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7 **BEFORE THE ARIZONA CORPORATION COMMISSION**

8 KRISTIN K. MAYES, CHAIRMAN
9 GARY PIERCE
10 PAUL NEWMAN
11 SANDRA D. KENNEDY
12 BOB STUMP

13 IN THE MATTER OF THE APPLICATION
14 OF ARIZONA PUBLIC SERVICE
15 COMPANY FOR A HEARING TO
16 DETERMINE THE FAIR VALUE OF THE
17 UTILITY PROPERTY OF THE COMPANY
18 FOR RATEMAKING PURPOSES, TO FIX A
19 JUST AND REASONABLE RATE OF
20 RETURN THEREON, TO APPROVE RATE
21 SCHEDULES DESIGNED TO DEVELOP
22 SUCH RETURN

Docket No. E-01345A-08-0172

**NOTICE OF FILING TESTIMONY
OF DAVID BERRY, WESTERN
RESOURCE ADVOCATES IN
SUPPORT OF SETTLEMENT
AGREEMENT**

Arizona Corporation Commission

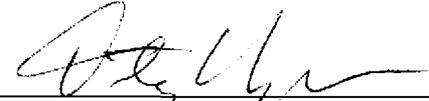
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22 The Western Resource Advocates ("WRA"), through its undersigned counsel,
23 hereby provides notice that it has this day filed the testimony of David Berry in support
24 of the settlement agreement in connection with the above-captioned matter.
25

1 DATED this 1st day of July, 2009.

2 ARIZONA CENTER FOR LAW IN
3 THE PUBLIC INTEREST

4 By 
5 Timothy M. Hogan

6 202 E. McDowell Rd., Suite 153

7 Phoenix, Arizona 85004

8 Attorneys for Western Resource Advocates

9 ORIGINAL and 13 COPIES of
10 the foregoing filed this 1st day
11 of July, 2009, with:

12 Docket Control
13 Arizona Corporation Commission
14 1200 W. Washington
15 Phoenix, AZ 85007

16 COPIES of the foregoing
17 electronically transmitted
18 this 1st day of July, 2009 to:

19 All Parties of Record
20
21
22
23
24
25



BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

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GARY PIERCE
PAUL NEWMAN
SANDRA D. KENNEDY
BOB STUMP

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FOR A HEARING TO DETERMINE THE
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OF THE COMPANY FOR RATEMAKING
PURPOSES, TO FIX A JUST AND
REASONABLE RATE OF RETURN
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SCHEDULES DESIGNED TO DEVELOP
SUCH RETURN.

DOCKET NO. E-01345A-08-0172

Testimony in Support of the Settlement Agreement

David Berry

Western Resource Advocates

July 1, 2009

**Testimony of David Berry
APS Rate Case Settlement
Docket No. E-01345A-08-0172**

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1 **Introduction**

2

3 Q. Please state your name and business address.

4

5 A. My name is David Berry. My business address is P.O. Box 1064, Scottsdale, Arizona 85252-
6 1064.

7

8

9 Q. By whom are you employed and in what capacity?

10

11 A. I am Senior Policy Advisor for Western Resource Advocates.

12

13

14 Q. Please describe Western Resource Advocates.

15

16 A. Founded in 1989, Western Resource Advocates (WRA) is a non-profit environmental law
17 and policy organization dedicated to restoring and protecting the natural environment of
18 the Interior American West. We have developed strategic programs in three areas: water,
19 energy, and lands. We meet our goals in collaboration with other environmental and
20 community groups and by developing solutions that are appropriate to the environmental,
21 economic and cultural framework of the region. Western Resource Advocates has been
22 involved in Arizona utility regulatory issues for about 20 years.

23

24

25 Q. What are your professional qualifications for presenting testimony in this docket?

26

27 A. Exhibit DB-1 summarizes my qualifications.

28

29

30 Q. Did you file direct testimony in this case?

31

32 A. No. Carolyn Stewart filed direct testimony on behalf of WRA in December 2008, dealing
33 with demand response tariffs.

34

35

36 Q. What is the purpose of your testimony?

37

38 A. I am testifying on behalf of WRA and address those portions of the settlement agreement
39 pertaining to renewable energy and demand response. I also provide responses to
40 Chairman Mayes' June 9th questions on these issues.

41

42

43 Q. Did you participate in the settlement discussions?

1
2 A. Yes. I participated in nearly all the meetings and worked with other parties to develop
3 specific provisions of the agreement.
4

5
6 **Renewable Energy**
7

8 Q. What role will clean energy resources play in Arizona's future?
9

10 A. Clean energy resources are those that emit little or no pollutants into the atmosphere, can
11 be supplied on a sustained basis over the long run, and in some cases, use little or no water
12 to produce electricity. These resources include various renewable energy technologies and
13 energy efficiency. Several recent analyses indicate that renewable energy and energy
14 efficiency could comprise the majority of resources needed to meet the growth in demand
15 for electric energy services over the next 5 to 10 years or longer.¹
16

