

BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

MARC SPITZER, Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
MIKE GLEASON
KRISTIN K. MAYES

IN THE MATTER OF THE APPLICATION
OF ARIZONA PUBLIC SERVICE COMPANY
FOR A HEARING TO DETERMINE THE
FAIR VALUE OF THE UTILITY PROPERTY
OF THE COMPANY FOR RATEMAKING
PURPOSES, TO FIX A JUST AND
REASONABLE RATE OF RETURN
THEREON, TO APPROVE RATE
SCHEDULES DESIGNED TO DEVELOP
SUCH RETURN, AND FOR APPROVAL OF
PURCHASED POWER CONTRACT.

DOCKET NO. E-01345A-03-0437

Direct Testimony of

Jeff Schlegel
Southwest Energy Efficiency Project (SWEEP)

February 3, 2004

**Direct Testimony of Jeff Schlegel, SWEEP
Docket No. E-01345A-03-0437**

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Introduction

1
2
3
4 Q. Please state your name and business address.

5
6 A. My name is Jeff Schlegel. My business address is 1167 W. Samalayuca Drive,
7 Tucson, Arizona 85704-3224.
8

9
10 Q. For whom and in what capacity are you testifying?

11
12 A. I am testifying on behalf of the Southwest Energy Efficiency Project (SWEEP). I am
13 the Arizona Representative for SWEEP.
14

15
16 Q. Please describe the Southwest Energy Efficiency Project.

17
18 A. SWEEP is a public interest organization dedicated to advancing energy efficiency as
19 a means of promoting both economic prosperity and environmental protection in the
20 six states of Arizona, Colorado, New Mexico, Nevada, Utah, and Wyoming. SWEEP
21 works on state energy legislation, analysis of energy efficiency opportunities and
22 potential, expansion of state and utility energy efficiency programs as well as the
23 design of these programs, building energy codes and appliance standards, and
24 voluntary partnerships with the private sector to advance energy efficiency. SWEEP
25 is collaborating with utilities, state agencies, environmental groups, universities, and
26 energy specialists in the region. SWEEP is funded primarily by foundations, the U.S.
27 Department of Energy, and the U.S. Environmental Protection Agency.
28

29
30 Q. What are your professional qualifications?

31
32 A. I am an independent consultant specializing in policy analysis, evaluation and
33 research, planning, and program design for energy efficiency and clean energy
34 resources. I consult for public groups and government agencies, and I have been
35 working in the field for over 20 years. In addition to my responsibilities with
36 SWEEP, I am working or have worked extensively in many of the states that have
37 effective energy efficiency programs, including California, Connecticut,
38 Massachusetts, New Jersey, Vermont, and Wisconsin. In 1997, I received the
39 Outstanding Achievement Award from the International Energy Program Evaluation
40 Conference. Exhibit JS-1 summarizes my professional qualifications.
41
42

Summary of Testimony and Recommendations

1
2
3 Q. Please summarize your testimony.
4

5 A. I will testify that:
6

- 7 • The Commission should substantially increase energy efficiency in the Arizona
8 Public Service Company (APS) service territory to achieve significant and cost-
9 effective benefits for APS customers, the electric system, the economy, and the
10 environment.
11
- 12 • Specifically, the Commission should set goals to achieve 7% of total energy
13 resources needed to meet retail load in 2010 from energy efficiency, and 17% in
14 2020. The Commission should set parallel goals to reduce summer peak demand
15 by at least 7% of total capacity resources needed to meet retail peak demand in
16 2010, and at least 17% in 2020.
17
- 18 • Achieving such goals would reduce average annual growth in retail energy and
19 summer peak demand from over 4% to under 3%, eliminate the need for at least
20 1,100 MW of new power plants by 2020 and associated power line and pipeline
21 infrastructure, save consumers and businesses over \$1.9 billion during 2004-2020,
22 reduce electricity price spikes and the risks of natural gas price volatility, and
23 reduce emissions.
24
- 25 • Similar energy savings and peak demand reduction goals have been implemented
26 by other states and utilities, and some have achieved or made progress towards
27 achieving similar levels of energy savings.
28
- 29 • Energy efficiency costs less than other resources for meeting the energy needs of
30 APS customers. Energy efficiency costs 2 to 3 cents per lifetime kWh saved,
31 delivered to the customer. This is less than the cost of power from existing
32 generation plants, and significantly less than the delivered cost of energy from
33 new natural gas-fired plants.
34
- 35 • A full portfolio of effective and cost-effective energy efficiency programs should
36 be implemented in the APS service territory to achieve the energy efficiency
37 goals. All APS customers should have an opportunity to participate in and benefit
38 directly from at least one energy efficiency program.
39
- 40 • The Commission should provide adequate funding to achieve the energy
41 efficiency goals. SWEEP estimates that energy efficiency funding of \$0.0015 per
42 kWh of retail energy sales (1.5 mills), or about \$35 million in the 2002 Test Year,
43 is necessary to achieve the goals.
44

- 1 • Energy efficiency funding and cost recovery could be accomplished through a
2 System Benefits Charge (SBC), expensing the energy efficiency expenditures, or
3 rate-basing.
4
- 5 • Overall, the existing APS energy efficiency programs are insufficient and do not
6 capture the vast majority of cost-effective energy efficiency opportunities for APS
7 customers. APS appears to have a beneficial residential new construction
8 program that is achieving meaningful results. However, APS energy efficiency
9 efforts and achievements in all other markets are inadequate or nonexistent.
10
- 11 • The Commission should act in a timely manner to increase energy efficiency in
12 Arizona. Each day that passes without effective energy efficiency programs
13 means more inefficient load is added to the electric system in this high load
14 growth state, leading to higher total costs for customers, a less diverse and riskier
15 energy resource mix, and increased damage to the environment.
16

