, manufactures and our customers; and 2) offer the best performing most economical systems to our Option 2 SunShare customers. This testing provides invaluable information that is not normally available to the home owners and others interested in investing in solar energy. Presently, we are testing 19 systems, using a combination of 17 different manufacturers' inverters and modules. We are in the process of installing five additional systems of different manufacturers' products.

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Below is a table of the systems presently in test.

Test Station	Panel Manufacturer/ Model No.	Cell Type	Inverter Manufacture	Total Installed Cost per Watt	System kW dc Rating
Inverter/Module					
OH SB/Sanyo 167	Sanyo 167 HIT	Amor/Cryst	Sunny Boy 1800 SBD	$6.71	1,336
OH Tr/Shell 40/1600	Shell ST40	CIS Thin Film	Trace 1500	$5.78	1,600
OH Tr/Shell 40/1440	Shell ST40	CIS Thin Film	Trace 1500	$6.01	1,440
OH Tr/Shell 40/1440	Shell ST40	CIS Thin Film	Trace 2500	$6.01	1,440
OH TR/Unisolar	Unisolar 64	Tri Junct Sil	Trace 1500	$6.66	1,536
OH GT3.0/BP4170	BP4170	Multi-Crystal	Xantrex GT3.0	$5.00	3,060
OH Tr/BP150	BP SX 150U	Multi-Crystal	Trace 1500	$5.81	1,500
OH SB/Sharp	Sharp 165	Multi-Crystal	SunnyBoy 1100	$5.66	1,320
OH Tr/Sharp	Sharp 165	Multi-Crystal	Trace 1500	$6.23	1,320
OH Tr/Kyocera	Kyocera 158	Multi-Crystal	Trace 1500	$5.79	1,422
OH Tr/BP 140	Bp SX140U	Multi-Crystal	Trace 1500	$5.88	1,400
OH SB/Shell 150	SP 150-PC	Multi-Crystal	SB/2500	$5.06	3,000
OH Sharp/Shell 150	SP 150-PC	Multi-Crystal	Sharp 3500	$5.66	3,000
OH Sharp/Shell150/MST50	MST50	Asi	Sharp 3500	$6.88	1,500
Global Solar Test	GS-45	CGIS	Trace 1500	$7.99	1,440
OH SB/Sanyo 180	Sanyo 180 HIT	Amor/Cryst	Sunny Boy 1800	$6.22	1,440
OH Fronius/Sanyo 180	Sanyo 180 HIT	Amor/Cryst	Fronius IG 2000	$6.53	1,440
OH Tr/MST 50	BP MST 50	Asi	Trace 1500	$4.44	1,500
OH Tr/MST 50	BP MST 50	Asi	Trace 2500	$4.44	1,500
OH Tr/Shell 150	SP 150-PC	Multi-Crystal	Trace 2500	$5.61	1,500
OH Beacon/MST50 (5kW)	BP MST 50	Asi	Beacon M5	$3.94	7,500
OH Trace/Astr Power 165	Asto Power 165	Single Cystal	Trace 2500	$5.75	1,485
OH Trace/Slimline	Global Solar	CIS Thin Film	Trace 2501	$11.30	1,656

Presently we are collecting data manually but as the number of test systems has grown will need to install an automated data logger system. We expect to have this system in place by the end of 2006.

The following Table on SunShare installations provides specific maintenance data on the systems installed to date.

SUNSHARE INSTALLATION AND MAINTENANCE DATA THROUGH DECEMBER 31, 2005

(Includes all maintenance from SunShare program inception.)