17
18 Q. What are the benefits of clean energy resources?
19

20 A. These resources have several important benefits:
21

- 22 • Renewable resources typically have fixed or stable costs. These fixed or stable costs
23 provide a hedge against volatile and uncertain fossil fuel prices for natural gas or coal-
24 fired power plants.
25 • Renewable resources typically have little or no air emissions, unlike conventional power
26 plants that burn fossil fuels. Thus, renewable resources reduce air pollution and
27 consequently reduce the health and environmental impacts of fossil fuel combustion.
28 Moreover, because they emit little or no carbon dioxide, sulfur dioxide, nitrogen oxides,
29 mercury, or particulate matter, renewable resources would not incur the costs of
30 controlling these emissions in contrast to fossil-fueled power plants.
31 • Cost effective energy efficiency has stable prices, little or no air emissions, and costs less
32 than conventional generation.²
33

34
35 Q. What provisions does the agreement contain that advance the role of renewable energy in
36 Arizona?
37

¹ Western Resource Advocates, *A Clean Electric Energy Strategy for Arizona*, Boulder, CO: 2007. Arizona Public Service Company, *Resource Plan Report*, January 29, 2009, filed in Docket No. E-01345A-09-0037.

² Other parties, including SWEEP, address energy efficiency aspects of the settlement agreement.

1 A. The agreement provides that APS obtain about 10% of its **energy needs** from renewable
2 resources by 2015. This is approximately double the Renewable Energy Standard (RES)
3 requirement that 5% of **retail sales** be obtained from renewable resources by 2015.
4

5 Under the terms of the settlement, Section XV, APS is to make its best efforts to acquire
6 new renewable energy resources with annual generation or savings of 1,700,000 MWh to
7 be in service by the end of 2015. These new resources are in addition to: (a) resources APS
8 had in place as of the end of 2008, and (b) resources which APS had committed to by the
9 end of 2008. Exhibit DB-2 presents information on existing, committed, and new resources
10 in more detail. Exhibit DB-3 shows the mix of renewable resources APS would have in 2015.
11 The sum of the energy output of the new renewable resources and the existing and
12 committed renewable energy resources is approximately the amount of renewable energy
13 inherent in APS' resource plan for the year 2015.
14

15 APS' resource plan proposes a reasonable acceleration of the deployment of renewable
16 resources through 2015 and it is consistent with WRA's analysis of the role of renewable
17 energy in Arizona in the next few years.³ The settlement agreement obligates APS to
18 implement its resource plan with respect to renewable energy through 2015.
19

20 The new renewable resources include both distributed and non-distributed projects. APS is
21 to report to the Commission on its plans for and progress toward acquiring the new
22 renewable energy resources in its Renewable Energy Standard Implementation Plans and
23 Compliance Reports and in future resource planning filings.
24

25 The agreement specifies some (not all) of the new resources APS will seek to acquire:
26

- 27 • A utility scale photovoltaic project. Central station photovoltaic projects are being
28 installed worldwide. For example, there are recent projects of 40 MW or larger in Spain,
29 Germany, and Portugal and a 30 MW photovoltaic plant is planned for service starting in
30 2010 by Tri-State in New Mexico.
- 31 • In-state wind energy.⁴
- 32 • A solar energy program for on-site projects at grade K through 12 public schools.
33 Projects could include photovoltaics, solar hot water, and day-lighting. The program

³ In our Clean Energy Strategy report, we proposed that about 10.5% of the state's (not just APS') 2015 energy needs come from renewable energy: Western Resource Advocates, *A Clean Electric Energy Strategy for Arizona*, Boulder, CO: 2007.

⁴ There is already one commercial scale wind energy project under construction in Arizona – the 63 MW Dry Lake project which will sell its energy to Salt River Project. According to the *Arizona Republic*, May 12, 2009, the capacity factor at the Dry Lake project would be about 24% which is considerably lower than the typical western wind energy project which has a capacity factor of about 35%. In general, projects with higher capacity factors have lower costs per MWh.

1 goal is to install projects producing 50,000 MWh per year of energy savings or
2 generation within 36 months of program approval by the Commission. This program
3 will be developed so that up-front customer costs are eliminated, thereby making it
4 easier for schools to participate. APS is to consider a request for proposals by project
5 developers to implement and install solar energy systems on multiple schools.

- 6 • A distributed solar energy program for government structures that reduces or
7 eliminates up-front customer costs.

8
9 The agreement also indicates that, following submission of the Biennial Transmission
10 Assessment report required by Decision No. 70635, APS will commence planning and
11 permitting for siting one or more new transmission lines or upgrades intended to facilitate
12 delivery of renewable energy to APS and will construct these lines or upgrades after
13 satisfactory permitting and authorizations are obtained.

14
15
16 Q. Has APS announced any other new renewable energy projects since the settlement
17 agreement term sheet was filed on May 4, 2009?

18
19 A. Yes. On May 22, 2009, APS announced a purchased power agreement to obtain solar
20 energy for 30 years from the 290 MW Starwood Solar I plant with thermal storage which is
21 expected to be available for service in 2013.

22
23
24 Q. How will the Commission review specific projects planned by APS?

25
26 A. In general, APS will either bring specific projects to the Commission for review, including
27 those identified in the settlement agreement, or will include resources in its Renewable
28 Energy Standard implementation plans, filed pursuant to A.A.C. R14-2-1813, that will be
29 reviewed by the Commission. For example, on May 22, 2009, APS filed an application
30 regarding the Starwood Solar project in Docket No. E-01345A-09-0261.

