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IN THE MATTER OF THE APPLICATION OF ARIZONA PUBLIC SERVICE COMPANY FOR APPROVAL OF ITS 2012 RENEWABLE ENERGY STANDARD IMPLEMENTATION PLAN AND REQUEST FOR RESET OF RENEWABLE ENERGY ADJUSTOR.

DOCKET NO. E-01345A-11-0264

SUPPLEMENTAL COMMENTS OF WESTERN RESOURCE ADVOCATES

Western Resource Advocates (WRA) hereby submits supplemental comments on several components of Arizona Public Service Company's (APS') 2012 Renewable Energy Standard (RES) Implementation Plan. These comments address the benefits of renewable energy and the willingness of residential customers to pay for renewable energy.

Benefits of Renewable Energy

The RES and the resulting deployment of renewable energy provide significant benefits. These include:

- **A hedge against high gas prices.** In general, renewable resources displace gas generation. The price of renewable energy is stable in contrast to natural gas prices.¹ Further, the price of some renewable energy is currently competitive with gas generation. Figure 1 shows that the cost of APS' 2010 mix of non-distributed renewable energy purchased from third parties is

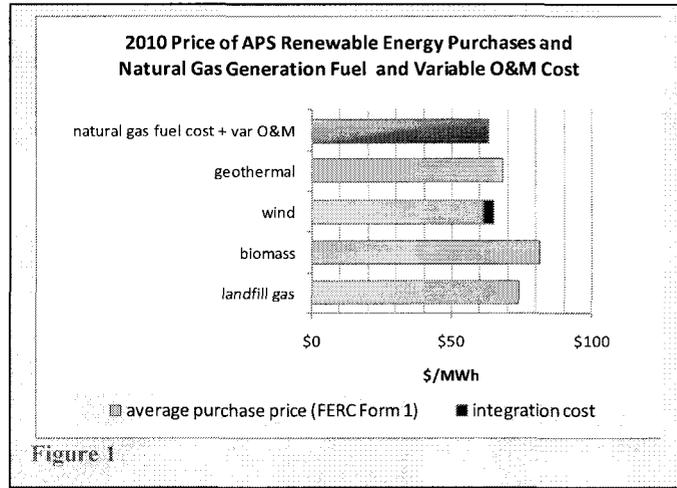


Figure 1

¹ Most of the cost of renewable energy projects is the capital cost. Except for some biomass projects, there is no fuel cost. Typical renewable energy power purchase agreements specify a schedule of charges over the term of the contract. This price stability contrasts with natural gas-fired generation in which a large portion of the costs is for fuel whose future prices are highly uncertain.

about the same as APS' fuel and variable O&M cost for natural gas generation in 2010.

- **Establishment of competitive renewable energy markets.** Prices of photovoltaics (PV) have been falling in the last several years, in part because of the RES which has created a robust market for distributed and non-distributed PV in Arizona. As a result, Arizona has some of the lowest cost residential PV systems in the country.² The cost decline is attributable to technological improvements, economies of scale in manufacturing and installation, learning by doing in manufacturing and installation, and vigorous market competition, among other factors.
- **No air emissions.** Conventional fossil fuel power plants emit carbon dioxide which contributes to climate change. Coal-fired power plants can also emit large quantities of sulfur dioxide, nitrogen oxides, mercury, and other pollutants. These emissions cause health impacts such as premature mortality, respiratory disease, and heart attacks, impair visibility, damage structures, crops, and timber, and harm wildlife. The costs of controlling air emissions can be large. In contrast to fossil fuels, most renewable resources have no air emissions and will not incur costs of controlling air emissions.

In sum, renewable energy provides benefits today and in the future. The RES enabled the market for renewable energy to develop in Arizona and has provided the foundation for greater benefits and additional deployment of renewable energy going forward.

Residential Customers' Willingness to Pay for the RES

At present, APS' residential customers pay up to a cap of \$4.05 per month for RES resources; this represents the above-market component or price premium for renewable energy. APS' nonresidential customers pay up to a cap of \$150.53 or \$451.60 per month, depending on whether they consume less or more than 3 MW. For 2012, APS has proposed a residential cap of \$5.43 to \$6.41 per month, depending on which proposed option is selected. The corresponding ranges of non-residential caps are \$201.84 to \$238.27 per month for customers under 3 MW, and \$605.53 to \$714.81 for larger customers. During 2010, the average APS residential customer paid \$1,521 for electricity (\$127/month on average).

WRA reviewed 10 studies of U.S. residential consumers' willingness to pay a premium for electricity obtained from renewable energy resources. A tabular summary of the findings is presented in Attachment A. The willingness to pay figures are presented in the year's dollars corresponding to the time the study was conducted and converted to 2011 dollars.

