

ORIGINAL



0000135606

**Tucson Electric Power Company**

88 East Broadway Blvd., P.O. Box 711  
Tucson, Arizona 85702

April 2, 2012

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

Re: Tucson Electric Power Company's 2012 Renewable Energy Standard and Tariff  
Compliance Report, Docket No. E-01933A-10-0266

Pursuant to A.A.C. R14-2-1812, each Affected Utility shall file with Docket Control a report that describes its compliance with the requirements of the Renewable Energy Standard and Tariff ("REST") Rules. Decision No. 72033 (December 10, 2010) approved Tucson Electric Power Company's ("TEP") 2011 REST Plan. Please find enclosed an original and thirteen copies of TEP's 2012 REST Compliance Report for year-end 2011.

If you have questions or comments please contact me at (520) 884-3680.

Sincerely,

Jessica Bryne  
Regulatory Services

Enclosure: Compliance Report

cc: Compliance Section, ACC

Arizona Corporation Commission

DOCKETED

APR - 2 2012

DOCKETED BY

RECEIVED  
AZ CORP COMMISSION  
DOCKET CONTROL  
2012 APR 2 PM 3 49

# ***Tucson Electric Power Company***

Response to R14-2-1812 Utility Reporting Requirements

of the

Arizona Corporation Commission

---

## **RENEWABLES DATA FOR YEAR-END 2011**

---



A UniSource Energy Company

P.O. Box 711

Tucson, Arizona 85702

## EXECUTIVE SUMMARY

This report covers Tucson Electric Power's ("TEP") Renewable Energy Standard and Tariff ("REST") progress from January 1, 2011, through December 31, 2011. TEP's specific REST target for this period was 279,963,210 Renewable Energy Credits ("REC"). That amount represents 3.0% of TEP's retail energy sales for 2011, which was 9,332,107,000 kilowatt-hours ("kWh").<sup>1</sup> The REST requires that 25% of those RECs be met through distributed energy ("DE") renewable resources, which represents a total of 69,990,803. Of the 25% met through DE resources, 50% must come from residential customer systems and 50% must come from non-residential systems. The remaining portion of the REST required RECs for 2011, 75% or 209,972,408, comes from utility-scale renewable energy resources.

TEP far exceeded its 2011 utility-scale REC requirement with 330,005,553 available RECs. Included in this number are RECs that were carried over (not retired) from 2010 as well as RECs purchased in 2011. Of these, 209,972,408 were retired to meet compliance; and 6,999,080 were retired to meet the 10% wholesale non-residential allowance. RECs in excess of what is needed for compliance will be carried forward for use in future years.

DE reservations exceeded compliance requirements in all categories at 164% compliant. Annualized-actual production compliance in 2011 increased dramatically over 2010 by 237% and reached 102% compliant excluding outstanding customer projects still in construction. TEP expects this type of annualized-actual increase to continue into 2012 and 2013 as reserved customer-sited projects continue to come on line and the average development time of larger projects continues to reduce.

---

<sup>1</sup> One renewable energy credit, or REC, is equivalent to one kWh of production from an eligible renewable energy resource. Except for RECs from distributed energy resources, in order to receive credit for energy from an eligible renewable energy resource, the energy must be delivered to retail customers.

## 1. REST REQUIREMENTS

The REST R14-2-1801 became effective August 14, 2007 following approval from the Arizona Corporation Commission (“ACC” or “Commission”). Among other things, the REST rules require TEP to generate or purchase at least 15% of its total annual retail energy requirements from eligible renewable energy resources by 2025, with smaller amounts required in earlier years. The Commission determined that the REST should supersede the then existing Environmental Portfolio Standard (“EPS”), which like REST, was designed to encourage development of renewable generation. When the REST supplanted the EPS, the Commission ordered that all remaining EPS funds be transferred to the REST program and that TEP be released from all EPS requirements. Accordingly, some of the RECs generated during the EPS program were transferred to the REST compliance period. TEP’s first REST Implementation Plan was approved by the Commission in Decision No. 70314 (April 28, 2008), and became effective on June 1, 2008. At that time, the RES Tariff was added to customer bills. After this date, the REST compliance period began, and the EPS compliance period ended.