31
32
33 Q. How will APS recover the costs of renewable energy projects?

34
35 A. Typically, APS would recover costs through its Renewable Energy Standard (RES) tariff and
36 the Power Supply Adjustor.⁵ Transmission costs may be recovered through the
37 Transmission Cost Adjustor.

38
39

⁵ The current practice is that the RES tariff recovers costs in excess of the market cost of comparable conventional generation and the remainder of the cost is recovered through the Power Supply Adjustor.

1 Q. What are new central station renewable energy technologies likely to cost?
2

3 A. The market prices of central station renewable energy and conventional generation change
4 over time, sometimes rather rapidly. Exhibit DB-4 shows WRA's current estimates of the
5 costs of utility scale central station renewable energy projects obtained under long term
6 purchased power agreements and, for comparison, costs of new conventional generation.
7 The costs of conventional generation are highly dependent on fossil fuel price forecasts and
8 such forecasts have proven to be unreliable in the past. Thus, there is great uncertainty
9 about future conventional generation costs. Also, the Exhibit assumes that complying with
10 greenhouse gas emission regulations will cost \$30 per metric ton of carbon dioxide
11 equivalent. In general, wind and geothermal energy are very cost competitive today.
12

13
14 Q. Please provide an overview of the on-site solar energy projects for schools required by the
15 settlement agreement.
16

17 A. The solar energy projects could include photovoltaics (PV), solar hot water systems, and
18 daylighting. The energy production or savings for schools contemplated by the settlement
19 agreement is 25% to 30% of APS' nonresidential distributed energy requirement in 2013.
20

21 School power needs are greatest in the early afternoon and therefore PV systems could
22 contribute significantly to lowering a school's grid power purchases. According to APS'
23 response to the Arizona School Boards Association First Data Request, a typical high school's
24 maximum load at noon in 2007 was 895 kW. The maximum load occurs at 1:00 or 2:00 p.m.
25 (slightly over 900 kW) in August. The typical elementary school maximum load at noon in
26 2007 was 292 kW and the peak load was at 2:00 pm (321 kW) in August.⁶
27

28 Innovations in financing PV projects for tax exempt non-residential site hosts are resulting in
29 a variety of possible ownership and payment arrangements that eliminate up-front
30 customer costs.⁷ One possible arrangement is a service contract (purchased power
31 agreement) where a third party owns the PV system and the site host (a school in this case)
32 buys all the electricity generated over a specified time period. The project developer owns
33 or leases the PV system and operates and maintains the system. The school pays only for
34 electricity actually delivered. The project developer or tax investors retain the project's tax
35 incentives and reflect those tax benefits in the price of the electricity. APS' portion of the
36 cost would be any performance or capacity incentive that lowers the cost of the project to

⁶ A large scale PV program has been implemented in the San Jose, CA Unified School District which completed a 5.5 MW solar energy project at 14 district sites: "San Jose Dedicates Largest School District Solar Power Project in U.S." www.pv-tech.org/lib/printable/4621/, February 5, 2009.

⁷ Mark Bolinger, *Financing Non-Residential Photovoltaic Projects: Options and Implications*, Lawrence Berkeley National Laboratory, LBNL-1410E, January 2009.

1 the schools and any administrative costs associated with the schools solar energy program.
2 The settlement agreement allows APS and developers flexibility in designing a program with
3 input from schools and the solar energy industry, and thus does not specify what incentive
4 APS is to offer.

5
6 Lastly, the settlement agreement contemplates that Stimulus Funding may be available to
7 help pay for the school solar energy program.
8
9

10 Demand Response

11
12 Q. What are demand response programs?

13
14 A. The Federal Energy Regulatory Commission (FERC) defines demand response as actions by
15 customers to change their consumption of electric power in response to price signals,
16 incentives, or directions from grid operators.⁸ The FERC explains that demand response is
17 typically an active response to prices or incentive payments. Changes in electricity use are
18 short term and centered on critical hours of the day or year when demand is high or system
19 reliability is jeopardized. Demand response programs are intended to reduce customer
20 usage during these critical periods.
21
22

23 Q. What provisions does the settlement agreement include regarding demand response
24 programs?
25

26 A. The settlement agreement includes an optional super peak time of use rate for residential
27 customers and optional critical peak pricing programs for residential and nonresidential
28 customers. The super peak pricing program charges a very high rate during the period from
29 3:00 p.m. to 6:00 p.m. on weekdays from June through August (the super peak period).
30 However, off-peak rates are lower than off-peak rates under residential time of use rate ET-
31 2, so participating customers could save money by shifting load to off-peak hours. With
32 critical peak pricing, APS notifies participating customers of critical events. Critical events
33 may be called for the afternoon and early evening on summer weekdays and would occur as
34 a result of severe weather, high loads, high wholesale prices, or major generation or
35 transmission outages. *The number and hours of critical events are limited by the terms of*
36 *the rate schedules.* Energy used during critical events is charged at a very high rate,
37 thereby discouraging customers from using electricity during a critical event. As an
38 incentive to customers to participate in critical peak pricing programs, APS offers a discount
39 to the customer's total monthly kWh during the summer. It is unknown how attractive the

⁸ Federal Energy Regulatory Commission, *Assessment of Demand Response and Advanced Metering*, Staff Report, Docket AD06-2-000, August 2006, p. 5.