Increasing Energy Efficiency in the APS Service Territory

1
2
3 Q. In general, what do you recommend regarding energy efficiency?
4

5 A. The Commission should substantially increase energy efficiency in the APS service
6 territory to achieve significant and cost-effective benefits for APS customers, the
7 electric system, the economy, and the environment.
8

9 When compared to conventional generation and transmission, energy efficiency is
10 more cost effective, cleaner, more distributed with no need for transmission or
11 distribution lines, more diverse, less risky in terms of market and fuel price volatility,
12 and less subject to security risks and interruptions – and it does not consume non-
13 renewable resources or harm the environment. Energy efficiency provides financial
14 and other direct benefits to consumers and businesses, and lowers the total cost of
15 electric service for customers. Energy efficiency creates jobs and improves the
16 economy. Finally, energy efficiency is a reliable energy resource that costs less than
17 other resources for meeting the energy needs of customers in the APS service
18 territory.
19

20
21 Q. Is energy efficiency an effective approach for diversifying the resource mix,
22 increasing reliability, and mitigating price volatility and associated risks?
23

24 A. Yes, increasing energy efficiency will diversify the resource mix, increase reliability,
25 and mitigate vulnerability to price volatility. Energy efficiency does not rely on any
26 fuel and is not subject to shortages of supply or fuel price volatility. Energy
27 efficiency is a distributed resource and does not rely on transmission or distribution
28 systems, or natural gas pipelines. Meeting load growth through increased energy
29 efficiency can help to relieve system constraints and pressure on load pockets.
30 Energy efficiency is not threatened by operational interruptions (from terrorists or
31 other threats to reliability) that central generation and transmission must address. In
32 addition, by reducing total load, energy efficiency puts downward pressure on market
33 prices for everyone purchasing power in the market.
34
35

Goals for Energy Savings and Peak Demand Reduction

36
37
38 Q. Specifically, what actions should the Commission take to increase energy efficiency
39 in the APS service territory?
40

41 A. The Commission should set goals to achieve 7% of total energy resources needed to
42 meet retail load in 2010 from energy efficiency, and 17% in 2020. The Commission
43 should set parallel goals to reduce summer peak demand by at least 7% of total
44 capacity resources needed to meet retail peak demand in 2010, and at least 17% in
45 2020. These goals are reasonable and achievable, and meeting the goals would

1 provide cost-effective benefits to consumers, the electric system, the economy, and
2 the environment.
3
4

5 Q. What benefits would result from achieving such goals?
6

7 A. Achieving the goals would reduce average annual growth in retail energy and summer
8 peak demand from over 4% to under 3%, eliminate the need for at least 1,100 MW of
9 new power plants by 2020 and associated power line and pipeline infrastructure, save
10 consumers and businesses over \$1.9 billion during 2004-2020, reduce electricity price
11 spikes and the risks of natural gas price volatility, and reduce emissions.
12
13

14 Q. Have other states or utilities implemented similar goals?
15

16 A. Yes, other states and utilities have implemented similar goals. Examples include:
17 • Austin Energy, the Austin, Texas municipal utility, plans “investment in energy
18 efficiency and peak load management to meet the target of achieving 15% of
19 Austin’s energy supply from energy efficiency efforts by 2020.”¹
20 • The Ft. Collins, Colorado municipal utility has implemented a goal to reduce per
21 capita electric consumption 10%, from the baseline of 2002, by the year 2012.
22 The 10% per capita consumption reduction target will reduce overall electric
23 consumption approximately 17% by 2012. Ft. Collins has also set a goal to
24 reduce per capita peak day electric demand 15%, from the baseline of 2002, by
25 the year 2012.
26 • State agencies and universities in Arizona are required to reduce energy use 10%
27 per square foot of floor area by 2008 and 15% by 2011, relative to 2001-02, per
28 the savings goals in HB2324, passed by the Arizona Legislature last session.
29
30

31 Q. Have other states or utilities achieved energy savings and peak demand reductions
32 similar to the goals SWEEP proposes?
33

34 A. Yes. According to a 2002 study by the American Council for an Energy Efficient
35 Economy (ACEEE), based on data the utilities report to EIA, the top four states in
36 terms of 2000 energy savings as a % of kWh retail sales saved energy equivalent to
37 between 5.1% and 6.8% of their actual electricity sales to consumers that year.² All
38 four of these states (Connecticut, Wisconsin, Minnesota, and Rhode Island) have
39 continued their energy efficiency programs since 2000, therefore I estimate that
40 several of the states have exceeded the level of 7% of total retail sales by now.
41

¹ Austin Energy 2003 Strategic Plan. Note: Austin Energy is a large municipally owned utility with about 2,700 MW of generation capacity; it provides service to 355,000 customers.

² "State Scorecard on Utility and Public Benefit Energy Efficiency Programs: an Update" by D. York and M. Kushler; American Council for an Energy Efficient Economy, December 2002.

1 Two major investor-owned utilities in Connecticut, Connecticut Light & Power and
2 United Illuminating, together spent about \$87 million per year on energy efficiency
3 and load management programs in 2001 and 2002 (approximately 2.8% of their
4 overall revenues from retail electricity sales). The 2001 programs saved 314 GWh/yr
5 (1.1% of sales) and the 2002 programs saved 246 GWh/yr (0.9% of sales).