Total DC Installed KW	Date System Is Accepted By TAG (In Service)	Total System Installed Cost	Inverter Problems	Panel Problems	Meter Problems	Wiring or Other Misc. Problems
6.20	12/01/1999	$52,000	X			
4.80	06/15/2000	$52,244	X			X
2.40	05/04/2001	$17,000		X		
4.80	05/30/2001	$45,000				X
1.29	10/12/2001	$9,500	X			
1.44	01/01/2002	$10,200				
1.68	04/10/2002	$12,000	X			X
1.50	06/27/2002	$6,000		X		
3.00	07/05/2002	$8,500				
1.50	07/25/2002	$6,000		X		
1.50	07/30/2002	$5,150				
1.50	08/05/2002	$4,500				
1.50	08/30/2002	$6,000				X
1.35	09/16/2002	$5,500				
2.88	10/03/2002	$22,000				
1.44	10/05/2002	$11,820	X	X		X
1.50	10/15/2002	$5,100		X		
1.44	10/20/2002	$10,500	X			
1.38	10/25/2002	$6,500	X			
1.44	11/04/2002	$10,820		X		
1.44	11/04/2002	$11,820	X	X		X
1.44	11/04/2002	$11,820		X		
1.44	11/04/2002	$11,820		X		
3.00	11/05/2002	$8,500	X	X		
1.50	11/07/2002	$6,000				
1.50	12/27/2002	$6,100				
3.30	12/27/2002	$19,582				
1.50	12/28/2002	$4,500				X
2.80	12/31/2002	$23,500	X			
1.50	02/06/2003	$5,000				
1.50	03/03/2003	$6,000				
2.40	05/02/2003	$8,500	X			
1.50	05/29/2003	$8,000		X		
1.50	06/03/2003	$5,000		X		
1.50	06/11/2003	$5,000				
1.44	07/07/2003	$11,820	X	X		
1.44	08/12/2003	$10,500				
1.44	08/12/2003	$10,500	X			
6.00	08/15/2003	$18,000	X			
1.44	09/04/2003	$10,500				
2.40	09/15/2003	$21,000				X

Total DC Installed KW	Date System Is Accepted By TAG (In Service)	Total System Installed Cost	Inverter Problems	Panel Problems	Meter Problems	Wiring or Other Misc. Problems
1.38	09/15/2003	$6,000				
2.58	09/17/2003	$25,000				
3.00	10/15/2003	$12,500				X
3.00	10/15/2003	$12,500				X
1.44	10/20/2003	$12,500	X			
9.00	10/21/2003	$36,000				X
1.44	11/04/2003	$14,187				
2.58	12/30/2003	$23,000				
4.20	01/01/2004	$24,352				
2.40	01/01/2004	$21,000				
1.50	02/04/2004	$6,500				
1.44	02/05/2004	$10,500				
1.50	03/09/2004	$6,500				
1.50	03/09/2004	$6,500				
1.44	03/10/2004	$10,700				
7.00	03/15/2004	$75,000	X			
1.44	04/08/2004	$10,705				
3.00	04/08/2004	$10,500				
1.44	04/08/2004	$15,000				
1.44	04/08/2004	$15,000				
1.49	04/08/2004	$10,000				
3.00	04/08/2004	$9,500				
1.20	04/08/2004	$10,000				
1.20	04/08/2004	$10,000				
1.44	04/09/2004	$10,700				
1.44	04/12/2004	$8,500		X		
3.00	04/14/2004	$14,000				
1.50	04/14/2004	$5,000				
1.54	04/30/2004	$10,000				
1.50	05/20/2004	$10,835				X
1.44	05/20/2004	$11,090				
3.00	05/20/2004	$7,000		X		
3.00	05/20/2004	$7,200				
1.44	05/24/2004	$10,705				
1.44	05/24/2004	$10,705				
1.44	05/24/2004	$10,705				
1.50	06/01/2004	$10,835				X
1.44	06/02/2004	$10,705	X			
1.50	06/02/2004	$4,500				
1.50	06/03/2004	$10,834				
1.44	06/03/2004	$10,705				
3.00	06/26/2004	$11,700				
3.00	06/28/2004	$10,700				
3.20	07/09/2004	$8,625				
1.44	07/15/2004	$10,705				
1.50	07/15/2004	$10,835				
1.44	07/15/2004	$10,820				
1.44	07/15/2004	$10,820				

