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ORIGINAL

Barbara A. Klemstine
Manager
Regulatory Affairs

AZ CORP COMMISSION

Tel 602/250-2031

Fax 602/250-3399

e-mail: bklemsti@apsc.com

<http://www.apsc.com>

Mail Station 9909

P.O. Box 53999

Phoenix, AZ 85072-3999

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August 30, 1999

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

RE: DOCKET NO. E-00000A-99-0205
IN THE MATTER OF THE GENERIC INVESTIGATION OF THE DEVELOPMENT OF A
RENEWABLE PROTFOLIO STANDARD AS A POTENTIAL PART OF THE RETAIL
ELECTRIC COMPETITION RULES

Dear Sir/Madam:

Pursuant to the Chief Hearing Officer's procedural order, dated June 16, 1999, Arizona Public Service Company hereby files the rebuttal testimony of Mr. Edward Z. Fox in the above referenced docket.

If you have any questions, please call me at 250-2031.

Sincerely,

Arizona Corporation Commission

DOCKETED

AUG 30 1999

DOCKETED BY

BAK/pb

BEFORE THE
ARIZONA CORPORATION COMMISSION

REBUTTAL TESTIMONY OF EDWARD Z. FOX

On Behalf of
Arizona Public Service Company
Docket No. E-00000A-99-0205

August 30, 1999

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REBUTTAL TESTIMONY
OF
EDWARD Z. FOX
(Docket Nos. E-00000A-99-0205)

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1.Q. WOULD YOU PLEASE STATE YOUR NAME AND BUSINESS ADDRESS?

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1.A. My name is Edward Z. Fox, and my business address is 400 North Fifth Street, Phoenix, Arizona 85004.

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2.Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY IN THIS PROCEEDING ON BEHALF OF ARIZONA PUBLIC SERVICE COMPANY (“APS” OR “COMPANY”)?

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2.A. Yes.

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3.Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS PROCEEDING?

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3.A. The purpose of my rebuttal testimony is to respond to the direct testimony and comments filed by Staff and several Intervenors regarding the development of a Renewable Portfolio Standard as a component of the Arizona Corporation Commission’s (“Commission”) Electric Competition Rules, A.A.C. R14-2-1601 *et seq.* I will generally explain why their direct testimony and comments fail to support a “percentage of sales” portfolio standard, but could support a properly designed dollar-driven renewable program.

1 **4.Q. WHAT DO YOU MEAN BY A “DOLLAR-DRIVEN”**
2 **STANDARD?**

3 4.A. With a “dollar-driven” standard, the Commission determines how
4 much will be spent on above-market solar resources and the ESPs or
5 UDCs (collectively referred to as “Energy Providers) are responsible
6 for acquiring as much solar energy as possible given these resource
7 constraints.

8
9 In contrast, an “energy-driven” or “percent of sales” portfolio standard
10 requires Energy Providers to acquire a fixed percentage of solar
11 energy regardless of cost. Thus, solar vendors and not the
12 Commission determine how much consumers will have to pay for
13 above-market solar energy.

14
15 I must note that both types of standard are relevant only to above-
16 market solar resources. If solar energy can meet or beat the market
17 cost of electricity, Energy Providers will be buying every kWh they
18 can with or without the proposed Portfolio Standard.

19
20 **5.Q. WHY IS A DOLLAR-DRIVEN RATHER THAN A KWH-**
21 **DRIVEN RENEWABLE PROGRAM MORE PRUDENT FOR**
22 **ARIZONA?**

23 5.A. The most serious problems with an energy-driven requirement, such
24 as the proposed Portfolio Standard, are that: (1) all of the risk is borne
25 by Energy Providers and, ultimately, consumers; (2) none of the risk is
26 borne by those who economically benefit (solar vendors); and (3) the
extent of that risk is open-ended.

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Renewable energy is a developing industry, so all projections of future technology costs and renewable energy prices are, at best, speculative. More importantly, ongoing technology improvements will almost certainly result in the early obsolescence of today's renewable technologies. Requiring significant up-front investments in existing solar technology through a mandated portfolio standard creates unnecessarily high levels of risk because of this potential for technology change. Just as companies today purposely avoid upgrading all of their computer systems at once using existing computer technology (because of the risk of premature technological obsolescence), it is flawed policy to impose a requirement that front-loads solar generation construction. Further, the renewable energy industry is relatively small compared to other sectors in our economy, and is thus less able to efficiently absorb sudden, large-scale increases in demand for solar products and technology.