Many of the studies compared different methods for eliciting willingness to pay and for removing potential biases in responses. In these cases, a range of results is reported. Further, the studies vary in the way the findings are presented: for instance, some report average willingness to pay, and some report percentages of respondents willing to pay a specific price.

It may be argued that many willingness-to-pay studies are not conclusive because the respondents don't actually make any payments. Some studies try to remove biases associated

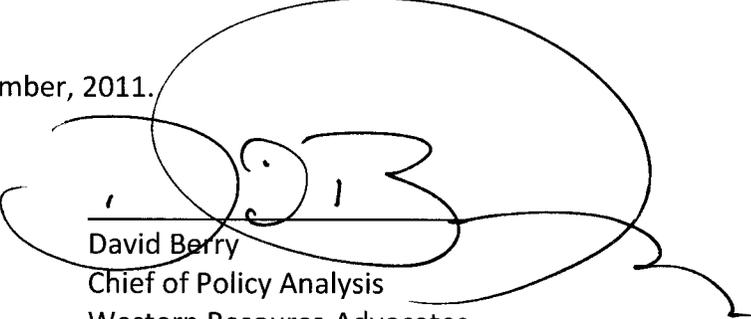
² Solar Energy Industries Association, *U.S. Solar Market Insight, 2010 Year in Review: Executive Summary*, p. 10.

with hypothetical situations by reminding respondents of their budget constraints or asking about the certainty of their responses. In the studies by Champ and Bishop and by Poe et al., respondents reporting that they would pay for renewable energy actually had to sign up for the renewable energy program and pay what they said they would be willing to pay.

There are several general conclusions about the magnitude of willingness to pay a premium for renewable energy:

1. **A monthly charge of about \$6 to \$12 for the RES would be reasonable for residential customers.** This corresponds to about 5% to 9% of the 2010 average monthly APS residential bill. The 2011 survey conducted by Public Opinion Strategies and Fairbank, Maslin, Maullin, Metz & Associates indicates that 56% of Arizona voters are willing to pay at least \$10 more per month for renewable energy. A similar 2007 Arizona poll found 65% of respondents willing to pay at least a \$10 premium per month for renewable energy. In a Colorado study, 55% of respondents were willing to pay at least about \$12 per month more for renewable energy (in 2011 dollars).³
2. There is a range of consumer interest in renewable energy programs. Some customers are willing to pay nothing for renewable energy and others are willing to pay \$20 a month or more for renewable energy.
3. Finally, in Arizona, "There is broad support for the development of renewable energy – particularly solar power" (Morrison Institute, p. 2). Additionally, the 2011 survey conducted by Public Opinion Strategies and Fairbank, Maslin, Maullin, Metz & Associates (p. 1) states that its "results show a strong voter preference for transitioning away from coal and increasing the use of clean, renewable energy to meet Arizona's future electricity needs."

Respectfully submitted this 13th day of September, 2011.



David Berry
Chief of Policy Analysis
Western Resource Advocates
PO Box 1064
Scottsdale, AZ 85252-1064

Original and 13 copies submitted to Docket Control
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, AZ 85007
Electronic copies to parties of record.

³ When asked, respondents tend to favor mandatory renewable energy programs over voluntary ones. A Texas study (Sloan and Taddune) found that 71% of respondents preferred that all customers pay for renewable energy instead of having only voluntary payments. In Colorado, Applebaum and Cuciti found that 67% of respondents believed that all customers should pay for renewable energy.

ATTACHMENT A

Summary of Studies of Residential Customers' Willingness to Pay for Renewable Energy