6
7 Cumulative annual energy savings at Massachusetts Electric Company through 2002
8 were 1,721 GWh, equivalent to about 10% of retail energy sales in 2002.
9

10
11 Q. How does Arizona rank in national studies of energy efficiency?
12

13 A. In the 2002 ACEEE study previously cited, Arizona ranked 45th among the states,
14 with 2000 energy efficiency savings equivalent to only 0.04% of retail sales. The
15 leading energy efficiency states achieve energy savings about 150 times higher than
16 Arizona. The ACEEE study also found that energy savings from utility energy
17 efficiency programs in Arizona declined from 146 kWh per capita in 1993 to 4 kWh
18 per capita in 2000.
19

20
21 Q. What is the potential for energy efficiency in Arizona?
22

23 A. In 2002, SWEEP completed a study of the potential for energy efficiency in Arizona,
24 Colorado, Nevada, New Mexico, Utah, and Wyoming. The study, "The New Mother
25 Lode: The Potential for More Efficient Electricity Use in the Southwest," identified
26 significant electricity savings, water conservation and other environmental benefits,
27 and economic growth potential for Arizona through the pursuit of energy efficiency
28 policies and programs.
29

30 The study analyzed electricity use in a "business-as-usual" Base Scenario and a High
31 Efficiency Scenario that gradually increases the efficiency of electricity use in homes
32 and work places. The study found the following benefits of the High Efficiency
33 Scenario for Arizona:

- 34 • Reducing total electricity consumption 18% by 2010 and 34% by 2020;
- 35 • Reducing average annual load growth from 3% per year in the Base Scenario to
36 0.7% per year in the High Efficiency Scenario;
- 37 • Eliminating the need to construct twelve 500 megawatt power plants or their
38 equivalent over the next 18 years, as well as transmission lines needed to serve
39 these plants;
- 40 • Saving consumers and businesses \$10.5 billion during 2003-2020, at a benefit-
41 cost ratio of about 4.2, with a net benefit of \$5,690 per household during this
42 period;
- 43 • Increasing statewide personal income by \$550 million per year and statewide
44 employment by 24,100 jobs by 2020;

- 1 • Saving 9.0 billion gallons of water per year by 2010 and 22.4 billion gallons per
2 year by 2020 (the latter equivalent to the water consumed by about 122,000
3 households); and
- 4 • Reducing carbon dioxide emissions, the main gas contributing to global warming,
5 by 20% in 2010 and 36% in 2020 relative to the emissions of the Base Scenario.

6
7 The SWEEP study acknowledged that the High Efficiency future will not happen on
8 its own. The study recommended new and expanded policies and initiatives to
9 achieve the High Efficiency future and its benefits. In the report, SWEEP listed
10 several energy efficiency policies that could be implemented in Arizona. Expanding
11 utility energy efficiency programs is the most important policy for achieving energy
12 savings. SWEEP also noted that not all of the potential energy savings are expected
13 to be achieved from utility energy efficiency programs.

14
15
16 Q. How do the proposed goals compare to estimates of the potential for energy
17 efficiency in Arizona?

18
19 A. Achieving the proposed goals would capture about half of the energy efficiency
20 potential in Arizona estimated in the SWEEP New Mother Lode study.

21
22
23 Q. Are the goals reasonable and realistic?

24
25 A. Yes, the proposed goals are both reasonable and realistic. They are reasonable and
26 realistic considering the low level of energy efficiency activities in Arizona in the
27 recent past, the need to ramp up energy efficiency efforts in the early years, the high
28 rate of load growth in the APS service territory, the significant energy efficiency
29 potential in new construction, and the historical energy efficiency performance in
30 leading states.

31
32 For comparison purposes, consider Integrated Resource Planning (IRP) principles
33 applied in some states, including Arizona, during the 1990's. The IRP principles
34 essentially stated that all cost-effective energy efficiency should be captured, as the
35 least-cost resource, before making investments in higher cost resources. By
36 definition, capturing less than the full amount of cost-effective energy efficiency
37 potential leads to higher total costs for consumers. In proposing the goals of 7% in
38 2010 and 17% in 2020, SWEEP is acknowledging that only about half of the cost-
39 effective energy efficiency potential identified in the SWEEP study (proportionally
40 for APS) is going to be captured. Even more electricity could be saved, but SWEEP
41 is being realistic about how much can be achieved and funded through utility
42 programs given the current situation and recent history in Arizona. Additional energy
43 savings could be achieved through other policies and programs, such as through the
44 adoption and implementation of building energy codes and appliance standards.

45

Energy Efficiency Savings, Benefits, and Costs in Other States

1
2
3
4 Q. What has been the experience with energy efficiency in other states and at other
5 utilities?

6
7 A. Based on results from other states and utilities, energy efficiency can provide
8 substantial resources that are reliable and cost-effective. Below are several examples
9 in addition to those summarized above:

