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EXCEPTION

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BEFORE THE ARIZONA CORPORATION COMMISSION

AZ CORP COMMISSION

Arizona Corporation Commission

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Commissioner

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IN THE MATTER OF THE COMPETITION IN)
THE PROVISION OF ELECTRIC SERVICES)
THROUGHOUT THE STATE OF ARIZONA.)

DOCKET NO. RE-00000C-94-0165

STAFF'S EXCEPTIONS TO PROPOSED ORDER

Staff of the Arizona Corporation Commission hereby files its exceptions to the recommended order in this matter. Specific language changes necessary to adopt these exceptions are proposed. Staff notes that corresponding changes to the Concise Explanatory Statement and proposed order will also have to be made in the event Staff's exceptions are adopted. All rule references are to the revised Appendix A issued by the Hearing Division on February 11, 1999.

R14-2-202. Certificate Of Convenience And Necessity for Electric Utilities Filing Requirements on Certain New Plants

Staff recommends that the phrase "maximum rates" in R14-2-202.A.1.b. be replaced with just the word "rates," because the term "maximum" suggests that there is implicit discounting authority for non-competitive services. This rule addresses the filing requirements for Certificates of Convenience and Necessity ("CC&Ns") for non-competitive services. This is in contrast with R14-2-1603, the CC&N Rule, which applies to "Any Electric Service Provider intending to supply Competitive Services" R14-2-1603.A. Rule R14-2-1611.B. explicitly provides for maximum rates for competitive services. However, there is no contemplation in the Commission's rules dealing with non-competitive services that an electric utility does or should have discounting authority. Indeed, there is no economic justification for discounting non-competitive services, other than in individual situations where a customer has a self-generation alternative. Those situations have been dealt with through special contracts. The word "maximum" in reference to rates for noncompetitive services should therefore be deleted.

1 **R14-2-211. Termination of Service**

2 The proposed amendment to subsection A.1.d. of this rule states that a customer
3 may avoid termination if the customer agrees to pay a previous underbilling “over a mutually
4 agreed period of time.” This is a change from the prior language stating that the payment could
5 be “over a reasonable period of time.” Staff believes that the new language is less consumer-
6 friendly and gives the utility veto power over a proposed payment schedule. Staff recommends
7 that “mutually agreed” be replaced with “reasonable.”

8 **R14-2-1601. Definitions.**

9 Staff recommends that the definition of “Must-Run Generating Units” at R14-2-
10 1601.26. be clarified in two respects. First, it should be made clear that this definition is
11 describing “local generating” units. Second, the reference to the Federal Energy Regulatory
12 Commission’s (“FERC”) determination of such units should be deleted, because FERC does not
13 make the determination whether a particular generating unit is required for security and stability.
14 The definition should read as follows with Staff’s proposed new language is in double-underline:

15 Must-Run Generating Units are those local generating units
16 that are required to maintain distribution system reliability
17 and to meet load requirements in times of congestion on
 certain portions of the interconnected transmission grid.

18 **R14-2-1606. Services Required to Be Made Available**

19 Rule R14-2-1606.C.1. makes references to a date indicated in R14-2-1602. That
20 date has been deleted in the proposed amendments. Staff recommends that March 19, 1999, be
21 utilized as the date for filing proposed tariffs to provide Standard Offer Service, consistent with
22 the date contained in R14-2-1606.D for filing Unbundled Service tariffs.