This combined uncertainty results in a significant risk that both the long- and short-term costs of complying with a kWh-driven portfolio standard will exceed current projections. Such higher costs would essentially "punish" Energy Providers and consumers for the renewable portfolio standard not meeting expectations; they would not directly affect the solar vendors who advocated a portfolio standard based on their overly-optimistic projections.

A dollar-driven standard, such as a System Benefits Charge ("SBC") funded program, avoids virtually all of the risks associated with a

1 portfolio standard. If technology costs increase unpredictably or,
2 more accurately, fail to decrease as rapidly as predicted by the solar
3 advocates, less solar capacity might be installed but the impact on
4 customers and suppliers is capped at a stable, predictable level. As
5 discussed in my Direct Testimony, such stability allows for the
6 sustainable development of solar energy resources in Arizona. Also,
7 because funds are collected and expended each year, technology
8 changes can be accommodated. Moreover, although a dollar-driven
9 standard eliminates most of the downside risks associated with a
10 renewable energy program, it still realizes benefits if costs are lower
11 than projected by allowing more solar capacity to be installed each
12 year. Indeed, because solar vendors will be competing for the funds
13 collected through the SBC, the vendors retain incentives to offer cost-
14 effective solutions and to continue to develop new solar technologies.

15
16 **6.Q. DO OTHER PARTIES SUPPORT A PROGRAM SIMILAR TO**
17 **THE DOLLAR-DRIVEN PROGRAM PROPOSED IN YOUR**
18 **DIRECT TESTIMONY?**

19 6.A Yes. I was pleased to note that a broad cross-section of comments and
20 testimony was consistent with a dollar-driven renewable energy
21 program. Such a program could be largely funded by allocating (or
22 reallocating) existing sources of revenue, rather than adding
23 significant new charges or increased costs to an electric consumer's
24 bill. For example, New West Energy's proposal—which is based on a
25 management proposal of Salt River Project—involves recovering
26 costs through the present SBC, rather than mandating fixed portfolio
percentages. Tucson Electric Power ("TEP") also recognized that

1 funds for a renewable energy program could be derived from its
2 existing SBC, and Arizona Electric Power Cooperative (“AEPCO”)
3 concluded that the recovery of costs through a SBC was preferable to
4 a kWh-driven portfolio standard. Witness Gilliam for the Land and
5 Water (“LAW”) Fund noted that renewable energy program costs are
6 already being recovered from customers through SBCs and stated that
7 SBCs could be used to implement the LAW Fund’s proposal for a bid-
8 based Renewable Energy Credit program.

9
10 **7.Q. THE LAW FUND SUPPORTS A PERCENT OF SALES**
11 **PORTFOLIO STANDARD FUNDED THROUGH THE SBC.**
12 **DOES THIS LIMIT THE RISK ASSOCIATED WITH A**
13 **PERCENT OF SALES PORTFOLIO STANDARD?**

14 7.A. No. The LAW Fund supports the proposed Portfolio Standard’s
15 percent of sales levels, but concluded that these could be met at
16 funding levels that are currently being recovered in SBCs. Although I
17 do not believe that the LAW Fund correctly characterizes APS’s
18 current renewable energy funding levels,¹ I agree that significant solar
19 capacity can be installed using funds generated by a SBC. However,
20 the LAW Fund’s proposal would still require an ESP or UDC to
21 procure renewable energy if current SBC levels failed to fully support
22 the percent of sales levels. Thus, the LAW Fund’s proposal does not
23 actually limit the risks associated with a percent of sales portfolio

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¹ The LAW Fund stated that APS’s funding levels for renewable energy were \$8.5 million in 1997. This amount is not accurate for 1998 under APS’s prior rate settlement; APS spent approximately \$7 million in 1998 on renewable, DSM and low income programs. APS has proposed in its competition Settlement that its SBC remain at this level.