Study, year, & location	Sample size, good to be valued	Willingness to pay (WTP) premium on monthly bill in nominal \$	WTP premium on monthly bill in 2011 \$	Notes
Public Opinion Strategies et al., 2011, AZ	600 interviews of registered voters, renewable energy	<ul style="list-style-type: none"> 34% willing to pay \$15 or more 22% willing to pay \$10 14% willing to pay \$5 	<ul style="list-style-type: none"> 34% willing to pay \$15 or more 22% willing to pay \$10 14% willing to pay \$5 	<ul style="list-style-type: none"> 56% willing to pay \$10 or more (34% + 22%) WTP depends on income levels (higher income willing to pay more)
Public Opinion Strategies, 2007, AZ	600 interviews of registered voters, renewable energy	<ul style="list-style-type: none"> 41% willing to pay \$15 or more 24% willing to pay \$10 13% willing to pay \$5 	<ul style="list-style-type: none"> 41% willing to pay \$16 or more 24% willing to pay \$11 13% willing to pay \$5 	<ul style="list-style-type: none"> 65% willing to pay \$11 or more (41% + 24%) in 2011 \$
Whitehead and Cherry, 2002, North Carolina	353 respondents, renewable energy	Median WTP: <ul style="list-style-type: none"> For small air quality improvement: \$4.24 to \$10.43 For moderate air quality improvement: \$10.89 to \$29.56 For major air quality improvement: \$12.62 to \$35.27 	Median WTP: <ul style="list-style-type: none"> For small air quality improvement: \$5.14 to \$12.65 For moderate air quality improvement: \$13.21 to \$35.85 For major air quality improvement: \$15.30 to \$42.77 	<ul style="list-style-type: none"> Ranges reflect method of removing biases in responses
Applebaum and Cuciti, 2003, Colorado	602 respondents, renewable energy	<ul style="list-style-type: none"> Average WTP = \$10 31% willing to pay \$15 or more 24% willing to pay \$10 to \$15 	<ul style="list-style-type: none"> Average WTP = \$11.87 31% willing to pay \$17.81 or more 24% willing to pay \$11.87 to \$17.81 	<ul style="list-style-type: none"> 55% (=31% + 24%) willing to pay at least \$11.87 (in 2011 dollars)
Poe et al., prior to 2001, New York	714 completed surveys, landfill gas and tree planting	<ul style="list-style-type: none"> 20% of respondents actually paid \$6 per month 16% to 21% of respondents not required to actually pay for green power reported they were willing to pay \$6 Average WTP on open ended version of survey = \$4.94 	<ul style="list-style-type: none"> 20% of respondents actually paid \$7.56 per month 16% to 21% of respondents not required to actually pay for green power reported they were willing to pay \$7.56 Average WTP on open ended version of survey = \$6.23 	<ul style="list-style-type: none"> A subsample of respondents was signed up for the program if they said they were willing to pay \$6 per month Study also analyzed different methods for eliciting WTP

Summary of Studies of Residential Customers' Willingness to Pay for Renewable Energy (continued)

Study, year & location	Sample size, good to be valued	Willingness to pay (WTP) premium on monthly bill in nominal \$	WTP premium on monthly bill in 2011 \$	Notes
Champ and Bishop, about 2001, Wisconsin	898 respondents, wind energy	Average WTP: \$3 to \$6.75	<ul style="list-style-type: none"> Average WTP: \$3.70 to \$8.32 	<ul style="list-style-type: none"> Range reflects how choices presented Respondents actually paid amount bid
Wiser, 2001, US	1574 respondents, renewable energy	% willing to pay: <ul style="list-style-type: none"> \$3 per month: 50%-60% \$8 per month: ~40% 	% willing to pay: <ul style="list-style-type: none"> \$3.70 per month: 50%-60% \$9.86 per month: ~40% 	WTP applies to a 3 year subscription to renewable energy purchase
Morrison Institute, 2010, AZ	184 participants, renewable energy & cleaner environment	For renewable energy: <ul style="list-style-type: none"> 60% willing to pay premium of 10% or more 43% willing to pay 20% premium 31% willing to pay nothing 	For renewable energy: <ul style="list-style-type: none"> 60% willing to pay premium of 10% or more 43% willing to pay 20% premium 31% willing to pay nothing 	Bimodal distribution: many respondents not willing to pay anything, many willing to incur 20% premium on bill
Farhar, 1995-1997, 5 western and southwestern states	Summary of 14 surveys conducted by utilities, renewable energy	On average (across the studies): <ul style="list-style-type: none"> 70% willing to pay at least \$5 per month for renewable energy 38% willing to pay at least \$10 per month for renewable energy 21% willing to pay at least \$15 per month for renewable energy 	On average (across the studies): <ul style="list-style-type: none"> 70% willing to pay at least \$6.72 per month 38% willing to pay at least \$13.44 per month 21% willing to pay at least \$20.17 per month 	
Bird and Sumner, 2009, US	green power purchases	Residential green power purchases (utility programs): <ul style="list-style-type: none"> Average premium in 2009: \$0.0175/kWh Average green power purchases in 2009: 5100 kWh/year Average monthly premium: \$7.44 	Residential green power purchases (utility programs): <ul style="list-style-type: none"> Average premium in 2009: \$0.0178/kWh Average green power purchases in 2009: 5100 kWh/year Average monthly premium: \$7.58 	<ul style="list-style-type: none"> Data pertain to actual voluntary green power purchases via utility green pricing programs On average, only about 2% of all utility customers participate in green pricing programs

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