- 10 • California: In 1999, the California Energy Commission stated: “Since 1975, a
11 combination of State energy efficiency standards for buildings and appliances and
12 utility energy efficiency programs have reduced electricity and natural gas
13 consumption in California by over 470,000 gigawatt hours and over 50 billion
14 therms. In 1998 alone, the savings from building and appliance standards totaled
15 \$1.4 billion per year. Utility distribution company energy efficiency programs
16 achieved a similar amount of savings. The displaced energy from both standards
17 and programs was roughly the equivalent of fourteen 700 megawatts power
18 plants,” or about 10,000 MW. Without sacrificing quality of life or productivity,
19 electricity use per capita increased by only 5% in California during 1977-2001,
20 compared to a nearly 50% increase in per capita electricity use in the other 49
21 states.³
- 22 • Connecticut: Two major investor-owned utilities in Connecticut, Connecticut
23 Light & Power and United Illuminating, are responsible for over 90% of
24 electricity sales in the state. Together they spent about \$87 million per year on
25 energy efficiency and load management programs in 2001 and 2002. This is
26 approximately 2.8% of their overall revenues from retail electricity sales. The
27 2001 programs saved 314 GWh/yr (1.1% of sales); the 2002 programs saved 246
28 GWh/yr (0.9% of sales). The estimated peak load reductions are 66 MW from
29 2001 programs and 99 MW from 2002 programs.
- 30 • Vermont: The Vermont Public Service Board established a statewide energy
31 efficiency program known as Efficiency Vermont in 1999. Efficiency Vermont
32 spent \$8.8 million (1.5% of electric utility revenues) in 2001 and \$11.0 million
33 (about 1.9% of revenues) in 2002. It is estimated that the programs in 2002
34 provided about 40 GWh/yr of electricity savings, equal to 0.7% of electricity sales
35 in the state.
- 36 • Massachusetts: Massachusetts Electric is an investor-owned utility owned by
37 National Grid USA. It spent \$64 million on energy efficiency and DSM programs
38 in 2001 (about 3.8% of revenues). The comprehensive energy efficiency
39 programs run in 2001 saved 187 GWh/yr and 37 MW of peak load. The energy
40 savings due to 2001 programs are equivalent to 1.0% of electricity sales.
- 41 • The Sacramento Municipal Utility District (SMUD) is a publicly-owned utility
42 serving over 500,000 customers in California. SMUD spent about \$17 million on

³ “Energy Efficiency Leadership in California: Preventing the Next Crisis.” Natural Resources Defense Council and Silicon Valley Manufacturing Group, San Francisco, CA, April 2003.

1 its energy efficiency programs in 2001 and nearly \$21 million (2.3% of revenues)
2 on these programs in 2002. The programs are comprehensive, including cash
3 incentives for all types of efficiency measures. SMUD estimates the programs
4 operated in 2002 reduced electricity use by 69 GWh/yr (0.72% of retail sales) and
5 peak demand by 21.2 MW (0.76% of the peak demand registered that year).

- 6 • Minnesota: Xcel Energy is the main investor-owned utility in Minnesota and is
7 responsible for about half of the electricity sold in the state. The utility spent
8 about \$37 million on energy efficiency and other DSM programs in 2001 and
9 \$38.5 million in 2002, slightly over 2% of revenues. The utility estimates it saved
10 254 GWh/yr and cut peak demand by 139 MW due to 2001 programs, and saved
11 267 GWh/yr and cut peak demand by 121 MW due to 2002 programs. The 2002
12 energy savings were equivalent to about 0.9% of retail sales. In addition, it is
13 estimated that the programs operated in 2002 will generate net benefits of \$233
14 million over the lifetime of measures installed that year.

15
16
17 Q. What does past experience say about the cost of energy efficiency?
18

- 19 A. Energy savings from energy efficiency programs cost less than other resources for
20 meeting the energy needs of customers. Energy efficiency costs 2 to 3 cents per
21 lifetime kWh saved, delivered to the customer. This is less than the cost of
22 conventional power, and significantly less than the delivered cost of energy from
23 natural gas fired plants.
24

25 In the Pacific Northwest, energy efficiency programs implemented by electric utilities
26 working with businesses, local governments, and others in the region saved over
27 10,000 GWh/yr as of 1998, at an average cost of 2 to 2.5 cents per kWh saved.⁴ In
28 Vermont, energy efficiency measures installed in 2002 alone as a result of the
29 Efficiency Vermont statewide program saved 574 GWh/yr, at a total cost of 2.9 cents
30 per kWh saved over the lifetime of these measures.⁵ In California, efficiency
31 measures installed during 2001 exhibited an overall average cost of 3 cents per kWh
32 saved over the lifetime of the measures.⁶ Finally, a review article published in 2000
33 states, "Large-scale energy efficiency programs operated in a number of states during
34 the 1990s were very cost-effective – saving energy at an average cost of \$0.03/kWh
35 or less, well below the cost of supplying electricity."⁷
36
37

⁴ Revised Fourth Northwest Conservation and Electric Power Plan. Portland, OR: Northwest Power Planning Council, 1998.

⁵ The Power of Efficient Ideas. Efficiency Vermont: Preliminary Report 2002. Burlington, VT: Efficiency Vermont. 2003.

⁶ California Summary Study of 2001 Energy Efficiency Programs. Report prepared by Global Energy Partners, LLC, Lafayette, CA and submitted to Southern California Edison Co. and The California Measurement Advisory Council, March 2003.

⁷ S. Nadel and M. Kushler. "Public Benefit Funds: A Key Strategy for Advancing Energy Efficiency." *The Electricity Journal* 13, Oct. 2000, pp. 74-84.