1 standard to Energy Providers or customers. A more logical approach
2 is to use funds from a SBC to support a dollar-driven renewable
3 energy program.
4

5 **8.Q. DO CUSTOMERS AND NEW MARKET ENTRANTS**
6 **SUPPORT A PERCENT OF SALES PORTFOLIO STANDARD?**

7 8.A. Generally, no. Apart from the City of Tucson, the only customer
8 group to file comments opposed any mandated renewables program.
9 It is ironic that Staff and the solar vendors argue that Arizona
10 consumers want renewable energy, cite a few “question and answer”
11 survey results, but then reject out-of-hand any program that would let
12 the competitive market—which is essentially consumers voting with
13 dollars—dictate the extent of renewable investment in the state.
14

15 APS’s experience with voluntary programs, which is consistent with
16 that in other states, is that consumer responses to surveys on
17 renewable energy spending do not correlate with results actually seen
18 in the market. Thus, I would expect that only about two percent of
19 APS’s customers, if faced with actually paying a higher electric bill
20 for selecting renewable energy, would voluntarily opt to do so. For
21 example, less than one-half of one percent of APS’s customers have
22 voluntarily elected to join the Solar Partners program. As I noted in
23 my Direct Testimony, there are public policy reasons that could
24 support a reasonable renewable energy mandate. But the public’s
25 alleged desire for a regulatory mandate that will appropriate their
26 anticipated savings from competition is not one of them.

1 ESPs participating in this docket also support an incentive-based
2 program rather than regulatory mandates (Commonwealth Energy) or
3 voluntary, market-based green power programs (NEV Southwest).
4 Such a position is not surprising: ESPs already face a number of start-
5 up and implementation costs. These costs will be compounded by
6 costs resulting from a portfolio standard, and could deter some ESPs
7 from entering the Arizona market if they determine that Arizona's
8 renewable portfolio standard is too risky or too burdensome. The
9 Commission should give ESPs' concerns at least equal weight to that
10 of the solar vendors who, not surprisingly, have an economic incentive
11 to advocate as large a portfolio standard as possible.
12

13 **9.Q. DID ANY ESP OBJECT TO A SBC-BASED PROGRAM?**

14 9.A. Yes. NEV Southwest expressed concerns about using a SBC to collect
15 funds from competitive customers in a manner that would favor
16 Standard Offer customers. However, a SBC-based program, such as
17 the one outlined in my Direct Testimony, can effectively address these
18 concerns. Such a program could be applied within existing rate
19 structures or by using a deferral mechanism, so there would be no
20 "rate increase" for competitive customers. This is especially
21 important if Standard Offer rates are frozen. Further, because the
22 Commission approves each UDC program—and there would be no
23 separate renewable mandates imposed on ESPs—a SBC-based plan
24 can be competitively neutral.
25

26 **10.Q. DOES STAFF'S ANALYSIS SUPPORT A PERCENT OF SALES
PORTFOLIO STANDARD OVER OTHER ALTERNATIVES?**

1 10.A. No. Staff witness Williamson justifies the costs of the proposed
2 portfolio standard by presuming that electric competition will result in
3 savings to consumers. Under his hypothesis, the savings from
4 competition can subsidize a renewable energy mandate. However, I do
5 not consider it acceptable to “spend” the expected dividends of electric
6 competition. This only serves to obscure the true costs of a renewable
7 energy mandate.

8
9 For example, witness Williamson calculated bill impacts for a
10 hypothetical TEP customer by assuming that a competitor would offer
11 electricity for 2% less than TEP’s pre-competition rate.² Then, under
12 what I believe are overly-optimistic assumptions, he concluded that
13 this customer would still get some savings over pre-competition rates,
14 even with the proposed Environmental Portfolio Standard. Thus,
15 witness Williamson speculates that the “nominal charges” for portfolio
16 resources will, on a net basis, still allow lower rates for competitive
17 customers. Masking the costs of a renewables program is not an
18 acceptable policy justification for such a program.