**TABLE 1.1 - THE REST MANDATE FROM 2008 TO 2025 AS REQUIRED PERCENTAGES OF RETAIL SALES**

Year	REST Requirement	Year	REST Requirement
2008	1.75% (10% DG)	2017	7.00% (30% DG)
2009	2.00% (15% DG)	2018	8.00% (30% DG)
2010	2.50% (20% DG)	2019	9.00% (30% DG)
2011	3.00% (25% DG)	2020	10.00% (30% DG)
2012	3.50% (30% DG)	2021	11.00% (30% DG)
2013	4.00% (30% DG)	2022	12.00% (30% DG)
2014	4.50% (30% DG)	2023	13.00% (30% DG)
2015	5.00% (30% DG)	2024	14.00% (30% DG)
2016	6.00% (30% DG)	2025	15.00% (30% DG)

Source: Renewable Energy Standard and Tariff, Section R14-2-1804 and R14-2-1805

**TABLE 1.2 - 2011 COMPLIANCE REQUIREMENTS BY CATEGORY**

Category	kWh Goal
Jan - Dec 2011 TEP Retail Sales	9,332,107,000
REST Target @ 3.0% of Retail Sales	279,963,210
Distributed Energy @ 25% of REST Goal, including:	69,990,803
50% Residential DE	34,995,401
50% Non-Residential, Non-Utility DE	34,995,401
Utility Scale @ 75% of REST Goal	209,972,408

**TABLE 1.3 – UTILITY-SCALE AND DISTRIBUTED ENERGY RECS**

**TEP 2011 RECS:**

Category	Production (kWh)	RECSE Multiplier(s) Applied	Multiplier Value	Extra Credits (from multipliers)	Total RECs
<b>Utility-Scale (Non-Distributed Energy)</b>					
Amonix	3,396,935	Annual kWh Production			3,396,935
Macho Springs	18,536,000	Annual kWh Production			18,536,000
Landfill Gas	15,790,632	Annual kWh Production			
		In-State Manufacturing and Installation Content	0.06	947,438	16,738,070
Global Solar		Manufacturing Partial Credit	2,190 * kW capacity produced and sold in 2011	7,103,101	7,103,101
	5,944,800	Annual kWh Production			
		In-State Manufacturing and Installation Content	0.5 * % in-state cost	0	
Springerville Solar (4.6MW)		In-State Power Plant Installation Credit	0.5	2,972,400	
		Distributed Generation Credit	0.5	N/A	
		Subtotal			8,917,200
Springerville Solar (1.8MW)	2,604,985	Annual kWh Production			2,604,985
	516,513	Annual kWh Production			
		In-State Manufacturing and Installation Content	0.5 * % in-state cost	58,382	
		In-State Power Plant Installation Credit	0.5	258,257	
		Distributed Generation Credit	0.5	N/A	
		Subtotal			833,152
OH/DMP Projects					
Other-Short Term Purchases	108,234,000	Annual kWh Production		N/A	108,234,000
TEP UASTP 1 (1.6MW)	1,938,671	Annual kWh Production			1,938,671
TEP UASTP 2 (5MW)	54,302	Annual kWh Production			54,302
<b>Total Non-DE Production</b>	<b>157,016,838</b>				
<b>Subtotal Non-DE RECs</b>					<b>168,356,416</b>
<b>Distributed Energy</b>					
	26,774,143	Annual kWh Production			
		In-State Manufacturing and Installation Content	0.15	97,470	
		In-State Power Plant Installation Credit	0.5	324,901	
		Distributed Generation Credit	0.5	324,901	
		Subtotal			27,521,415
Solar PV (Residential)					
Solar Hot Water (Residential)	4,037,732	Annual kWh Production			4,037,732
	166,192	Annual kWh Production			
		In-State Manufacturing and Installation Content	0.5 * % in-state cost	38,992	
		In-State Power Plant Installation Credit	0.5	83,096	
		Distributed Generation Credit	0.5	83,096	
		Subtotal			371,376
Greca Watts (Commercial)					
Wind (Commercial)	7,415	Annual kWh Production	N/A		7,415
Solar PV (Small Commercial)	1,664,885	Annual kWh Production	N/A		1,664,885
Solar PV (Large Commercial)	15,116,776	Annual kWh Production	N/A		15,116,776
Solar Hot Water (Commercial)	227,638	Annual kWh Production	N/A		227,638
<b>Total DE Production</b>	<b>47,994,781</b>				
<b>Subtotal DE RECs</b>					<b>48,947,237</b>
<b>Summary</b>					
<b>Total DE RECs To Be Retired</b>					<b>48,947,237</b>
<b>Total 2011 Non-DE RECs</b>					<b>168,356,416</b>
<b>Carryover Non-DE RECs from 2010</b>					<b>161,649,137</b>
<b>Total (Non-DE 2011 new production + 2010 carryover)</b>					<b>330,005,553</b>
<b>Total Non-DE RECs Applied to Non-Res DE From 10% Allocation</b>					<b>6,999,080</b>
<b>Total Non-DE Retired in 2011</b>					<b>209,972,408</b>
<b>Total Non-DE Carryover to 2012</b>					<b>113,034,065</b>

TEP reports DE production in three compliance scenarios: (1) metered production from currently installed systems; (2) production that is annualized to more accurately reflect currently installed systems; and (3) the annualized production from currently installed *plus* the annualized production of reserved systems in construction to fully reflect the most accurate compliance picture.