1 proposed rate designs will be to customers, how much demand will be reduced, and how
2 much energy consumption will be shifted to other time periods.
3
4

5 Q. Does the settlement agreement adopt WRA's recommendations on demand response
6 programs?
7

8 A. Yes, the agreement adopts Carolyn Stewart's two recommendations. First, the agreement
9 requires that demand response programs be offered and marketed jointly with energy
10 efficiency programs to increase the chance that participants also save energy. By offering
11 the demand response and energy efficiency programs together, APS will increase the
12 benefits of its demand side management activities for both itself and its customers.
13 Second, the agreement requires APS to prepare a study on the impacts of demand response
14 rates on the mix of power generation sources, and to determine whether more coal-fired
15 generation is used as a result of these rates. The study will include estimates of impacts of
16 the new rate schedules on air emissions including carbon dioxide, sulfur dioxide, nitrogen
17 oxides, particulate matter, and mercury. APS is to also analyze the impacts of the demand
18 response rates on overall energy usage for participants and identify methods to better
19 integrate its demand response and energy efficiency programs. Finally, the study will
20 analyze the benefits of the demand response rates, taking into account avoided or deferred
21 generating capacity costs and fuel and other variable cost savings.
22
23

24 **Matters Raised by Chairman Mayes**
25

26 Q. In her letter dated June 9, 2009, Chairman Mayes raised several matters related to
27 renewable energy and energy efficiency. The first matter deals with APS' new utility-scale
28 photovoltaic energy project: whether the solar plant referenced in the term sheet is the
29 Starwood solar project, whether it is one of the other projects identified in APS' resource
30 plan, and whether it goes beyond projects previously identified by the Company. Chairman
31 Mayes also asked why, if the utility scale photovoltaic project is already in APS' resource
32 plan, is it considered a benefit in the settlement agreement? Please respond to Chairman
33 Mayes' questions on this project.
34

35 A. This planned utility-scale photovoltaic project is not the Starwood concentrating solar
36 power plant. (See Exhibits DB-2 and 3). APS' resource plan does not identify specific
37 projects but deals with renewable energy additions generically. The utility-scale
38 photovoltaic project is contained within the overall renewable energy target for 2015
39 incorporated in the resource plan but is not specifically identified in the resource plan.
40

41 The benefits of the renewable energy goals in the settlement agreement are that: (1) APS'
42 renewable energy plans through 2015 are reasonable, (2) the agreement commits APS to
43 implement its resource plan with regard to renewable energy through 2015, and (3) the

1 agreement identifies some specific projects that were characterized generically in the
2 resource plan.
3
4

5 Q. The second matter deals with the time frame for an in-state wind energy project, the
6 process for selecting an in-state wind generation project, and whether the project would be
7 constructed. Please address these issues.
8

9 A. The settlement agreement indicates that APS will issue a new request for proposals for in-
10 state wind generation within 90 days of Commission approval of the Agreement. Within
11 180 days of issuing the RFP, APS will file a request for Commission approval of one or more
12 such projects. I expect that APS would proceed with in-state wind energy projects if the
13 Commission approved the projects. As I noted above, if the projects have relatively low
14 capacity factors, as the Dry Lake project does, then the cost per MWh would be higher.
15
16

17 Q. Chairman Mayes asked whether the Parties believe that it is in the public interest to adopt
18 the RES in this case and whether the Parties would object to the Commission requiring that
19 APS exceed the RES standard in this case by setting a goal of 8.813 million MWh of
20 renewable energy by 2025. What is WRA's position on these matters?
21

22 A. Section 15.8 of the settlement agreement indicates that APS supports the current RES and
23 commits to the renewable energy goals inherent in the settlement agreement. We
24 negotiated provisions that exceed RES requirements through 2015. It would very difficult to
25 plan with any precision for years after 2015 at this time and the agreement does not
26 address renewable energy additions after 2015.
27

28 As for setting a renewable energy goal for 2025 in excess of the existing RES target, there
29 are two fundamental issues that the Commission must consider. **First** is whether a higher
30 target is in the public interest. WRA supported a higher target in the rulemaking process
31 leading to the RES.⁹ A higher target has several benefits, including the following:
32

- 33 • Renewable energy, along with energy efficiency, are the two most important
34 components of the new energy paradigm for serving Arizona consumers over the
35 long run.
- 36 • Renewable energy is, in general, stably priced in contrast to fossil-fueled power
37 generation which suffers from considerable uncertainty about future fuel prices.
- 38 • Renewable energy has little or no air emissions. Complying with existing and future
39 regulations of carbon dioxide, mercury, sulfur dioxide, and nitrogen oxide

⁹ See comments filed in Docket No. RE-00000C-05-0030, February 17, 2005.

1 emissions from fossil-fueled power plants has large, uncertain costs. Renewable
2 energy will not, in general, incur these costs.

- 3 • Particulate matter resulting from coal-fired power production imposes large health
4 costs on the nation, including premature mortality, various respiratory diseases,
5 and heart attacks.