1 Q. Are similar results possible in the APS service territory?
2

3 A. Yes. Many of the states and utilities cited above have implemented fairly aggressive
4 energy efficiency programs for a decade or more. There are more remaining
5 opportunities for increased energy efficiency in the APS service territory, where
6 energy efficiency programs have been much smaller (or nonexistent in some market
7 segments), than there are in states and service territories where significant, effective
8 programs have been operated for many years.
9

10
11 Q. Are other western states or utilities increasing their energy efficiency efforts?
12

13 A. Yes, several western states or utilities have increased their energy efficiency efforts
14 and commitments recently, including:
15 • Xcel, Colorado: Planning to achieve 134 MW of peak demand reduction through
16 DSM programs during 2001-05; 172 GWh/yr savings by 2005; spending \$61
17 million over 5 years.⁸
18 • PacificCorp, Utah: Planning to spend \$10 million on DSM in 2003, at least \$17
19 million on currently-approved programs in 2004 (\$17 million is about 1.8% of
20 revenues). New DSM programs are under development.
21 • Nevada Power and Sierra Pacific Power: Began spending \$11.2 million per year
22 on DSM programs in 2003 (about 0.5% of revenues). Estimated energy savings
23 of 37.5 GWh/yr; estimated peak load reduction of about 20 MW per program
24 year. New energy efficiency programs are now being developed and analyzed.
25 • Texas Energy Efficiency Performance Standard: Energy efficiency goal requires
26 that each utility acquire energy efficiency savings equivalent to at least 10% of its
27 projected growth in demand. Utilities in Texas (both IOUs and municipals) are
28 now spending around \$100 million per year.
29
30

31 **Energy Efficiency Programs and Strategies** 32

33 Q. If energy efficiency is so beneficial, why doesn't it just happen in the marketplace?
34

35 A. Some of it does. However, cost-effective energy efficiency resources in Arizona are
36 often untapped due to significant market failures and barriers faced by customers and
37 other market participants (e.g., retailers, distributors, manufacturers, builders,
38 contractors, and property managers). These market failures and barriers include lack
39 of information, high transaction costs, low priority placed on energy issues by many
40 consumers, lack of money or financing, misplaced or split incentives, institutional
41 practices, and incomplete markets for energy efficiency.⁹ Market intervention in the

⁸ "Response to Issues Raised During the November 13, 2003 DSM Roundtable Discussion", memo distributed by Grey Staples, Xcel Energy, Minneapolis, MN, January 26, 2004.

⁹ For one discussion of market failures and barriers, see M.A. Brown, "Market Failures and Barriers as a Basis for Clean Energy Policies," Energy Policy 29 (2001), pp. 1197-1207.

1 form of energy efficiency programs is necessary to reduce or eliminate the market
2 failures and barriers to the adoption of cost-effective energy efficiency.

3
4
5 Q. What types of energy efficiency programs should be offered in the APS service
6 territory?

7
8 A. A full portfolio of effective and cost-effective programs should be implemented in the
9 APS service territory to achieve the energy efficiency goals proposed by SWEEP.
10 All APS customers should have an opportunity to participate in and benefit directly
11 from at least one energy efficiency program.

12
13 The energy efficiency programs should be market-oriented, thereby leveraging and
14 focusing on naturally-occurring market opportunities, such as increasing energy
15 efficiency when buying or building a new home, designing and building a new office
16 building or facility, purchasing a new appliance, replacing old or failed equipment,
17 modifying an industrial process, buying or replacing a heating or cooling system, or
18 remodeling a home or business. The programs should work with the market by
19 focusing on market opportunities, reducing market barriers, and increasing
20 opportunities for and adoption of energy efficiency.

21
22 The energy efficiency programs should be focused on achieving energy savings as
23 well as reducing summer peak demand, to ensure that the maximum economic and
24 environmental benefits from energy savings are captured.

25
26
27 Q. Please provide a list of recommended energy efficiency programs.

28
29 A. Energy efficiency programs in the APS service territory should include:
30 • Commercial and Industrial (C&I) construction (new construction, renovation, and
31 equipment replacement);
32 • C&I existing buildings including lighting, HVAC, motors/drives, compressed air,
33 operations and maintenance, industrial process, and custom applications;
34 • Small business;
35 • Schools and local government;
36 • Residential new construction;
37 • Residential products including appliances, lighting, and windows;
38 • Residential existing buildings, with an emphasis on heating and cooling systems;
39 • Low/moderate income; and
40 • Targeted energy efficiency and distributed resources for T&D constrained areas.

41
42 These programs are being discussed in the DSM Workshops, ongoing in parallel at
43 the Commission.
44

1 Q. What strategies should be employed in the energy efficiency programs listed above?

2
3 A. The following are effective program strategies, or tools in the toolbox:

- 4 • Promotion and marketing
- 5 • Consumer education
- 6 • Technical and design assistance
- 7 • Financial incentives (including rebates and financing for some markets and
- 8 customer groups)
- 9 • Training for trade allies and vendors
- 10 • Coordination/initiatives with market actors in the distribution chain
- 11 (manufacturers, distributors, retailers, builders, etc.)
- 12 • Product/service testing and RD&D
- 13 • Feedback on performance, and market tracking

14
15 As shown in the list above, I recommend a broad and diverse mix of strategies, not
16 simply rebates or other financial incentives. In general, the most effective energy
17 efficiency programs employ a combination of strategies targeted to reduce or
18 overcome the key barriers to energy efficiency in the marketplace.

19
20
21 Q. Who should administer and deliver the energy efficiency programs?

22
23 A. The programs could be administered by APS or by an independent administrator,
24 such as a contractor. Either option is viable. The important issue is to ensure
25 effective administration of the programs to achieve the goals. Program delivery could
26 be achieved through vendors, contractors, and other actors in the marketplace. Some
27 programs could be delivered through partners such as the State Energy Office or low
28 income weatherization agencies.

29
30
31 **SWEEP Estimate of Energy Savings and Funding for the APS Service Territory**

32
33 Q. Has SWEEP prepared an estimate of the impact of its proposed goals in terms of
34 energy savings and associated funding in 2004 through 2020?

35
36 A. Yes. See Exhibit JS-2, which shows annual and cumulative annual energy savings,
37 the impact of the energy savings on the forecast and load growth, and the funding
38 necessary to achieve the goals. Total cumulative annual energy savings of 2,278
39 GWh are necessary to achieve the goal of 7% of total energy resources needed to
40 meet retail load in 2010 from energy efficiency.