23 Section C.1. addresses Standard Offer tariffs. However, it is unclear whether an
24 Affected Utility or Utility Distribution Company that proposes a rate increase (or change) over
25 existing rates for bundled service in its initial filing of Standard Offer tariffs must fully justify
26 such increase (or change) through a rate case proceeding. Staff believes that requiring
27 justification through a rate case proceeding is appropriate, and recommends that similar language
28 found in R14-2-1606.C.2. be included in R14-2-1606.C.1. With the changes suggested above,

1 this section would read as follows with Staff's proposed language is double-underlined:

2 By the date indicated in R14-2-1602 March 19, 1999, each
3 Affected Utility may shall file proposed tariffs to provide
4 Standard Offer Bundled Service and such Service. Such
5 rates shall not become effective until approved by the
6 Commission. Any rate increase proposed by an Affected
7 Utility or Utility Distribution Company for Standard Offer
8 Service must be fully justified through a rate case
9 proceeding. If no such tariffs are filed, rules and services
10 in existence as of the date in R14-2-1602 shall constitute
11 the Standard Offer. Standard Offer tariffs shall include the
12 billing cost elements required by R14-2-1612(N).

13 In addition, Staff recommends that R14-2-1606.C.5. be clarified by adding
14 language from the discussion of this subsection on p. 24 of Appendix C, the Concise Explanatory
15 Statement. This would clarify that Electric Service Providers ("ESPs") can continue to offer
16 time-of-use rates, interruptible rates and self-generation deferral rates to their customers. This
17 subsection would read as follows, with Staff's proposed language in double-underline:

18 After January 1, 2001, tariffs for Standard Offer Service
19 shall not include any special discounts or contracts with
20 term, or any tariff which prevents the customer from
21 accessing a competitive option, other than time-of-use
22 rates, interruptible rates or self-generation deferral rates.

23 R14-2-1606.F. is ambiguous and could be read to require Affected Utilities and
24 Utility Distribution Companies to provide transmission, distribution and ancillary services. Staff
25 does not believe that this is the intent. Staff therefore recommends that this section apply only if
26 the services are rendered. Staff suggests the following changes, with Staff's proposed language
27 in double-underline:

28 If ~~The~~ Affected Utilities and Utility Distribution
Companies ~~must~~ provide transmission, distribution and
ancillary services, those services must be provided
according to the following guidelines:

R14-2-1606.H applies to rates for unbundled services. Pursuant to subsection
H.1., the rates are for both Competitive Services and Non-Competitive Services. Section H.3.
states that the rates may be downwardly flexible if approved by the Commission. However,
R14-2-1611.E. allows an ESP to price below the maximum rate only for Competitive Services.

1 Therefore, Staff recommends that R14-2-1606.H.3. be clarified to apply only to Competitive
2 Services, as follows, with Staff's proposed language in double-underline:

3 Such Rates for competitive services may be downwardly
4 flexible if approved by the Commission.

5 **R14-2-1607. Recovery of Stranded Cost of Affected Utilities**

6 R14-2-1607.E.9. appears to be missing a word after "interruptible," which word
7 Staff assumes to be "customers." This subsection should therefore read "The applicability of
8 Stranded Cost to interruptible customers."

9 **R14-2-1609. Solar Portfolio Standard**

10 The Solar Portfolio Standard has been targeted for elimination because it would
11 be "prohibitively expensive and would hinder competition in Arizona." However, the record
12 developed over the past four years shows that, if solar electricity is added as a small percentage
13 into the generation mix, there will be minimal impact on customers. In particular, Appendix A
14 of the September 26, 1997, Final Report of the Solar Portfolio Standard Subcommittee (attached)
15 shows that rather than being prohibitively expensive, the impact of a small amount of solar
16 generation will only be marginally more expensive and, in conjunction with competitive
17 electricity price reductions, will still be less expensive than current electricity costs.

18 The Solar Portfolio Standard percentage contained in the current Rules (.2% of
19 electricity sold) is less than 1/10th of the annual increase in demand for electricity. So, as the
20 demand for electricity in Arizona increases by 2-3% every year, the initial Portfolio Standard
21 would only require 1/10th of the annual increase to be committed to solar. Finally, much has
22 been said about "expensive" solar technologies and that some of the solar technologies cost more
23 than 30 cents per kWh. Today's conventional peaking plants, when evaluated on a per kWh
24 basis, often exceed 30-50 cents per kWh because the plants are used so infrequently. However,
25 nobody complains that they are "prohibitively expensive," because that cost is "blended in" with
26 other costs in the utility portfolio mix. The same applies to solar electricity which will be .2% or
27 less (when extra credit multipliers are considered) of electricity sold.