19
20 Additionally, witness Williamson’s analysis risks derailing the very
21 “competition” that he uses to finance the percent of sales portfolio
22 standard without causing rate increases. Even if such a portfolio
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25 ² In a response to an APS data request, witness Williamson admitted that the only support for this
26 “2% less” figure is the rate concessions in the APS/TEP settlements. For example, under APS’s 1.5%
rate reduction, witness Williamson stated that a competitor would have to offer rates at least 2% less than
APS’s current rates to attract a customer off Standard Offer service. How a competitor can pay ever
higher portfolio standard costs and still offer a discount against annually decreasing Standard Offer rates
is not explained.

1 standard is applied to both Standard Offer and competitive customers,
2 the proposed settlements of both APS and TEP require rate decreases
3 for Standard Offer customers. At least in the short-term, Standard
4 Offer rates cannot be increased to reflect the added costs of a percent
5 of sales portfolio standard. ESPs, however, must beat the Standard
6 Offer price to attract customers. Thus, if a portfolio standard is
7 imposed, ESPs must beat the Standard Offer price (with rate
8 reductions) while absorbing the added cost of complying with a
9 portfolio standard. In other words, the costs of complying with the
10 portfolio standard come straight out of the margins of ESPs. To make
11 matters worse, Staff witness Hoff even recommends front-loading the
12 expected rate increases associated with the portfolio standard.

13
14 After years of effort aimed at lowering the electric rates of Arizona
15 consumers, the Commission should not spend consumers' as-yet-
16 unrealized savings from competition to fund a new renewable energy
17 mandate. Indeed, rather than resulting in "net" savings, as predicted
18 by witness Williamson, a percentage of sales portfolio standard is
19 more likely to halt retail competition altogether (or at least for some
20 customer groups).

21
22 **11.Q. ARE THERE OTHER FACTORS THAT SUPPORT A**
23 **DOLLAR-DRIVEN STANDARD?**

24 11.A. Yes. Most importantly, the parties advocating a percent of sales
25 portfolio standard do not point out the financing difficulties that will
26 accompany a mandated portfolio standard. The risk of new stranded
costs from both regulatory and technological changes will deter most

1 Energy Providers from making the significant capital investments
2 necessary to construct large amounts of new solar capacity or from
3 entering into long-term contracts for solar energy. Thus, I expect that
4 most market participants will satisfy a portfolio standard by paying the
5 penalty or paying high prices for short-term purchases from solar
6 resources completed since 1997 or which are presently “in the
7 pipeline.”

8
9 Even if some new investment in solar capacity does occur, the risk of
10 stranded investment and higher financing costs are not reflected in the
11 cost estimates prepared by the advocates of a portfolio standard. For
12 example, Arizona Clean Energy Industries Alliance (“ACEIA”)
13 witness Osborn describes the successes of the Sacramento Municipal
14 Utility District (“SMUD”) with solar power. SMUD’s programs,
15 however, are generally pay-as-you-go, and SMUD is not at risk for
16 stranded costs under its own voluntary renewable energy programs.
17 Also, SMUD’s program involves installing 10 MW of solar capacity
18 over 5 years; the proposed portfolio standard would require APS alone
19 to install almost 120 MW of solar capacity over the same time frame.³
20 Thus, witness Osborn’s assertion that a “major” renewables effort is
21 both low cost and low risk simply does not apply to the proposed
22 Portfolio Standard.

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³ Even using the credits, the amount of solar capacity required for APS alone is over 55 MW—
more than five times the size of the SMUD program.

1 Indeed, if the installation of hundreds of megawatts of new solar
2 capacity over the first five years of the program cannot be ‘levelized’
3 through affordable long-term financing, the cost of complying with the
4 portfolio standard (Staff - \$343 million pessimistic scenario; ACEIA -
5 \$850 million, APS - \$1,340 million pessimistic scenario⁴) will be
6 passed through to consumers all at once. As I noted in my Direct
7 Testimony, if suppliers are required to pay for solar capacity as built,
8 the bill impact of the proposed portfolio standard will exceed 4% in
9 some years.