41
42

Funding to Achieve the Energy Efficiency Goals

1
2
3 Q. What funding level will be needed to achieve the energy efficiency goals proposed by
4 SWEEP?

5
6 A. The Commission should adopt a policy that would provide adequate funding to
7 achieve the energy efficiency goals. SWEEP estimates that energy efficiency funding
8 of \$0.0015 per kWh of retail energy sales (1.5 mills), or about \$35 million in the 2002
9 Test Year, is necessary to achieve the goals (Exhibit JS-2).

10
11 The level of energy efficiency funding would increase over time as retail electricity
12 sales increase. For example, funding would reach approximately \$41 million in 2006,
13 given recent and anticipated load growth. This level of funding should be adequate to
14 achieve 1% electricity savings in 2006 and reduce load growth to 3% (Exhibit JS-2).
15 SWEEP recommends that energy efficiency program spending ramp-up gradually in
16 the first two years (\$13 million in 2004 and \$30 million in 2005).

17
18
19 Q. What would be the impact of this funding level on residential customers?

20
21 A. The energy efficiency funding level of \$0.0015 per kWh of retail energy sales (1.5
22 mills) would amount to about \$1.60 per month for the average APS residential
23 customer.

24
25
26 Q. What funding and cost recovery mechanisms could be used?

27
28 A. Energy efficiency funding and cost recovery could be accomplished through a System
29 Benefits Charge (SBC), expensing the energy efficiency expenditures, or rate-basing
30 (capitalization).

31
32
33 Q. What should happen to under- or over-expenditures of energy efficiency funding in a
34 given program year?

35
36 A. Unexpended funds should be carried over to future program years. An adjustor
37 mechanism could be used to reconcile actual expenditures that are higher than
38 \$0.0015 per kWh, if higher expenditures are necessary to achieve the goals.
39
40

Existing APS Energy Efficiency Programs

1
2
3 Q. What energy efficiency programs does APS offer now?
4

5 A. In the 2002 Test Year, APS offered a residential new construction program; a low
6 income weatherization program; a residential HVAC retrofit program; and a
7 commercial energy information, analysis, and training program. APS also offered
8 residential time-of-use rates and a C&I peak load reduction program (Power
9 Partners). (APS response to Staff 5-13)
10

11
12 Q. Please summarize the findings of your assessment of the APS energy efficiency
13 programs.
14

15 A. Overall, the existing APS energy efficiency programs are insufficient and do not
16 capture the vast majority of cost-effective energy efficiency opportunities for APS
17 customers. APS appears to have a beneficial residential new construction program
18 that is achieving meaningful results. However, APS energy efficiency efforts and
19 achievements in all other markets are inadequate or nonexistent.
20

21
22 Q. Please compare the overall level of APS spending and savings to the SWEEP
23 proposal.
24

25 A. APS spent about \$1.1 million on energy efficiency programs in 2002, about 0.05% of
26 revenues (APS response to Staff 5-13). It appears that APS achieved annual savings
27 equivalent to about 0.15% of retail sales.¹⁰ These energy savings and spending levels
28 are significantly lower than the levels recommended by SWEEP. The majority of
29 cost-effective energy efficiency opportunities in the APS service territory are not
30 being achieved at this very low level of program activity and funding.
31

Other DSM and Pricing Approaches

32
33
34
35 Q. Are there other approaches to achieving energy savings and peak demand reductions?
36

37 A. Yes. SWEEP supports complementary approaches such as DSM programs to
38 encourage peak load reductions (load management and short-term demand response),
39 and pricing and rate design (inclining block rates and critical peak pricing). SWEEP
40 supports these approaches as complements to effective energy efficiency policies and
41 programs, not as replacements for cost-effective utility energy efficiency programs.
42

¹⁰ SWEEP plans to further document the performance and cost of APS energy efficiency programs prior to the hearings in April, either through the ongoing DSM Workshops at the Commission, or through discovery.

1 **Development of an Energy Efficiency Plan for the APS Service Territory**

2
3 Q. How should an energy efficiency plan for the APS service territory be developed?

4
5 A. SWEEP and others are working on a more detailed energy efficiency plan for APS as
6 one part of the ongoing DSM workshops at the Commission. The Staff report on the
7 DSM workshops is due in March 2004. SWEEP plans to submit its recommended
8 plan for APS, based on the DSM workshop discussions, to the Commission prior to
9 the April hearings. If the DSM workshops do not progress sufficiently to develop a
10 plan for APS, SWEEP will either develop a plan for APS itself, or propose a process
11 for developing a plan collaboratively, and SWEEP will file one or the other before the
12 April hearings.

13
14
15 **Timeliness of Commission Action**

16
17 Q. Is timely action by the Commission on energy efficiency important?

18
19 A. Yes. The Commission should act in a timely manner to increase energy efficiency in
20 Arizona and the APS territory. Each day that passes without effective energy
21 efficiency programs means more inefficient load is added to the electric system in this
22 high load growth state, leading to higher total costs for customers, a less diverse and
23 riskier energy resource mix, and increased damage to the environment.

24
25
26
27 Q. Does that conclude your direct testimony?

28
29 A. Yes.