**TABLE 1.4 – DISTRIBUTED ENERGY KWH EQUIVALENT COMPLIANCE**

	Residential			Commercial			Total DE kWh		
	Actual (Actual production Jan-Dec 2011)	Annualized (production prorated Jan-Dec for current systems)	Annualized production + Annualized Reservations	Actual (Actual production Jan-Dec 2011)	Annualized (production prorated Jan-Dec for current systems)	Annualized production + Annualized Reservations*	Actual (Actual production Jan-Dec 2011)	Annualized (production prorated Jan-Dec for current systems)	Annualized production + Annualized Reservations
<b>Installed kWh</b>	30,811,875	35,559,491	41,766,951	24,208,225	35,748,348	73,031,627	55,020,100	71,307,839	114,798,578
<b>Required kWh</b>	34,995,401	34,995,401	34,995,401	34,995,401	34,995,401	34,995,401	69,990,802	69,990,802	69,990,802
<b>% Compliance met</b>	88%	102%	119%	69%	102%	209%	79%	102%	164%

\* Commercial Annualized plus Reservations includes Davis-Monthan Air Force Base 14 MW reservation.

## 2. GENERATION CAPACITY AND TECHNOLOGY

The REST rules allow for a variety of renewable technologies to be utilized for compliance. TEP's utility scale efforts are strategically designed to minimize resource costs to consumers, capture economies of scale, utilize proven technologies, have a benefit to Tucson area residents, rely very little on transmission capacity, and have a sustainable environmental footprint. DE projects are not controlled by TEP and customers have graduated toward almost exclusively solar photovoltaics ("PV") and solar thermal (water heating). The industrial market place in TEP's service territory is moving more toward chilling and cogeneration or hybrid PV and water heating. TEP promotes technologies that provide the most cost-effective RECs.

**TABLE 2.1 - GENERATION CAPACITY DISAGGREGATED BY TECHNOLOGY TYPE**

	Technology Type	Cumulative Capacity kW	2011 New Capacity kW	2011 Actual Production kWh	Annualized Production kWh
Utility Scale	<b>Owned</b>				
	Solar PV	13,312	5,000	10,542,758	23,296,000
	<b>Purchase Power Agreements</b>				
	Solar PV	2,500	2,500	3,396,935	4,375,000
	Wind	50,000	50,000	18,536,000	74,144,000
	Landfill Gas	5,000	-	15,790,632	15,790,632
	Other	-	-	108,234,000	108,234,000
	<b>Subtotal</b>	<b>70,812</b>	<b>57,500</b>	<b>156,500,325</b>	<b>225,839,632</b>
Distributed Energy	Solar PV	30,401	13,796	50,754,730	53,201,750
	Solar Thermal	2,136	1,051	4,265,370	6,114,776
	Solar Chilling	-	-	71,266	855,193
	Wind	12	-	7,415	7,415
	<b>Subtotal</b>	<b>32,549</b>	<b>14,847</b>	<b>55,098,781</b>	<b>60,179,134</b>
<b>TOTALS</b>		<b>103,361</b>	<b>72,347</b>	<b>211,599,106</b>	<b>286,018,766</b>

\* Due to a two year software upgrade and a number of systems being behind a master meter estimates have been used in some instances for 2011 kWh production.

### 3. REST COSTS, SURCHARGES, AND EXPENDITURES

The costs of the REST are covered by revenue collected from the REST surcharge on customer bills. These caps are set by the Commission and vary by customer class. The surcharge is set to collect the money required to cover the Commission approved REST budget. TEP prepares the budget as a part of its annual implementation plan filing.

**TABLE 3.1 – 2011 COMMISSION APPROVED REST LINE-ITEM BUDGET**

	2011 Budget REST Collections (\$)	2011 Budget Expenditures (\$)
<b>To Be Recovered Through REST Charges</b>	\$ (35,883,389)	
<b>REST Expenditures</b>		
<b>Purchased Renewable Energy</b>		
<i>Above Market Cost of Conventional Generation</i>		\$ 3,268,184
<i>Purchased Sun Edison RECs</i>		1,275,000
<i>TEP Owned</i>		1,758,759
<i>Other</i>		200,000
<b>Total Purchased Renewable Energy</b>		<b>6,501,943</b>
<b>Customer Sited Distributed Renewable Energy</b>		
<i>Up-Front Payments to Customers</i>		20,327,341
<i>Production Based Payments to Customers</i>		3,950,375
<i>Outreach Efforts</i>		700,000
<i>Customer Self-Directed</i>		500,000
<i>Other</i>		1,000,000
<b>Total Customer Sited Distributed Renewable Energy</b>		<b>26,477,716</b>
<i>Information Systems</i>		425,000
<i>School Vocational Program</i>		650,000
<i>Net Metering</i>		586,231
<i>Reporting</i>		230,000
<b>Outside Coordination and Support and R&amp;D</b>		
<i>Support to University Research</i>		250,000
<i>Technology Development Projects</i>		300,000
<i>Other</i>		515,000
<b>Total Outside Coordination and Support and R&amp;D</b>		<b>1,065,000</b>
<b>Grand Total</b>	<b>\$ (35,883,389)</b>	<b>\$ 35,935,890</b>

Part of the annual budget process is creating an estimate of the surcharges by customer class. Because these customer REST surcharges are paid in correspondence with actual kWh used by the customer, the estimated surcharges will differ from actual collections in accordance with the variance from forecast customer consumption and actual kWh consumption.