10
11 **12.Q. THE SOLAR TECHNOLOGY VENDORS ASSERT THAT THE**
12 **PORTFOLIO STANDARD WILL RESULT IN NO MORE**
13 **THAN A \$1.00 PER MONTH BILL IMPACT AND FURTHER**
14 **CLAIM VARIOUS OFFSETTING BENEFITS. DO YOU**
15 **AGREE?**

16 12.A. No. I would expect the solar vendors—participating mostly through
17 the ACEIA—to be optimistic in their projections and to support a
18 kWh-driven portfolio standard. If someone were to propose a law
19 requiring 10% of all Arizona drivers to drive Volvo cars, I would
20 expect Volvo to lobby aggressively in support of such a proposal out
21 of rational self-interest. However, the assumptions and claims made
22 in the solar vendors’ testimony are unrealistic.

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⁴ These APS statewide estimates are “pessimistic” in that they assume no extra credit multipliers are used. The figures, like Staff’s, also assume that SRP implements a similar program.

1 For example, ACEIA witness Annan concludes that under his “worst
2 case” scenario solar energy can be dispatched to customers at 10
3 cents/kWh above the market price for power, yielding a bill impact of
4 \$1.00 for a 1,000 kWh residential customer.⁵ APS’s experience
5 installing renewable capacity suggests that 10 cents/kWh over market
6 is unrealistic. Based on APS’s recent installations of solar capacity, at
7 least in the near term, the cost for solar energy is more likely to be 60
8 cents/kWh above market. Regardless, the parameters of the worst-
9 case bill impact are established by the proposed Portfolio Standard
10 rules. The “worst-case” must assume that suppliers pay the 30
11 cents/kWh penalty—which results in a bill impact closer to \$3.00 or
12 over 3 % of a customer’s monthly bill.

13
14 Witness Annan then claims that “with aggressive marketing
15 strategies” and the use of extra-credit multipliers, solar power can be
16 acquired at only 4 cents/kWh over the market price. This assertion
17 ignores that an “aggressive marketing” campaign itself adds
18 significant cost to a renewables program, such that projected
19 reductions in cost to 4 cents/kWh above market are even more
20 improbable. Of course, with a percent of sales portfolio standard, the
21 ACEIA has nothing to lose should these predictions prove too
22 optimistic. I doubt that ACEIA members would commit today to
23 providing the solar energy required under the proposed Portfolio
24 Standard at 10 cents/kWh over market price, let alone 4 cents. Yet by
25
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⁵ The calculation, when the solar portfolio requirement is 1%, is: 10¢/kWh * 1000 kWh * .01, which equals \$1.00.

1 advocating such an energy-driven portfolio standard, these vendors
2 ask Energy Providers and customers to guarantee a level of purchases
3 and to commit to obtaining a given amount of solar energy regardless
4 of the price.

5
6 The solar vendors' description of the benefits of a portfolio standard
7 are also unrealistic. ACEIA witness Annan claims as a benefit of the
8 proposed portfolio standard that "lower utility bills for commercial
9 and residential energy consumers will result in increased profits and
10 disposable income." No other party has suggested that imposing a
11 renewable portfolio standard will result in lower electric rates for the
12 foreseeable future. Finally, the solar vendors also proclaim support
13 for the portfolio standard because it is "market-based." A portfolio
14 standard requiring the use of a fixed percentage of renewable energy is
15 not market based—it is a quota system imposed by regulatory
16 mandate.

17
18 **13.Q. DO YOU AGREE WITH ACEIA'S RECOMMENDATION**
19 **THAT COST-BENEFIT CRITERIA SHOULD ONLY BE**
20 **ESTABLISHED AFTER SUFFICIENT DATA IS AVAILABLE?**

21 13.A. If ACEIA means by this that no cost-benefit criteria should be
22 established until after all the money is spent, I absolutely do not agree.
23 (This would, however, be consistent with the solar vendors' position
24 that Energy Providers and customers should bear all the risk of the
25 portfolio standard.) The cost-benefit review for any portfolio standard
26 is necessary to guard against uncontrolled upward cost spirals should
the optimistic projections of compliance costs fail to materialize.

1 Additionally, because a renewable portfolio standard is being
2 developed today, it is important to set the cost-benefit threshold today
3 or as soon after a portfolio standard is adopted as possible.