Qualifications of Jeff Schlegel

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Jeff Schlegel is an independent consultant specializing in policy analysis, planning, evaluation and research, and program design for energy efficiency, renewable energy, and low-income energy programs. Mr. Schlegel has more than 20 years of experience in the energy field. He works for public groups, collaboratives, and government agencies. Currently he is working with:

- The Southwest Energy Efficiency Project (SWEET) on energy efficiency and distributed resources issues (2002-present);
- The State of Connecticut Energy Conservation Management Board, a public board appointed by the Connecticut legislature to oversee energy efficiency, demand response, and low income programs in the state (2000-present);
- The Massachusetts Energy Efficiency Collaboratives on behalf of the non-utility parties, providing policy analysis, planning, and evaluation oversight of energy efficiency and demand response programs (1992-present).

Summaries of Recent Projects: Policy Analysis, Planning, Program Design, and Measurement and Evaluation for Energy Efficiency and Renewable Energy Programs

- Arizona representative for the Southwest Energy Efficiency Project (SWEET), a public interest organization devoted to advancing energy efficiency in Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming (2002-present). SWEET was launched in 2001, and is working collaboratively with state governments, utilities, and other organizations. Represents SWEET in Arizona, and coordinates with a coalition of environmental, consumer, and renewable energy groups in Arizona and the southwest on energy efficiency and distributed resource issues. Advocates and provides technical assistance regarding policies, programs, and market rules to advance energy efficiency.
- Policy and evaluation consultant for the Massachusetts non-utility parties in the New England energy efficiency collaboratives (1992-2003). Also provided policy analysis and evaluation support for the Conservation Law Foundation (CLF) in the early period of the collaboratives. Provides policy and technical support directly to the non-utility parties in the Massachusetts collaboratives (National Grid/Massachusetts Electric, NSTAR/Boston Edison, and Northeast Utilities/Western Massachusetts Electric), and coordinates with other collaboratives in New England. Mr. Schlegel's primary responsibilities include policy analysis, resource analysis and planning, evaluation and research, and program review for commercial and industrial (C&I) as well as residential programs.

- Policy, program, and evaluation consultant for the State of Connecticut Energy Conservation Management Board (ECMB), a public board appointed by the Connecticut legislature to oversee energy efficiency, demand response, and low income programs in the state (2000-present). Serves as the lead technical and policy consultant for the ECMB regarding the Conservation and Load Management (C&LM) programs in Connecticut, funded at \$89 million annually.
- Technical consultant for the New England Demand Response Initiative (NEDRI). Assisted a 50-member stakeholder group from the six New England states in developing a comprehensive, coordinated set of demand response programs for the New England regional power markets (2002-2003).
- Policy, evaluation, and protocols consultant for the New Jersey Clean Energy Collaborative, a collaborative of the New Jersey electric and gas utilities and the Natural Resources Defense Council (NRDC) on energy efficiency and low income programs (2000-2003).
- From July 1997 to March 2000, Mr. Schlegel served as the lead technical consultant to the California Board for Energy Efficiency (CBEE). CBEE was a public advisory board that provided recommendations to the California Public Utilities Commission on the \$275 to \$300 million of energy efficiency programs operated in the State of California annually by the four largest investor-owned utilities. In this full-time position Mr. Schlegel served as the CBEE's technical coordinator and lead technical consultant; developed and drafted the energy efficiency policy rules adopted by the California Public Utilities Commission; assisted the CBEE in formulating policy and program recommendations for consideration by the Commission; examined policy initiatives proposed by utilities and parties; reviewed and prepared comments on three years of annual program plans proposed by the utilities; recommended new program concepts and alternatives to utility proposals based on compilation and assessment of ideas from other states and regions; tracked and monitored program performance and market progress; and developed an RFP for independent administration of energy efficiency programs. As part of this assignment Mr. Schlegel did extensive analysis of options for administration, management, and implementation of publicly-funded energy efficiency programs.
- Conducted a scoping study of market effects and market transformation due to California utility energy efficiency programs for the California PUC in conjunction with Lawrence Berkeley National Laboratory (1996). Reviewed the performance of C&I and residential programs in terms of how they have impacted and changed markets.
- Reviewed California demand-side management (DSM) measurement and evaluation activities for the California Public Utilities Commission (1994-1999), including the activities of the California Demand-Side Management Measurement Advisory Committee (CADMAC). This included independently reviewing the California measurement and evaluation protocols, providing independent assessments of

utilities' requests for protocol waivers, and reviewing and commenting on evaluation studies and program performance.

- Participated in electric retail competition workshops and meetings, as part of the Arizona Corporation Commission's consideration of electric restructuring, on behalf of the Arizona Community Action Association (ACAA) (1994-1997). Represented low income customers and coordinated with consumer and environmental groups. Advocated and provided technical and policy support for energy efficiency and low income weatherization programs.
- Directed the evaluation of DSM shareholder incentive mechanisms for the California Public Utilities Commission (1992-1994). This study evaluated the effects of incentive mechanisms used for four California utilities and assessed the effectiveness of DSM incentives as a regulatory strategy. The evaluation also assessed the balance of risks and rewards for ratepayers and shareholders, evaluated market transformation, explored the role of measurement and evaluation in the regulatory process, and compared and contrasted various options for performance incentive mechanisms. As part of this study, Mr. Schlegel reviewed evaluation studies of DSM programs offered by the four major California utilities. Testified on these issues before the Commission in 1993-1994, and participated in a series of workshops on shareholder incentives in 1993.
- Reviewed the performance of DSM programs in New England for the Conservation Law Foundation and the Pew Charitable Trust (1994-1996). Compared evaluation results to planning estimates (costs, savings, and cost-effectiveness) to determine the overall performance and reliability of DSM.
- Conducted a verification audit of Pacific Gas and Electric Company's commercial and industrial custom rebate program as a consultant for the Commission Advisory and Compliance Division of the California Public Utilities Commission (CPUC) (1992-1993). As part of this project, designed the overall verification approach, developed the stratified sampling plan, reviewed the program results, and developed the procedures for adjusting engineering estimates based on the verification results.
- Executive Director (1990-1992) and Research Director (1985-1990) at Wisconsin Energy Conservation Corporation (WECC), a not-for-profit research, policy analysis, resource planning, and program design firm. Performed evaluations of utility, government, and public energy efficiency programs. Conducted research on new and emerging energy efficiency technologies, designed programs, and developed resource plans including portfolios of DSM and energy efficiency programs. As Executive Director, responsible for all operations of the not-for-profit corporation, with an annual budget of over \$2 million. WECC grew from three to twenty-two employees during Mr. Schlegel's tenure.