**TABLE 3.2 ACTUAL SURCHARGE COLLECTED FROM CUSTOMERS**

<b>Date</b>	<b>Residential</b>	<b>Small General Service</b>	<b>Large General Service</b>	<b>Large Light &amp; Power &amp; Mining</b>	<b>Total</b>
<b>Jan-11</b>	\$ 1,330,614.45	\$ 898,009.10	\$ 438,335.88	\$ 197,194.49	\$ 2,864,153.92
<b>Feb-11</b>	\$ 1,223,486.27	\$ 824,720.74	\$ 416,778.50	\$ 179,170.74	\$ 2,644,156.25
<b>Mar-11</b>	\$ 1,298,306.14	\$ 874,960.78	\$ 465,541.49	\$ 187,504.33	\$ 2,826,312.74
<b>Apr-11</b>	\$ 1,178,685.22	\$ 840,796.95	\$ 434,107.05	\$ 197,429.41	\$ 2,651,018.63
<b>May-11</b>	\$ 1,234,875.78	\$ 889,294.71	\$ 447,894.70	\$ 196,246.57	\$ 2,768,311.76
<b>Jun-11</b>	\$ 1,437,618.49	\$ 1,039,251.09	\$ 483,903.54	\$ 202,360.38	\$ 3,163,133.50
<b>Jul-11</b>	\$ 1,345,065.47	\$ 1,076,120.19	\$ 445,251.27	\$ 198,771.14	\$ 3,065,208.07
<b>Aug-11</b>	\$ 1,628,497.02	\$ 1,214,496.97	\$ 555,394.40	\$ 198,755.01	\$ 3,597,143.40
<b>Sep-11</b>	\$ 1,488,615.91	\$ 1,128,327.30	\$ 508,873.31	\$ 200,702.39	\$ 3,326,518.91
<b>Oct-11</b>	\$ 1,295,804.99	\$ 950,669.21	\$ 461,992.55	\$ 195,155.25	\$ 2,903,622.00
<b>Nov-11</b>	\$ 1,195,986.42	\$ 853,788.21	\$ 408,693.06	\$ 189,568.10	\$ 2,648,035.79
<b>Dec-11</b>	\$ 1,251,373.85	\$ 855,019.10	\$ 426,331.67	\$ 187,351.38	\$ 2,720,076.00
	<b>\$15,908,930.01</b>	<b>\$11,445,454.35</b>	<b>\$5,493,097.42</b>	<b>\$2,330,209.19</b>	<b>\$35,177,690.97</b>

Actual REST spending by TEP is tracked by line item. Money not spent will be carried over into the 2013 REST budget.

**TABLE 3.3 - 2011 COLLECTIONS AND EXPENDITURES AND ANY FUND CARRYING OVER INTO THE 2012 REST IMPLEMENTATION PLAN**

	2011 REST Collections (\$)	2011 Expenditures (\$)
<i>Revenue (Tariff collected year to date)</i>	\$ (35,177,691)	
<b>REST Expenditures</b>		
<b>Purchased Renewable Energy</b>		
<i>Above Market Cost of Conventional Generation</i>		\$ 2,331,741
<i>Purchased Other RECs</i>		545,877
<i>Purchased Sun Edison RECs</i>		-
<i>TEP Owned</i>		1,732,556
<i>Leases &amp; Administration</i>		199,383
		<hr/>
<i>Total Purchased Renewable Energy</i>		4,809,557
<b>Customer Sited Distributed Renewable Energy</b>		
<i>Reserved Up-Front Payments to Customers</i>		19,497,397
<i>Production Based Payments to Customers</i>		2,411,727
<i>Outreach Efforts</i>		670,672
<i>Customer Self-Directed</i>		-
<i>Labor &amp; Administration</i>		997,427
		<hr/>
<i>Total Customer Sited Distributed Renewable Energy</i>		23,577,223
<i>Information Systems</i>		421,281
<i>School Vocational Program</i>		624,829
<i>Net Metering</i>		207,268
<i>Reporting</i>		99,516
<b>Outside Coordination and Support and R&amp;D</b>		
<i>Support to University Research</i>		280,000
<i>Technology Development Projects</i>		300,250
<i>Grid Analysis and Research</i>		514,273
		<hr/>
<i>Total Outside Coordination, Support and R&amp;D</i>		1,094,523
		<hr/>
<b>Grand Total</b>	(35,177,691)	30,834,197
		<hr/>
<b>Net (Revenue) Expenditures</b>	\$ (4,343,494)	\$ -