6
7 The **second** issue is whether this rate case is the proper forum for setting a higher
8 renewable energy target for 2025. Some stakeholders (for example, renewable energy
9 contractors and developers) are not parties to the current APS rate case and they should
10 have the opportunity to address changes in the renewable energy goals. Additionally, there
11 are many factors that should be carefully weighed in selecting a higher target, whether it is
12 the one proposed by Chairman Mayes or another target. For example, to reduce the
13 impacts of climate change it will be necessary to dramatically reduce carbon dioxide
14 emissions in absolute terms, not just reduce the increase in emissions. Therefore, existing
15 coal-fired power plants will have to be retired and replaced with clean energy resources or
16 the carbon dioxide emissions from existing coal-fired power plants will have to be captured
17 and safely stored. A new renewable energy target, whether established as a new RES or in
18 a resource planning context, should consider retirement of existing coal plants. I believe
19 that the Commission should address a higher target for APS and perhaps other utilities in a
20 separate proceeding where the pertinent factors can be explicitly considered and a solid
21 basis for a new standard can be established.

22
23 In sum, in the context of the current rate case, WRA supports the settlement agreement.
24 Beyond the scope of the settlement agreement and this rate case, WRA continues to
25 support the use of renewable energy above the level of the RES target for 2025.

26
27
28 Q. Chairman Mayes also asked whether the 1.7 million MWh of additional renewable energy
29 to be acquired is above and beyond or part of the 400 MW referenced in APS' resource plan
30 and whether the 1.7 million MWh exceeds the Company's announcement, in connection
31 with the Starwood Solar project, that it would achieve nearly double the RES standard by
32 2015. If the Company's pre-existing plan was to double the RES requirements by adding an
33 additional 1.7 million MWh of renewable energy, should the Commission consider this a
34 benefit to consumers in this case?

35
36 A. The 1.7 million MWh of additional renewable energy contemplated by the settlement
37 agreement plus existing and committed renewable resources are consistent with and reflect
38 the level renewable resources shown in APS' load and resources table in its resource plan
39 for 2015. Note that the MW shown in the load and resources table are not nameplate MW,
40 but APS' projection of the capacity credits of a generic mix of renewable resources.

41

1 The 1.7 million MWh of additional renewable resources plus existing and committed
2 renewable resources are the means by which the Company would nearly double the RES
3 standard by 2015. The 1.7 million MWh is not on top of the goal of approximately doubling
4 the RES requirement by 2015.

5
6 As noted above, the benefits of the renewable energy goals in the settlement agreement
7 are that APS' renewable resource plans through 2015 are reasonable, that the agreement
8 commits APS to carry out its resource plan, with regard to renewable resources, through
9 2015, and that the agreement identifies some specific projects that were characterized
10 generically in the resource plan.

11
12
13 Q. Chairman Mayes asked the Parties to consider whether it would be in the public interest to
14 require APS to adopt a pilot feed-in tariff to encourage the rapid adoption of solar energy by
15 Arizona business or in areas of the state where APS projects that significant growth will
16 occur. Please comment in this matter.

17
18 A. A feed-in tariff is one tool for encouraging renewable energy. Feed-in tariffs are used in
19 Europe and Canada and apply to central station and distributed renewable energy
20 resources. Feed-in tariffs may offer project owners large payments for delivering renewable
21 energy. A feed-in tariff could be targeted toward specific market segments if the
22 Commission's goals for those market segments are not being met using competitive
23 bidding, performance based incentives, other incentives, or other resource acquisition
24 techniques.

25
26 A feed-in tariff appears to be similar to APS' current performance based incentives for large
27 distributed energy projects. The current performance incentives depend on the length of
28 the contract (10 to 20 years) and duration of payments – the maximum payments vary from
29 \$0.180 per kWh to \$0.250 per kWh.

30
31 The California Public Utilities Commission has established feed-in tariffs.¹⁰ The three largest
32 California utilities must offer a buy/sell option and an excess sale option. The feed-in tariff
33 applies to projects up to 1.5 MW for the larger utilities and up to 1.0 MW for other utilities.
34 Each utility is allocated a maximum amount of MW of eligible generation capacity subject to
35 the feed-in tariff. The price paid by the utility for renewable energy is based on California's
36 market price referent, adjusted by a time of day factor. Rates are set for a period of 10, 15,
37 or 20 years.

38
39 Gainesville Regional Utilities (GRU) in Florida recently implemented a solar feed-in tariff.
40 Among the features of the tariff are the following:
41

¹⁰ California Public Utilities Commission, Energy Division, Resolution E-4137, February 14, 2008.

- 1 • Eligibility is restricted to photovoltaic (PV) projects.
- 2 • Standardized 20 year contracts with fixed rates for purchasing kWh from eligible
- 3 projects are used.
- 4 • There are declining payment schedules over time, so that projects starting in, say,
- 5 2012, receive a lower payment rate than projects starting in 2009. The payment
- 6 rate for projects starting in 2009 for building or pavement mounted systems of any
- 7 size or ground mounted projects less than 25 kW is \$0.32 per kWh.
- 8 • GRU buys all the PV output.
- 9 • GRU retains renewable energy credits and environmental attributes.
- 10 • A program cap of 4 MW per year applies.

11
12 If the Commission desires to have APS undertake a feed-in tariff pilot program targeted to a
13 specific customer group, I recommend that it order APS to design and propose a pilot with
14 input from interested stakeholders and submit its proposal for Commission review in its July
15 2010 RES implementation plan.