Low-Income Program Experience

Mr. Schlegel has worked with utilities and government agencies to design, implement, and evaluate low-income programs. From October 1998 through May 2002 he worked with the Arizona Department of Economic Security on the REACH program, a low-income self-sufficiency program, performing evaluation, analysis, and reporting tasks. From 1994 to 1997 he worked with the Arizona Community Action Association (ACAA) on a series of energy affordability and weatherization/DSM programs. As part of this work he analyzed options, designed and evaluated different program approaches, and prepared comments for several rate cases. He has also represented ACAA on electric restructuring issues in workshops before the Arizona Corporation Commission.

Mr. Schlegel managed many projects with the State of Wisconsin Low Income Weatherization Assistance Program over an eight-year period from 1985 through 1993. He led the development of the integrated computerized energy audit system and other software used by the State of Wisconsin in its program. In 1989 he directed an evaluation and review of the use of the computerized energy audit system and infiltration procedures in the State of Wisconsin program. He also conducted an evaluation of the Wisconsin Gas Company low-income programs.

Awards

Mr. Schlegel is the winner of the 1997 Outstanding Achievement Award from the International Energy Program Evaluation Conference. The Outstanding Achievement Award was given to only four individuals nationwide between 1991 and 2002.

Publications and Presentations

Mr. Schlegel has presented at more than 60 major national, regional, and statewide energy conservation conferences, and is the author of many published papers and articles. He has presented papers at several major conferences including the National Association of Regulatory Utility Commissioners (NARUC) Conference, the International Conference on Energy Program Evaluation, the American Council for an Energy Efficient Economy (ACEEE) Summer Study on Energy Efficiency in Buildings, the National Energy Services and DSM Conferences, the E-Source Conference, the Affordable Comfort Conference, the National Low-Income Energy Consortium Conference, the National Community Action Foundation Conference, the National Consumer Law Center Conference, and the National Department of Energy Weatherization Conference. He was a panel leader for the 1990 and 1996 ACEEE Summer Studies on Energy Efficiency.

SWEEP Energy Efficiency Goals of 7% by 2010 and 17% by 2020
 APS Service Territory

Exhibit JS-2

SWEEP Proposal	Test Year	<---Ramp Up--->			<-----Full Implementation----->							7% Goal								17% Goal
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Base Case Retail Energy Sales (GWh)	23,373	24,495	25,670	26,902	27,979	29,098	30,262	31,472	32,731	34,040	35,402	36,818	38,291	39,822	41,415	43,072	44,795	46,586	48,450	
Annual Growth Rate (%)		4.8%	4.8%	4.8%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	
Energy Savings Goal (% of forecast)			0.35%	0.75%	1.00%	1.15%	1.35%	1.50%	1.50%	1.50%	1.50%	1.45%	1.45%	1.45%	1.45%	1.45%	1.45%	1.45%	1.45%	
Annual Energy Savings (GWh)			89.8	201.8	279.8	334.6	408.5	472.1	491.0	510.6	531.0	533.9	555.2	577.4	600.5	624.5	649.5	675.5	702.5	
Cumulative Annual Savings (GWh)			89.8	291.6	571.4	906.0	1,314.6	1,786.6	2,277.6	2,788.2	3,319.2	3,853.1	4,408.3	4,985.7	5,586.3	6,210.8	6,860.3	7,535.8	8,238.3	
Cumulative Annual % Savings (relative to the forecast)			0.4%	1.1%	2.0%	3.1%	4.3%	5.7%	7.0%	8.2%	9.4%	10.5%	11.5%	12.5%	13.5%	14.4%	15.3%	16.2%	17.0%	
Revised Retail Energy Sales (GWh)	23,373	24,495	25,580	26,611	27,407	28,192	28,947	29,685	30,453	31,252	32,083	32,965	33,882	34,837	35,829	36,861	37,934	39,051	40,212	
Revised Annual Growth Rate (%)		4.8%	4.4%	4.0%	3.0%	2.9%	2.7%	2.6%	2.6%	2.6%	2.7%	2.7%	2.8%	2.8%	2.8%	2.9%	2.9%	2.9%	3.0%	
Annual Energy Efficiency Budget (\$, 000)	\$35,059 <i>test year</i>		\$13,477 <i>\$38,371</i>	\$30,265 <i>\$39,916</i>	\$41,111	\$42,288	\$43,421	\$44,528	\$45,680	\$46,878	\$48,124	\$49,447	\$50,823	\$52,255	\$53,743	\$55,291	\$56,901	\$58,576	\$60,317	
Assumptions:	Based on APS Schedules E-7 and F-4, APS Rate Case																			
Energy Forecast	4.0% for 2006-2020; 4.8% for 2003-2005 per Schedule F-4																			
Annual Growth Rate (%)	4.0% for 2006-2020; 4.8% for 2003-2005 per Schedule F-4																			
Energy Efficiency Funding Rate	\$0.0015 /kWh of retail energy sales																			