28

1 There is a claim that the Solar Portfolio “would hinder competition in Arizona.”
2 Even with the current Solar Portfolio Standard in place, Arizona has received applications from
3 13 potential competitors. These include the major players who dominate the major share of the
4 California competitive market: PG & E Energy Services, APS Energy Services, New Energy
5 Ventures, Sempra Energy Trading Corporation, Enron Energy Services, and New West Energy,
6 as well as others. They have applied for CC&Ns in Arizona and are prepared to do business
7 under the Rules adopted in 1996 and revised in 1998, which include the Solar Portfolio Standard.
8 Had the Solar Portfolio Standard been seen as a hindrance to competition, these “major players”
9 would not have applied for CC&Ns in Arizona.

10 The stated justifications for eliminating the Solar Portfolio Standard are not, in
11 Staff’s view, adequately supported. Therefore, Staff recommends maintaining the Solar
12 Portfolio Standard as modified in 1998, although with two changes. Since there seems to be
13 significant concern about the cost of the Standard, Staff recommends freezing the Solar Portfolio
14 percentage at .2% in 1999 and 2000, and increasing it gradually by .1% per year starting in 2001.
15 After 2003, the percentage could continue the .1% annual increase only if the price of solar
16 electricity reached an acceptable cost/benefit point or solar kWh cost impact cap to be
17 determined by a Solar Electricity Cost Evaluation Working Group in 2002. Staff further
18 proposes to add language in a new subsection M that would allow solar water heaters to qualify
19 for up to 20% of the Solar Portfolio Standard requirement.

20 It should be noted that the current .2% standard, combined with the extra credit
21 multipliers, would produce an effective Solar Portfolio rate of approximately .1%, which was
22 proposed by both APS and TEP in past filings as a reasonable approach.

23 Staff’s recommendation is to retain the entire Section 1609 with the following
24 changes with Staff’s language in double-underline:

25 B. Starting January 1 of each year from 2001 ~~2000~~
26 through 2008 ~~2003~~, the solar resource requirement shall
27 increase by .1% ~~.2%~~ with the result that starting January 1,
28 2008 ~~2003~~, any Electric Service Provider selling electricity
or aggregating customers for the purpose of selling
electricity under the provisions of this Article must derive
at least 1.0% of the total retail energy sold

1 competitively from new solar energy resources. The 1.0%
2 requirement shall be in effect from January 1, ~~2008~~ 2003
3 through December 31, 2012. The Commission would
4 continue the .1% per year increase in the solar portfolio
5 percentage after December 31, 2003, only if the cost of
6 solar electricity has declined to an acceptable cost/benefit
7 point. The Director, Utilities Division shall establish, not
8 later than January 1, 2002, a Solar Electricity Cost
9 Evaluation Working Group to make recommendations to
10 the Commission of an acceptable solar electricity
11 cost/benefit point or solar kWh cost impact cap that the
12 Commission could use as criteria for the decision to
13 continue the increase in the solar portfolio percentage. The
14 recommendations of the Working Group shall be presented
15 to the Commission not later than December 31, 2002.

9 Add new subsection:

10 M. An Electric Service Provider shall be entitled to
11 receive a credit of up to 20% of the solar portfolio
12 requirement for solar water heating systems purchased by
13 the Electric Service Provider for use by its customers, or
14 purchased by its customers and paid for by the Electric
15 Service Provider through bill credits or other similar
16 mechanisms. The solar water heaters must replace the use
17 of electric water heaters for residential, commercial, or
18 industrial water heating purposes.