Total DC Installed KW	Date System Is Accepted By TAG (In Service)	Total System Installed Cost	Inverter Problems	Panel Problems	Meter Problems	Wiring or Other Misc. Problems
1.44	07/15/2004	$10,805	X			
1.44	07/15/2004	$10,700				
1.50	07/20/2004	$6,200				
3.20	08/18/2004	$9,700				X
1.29	09/01/2004	$10,000				
5.94	09/15/2004	$18,765				
3.00	09/20/2004	$7,200	X			
1.60	09/24/2004	$10,800				
3	10/01/2004	$6,700				
1.44	10/20/2004	$10,835				
3.10	11/01/2004	$12,850				
1.50	11/03/2004	$10,835				
3.00	11/18/2004	$16,000				
3.20	12/01/2004	$7,300				
1.44	12/02/2004	$10,835				
3.2	12/09/2004	$9,700				
1.16	12/31/2004	$12,885				
3.20	01/18/2005	$11,325				
1.50	02/14/2005	$6,000				
1.40	02/15/2005	$10,835		X		
1.44	02/24/2005	$10,835				
1.5	02/25/2005	$10,835				
6.40	03/01/2005	$23,600				
3.20	03/08/2005	$11,300				
1.60	03/11/2005	$10,835				
3.00	04/08/2005	$14,700				
1.60	04/11/2005	$8,436				
3.20	04/19/2005	$7,600				
4.80	05/01/2005	$33,200				
2.40	05/01/2005	$14,600				
2.00	05/09/2005	$10,500				
1.5	05/09/2005	$7,380				
2.80	05/27/2005	$17,500				
1.50	06/14/2005	$10,835				
1.50	06/14/2005	$10,835				
1.60	06/21/2005	$10,835				
1.40	06/21/2005	$18,835				
7.20	06/25/2005	$77,426				
1.50	06/28/2005	$11,219				
3.20	06/29/2005	$11,800				
3.00	07/01/2005	$11,800				
1.50	07/15/2005	$10,835				
3.2	07/15/2005					
3.20	08/18/2005	$14,486				
5.10	08/19/2005	$26,644				
3.00	08/29/2005	$10,800				
1.50	08/30/2005	$6,600				
3.20	09/02/2005					

Total DC Installed KW	Date System Is Accepted By TAG (In Service)	Total System Installed Cost	Inverter Problems	Panel Problems	Meter Problems	Wiring or Other Misc. Problems
3.20	09/02/2005	$10,200				
3.00	09/15/2005					
1.50	09/15/2005	$6,500				
3.20	09/15/2005	$11,300				
6.00	09/16/2005		X			
1.50	09/16/2005	$10,835				
1.50	09/16/2005	$6,500				
7.65	09/22/2005	$29,100				
3.20	09/23/2005					
3.00	09/28/2005	$11,300				
3.00	10/07/2005	$14,000				
3,20	11/04/2005					
3.00	11/18/2005					
1.50	11/19/2005	$10,835				
3.00	12/02/2005	$8,150				
1.5	12/20/2005					

RESULTS AND FORECASTS:

