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BEFORE THE ARIZONA CORPORATION COMMISSION

GARY PIERCE, Chairman
BOB STUMP
SANDRA KENNEDY
PAUL NEWMAN
BRENDA BURNS

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.	DOCKET NO. E-01345A-11-0224 **NOTICE OF FILING DIRECT TESTIMONY OF WESTERN RESOURCE ADVOCATES**

Western Resource Advocates ("WRA"), through its undersigned counsel, hereby provides notice that it has this day filed the written direct testimony of David Berry in connection with the above-captioned matter.

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DATED this 18th day of November, 2011.

ARIZONA CENTER FOR LAW IN
THE PUBLIC INTEREST

By _____
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ORIGINAL and 13 COPIES of
the foregoing filed this 18th day
of November, 2011, with:

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1200 W. Washington
Phoenix, AZ 85007

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18th day of November, 2011 to:

All Parties of Record

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COMMISSIONERS

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Testimony of

David Berry

Western Resource Advocates

November 18, 2011

Testimony of David Berry
Docket No. E-01345A-11-0224

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I. Introduction

Q. Please state your name and business address.

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

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

A. I am Chief of Policy Analysis for Western Resource Advocates (WRA).

Q. Please describe Western Resource Advocates.

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

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

A. Exhibit DB-1 summarizes my qualifications.

Q. What is the purpose of your testimony?

A. My testimony addresses Arizona Public Service Company's (APS') decoupling proposal and the recovery of demand side management program costs. APS is engaged in large scale energy efficiency programs. However, traditional rate designs recover much of a utility's fixed costs through energy (kWh) charges. Consequently, as efficiency programs reduce kWh sales, APS will under-recover its fixed costs between rate cases, thereby creating a financial disincentive to engaging in large scale energy efficiency programs. APS has proposed to decouple revenues from sales to minimize this financial disincentive. WRA supports decoupling for APS. WRA also proposes several recommendations pertaining to the application of decoupling and to the recovery of demand side management program costs in base rates.

II. Energy Efficiency

Q. Has the Commission established an energy efficiency standard?

A. Yes. The standard is contained in A.A.C. R14-2-2401 *et seq.* In short, the standard states that by December 31, 2020, an affected utility shall, through cost-effective demand side management energy efficiency programs, achieve cumulative annual energy savings, measured in kWh, equivalent to at least 22% of the affected utility's retail electric energy sales for the calendar year 2019.

Q. Is APS obligated to engage in large scale efficiency programs?

A. Yes, the Commission's energy efficiency standard applies to APS.

Q. Briefly describe APS' energy efficiency programs.

A. APS has designed and implemented residential and non-residential programs to encourage customers to adopt energy efficient measures for lighting, space cooling, motor drives, refrigeration, and other end uses, to improve the design of buildings and landscaping with respect to energy usage, and to change behavior regarding energy awareness and energy usage. APS' programs utilize financial incentives, education, and social norms to encourage customers to be more energy efficient.

Q. What are the benefits to customers of APS' energy efficiency programs?

A. Customers benefit in three ways:

- First, participants in APS' efficiency programs reduce their electricity bills. The savings from various residential or non-residential efficiency measures, better building designs, and changes in behavior lower the bills of those customers who use electricity more efficiently.
- Second, all of APS' customers in the aggregate will save money as a result of cost-effective efficiency measures. The efficiency programs enable APS to avoid costs of generating electricity that would have simply been wasted due to inefficient end uses, inefficient behavior, and poor design. These avoided costs include avoided investments in new generation, transmission, and distribution equipment and avoided fuel and operating and maintenance costs. The Commission's cost–effectiveness review ensures that the incremental costs of efficiency programs are less than APS' avoided costs.
- Third, air emissions from power generation, such as sulfur dioxide, nitrogen oxides, and carbon dioxide, will be reduced as electricity consumption is reduced.

Q. What are the benefits of APS' energy efficiency programs to society?

A. Societal benefits are the avoided generation, transmission, and distribution costs attributable to energy efficiency (fuel, operating and maintenance, and new capacity costs) plus the economic value of avoided damages from pollution associated with avoided generation. (APS only recently began including monetary values for some avoided air emissions in its analysis of benefits).

Q. What are the costs of APS' energy efficiency programs?

A. APS' **program costs** consist of its administration costs plus any incentives it pays to program participants plus the costs of educational or similar program elements. The **societal costs** are the incremental costs of energy efficient measures and designs relative to baseline or customary lighting, motor drives, refrigerators, etc., whether these incremental costs are paid by the consumer, or through APS incentives, or by a combination of both, plus APS' administration costs, plus the costs of educational or similar program elements.

Q. What is the magnitude of energy savings, program costs, and net benefits APS has been able to achieve?

A. Exhibit DB-2 summarizes APS' recent DSM activities and current plans. The data are from APS' annual demand side management (DSM) reports and its DSM program plans. Each year's efforts result in enormous net benefits to society:

- APS' customers will save over 1.3 million MWh of electricity in 2012 and subsequent years because of the efficiency programs implemented in the years 2009 through 2012 (row 2, column f).
- Over the lives of the efficiency measures installed during the period 2009 to 2012, APS customers will have saved over 14 million MWh (row 3, column f).
- APS' programs are cost effective. The net benefits to society of the efficiency programs implemented during the period 2009 to 2012 exceed $500 million (row 6, column f). These net benefits equal societal benefits minus societal costs over the lives of the efficiency measures.