15 **R14-2-1609. Transmission and Distribution Access**

16 Section A of this rule requires Affected Utilities to allocate transmission capacity
17 that is reserved for use by the retail customers on a pro-rata basis among Standard Offer
18 customers and competitive market customers, in accordance with FERC Orders 888 or 889.
19 However, this allocation is a feature of Arizona's state retail access program and is not the result
20 of a specific FERC directive in Orders 888 or 889. Staff therefore recommends that the
21 reference to the FERC Orders be deleted, as follows:

22 A. The Affected Utilities shall provide non-
23 discriminatory open access to transmission and distribution
24 facilities to serve all customers. No preference or priority
25 shall be given to any distribution customer based on
26 whether the customer is purchasing power under the
27 Affected Utility's Standard Offer or in the competitive
28 market. Any transmission capacity that is reserved for use
by the retail customers of the Affected Utility's Utility
Distribution Company shall be allocated among Standard
Offer customers and competitive market customers on a
pro-rata basis, ~~in accordance with FERC Orders 888 and~~
~~889.~~

1 Section I of this rule addresses services from Must-Run Generating Units. Under
2 the auspices of the Arizona Independent Scheduling Administrator Association ("AISA"),
3 stakeholders have made considerable progress in developing Must-Run Generation protocols. In
4 accordance with the draft AISA protocol, Staff recommends that fixed Must-Run Generation
5 costs be recovered through a charge to end-use customers in the appropriate load zone. In some
6 cases, such a charge may be most effectively levied by the Commission when there is an
7 appropriate nexus, such as distribution service. Therefore Staff recommends that the
8 Commission reserve the right to approve the pricing features of the Must-Run Generation
9 protocol, when such approval is appropriate. Staff's proposed language changes are double-
10 underlined:

11 I. The Affected Utilities and Utility Distribution
12 Companies shall provide ~~services from the~~ Must-Run
13 Generation ~~services~~ ~~Generating Units~~ to Standard Offer
14 retail customers and competitive retail customers on a
15 comparable, non-discriminatory basis at regulated prices.
16 The Affected Utilities shall specify the obligations of ~~any~~
17 ~~the Must Run Generating Units~~ generation units needed for
18 ~~providing Must-Run Generation~~ in appropriate sales
19 contracts prior to any divestiture. Under auspices of ~~the~~
20 ~~Electric System Reliability and Safety Working Group~~
21 ~~Arizona Independent Scheduling Coordinator~~
22 Administrator, the Affected Utilities and other stakeholders
23 shall develop statewide protocols for pricing and
24 availability of ~~services from~~ Must-Run Generation
25 ~~Generating Units~~ ~~services with input from other~~
26 ~~stakeholders~~. These protocols shall be presented to the
27 Commission for review and, when appropriate, approval,
28 and filed with the Federal Energy Regulatory Commission,
if necessary, by October 31, 1998 in conjunction with the
Arizona Independent Scheduling ~~Schedule~~ Administrator
tariff filing. Fixed Must-Run Generation costs are to be
recovered through a charge to end-use customers. This
charge must be levied by the Commission as part of the
end-use customer's distribution service.

24 **R14-2-1612. Service Quality, Consumer Protection, Safety, and Billing Requirements.**

25 Section K.1. of this rule requires an ESP who provides Metering or Metering
26 Service shall provide access to meter reading using EDI formats data to other ESPs serving that
27 same customer when authorized by the customer. Although Staff's comment on this section is
28 not technically an exception to the Hearing Officer's proposal because no amendments are

1 recommended in the proposed order, Staff notes that EDI formats are not used by Metering
2 Service Providers and the reference should therefore be deleted. Staff recommends that this
3 section of the rule should therefore read as follows, with Staff's changes in double-underline:

4 An Electric Service Provider who provides Metering or
5 Meter Reading Service pertaining to a particular consumer
6 shall provide access to meter reading data using EDI
7 formats to ~~meter reading data~~ to other Electric Service
8 Providers serving that same consumer when authorized by
9 the consumer.