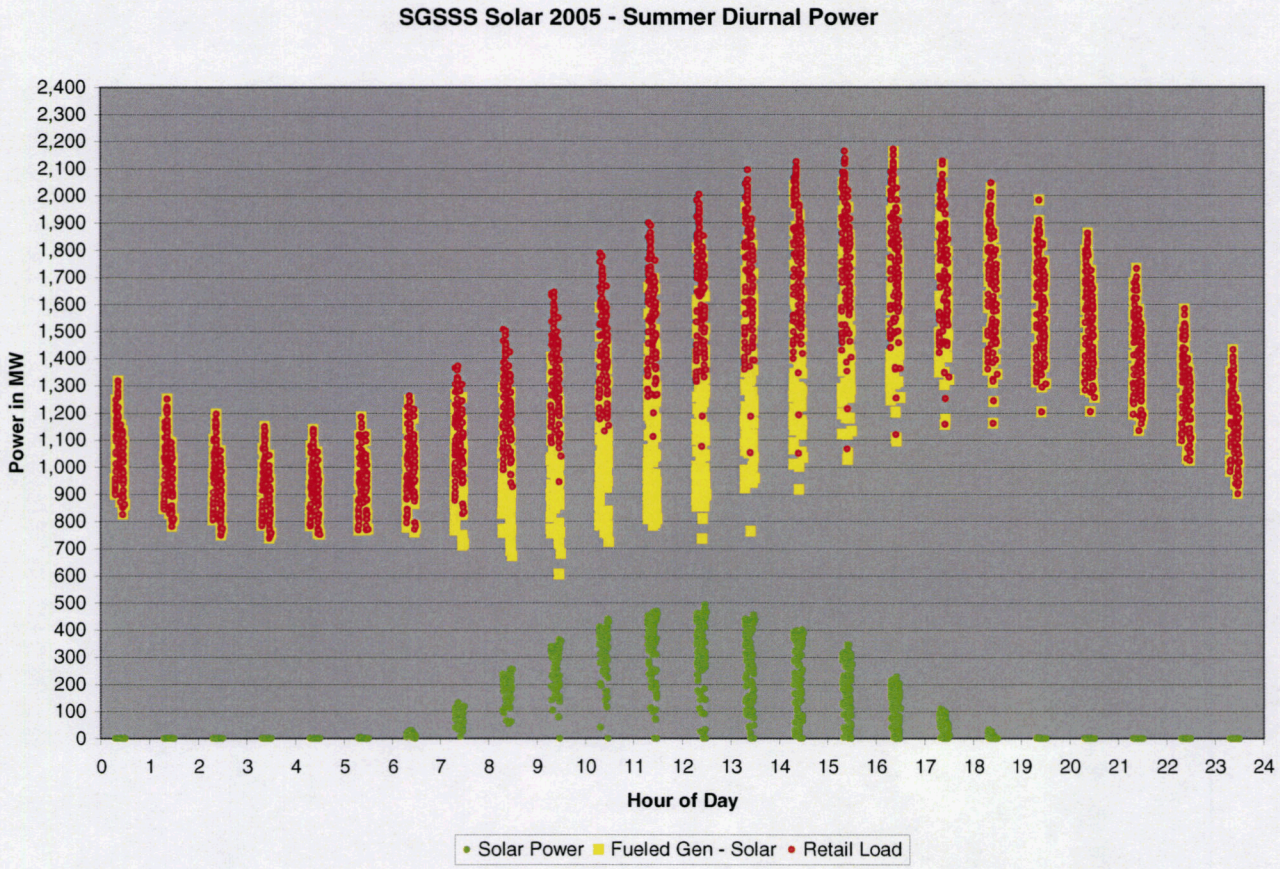
TEP has calculated the value of solar energy production by using an hourly wholesale spot market model based on real hourly on-peak and off-peak pricing at Palo Verde as multiplied by the actual hourly solar electricity production at both Springerville and Tucson locations. As expected, the closer coincidence of the Tucson loads with the solar input makes Tucson produced energy slightly more valuable than Springerville based solar energy on an annual $ per MWh basis. Again, due to coincidence between area electrical loads and solar influx, the average annual value for solar energy at both locations is higher than the Round the Clock average annual electricity value:

VALUE OF SOLAR ENERGY AT 2004 & 2005 WHOLESALE SPOT MARKET RATES PER MWH

	2004	2005
Around the Clock Market Value:	$40.72	$56.40
Solar Generation at SGSSS:	$43.56	$60.99
Solar Generation at Tucson Operating Headquarters:	$43.74	$61.18