4 Establishing cost-benefit standards up front is a prudent business
5 practice and will prevent portfolio standard proponents from imposing
6 additional unwarranted costs on customers and Energy Providers by
7 arguing in the future that “it’s too late to turn back now.”

8
9 Accordingly, the cost-benefit criteria must be established at the start of
10 the program and should include reasonable and measurable goals, tied
11 to compliance costs, if a portfolio standard is adopted. In fact,
12 because Staff and the other advocates of the proposed Portfolio
13 Standard have set out assumptions that they claim justify the program,
14 the Commission should hold them to their claims. If a “percentage of
15 sales” portfolio standard is adopted, the cost-benefit criteria should be
16 based on the optimistic assumptions being touted in this proceeding by
17 the advocates of such a program.

18
19 **14.Q. ARE PREDICTIONS THAT THE SOLAR POWER INDUSTRY**
20 **WILL RELOCATE TO ARIZONA AS A RESULT OF THE**
21 **PORTFOLIO STANDARD REASONABLE?**

22 14.A. I agree that renewable energy programs can bring certain economic
23 benefits to the state. I disagree, however, that a solar portfolio
24 standard will result in an *en masse* relocation of the solar energy
25 industry to Arizona. The location of manufacturing and design
26 facilities is affected much more by tax incentives, proximity to low-
cost transportation and the availability of skilled labor than by lots of

1 sun or even a demand for the end product. If the latter were true, there
2 would be many car companies building cars in California. Of course,
3 most American cars are still made in Michigan and other parts of the
4 Midwest. Similarly, if an out-of-state solar vendor is considering
5 whether to increase capacity at an existing plant, or start an entirely
6 new facility in Arizona, I do not believe that a portfolio standard will
7 have a significant impact on its decision.

8
9 Although extra credit multipliers may increase the effective profit
10 margins of solar technology firms that locate in Arizona, other options
11 would likely be more effective. Property tax relief, development
12 grants, and infrastructure improvements would all have more success
13 in cultivating the solar energy industry in Arizona. Such incentive
14 methods do not involve extracting penalties from Energy Providers
15 and consumers—an approach that is completely at odds with the trend
16 of less governmental intervention in commerce. Moreover, I have
17 serious doubts that the “penalty” in the proposed Portfolio Standard
18 could be lawfully imposed or used to construct solar capacity (rather
19 than being applied to the State’s general fund).

20
21 **15.Q. WOULD YOU SUMMARIZE YOUR REBUTTAL**
22 **TESTIMONY?**

23 15.A. The comments and testimony submitted by a broad cross-section of
24 stakeholders support, or are consistent with, using a risk-limiting
25 dollar-driven standard, rather than higher risk energy-driven standard.
26 Many commenters advocate, or at least do not oppose, using existing
revenue sources such as SBCs to collect the funds for a renewable

1 energy program, rather than creating new funding mechanisms,
2 increasing consumers' bills, or presuming to appropriate any cost
3 savings resulting from electric competition.
4

5 Also, unlike an energy-driven percent of sales standard, a SBC-based
6 program limits both technology and financial risks for Energy
7 Providers and their customers, while still providing incentives to solar
8 technology vendors to supply cost-effective systems and develop new,
9 more efficient solar technologies. The advocates of a percent of sales
10 portfolio standard, on the other hand, do not consider the risks of
11 stranded investment and the impact this risk has on obtaining long-
12 term financing. Further, these parties' cost estimates are overly
13 optimistic—with solar vendors going so far as to claim that the
14 proposed Portfolio Standard will lower consumers' energy bills—yet
15 place all of the risk of not meeting expectations on Energy Providers
16 and customers, rather than on those that stand to directly benefit from
17 the Portfolio Standard.
18

19 These overly-optimistic claims and assumptions, in support of a
20 program that requires large investments in existing solar
21 technologies—which may well be obsolete in a few years—do not
22 justify a percentage of sales portfolio standard. Rather, a dollar-driven
23 program, such as the SBC-based program described in my Direct
24 Testimony, is the most reasonable compromise for implementing a
25 renewable energy program in Arizona.
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**16.Q. DOES THIS CONCLUDE YOUR WRITTEN REBUTTAL
TESTIMONY?**

16.A. Yes.