8 Section K.6. of this rule should also be modified slightly for clarification. The
9 proposed new language refers to "predictable loads such as streetlights" that will be permitted to
10 use load profiles rather than hourly consumption measurement meters or meter systems.
11 However, pursuant to R14-2-209.B.1., streetlights are not required to have meters.
12 Consequently, since streetlights are not required to have meters in any event, the reference to
13 streetlights as a candidate for load profiling should be deleted. The section should therefore read
14 as follows, with Staff's changes in double-underline:

15 Minimum metering requirements for competitive customers
16 over 20 kW, or 100,000 kWh annually, should consist of
17 hourly consumption measurement meters or meter systems.
18 Predictable loads such as streetlights will be permitted to
19 use load profiles to satisfy the requirements for hourly
20 consumption data. The Affected Utility or Electric Service
21 Provider will make the determination if a load is
22 predictable.

20 **R14-2-1615. Separation of Monopoly and Competitive Services**

21
22 R14-2-1615.B. states that after January 1, 2001 an Affected Utility shall not
23 provide Competitive Services. R14-2-1601.5. defines Competitive Services as meaning all
24 aspects of retail services (other than Noncompetitive Services), which includes billing and
25 collections, metering and meter reading services. Language in R14-2-1615.B. has been deleted
26 that explains the services that Affected Utilities and Utility Distribution Companies may offer as
27 well as the time frame during which those services may be offered. Staff is concerned that an
28 Affected Utility may not be able to offer billing and collections, metering and meter reading

1 services to Standard Offer customers after January 1, 2001, thereby forcing Standard Offer
2 customers to choose a competitive supplier for these services.

3 Staff therefore recommends adding the following language to R14-2-1615.B. after
4 the first sentence:

5 This rule does not preclude an Affected Utility or Utility
6 Distribution Company from billing its own customers for
7 distribution service, or from providing billing services to
8 Electric Service Providers in conjunction with its own
9 billing or from providing meters for Load Profiled
10 residential customers. Nor does this rule preclude an
11 Affected Utility or Utility Distribution Company from
12 providing billing and collections, metering and meter
13 reading services as part of the Bundled Standard Offer
14 tariff to Standard Offer customers after January 1, 2001.

15 In addition, this section B. should also be clarified by adding language from R14-
16 2-1612.K.10. and 11., indicating that Affected Utilities and Utility Distribution Companies may
17 own distribution and transmission primary voltage Current Transformers and Potential
18 Transformers. Staff recommends adding the following sentence:

19 This rule does not preclude an Affected Utility or Utility
20 Distribution Company from owning distribution and
21 transmission primary voltage Current Transformers and
22 Potential Transformers.

23 **R14-2-1616. Affiliate Transactions**

24 Section A of this rule adds a new sentence applying the rule to any affiliate of an
25 ESP that would be deemed a Utility Distribution Company if operating in Arizona and subject to
26 the Commission's jurisdiction. Staff recommends deleting this sentence on both legal and policy
27 grounds.

28 The legal issue at work here is self-evident from the new language itself, which
purports to exert Commission jurisdiction over entities that are not subject to the Commission's
jurisdiction. Presumably this would include out-of-state utilities who operate in Arizona through
subsidiaries. The Commission does not have jurisdiction over those utilities, and could not
enforce this rule against them.

...

1 Staff also believes that there are strong policy reasons against applying this rule to
2 out-of-state utilities. The intent of the rule is both to protect captive ratepayers from subsidizing
3 competitive services, and to counteract the vertical market power of incumbent utilities. While
4 this Commission has an obligation to protect Arizona captive ratepayers, it has no such duty to
5 ensure that captive ratepayers in California are not subsidizing competitive customers in
6 Arizona. In addition, out-of-state utilities have no vertical market power in Arizona. Thus, the
7 argument of the Affected Utilities that a level playing field must be established vis-a-vis
8 affiliates of out-of-state utilities is merely self-serving protectionism.

9 For these reasons, Staff recommends deleting the proposed new second sentence
10 in R14-2-1616.A.

11 The proposed amendments also delete the words “and shall not provide access to
12 confidential utility information” from R14-2-1616.A.8. because, as discussed at p. 49 of
13 Appendix C, Concise Explanatory Statement, this is covered in R14-2-1616.B. This does not
14 appear to be entirely accurate.