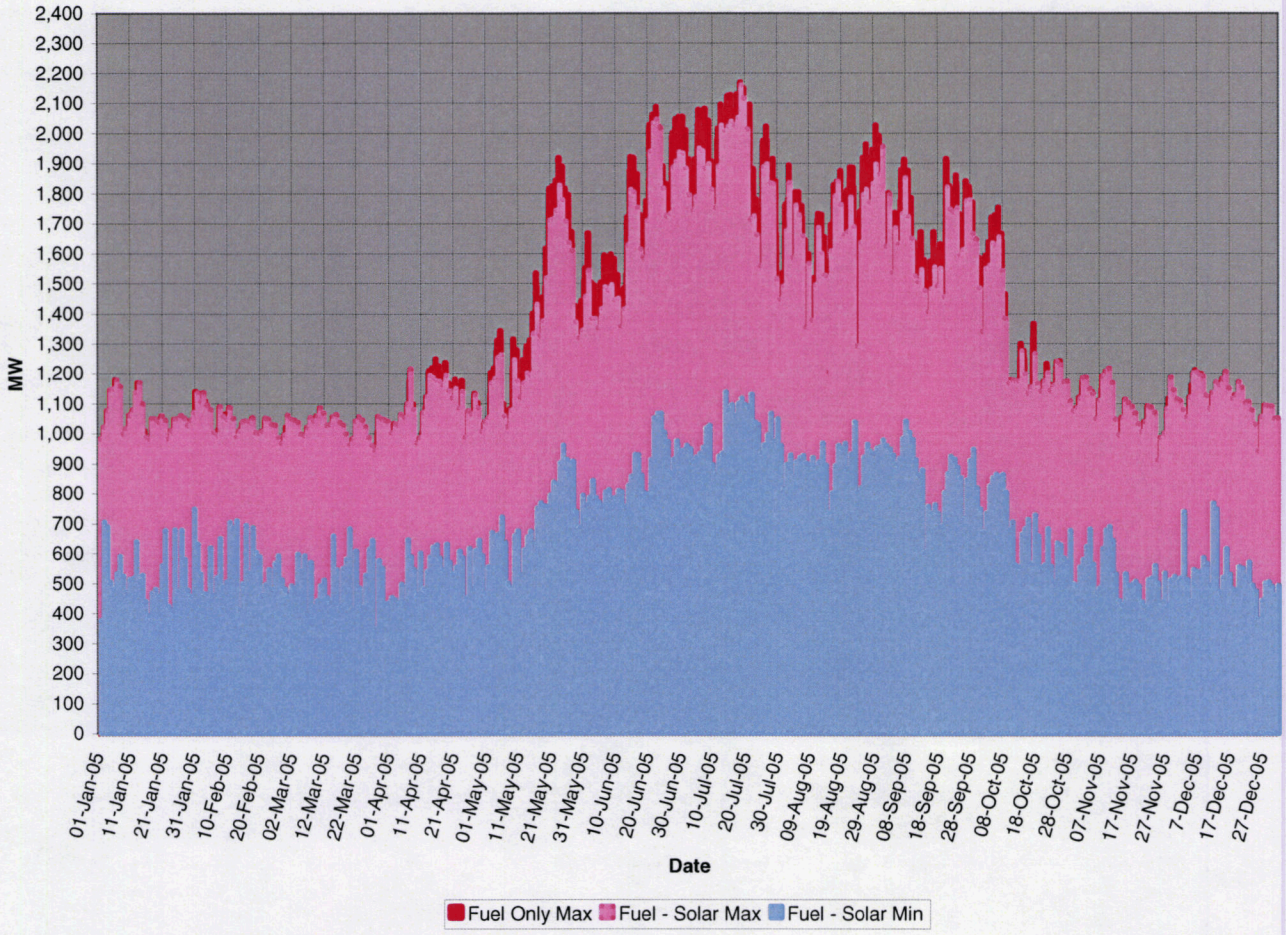
TEP plans to continue the analysis of the effects of time variance of solar energy production on the effects of energy value and capacity value.

Below is a graph of the TEP 2005 hourly native retail load, overlaid by the hourly energy produced by 583 MW of hypothetical solar generation located at SGS and the effect on fueled generation demand reduction – 8 MW – from the application of 583 MW of solar capacity. The 583 MW of solar capacity was chosen as the level needed to produce 10% of the TEP annual retail energy sold from new renewable generation sources in 2005. The reduction of the need for fueled generation is shown by the displacement between the red points and the yellow points. Where they are coincident, there is no displacement of fueled generation from solar energy. More detail about this scenario is provided in the Executive Summary section of this report.