## 4 FURTHER DISCUSSION OF UTILITY-SCALE

### 4.1 REQUEST FOR PROPOSAL PROCESS FOR PURCHASED POWER AGREEMENTS

TEP issued one Request for Proposal (“RFP”) for in-state wind in 2011. Results were filed with the Commission in September 2011. Negotiations for final project selections are in progress and dependent upon procuring transmission capacity. Results of 2009’s RFPs and Accion’s Independent Auditing report were filed with the Commission in 2010. As a result of the 2009 RFPs, a total of nine (9) new solar Power Purchase Agreements (“PPA”) were signed by TEP and two (2) additional self-build contracts were signed with Solon Corporation. TEP built approximately 5 megawatts (“MW”) in 2011 at the University of Arizona Science and Technology Park (“UASTP”). In 2012 TEP expects to build another 5 MW project with Solon which will be located in Pima County. Listed below is a table showing all of the current contracts both under construction and planned.

**TABLE 4.1 - TEP RENEWABLE CONTRACTS AND PROJECTS**

Resource/ Counterparty	Technology	Location	Operator	Completion Date	Term (Years)	Purchase Option	Capacity MW
<b>Solar</b>							
Amonix	Concentrating PV	Tucson, AZ	Amonix	Mar-11	20	On or after yr. 6 at FMV	2
Swan Solar	Concentrating PV	Tucson, AZ	Amonix	Oct-12	20		12
NRG Solar	Fixed PV	Tucson, AZ	NRG Solar	Sep-12	20		25
AstroSol	Fixed PV	Tucson, AZ	Astronergy	Jun-12	20		5
Emcore Solar	Concentrating PV	Tucson, AZ	Emcore	Sep-12	20		2
FRV Tucson Solar	SAT PV	Tucson, AZ	Renewable Ventures	Jul-12	20		25
FSP Solar One	SAT PV	Tucson, AZ	Foresight Solar	Sep-12	20		4
FSP Solar Two	SAT PV	Tucson, AZ	Foresight Solar	Dec-12	20		12
Avalon Solar	Fixed PV	Marana, AZ	Avalon	Dec-12	20		35
<b>Wind</b>							
Macho Springs	Wind	Deming, NM	Element Power	Sep-11	20	None	50
<b>Landfill Gas</b>							
Sexton Energy	Landfill Gas	Tucson, AZ	Sexton Energy	Dec-13	15	None	2.2
<b>Total</b>							<b>174.2</b>

#### Owned/Under Construction

Fuel/ Plant	Technology	Status	Completion Date	Net Capacity MW
<b>Solar</b>				
Springerville Solar Station	Fixed PV	Complete	2002	4.6
Springerville Solar Expansion	Fixed PV	Complete	2010	1.8
Univ. of Arizona Tech Park	SAT PV	Complete	2010	1.6
Univ. of Arizona Tech Park II	Fixed PV	Complete	2011	5
DM Air Corridor (Pima County)	Fixed PV	Scheduled	2012	5
<b>Total</b>				<b>18</b>

### 4.2 LANDFILL GAS

In August 1999, TEP and the City of Tucson started producing electricity from the installation of a nameplate 5 MW landfill gas system at the Los Reales Landfill in Tucson, Arizona. The gas is piped from the landfill to the TEP H.W. Sundt Generating Station, where it is co-fired with coal and/or natural gas. In 2011, TEP’s landfill gas resource produced 15,790,632 kWh; equivalent to the same number of RECs. Applying the In-State Manufacturing and Installation Content

Extra Credit Multiplier to this production added 947,438 RECs for 2011. In total, the landfill gas resource produced 16,738,070 RECs.

#### **4.3 EXISTING PHOTOVOLTAICS**

The solar PV System located at the Springerville Generating Station ("SGS") had an approximate nameplate capacity of 4.6 MW, which was increased in size in 2010 by 1.8 MW to a total of 6.4 MW. In 2011 energy production was 8,549,785 kWh. Inclusive of applicable extra credits from multipliers, the total SGS RECs in 2011 was 11,522,185. Also installed at the UASTP in 2010 was a single axis tracker with an output of 1,938,671 kWh in 2011. As part of the 2011 Bright Tucson Solar Buildout Plan a second system was installed at the University of Arizona Science and Technology Park. The 5.0 MW system is estimated to produce 8,750,000 kWh of power when fully realized in 2012. At the end of 2011 a 500 kilowatt ("kW") system of photovoltaic panels was installed on an office building at the H.W. Sundt Generating Plant site and in early 2012 a 50 kW system was completed at UniSource Energy's new headquarters in downtown Tucson with an expected energy production of 962,500 kWh in 2012.