15 R14-2-1616.B. requires confidential information “concerning customers” to be
16 made available by a Utility Distribution Company or ESP to its affiliates and other ESPs on the
17 same terms and conditions. This leaves the loophole that confidential utility information not
18 concerning customers is not precluded from being provided to an affiliate of a Utility
19 Distribution Company.

20 Therefore, Staff recommends that the language stated above not be deleted from
21 R14-2-1616.A.8.

22 **R14-2-1617. Disclosure of Information**

23 This rule addresses the disclosure of information to customers. The proposed
24 amendment to R14-2-1617.A. replaces the term “Load Serving Entity” with “Electric Service
25 Provider providing generation services” to describe the entity responsible for providing certain
26 information to residential customers.

27 Staff is concerned that the proposed language does not describe the entire
28 universe of entities providing generation services to residential customers. For example, Utility

1 Distribution Companies providing Standard Offer service provide generation service. In
2 addition, Affected Utilities provide generation service until they separate their competitive arm.
3 Staff therefore recommends retaining the term "Load Serving Entity."

4 **CONCLUSION.**

5 For the reasons discussed above, Staff recommends that its exceptions to the
6 proposed rule amendments be adopted.

7 RESPECTFULLY SUBMITTED this 17th day of February, 1999.

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By: Paul A Bullis
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Original and ten copies of the
foregoing filed this 17th day
of February, 1999 with:

Docket Control
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A copy of the foregoing was
mailed this 17th day of February,
1999 to:

All parties on the service list for
Docket No. RE-00000C-94-0165

By: Mary Ippolito

MAJOR FINDINGS

Solar Portfolio Standard Analysis

Submitted to the Arizona Corporation Commission
By Pacific Energy Group

On August 6, 1997, the Solar Portfolio Standard Subcommittee requested an independently-derived analysis of the impact of suggested changes to the Arizona Solar Portfolio Standard (SPS).¹ Pacific Energy Group, under subcontract to NREL, developed a computer spreadsheet tool to analyze costs, MW deployment schedule, and rate impacts of five different options to the current SPS.² The following major findings have been abstracted from a more detailed report.

- Table 1 provides a summary of the analysis results.³ Depending on the SPS option selected, the Base Case ("best guess") results indicate that 250 to 330 MW of new solar capacity will be needed by the year 2010 at a total cost to Energy Service Providers (ESPs) of \$450 to \$750 million (1998\$). This cost range results in a rate increase of about 0.6% to 1.0% or \$0.0005/kWh to \$0.0008/kWh. The costs and rate impacts are bounded by the Low and High Case which are about 50% lower and 50% higher than the Base Case, respectively. *The analysis assumed that Sali River Project is a full participant in the SPS. The total costs and solar capacity needs are reduced by about 40% if SRP does not participate.*

Table 1. Results Summary

	Solar Capacity by 2010 (MW)	Total Cost, NPV (\$million)	Rate Increase (%)	Rate Increase (\$/kWh)
Low Case	250 to 330	\$250 to \$450	0.3% to 0.6%	\$0.0002 to \$0.0005
Base Case	250 to 330	\$450 to \$750	0.6% to 1.0%	\$0.0005 to \$0.0008
High Case	250 to 330	\$750 to \$1.150	1.0% to 1.7%	\$0.0008 to \$0.0013

- Between 11,600 GWh and 12,800 GWh of new solar energy generation and/or credits are needed cumulatively by 2020 for all options, except Option 4 which requires 17,400 GWh.
- The results indicate there is a strong incentive for ESPs to comply with the SPS rather than pay a credit, or penalty charge, even at the high end of the cost assumptions. Non-compliance costs for most options range between \$1.3 and \$1.6 billion.
- Including a double or multiple credit provision as an incentive for in-state economic development and/or longer-term power purchase contracts reduces total costs by about 30% and solar capacity needs by about 20% relative to the current SPS. It also provides ESPs an added incentive to comply with the SPS rather than pay for credits or penalty charges.