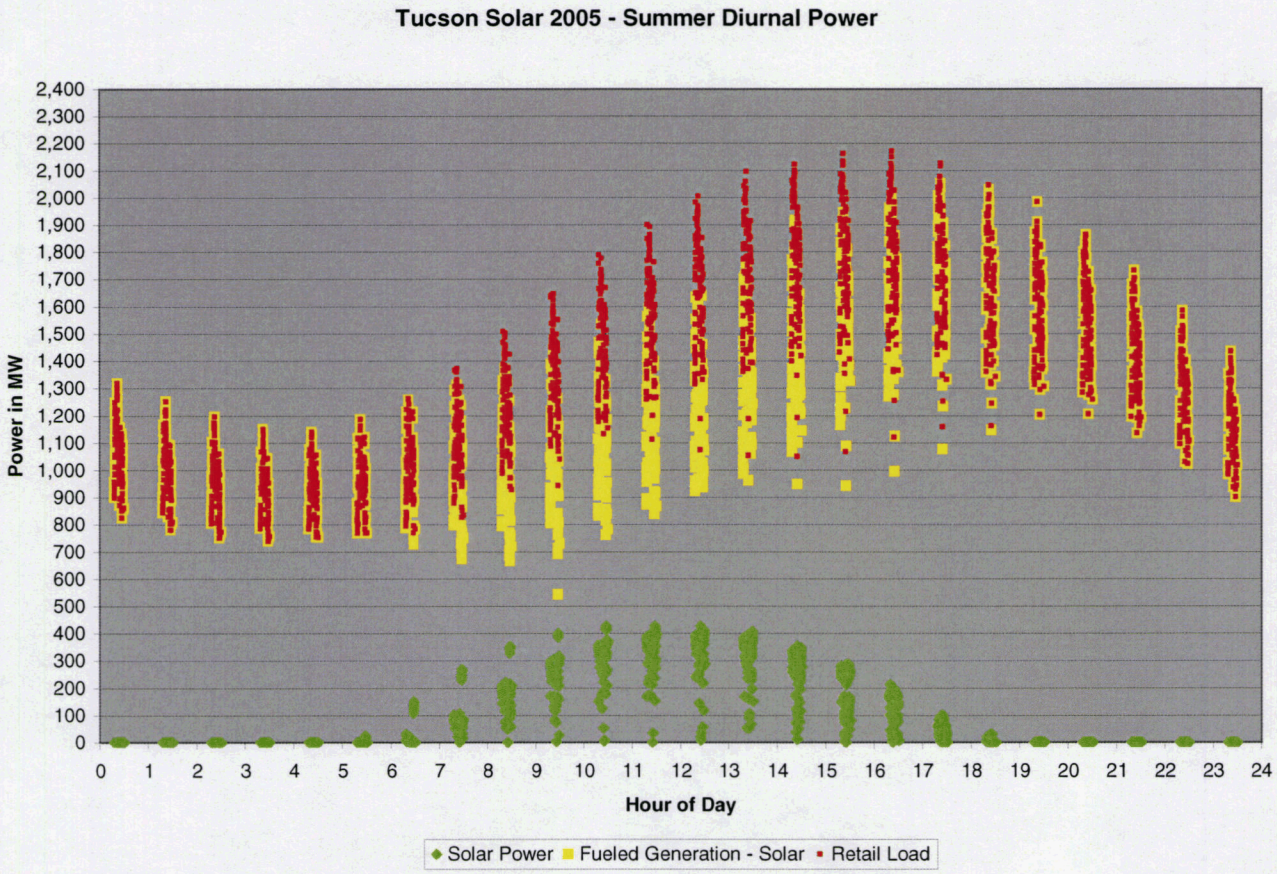


Below is a graph of the TEP 2005 hourly daily maximum and minimum native load generation demand as if provided by: 1. Maximum daily demand met by fueled generation only, in red; 2. Maximum daily demand met by fueled generation as reduced by 583 MW of SGS located solar generation, in pink; and 3. Minimum daily demand met by fueled generation as reduced by 583 MW of SGS located solar generation, in blue. Displacement of peak fueled capacity needs by solar energy is indicated where the red shows through the pink areas. Displacement of fueled generation by solar energy at minimum loads is indicated where the pink show through the blue areas. More detail about this scenario is provided in the Executive Summary section of this report.