16
17
18 Q. Chairman Mayes asked whether CWIP for renewable energy projects is considered in the
19 settlement agreement. Is it?

20
21 A. Yes. Section 15.7 states that APS will not seek to recover CWIP related to any of the
22 renewable energy projects required in Section 15 of the settlement agreement because APS
23 will be able to recover carrying costs on utility-owned renewable energy projects.

24
25
26 Q. Chairman Mayes asked whether it is in the public interest to require that any monetized
27 benefits associated with banked carbon credits accrue to ratepayers or be utilized to further
28 enhance APS' renewable energy infrastructure. She also asked whether it would be in the
29 public interest to create a carbon trust fund to ensure that ratepayers receive the full
30 benefit associated with carbon credits created by the RES or energy efficiency programs.
31 What is WRA's position on the treatment of carbon credits?

32
33 A. The credits resulting from APS' renewable energy projects and energy efficiency programs
34 might be used by APS in several ways.¹¹ If APS used the credits to meet its own emission
35 reduction obligations, it will avoid the costs of purchasing credits from others or the costs of
36 making physical changes to its resources to comply with carbon dioxide emission limits;
37 savings could be passed on through lower rates than would otherwise occur. If APS sold the
38 credits, assuming the current limitations on doing so were overcome, the revenues could be

¹¹ A.A.C. R14-2-1804 (E) states that if an affected utility trades or sells environmental pollution reduction credits or any other environmental attributes associated with kWh produced by an eligible renewable energy resource, the affected utility may not apply renewable energy credits derived from those kWh to satisfy the RES requirements.

1 counted against renewable energy and energy efficiency program costs or other costs as the
2 Commission directs, thereby benefiting ratepayers. If APS retired the credits, it would
3 accelerate emission reductions and benefit ratepayers and society in general through
4 improved environmental conditions. The Commission should evaluate a range of options in
5 another forum before setting a policy on how to best use emission credits associated with
6 the renewable energy and energy efficiency projects.
7
8

9 Q. Chairman Mayes asked how the energy efficiency goals incorporated in the settlement
10 agreement compare to the Parties' recommendations in the energy efficiency workshops.
11 How does the settlement compare with WRA's recommended efficiency goals?
12

13 A. WRA proposed efficiency targets of 1.25% of total energy resources to meet retail load for
14 2011 and 1.5% in 2012 in its proposed rule submitted on May 29, 2009 in Docket Nos. E-
15 00000J-08-0314 and G-00000C-08-0314. These recommendations are the same as in the
16 settlement agreement for those years.
17
18

19 Q. Chairman Mayes asked for comments on whether the same energy efficiency standard that
20 is being considered in the efficiency workshops could be adopted as part of this rate case.
21 What is WRA's view on this matter?
22

23 A. The settlement agreement states that if higher efficiency goals are adopted by the
24 Commission for 2010, 2011 or 2012 in another docket, then those higher goals will
25 supersede the goals listed in the settlement agreement, as will any higher performance
26 incentives.
27

28 Recommendation

29

30 Q. What is your recommendation regarding the settlement agreement?
31

32 A. I believe that the agreement is in the public interest. Of particular importance, it specifies
33 actions for advancing renewable energy and energy efficiency and for moving Arizona
34 toward a new energy economy. I recommend that the Commission approve the settlement
35 agreement.
36
37

38 Q. Does this conclude your testimony?
39

40 A. Yes

Exhibit DB-1

Qualifications of David Berry

Areas of Expertise

Energy, natural resource, and environmental economics and policy

Experience

Western Resource Advocates (Scottsdale, AZ), Senior Policy Advisor (2001 – present).

Navigant Consulting, Inc. (Phoenix, AZ), Senior Engagement Manager (1997-2001).

Arizona Corporation Commission (Phoenix, AZ), Chief Economist and Chief, Economics and Research (1985 – 1996).

Boston University Department of Urban Affairs and Planning, Lecturer (1981-1985).

Abt Associates, Inc. (Cambridge, MA), Senior Analyst (1979-1985).

University of Illinois Department of Urban and Regional Planning, Visiting Assistant Professor (1977-1979).

University of Pennsylvania Regional Science Department, Lecturer (1974 –1977).

Regional Science Research Institute (Philadelphia, PA), Research Associate (1972-1977).

U.S. Army (1969-1971).

Education

Ph.D. Regional Science, University of Pennsylvania

MA Regional Science, University of Pennsylvania

BA Geography, Syracuse University

Selected Articles & Papers

"Innovation and the Price of Wind Energy in the US," *Energy Policy* (forthcoming).

"The Impact of Energy Efficiency Programs on the Growth of Electricity Sales," *Energy Policy*, vol. 36 (September 2008): 3620-3625.

"Carbon Risk: Decentralized Risk Management Policy in the US Electric Industry," *Local Environment*, vol. 10. no. 3 (June 2005): 299-307.

"Renewable Energy as a Natural Gas Price Hedge: The Case of Wind," *Energy Policy*, vol. 33, no. 6 (April 2005): 799-807.

"The Market for Tradable Renewable Energy Credits," *Ecological Economics*, vol. 42, no. 3 (September 2002): 369-379.