#### **4.4 TEP-OWNED**

As approved by the Commission, in 2011 TEP completed the 5.0 MW single-axis tracking system built by Solon and 500 kW of rooftop solar.

#### **4.5 UNIVERSITY OF ARIZONA SCIENCE AND TECHNOLOGY PARK**

Approximately 200 acres of construction is underway at what will soon be a world-class solar research park called the University of Arizona Science and Technology Park Solar Zone. TEP will be placing 20 MW of various technologies for the purposes of renewable energy generation and state of the art comparative analysis on solar. In 2011 5.0 MW of fixed-axis PV was commissioned and the estimated annualized production should be 8,750,000 kWh when fully realized in 2012. Completed was a third project, a 2 MW concentrated photovoltaics ("CPV") built by Amonix, it was completed in April 2011. Construction of the remaining projects are expected to begin in the summer of 2012 and be completed by the end of 2012.

#### **4.6 MANUFACTURING CREDITS**

TEP buys RECs from Global Solar, under the REST Manufacturing Partial Credit (R14-2-1807) rule. This rule stipulates that an affected utility (TEP) can earn RECs using the following calculation:

$$\text{Nameplate capacity produced in AZ and sold Year } X * 2190 = \text{Total RECs}$$

As a result of its investment in Global Solar, TEP obtained 7,103,101 RECs in 2011 that are eligible to contribute to its REST requirement.<sup>2</sup> In 2011, Global Solar sold PV modules that were produced and sold at the Tucson facility with a combined nameplate capacity of 3,887 kW. Using the 2,190 factor assumes a 25% capacity factor for these units when they are deployed.

---

<sup>2</sup> Manufacturing Partial Credits obtained from Global Solar are prorated between TEP and UniSource Energy Services, at an approximate rate of 83% and 17%, respectively.

## **5 FURTHER DISCUSSION OF DISTRIBUTED ENERGY**

### **5.1 RESIDENTIAL DISTRIBUTED ENERGY**

The residential DE market increased dramatically in the TEP service territory in 2011. In 2007, a small handful of companies were doing solar installations in the area. In 2011, more than 150 companies were installing PV and solar hot water, primarily due to significantly lower system prices and relatively high incentive levels. The combination of lower prices, attractive incentives, federal tax credits and significant consumer demand for solar resulted in TEP experiencing a large influx of applications (approximately 200) in September and funds were exhausted. TEP had to suspend accepting applications until special Commission proceedings were held to transfer additional funds into residential DE and the incentives were lowered from \$2.00 per Watt DC to \$0.75 per Watt. Even with lowered incentives TEP has had only six cancellations from that period of time. TEP worked diligently to streamline DE reservation processes, improve inspection and metering policy, and to support the impact of solar construction on local area inspection jurisdictions. TEP also published improved technical specifications for solar installations to insure safe and reliable grid integration. The residential marketplace continues to be a dynamic and rapidly changing environment.

### **5.2 SMALL COMMERCIAL DISTRIBUTED ENERGY**

Similar demand to the residential program occurred in the small commercial up-front incentive program in 2011, despite the limited availability of capital in the marketplace. This continued demand was due to several factors, including the reduction of the maximum up-front incentive system from 100 kW AC TO 50 kW AC and the incentive remaining at \$1.50 per watt throughout the majority of the year. This allowed more customers to participate in the program with the same budget. Due to the high demand, the program exhausted incentive funds at the end of the third quarter.

### **5.3 LARGE COMMERCIAL AND INDUSTRIAL DISTRIBUTED ENERGY**

The larger commercial performance-based incentive ("PBI") program was very active, yet stable throughout the year. The monthly allocation of budgets for projects allowed for reservations to be awarded throughout the year. Systems reserved ranged in size from 50 kW AC to 1.2 MW DC. Prices for RECs ranged from \$0.13 to 0.095, with levelized REC prices ranging from \$0.104 to \$0.0585.

SunEdison was awarded the Davis-Monthan Air Force Base contract for 14 MW. This project is included in outstanding reservations and is expected to be completed by mid-year 2012.