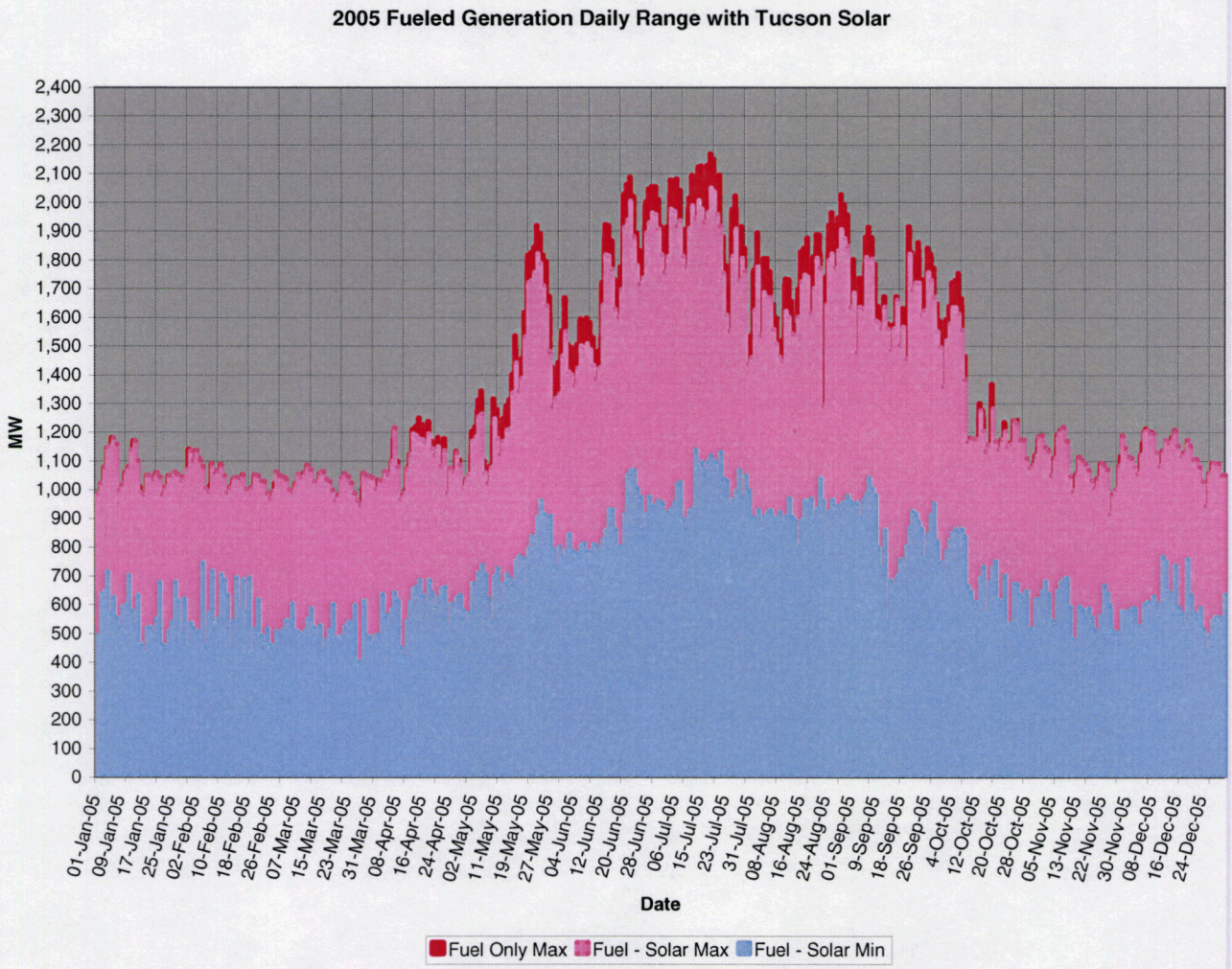
2005 Fueled Generation Daily Range with SGS Solar



Below is a graph of the TEP 2005 hourly native retail load, overlaid by the hourly energy produced by 583 MW of hypothetical solar generation located at TEP's DeMoss Petrie Substation in Tucson and the effect on fueled generation demand reduction – 118 MW – from the application of 583 MW of solar capacity. The 583 MW of solar capacity was chosen as the level needed to produce 9.54% of the TEP annual retail energy sold from new renewable generation sources in 2005. The reduction of the need for fueled generation is shown by the displacement between the red points and the yellow points. Where they are coincident, there is no displacement of fueled generation from solar energy. More detail about this scenario is provided in the Executive Summary section of this report.



Below is a graph of the TEP 2005 hourly daily maximum and minimum native load generation demand as if provided: 1. Maximum daily demand met by fueled generation only, in red; 2. Maximum daily demand met by fueled generation as reduced by 583 MW of TEP Operating Headquarters in Tucson located solar generation, in pink; and 3. Minimum daily demand met by fueled generation as reduced by 583 MW of DeMoss Petrie - Tucson located solar generation, in blue. Displacement of peak fueled capacity needs is indicated where the red shows through the pink areas. Displacement of fueled generation at minimum loads is indicated where the pink show through the blue areas. More detail about this scenario is provided in the Executive Summary section of this report.