¹ The current rule sets the SPS at one-half of one percent beginning in 1999 and one percent beginning in 2002.

² The spreadsheet tool is available for downloading at www.PacificEnergy.com

³ Option 4 has substantially higher requirements than all other options because it has a 1.5% SPS. All other options have a 1% SPS. Therefore Option 4 has been excluded from the table to avoid skewing the summary results.

- ESPs can substantially delay and more evenly spread out the costs associated with the SPS by contracting with solar power providers. Contracting for power may also serve to minimize risks to the ESP associated with new plant construction.
- Rate impacts are substantially lower than expected. Rate impacts (or rate increases), however, are somewhat illusory in the sense that once competition is introduced rates are projected to decline considerably. Rates for certain customers may not be at all impacted by the SPS. Rates for other customers may just not decline as much with the SPS.

To illustrate this point, take the case of a residential customer. The average AZ rate over the next 30 years is estimated at \$0.0761/kWh. The SPS requirement increases this \$0.0761/kWh rate to about \$0.0768/kWh. This translates to a bill increase of about 70 cents per month for a residential customer with a 12,000 kWh/year demand. This increase, however, may in fact be transparent to the customer. Assume because of competition the customer would have realized a 10% rate reduction with a net bill savings of about \$8.45 per month. Now because of the SPS the customer saves \$7.75 per month instead. See Table 2.

Table 2. Bill Impact for Residential Customer

	Before Competition	After Competition without SPS	After Competition with SPS
Customer Electric Bill Total (\$/month)	\$84.55	\$76.10	\$76.80
Customer Electric Bill Savings (\$/month)	NA	\$8.45	\$7.75

- In our opinion, all of the objectives of the Solar Portfolio Standard will be met. This statement must be qualified in part to say that at least three of the objectives may require further attention: "Economic benefit throughout Arizona", "Reach an acceptable cost/benefit point", and "Environmental benefits". In order to address these objectives, the benefits of the SPS to Arizona need to be quantified. The focus so far has been on costs.

Table 3 shows a preliminary estimate of selected economic development and environmental benefits, assuming full implementation of the current SPS. The analysis indicates that these benefits may indeed be substantial with some 600 jobs created and \$450 million in wages, salaries, state income taxes, and avoided environmental externalities. These results are intended to begin to address the open questions regarding benefits-oriented objectives.

The results are preliminary, however, and a detailed input-output analysis that quantifies direct, indirect, and induced effects is suggested. Other studies provide some insight to these detailed analyses, including a macroeconomic study of the Wisconsin economy: "The results show that renewable energy investments produce over three times more jobs, income, and economic activity than the same amount of electricity generated from coal and natural gas power plants."⁴

⁴ Ciemmer, S., and D. Wichert. *The Economic Impacts of Renewable Energy Use in Wisconsin*. Wisconsin Department of Administration, Energy Bureau, April, 1994.

Table 3. Preliminary estimate of selected SPS benefits to Arizona

Parameter	Result	Notes
Jobs Created by 2010	600 jobs	From operating solar plants. 20 MW/yr local manufacturing, and ancillary services. Indirect and induced effects are <u>not</u> included.
Wage, salary, and state income tax revenue (1998-2020)	\$200 million	\$400 million in nominal\$. Does <u>not</u> include other direct, indirect, and induced effects normally considered in a full input-output model used in economic development analysis. These multipliers are considerable.
Global warming CO ₂ emissions avoided by 2020	12 million tons, \$120 million	At \$13/ton this equates to \$120 million in 1998\$.
Acid rain SO _x emissions avoided by 2020	32 thousand tons, \$85 million	At \$2.03/lb this equates to \$85 million in 1998\$.
SMOG NO _x emissions avoided by 2020	38 thousand tons, \$40 million	At \$0.82/lb this equates to \$40 million in 1998\$.