### **5.4 SCHOOLS VOCATIONAL PROGRAM**

2011 was a successful pilot year for the School Vocational Program. The purpose of this program was to offer high schools and select middle schools within the TEP service territory fully-furnished solar PV systems, as well as educational curriculum. Thirteen area schools received solar PV systems that ranged in capacity from 5 kW to 10 kW. The arrays were specifically designed to be in a very visible location. Educational material was also provided for instructors. The following schools received a system in 2011:

1. Arizona Schools for the Deaf and Blind
2. Canyon del Oro High School – Amphitheatre Unified School District
3. Cholla High School – Tucson Unified School District
4. Cienega High School – Vail School District
5. Desert View High School – Sunnyside Unified School District
6. Flowing Wells High School – Flowing Wells Unified School District
7. Mountain View High School – Marana Unified School District
8. Orange Grove Middle School – Catalina Foothills Unified School District
9. Pueblo High School – Tucson Unified School District

10. Sabino High School – Tucson Unified School District
11. Sahuaro High School – Tucson Unified School District
12. Santa Rita High School – Tucson Unified School District
13. Tanque Verde High School – Tanque Verde School District

The Commission approved a continuation of the program in 2012. The following schools are slated to participate in 2012:

1. Amphitheatre High School – Amphitheatre Unified School District
2. Catalina High School – Tucson Unified School District
3. Catalina Foothills High School – Catalina Foothills Unified School District
4. Ironwood Ridge High School – Amphitheatre Unified School District
5. Palo Verde High School – Tucson Unified School District
6. Rincon High School – Tucson Unified School District
7. Sahuarita High School – Sahuarita Unified School District
8. Sunnyside High School – Sunnyside Unified School District
9. Tucson High School – Tucson Unified School District
10. University High School – Tucson Unified School District

**TABLE 5.1 - RESIDENTIAL, SMALL AND LARGE COMMERCIAL REC PRICES FOR DE BY TECHNOLOGY**

**RECPP – CONFORMING PROJECT INCENTIVE MATRIX**

2011 Program Year

Technology/Application	UP FRONT INCENTIVE <sup>1</sup>			
	20-Year REC Agreement	10-Year REC Agreement <sup>2</sup> 10-Year Payment (\$/kWh)	15-Year REC Agreement <sup>2</sup> 15-Year Payment (\$/kWh)	20-Year REC Agreement <sup>2</sup> 20-Year Payment (\$/kWh)
BIOMASS/BIOGAS (Electric)	NA	0.060	0.056	0.054
BIOMASS/BIOGAS – CHP (Electric) <sup>3</sup>	NA	0.035	0.032	0.031
BIOMASS/BIOGAS – CHP (Thermal) <sup>3</sup>	NA	0.018	0.017	0.016
BIOMASS/BIOGAS (thermal)	NA	0.015	0.014	0.013
BIOMASS/BIOGAS (cooling)	NA	0.032	0.030	0.029
DAYLIGHTING (Non-Residential)	\$0.18/kWh <sup>7</sup>	NA	NA	NA
	See this note for clarification			
GEOHERMAL – (electric)	NA	0.024	0.022	0.022
GEOHERMAL – (thermal)	NA	0.048	0.045	0.043
GROUND SOURCE HEAT PUMP – (cooling)	\$500/ton	NA	NA	NA
SMALL HYDRO	NA	0.060	0.056	0.054
SMALL WIND (grid-tied) <sup>4</sup>	\$2.25/Watt AC	NA	NA	NA
SMALL WIND (off-grid) <sup>4</sup>	\$1.80/Watt AC	NA	NA	NA
<b>SOLAR ELECTRIC:</b>				
RESIDENTIAL (GRID-TIED)	\$2.00/Watt DC <sup>8</sup>	NA	NA	NA
NON-RESIDENTIAL (GRID-TIED) 50 kW AC or less	\$1.50/Watt DC <sup>8</sup>	NA	NA	NA
NON-RESIDENTIAL (GRID-TIED) 51 - 500 kW AC <sup>11</sup>	NA	0.142	0.142	0.142
NON-RESIDENTIAL (GRID-TIED) 500 - 1000 kW AC <sup>11</sup>	NA	0.122	0.122	0.122
NON-RESIDENTIAL (GRID-TIED) More than 1MW AC <sup>11</sup>	NA	0.102	0.102	0.102
RESIDENTIAL (OFF-GRID)	\$2.00/Watt DC <sup>8</sup>	NA	NA	NA
NON-RESIDENTIAL (OFF-GRID)	\$1.50/Watt DC <sup>8</sup>	NA	NA	NA
SOLAR SPACE COOLING <sup>5</sup>	NA	0.116	0.108	0.104
NON-RESIDENTIAL SOLAR WATER HEATING/SPACE HEATING <sup>5,9,10</sup> (400,000 annual kWh output production equivalent or less)	\$750 plus \$0.50/kWh	NA	NA	NA
NON-RESIDENTIAL SOLAR WATER HEATING/SPACE HEATING <sup>5,9,10</sup> (Greater than 400,000 annual kWh output production equivalent)	NA	0.057	0.052	0.051
RESIDENTIAL SOLAR WATER/SPACE HEATING <sup>6,9,10</sup>	\$750 plus \$0.25/kWh	NA	NA	NA
NON-RESIDENTIAL POOL HEATING <sup>10</sup>	\$750 plus \$0.50/kWh	NA	NA	NA