GLOBAL SOLAR ENERGY VENTURE

PROJECT DESCRIPTION

Advanced Energy Technologies, Inc. ("AET") is an Arizona corporation that is a wholly-owned subsidiary of Millennium Energy Holdings, Inc. ("Millennium"). Millennium is a wholly-owned subsidiary of UniSource Energy Corporation ("UniSource Energy"), the parent company of TEP. AET is a developer of distributed power systems and a producer of flexible thin-film PV modules through its 98%-owned affiliate, Global Solar Energy, Inc. Global Solar has built an advanced manufacturing facility in Tucson, Arizona to produce CIGS, thin-film PV modules on flexible substrates. The many potential applications for this unique technology include use in advanced military, aerospace and commercial applications. Global Solar's principal office and place of business is 5575 S. Houghton Road, Tucson, Arizona 85747, and AET's principal office and place of business is One South Church Avenue, Tucson, Arizona 85701.

THE PRODUCTION FACILITY

Global Solar's production facility in Tucson, Arizona is ramping up its production of CIGS PV products, with a view towards rapidly expanding the annual production capacity to meet the growing commercial demand.

On March 25, 2006, AET entered into an agreement to sell all of the capital stock of Global Solar to Solon AG and I-Sol Ventures Gmbh. The transaction is expected to close by mid-April 2006.

IMPORTANCE OF THIN-FILM PV TECHNOLOGIES

Crystalline technology currently dominates the PV industry because it is a proven product with a mature manufacturing process. The cost reductions needed to make this technology more commercially viable are difficult to achieve because the principle raw material utilized (silicon) is increasingly expensive and the manufacturing process is both labor and capital intensive.

The most credible means of reducing PV manufacturing costs is through the development of thin-film PV. Thin-film PV modules are commonly comprised of a very thin layer of PV material affixed to a supporting structure -- usually rigid and, most commonly, glass. Thin-film modules are less expensive to manufacture due to their reduced labor, lower material, energy, handling and capital costs. In contrast, Global Solar is commercializing continuous roll-to-roll deposition of thin-film PV on a flexible substrate.

COPPER INDIUM GALLIUM DISELENIDE

Global Solar's PV material utilizes an absorber layer primarily composed of CIGS.

The distinct advantage of CIGS is that the light-absorbing band gap of this thin-film most closely matches that of natural ambient light. As a result, CIGS has achieved much higher conversion efficiencies than all other thin-film PV technologies to date. Unlike other low-cost thin-film options, CIGS also possesses higher device efficiency and longer-term stability comparable tosilicon. This is an important point because efficiency and long-term stability drive the sizing of a given PV system and, hence, its attendant cost.

Unlike silicon devices where size is severely restricted by the availability of large silicon wafers, CIGS device size is only limited by the size of the vacuum chamber and deposition system used in the manufacturing process. Global Solar's production cost is minimized by utilizing low-cost, industrially-proven, thin-film deposition technologies similar to those used to apply reflective coatings on eyeglasses, food packages and plate glass in commercial buildings. Moreover, Global Solar will employ a high degree of automation and intelligent processing control to improve product yield. Furthermore, CIGS has a demonstrated ability to pass appropriate environmental certification and regulated waste-handling issues.

UNIQUENESS OF GLOBAL SOLAR'S PV PRODUCTS

The literal flexibility of Global Solar's thin-film PV coupled with certain proprietary design characteristics ensures an extremely durable product. In addition, this PV product is highly portable and can be rolled or folded into compact packages for shipping. This ability to provide compact storage and damage tolerance is a significant advantage for numerous military, consumer and commercial applications and makes it ideal for, among other things, portable or remote stationary communication equipment, low-cost housing and remote agricultural irrigation.

Global Solar is currently delivering products to domestic and international markets. Such products include Portable Power Packs™, small solar power systems that fold into small, lightweight packages. These small 15, 30, 48 and 55 watt Power Packs can be used to power radios, computers, and other compact power needs and can replace or complement traditional batteries. Global Solar is also delivering commercial products ranging from 5 to 20 watts for retail sale through various customers. Further, Global Solar is working with original equipment manufacturers to integrate its solar modules into products of their own manufacture.

COST RECOVERY AND RENEWABLE RESOURCE COMMITMENT

Since UniSource Energy is investing in Global Solar as a "for profit" subsidiary, expenses associated with Global Solar are not included as part of TEP's recoverable $2,250,000 per year expenditure commitment to renewables. However, Global Solar's production capacity will be applied towards TEP's 5 MW commitment to implement renewable resources.