(with Barbara Keene) "Contracting for Power," *Business Economics*, vol. 30 no. 4 (October 1995): 51-54.

(with Kim Clark) "House Characteristics and the Effectiveness of Energy Conservation Measures," *Journal of the American Planning Association*, vol. 61 (Summer 1995) 386-395.

"The Structure of Electric Utility Least Cost Planning," *Journal of Economic Issues*, vol. 26 (September 1992) 769-789.

- "U. S. Cogeneration Policy in Transition," *Energy Policy*, vol. 17 (October 1989) 471-484.
- "The Geographic Distribution of Governmental Powers: The Case of Regulation," *Professional Geographer*, vol. 39 (1987) 428-437.
- (with J. Andrew Stoeckle) "Decentralization of Risk Management: The Case of Drinking Water," *Journal of Environmental Management*, vol. 22 (1986) 373-388.
- (with Stephanie Wilson) "Untapped Labor in the Midwest," in Barry Checkoway and Carl Patton, eds., *The Metropolitan Midwest*, Urbana: University of Illinois Press (1985).
- "The Impact of Municipal Water Quality Improvements on Household Water Bills," *Water International*, vol. 10 (1985) 146-150.
- "Threats to American Cropland: Urbanization and Soil Erosion," in R. Platt and G. Macinko, eds., *Beyond the Urban Fringe*, Minneapolis: University of Minnesota Press (1983).
- "Population Redistribution and Conflicts in Land Use: A Midwestern Perspective," in C. Roseman et al. eds., *Population Redistribution in the Midwest*, Ames, Iowa: North Central Regional Center for Rural Development, Iowa State University (1982).
- "The Sensitivity of Dairying to Urbanization: A Study of Northeastern Illinois," *Professional Geographer*, vol. 31 (May 1979) 170-179.
- (with Susan Rees) "Location Decisions and Urban Revival: The East St. Louis Riverfront," *Geographical Perspectives*, no. 44 (Fall 1979) 15-29.
- "Effects of Urbanization on Agricultural Activities," *Growth and Change*, vol. 9 (July 1978) 2-8.
- (with Robert E. Coughlin and Thomas Plaut) "Differential Assessment of Real Property as an Incentive to Open Space Preservation and Farmland Retention," *National Tax Journal*, vol. 31 (June 1978) 165-179.
- (with Thomas Plaut) "Retaining Agricultural Activities Under Urban Pressures," *Policy Sciences*, vol. 9 (April 1978) 153-178.
- (with Gene Steiker) "An Economic Analysis of Transfer of Development Rights," *Natural Resources Journal*, vol. 17 (January 1977) 55-80.
- "Preservation of Open Space and the Concept of Value," *American Journal of Economics and Sociology*, vol. 35 (April 1976) 113-124.
- (with Gene Steiker) "The Concept of Justice in Regional Planning," *Journal of the American Institute of Planners*, vol. 40 (November 1974) 414-421.

Recent Reports

- Investment Risk of New Coal-Fired Power Plants*, Western Resource Advocates, 2008.
- A Clean Electric Energy Strategy for Arizona*, Western Resource Advocates, 2007.
- (with others) *Using Natural Gas More Efficiently*, Western Resource Advocates, 2005.
- (with John Nielsen, Ron Lehr, Susan Innis, et al.) *A Balanced Energy Plan for the Interior West*, Western Resource Advocates, 2004.

Testimony and Public Comment Before:

Maine Land Use Regulation Commission
 Arizona Corporation Commission
 New Mexico Public Regulation Commission
 Public Utilities Commission of Nevada