Notes:

- 1) Residential projects are eligible for an up-front incentive (UFI). UFI payments cannot exceed 50% of the cost of renewable energy equipment.
- 2) Non-residential systems 50 kW AC or less are UFI only. Non-residential greater than 50 kW AC are PBI only. The total of payments under a production based incentive cannot exceed 50% of the project costs for any project.
- 3) The CHP incentives may be used in combination for the appropriate components of one system.
- 4) This UFI applies to a maximum system size of 1 MW.
- 5) The solar space heating and cooling incentives may be used in combination for the appropriate components of one system.
- 6) This category includes both traditional water heating and those systems combined with residential solar water heating used for space heating. Space heating applications require a report detailing energy saving for the complete system.
- 7) Rate applies to estimated first five years of energy savings only. Payment is made up-front at beginning of 1<sup>st</sup> year.
- 8) Some UFI based installations will require an adjustment of the incentive as detailed in the PV Incentive Adjustment Chart.
- 9) Energy savings rating is based on the SRCC OG-300 published rating or the TEP-RECPP Space Heating Calculator. The customer contribution must be a minimum of 15% of the project cost after accounting for and applying all available Federal and State incentives.
- 10) Rate applies to forecast/estimated first year energy savings only.
- 11) REC terms may be negotiated in excess of printed maximums to accommodate for higher initial payments.

**TABLE 5.2 – 2011 DISTRIBUTED ENERGY PROJECT VOLUME AND CAPACITY**

<b>Residential</b>	<b>Solar PV</b>	<b>Solar Thermal</b>	<b>Total</b>
<b>Applications Reserved</b>	1,103	560	1,663
Capacity (kW)	7,340	550	7,890
Energy (kWh)	12,845,037	1,513,788	14,358,825
<b>Systems Installed</b>	1,113	807	1,920
Capacity (kW)	7,280	796	8,076
Energy (kWh)	12,740,718	2,189,440	14,930,158
<b>Reservations Carried Into 2012</b>	377	177	554
Capacity (kW)	3,430	76	3,506
Energy (kWh)	6,002,050	208,509	6,210,559

<b>Commercial</b>	<b>Solar PV</b>	<b>Solar Thermal</b>	<b>Other</b>	<b>Total</b>
<b>Applications Reserved</b>	36	28	4	68
Capacity (kW)	8,313	958	-	9,271
Energy (kWh)	13,672,750	2,634,728	710,193	17,017,671
<b>Systems Installed</b>	53	26	1	80
Capacity (kW)	6,516	83	-	6,599
Energy (kWh)	10,694,286	227,638	855,193	11,777,117
<b>Reservations Carried Into 2012</b>	43	22	4	69
Capacity (kW)	23,485	768	-	24,253
Energy (kWh)	41,099,030	2,112,009	710,193	43,921,232

**EXHIBIT 1 – DESCRIPTION OF EXTRA CREDIT MULTIPLIERS**

The REST order allows utilities to earn RECs from sources other than actual energy production based on applicable extra credit multipliers (“Multipliers”). These Multipliers include the Early Installation Extra Credit Multiplier, the In-State Power Plant Installation Extra Credit Multiplier, the In-State Manufacturing and Installation Content Extra Credit Multiplier, and the Distributed Solar Electric Generator and Solar Incentive Program Extra Credit Multiplier.

The Multipliers are applied to the energy generated by an eligible renewable energy resource. The energy generated by a given facility during a compliance period is multiplied by the multiplier, producing the “extra credit” earned by that facility. This “extra credit” is then added to the RECs produced by the facility as a result of its energy production to provide the total number of RECs generated by that facility during a given compliance period. The multipliers are additive, but the total multiplier cannot exceed 2.0. Table E3.1, below, shows each multiplier and its related value.

**Table E3.1 - REST Extra Credit Multipliers**

Extra Credit Multipliers	Value
Early Installation Extra Credit: Installed and Began Operating in	
2001	0.3
2002	0.2
2003	0.1
In-State Power Plant Extra Credit (1997-2005)	0.5
In-State Manufacturing and Installation Content (1997-2005)	0.5 * (% in-state content in installed plant)
DE Solar Electric Generator and Solar Incentive Program (1997-2005)	0.5

*Source: Renewable Energy Standard and Tariff, R14-2-1806*

The Multipliers only apply to systems installed between January 1, 1997 and December 31, 2005. In some cases, the definition is even narrower. There is no expiration date for any of the Multipliers except the Early Installation Extra Credit Multiplier. The Early Installation Extra Credit Multiplier is only applied during the first five years following a facility’s operational startup; as a result, 2008 will be the final year for applying this multiplier. The remaining Multipliers can be applied to facility generation for the life of the facility.