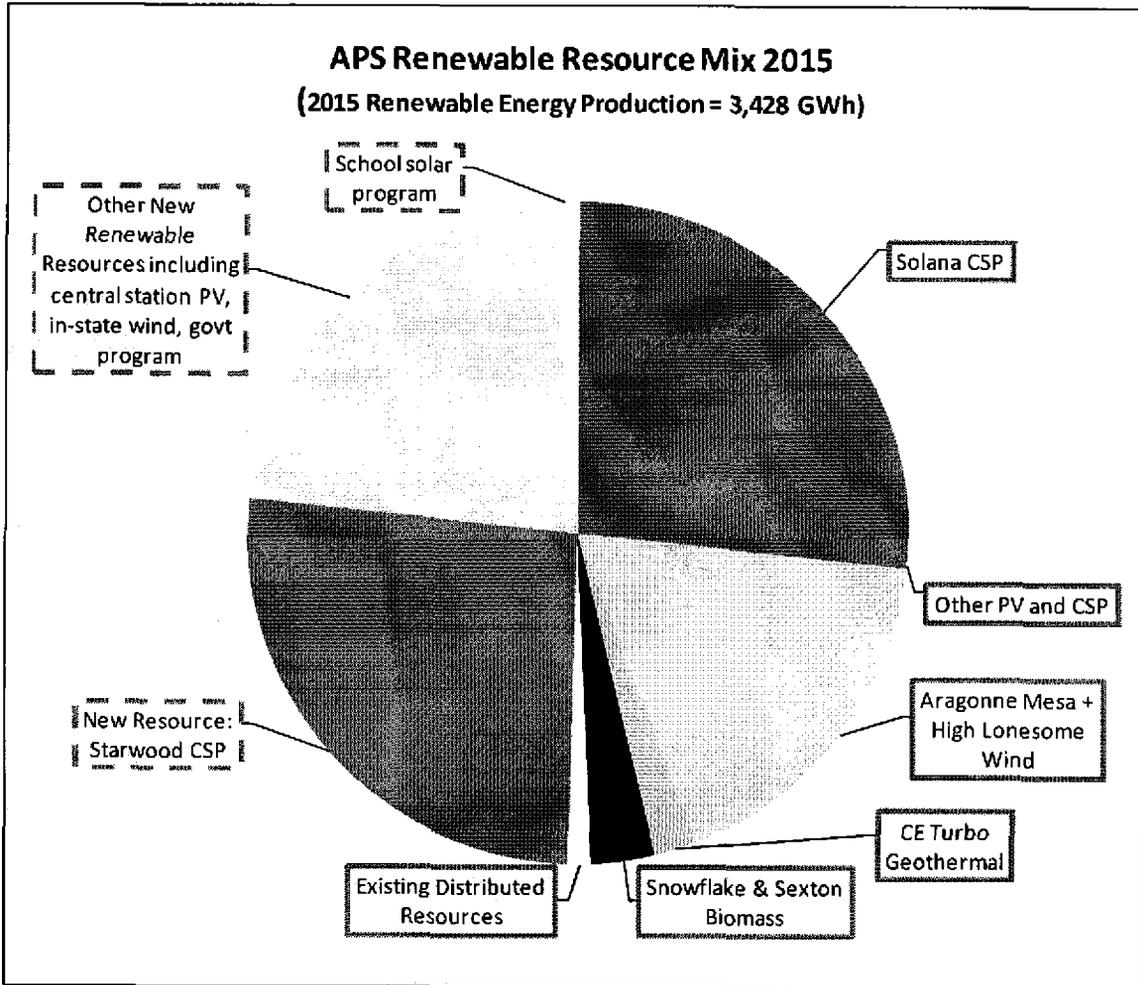
Exhibit DB-2
Summary of APS Renewable Resources

Status	Project/Plans	Start of Service to APS	Annual MWh
Existing and Committed*	Aragonne Mesa Wind	2006	298,455
	High Lonesome Wind	2009	300,000
	CE Turbo Geothermal	2006	71,545
	Snowflake Biomass	2008	86,000
	Sexton Biomass	2009	21,000
	Solana Concentrating Solar Power	2012	903,000
	Other APS owned photovoltaics and concentrating solar power	various	10,243
	Distributed energy	various	37,634
	Subtotal Existing and Committed Projects		1,727,877
New	New Renewable Resources Target in Settlement Agreement includes: <ul style="list-style-type: none"> • Starwood Solar I (announced May 22, 2009): ~900,000 MWh per year; on-line in 2013 • Central station PV and wind projects incorporated in settlement agreement • Distributed solar energy projects at schools and government institutions incorporated in settlement agreement • Other projects not yet announced 	By 12/31/2015	1,700,000
Total	Total Annual Renewable Energy	By 12/31/2015	3,427,877
	APS Resource Plan Own Load Energy Requirements**	2015	34,996,800

* APS Renewable Energy Standard Annual Compliance Report for the Calendar Year Ending December 31, 2008, filed in Docket No. E-01345A-07-0468, April 1, 2009. Actual 2008 MWh for Aragonne Mesa, CE Turbo, and other APS owned photovoltaics and concentrating solar power, excluding multipliers. Actual annualized 2008 MWh plus reservations for distributed energy, excluding multipliers. Energy production for other projects reflects APS' projected annual production.

** APS Resource Plan Report, Appendix 1, Table 5. These requirements will be met by central station generation, distributed generation, and energy efficiency. Energy requirements include losses.

Exhibit DB-3
APS Renewable Resource Mix 2015



Labels with solid borders indicate existing and committed resources as of December 31, 2008. Labels with dashed borders indicate new resources. CSP = Concentrating Solar Power.

Exhibit DB-4**Approximate Costs of Utility Scale Renewable Energy**

Technology	Approximate Cost \$/MWh (2009 \$)	Comments
Concentrating solar power with thermal storage	\$140 to \$163	Operational projects in Spain and the US utilize parabolic troughs and central receivers. Some utilize thermal storage. Costs may decrease as more projects are built.
Wind	\$51	Wind project costs vary by project capacity factor, wind farm generation capacity, transmission availability, and site specific features. Cost estimate includes \$4 per MWh integration cost.
Geothermal	\$53	Costs vary according to site specific conditions and type of plant (binary, flash)
Photovoltaics	Project specific	Prices may be falling rapidly as thin film technologies are deployed at large scale plants
Biomass	About \$71, but project specific	Numerous types of biomass plants may be deployed – e.g., landfill gas, wood waste, agricultural waste, etc. Costs depend on fuel source and technology.
New natural gas fired combined cycle plant	\$111	Cost per MWh is very dependent on fuel prices and capacity factor (assumed to be 35% here). Cost includes an assumed \$30 per metric ton cost of complying with carbon dioxide emission regulations.
New conventional coal-fired power plant	\$110	Cost includes an assumed \$30 per metric ton cost of complying with carbon dioxide emission regulations.