As a result of APS' efficiency programs, air emissions from power generation decrease as indicated in Exhibit DB-2. For example, over the lifetimes of the measures installed in 2009 through 2012, 5.8 million tons of carbon dioxide emissions will be avoided (row 9, column f).

Q. How do costs for energy efficiency compare to the costs of generating electricity?

A. As indicted in Exhibit DB-2, APS' **program** costs divided by lifetime MWh saved are about $15.53 per MWh, a cost far less than the fuel costs of running APS' existing gas-fired power

plants. Most of the energy avoided by APS' efficiency programs would have been supplied by gas-fired power plants. As indicated by APS witness Pete Ewen, Attachment PME-3, page 1, as revised in response to Staff data request 14.3, APS' average 2010 cost of natural gas for power generation (excluding fixed gas transport and fuel handling cost) was $57.80 per MWh, and APS' average 2010 cost for purchased power (excluding renewable energy) was $110.70 per MWh.

Also, as noted above, the societal costs of APS' efficiency programs are far less than the societal benefits.

Q. Are energy savings from efficiency programs real?

A. Yes. Peer-reviewed studies have demonstrated that energy efficiency programs save energy. These studies were not conducted by utilities. Several studies are summarized below.

In a study of energy intensities across states from the 1970s through 2003, Marvin Horowitz found that states with moderate or strong energy efficiency programs reduced energy intensity compared to what would have occurred with weak programs.[1] Savings were larger in the industrial and commercial sectors and smaller in the residential sector. Energy intensity was measured as electricity consumption per capita or per dollar of gross state product. The study also found that spillovers from energy efficiency programs in some states to other states occur rapidly in the residential sector.

Grant Jacobsen and Matthew Kotchen analyzed the energy savings attributable to a more stringent building code that went into effect in 2002 in Florida.[2] The code changes addressed improved windows and other features. The study examined monthly kWh consumption of new homes in Gainesville built within three years of the date the new building code went into effect (i.e., three years before and three years after the new code went into effect), holding constant, in a statistical sense, house characteristics and weather. The authors found that the building code changes resulted in a 4% decrease in residential electricity consumption (576 kWh per year on average). The electricity savings are concentrated in the warmer months, reflecting savings due to reduced energy used for air conditioning.

A study that I conducted analyzed the effect of the strength of utility and non-utility efficiency programs on the growth of electricity sales from 2001 to 2006 at the state level, after accounting for the effects on sales growth of electricity prices, changes in weather,

[1] Marvin Horowitz, "Changes in Electricity Demand in the United States from the 1970s to 2003," *The Energy Journal*, 28 (2007): 93-119.

[2] Grant Jacobsen and Matthew Kotchen, "Are Building Codes Effective at Saving Energy? Evidence from Residential Billing Data in Florida," *The Review of Economics and Statistics* (forthcoming). This study also estimated natural gas savings attributable to changes in the building code.

changes in state gross domestic product, and other factors.[3] The strength of efficiency programs was measured using the 2006 scorecard scores prepared by the American Council for an Energy-Efficient Economy (ACEEE) for each state, a higher score indicating a more aggressive efficiency program. If the leading states' energy efficiency programs were pursued, on average, the growth in a state's electricity sales over the study period would have been reduced by about 60% relative to implementing no efficiency programs.

As a final example, Geoffrey Donovan and David Butry found that the current level of tree cover on the south and west sides of houses in Sacramento reduces electricity consumption, on average, by 185 kWh per house (5.2%) during the summer.[4] The study used billing data from the local utility, took into account house characteristics, and used aerial photographs to locate and measure trees in residential yards.

Q. Why are consumers not being more energy efficient?

A. There are numerous reasons why consumers have not and do not choose energy efficient solutions to their lighting, motor drive, space cooling, water heating, and other needs. These barriers include:[5]

- Habit which leads them to overlook the energy and cost consequences of their routines
- Lack of information about how to cost-effectively reduce the amount of energy they waste
- Skepticism about the benefits and costs of energy efficiency
- High up-front costs of some (but not all) energy efficiency measures
- Short term perspectives on costs and benefits of energy efficiency

Q. Do APS' efficiency programs address the range of reasons consumers do not pursue energy efficiency?

A. In general, yes. APS employs educational program elements, uses social norms to change behavior, and offers financial incentives to participants.

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

[4] Geoffrey Donovan and David Butry, "The Value of Shade: Estimating the Effect of Urban Trees on Summertime Electricity Use," *Energy and Buildings* 41 (2009): 662-668.

[5] See, for example, Paul C. Stern, "Changing Behavior in Households and Communities: What Have We Learned?" in National Research Council, *New Tools for Environmental Protection: Information, Education, and Voluntary Measures* (Washington, DC, National Academies Press, 2002), pp. 201-211. Kevin Maréchal, "An Evolutionary Perspective on the Economics of Energy Consumption: The Crucial Role of Habits," *Journal of Economic Issues* 43 (2009): 69-88. Doug McKenzie-Mohr, "Promoting Sustainable Behavior: An Introduction to Community-Based Social Marketing," *Journal of Social Issues* 56 (2000): 543-554.

Q. Why should APS' customers care if other customers waste energy?

A. If some customers waste energy, the cost of providing electricity increases for all customers, even those who are parsimonious in their energy use. For example, if it had not implemented the programs shown in Exhibit DB-2, APS would have needed to acquire a new power plant to provide the capacity (MW) saved by the efficiency programs. All customers would have paid for this capacity, built solely to provide wasted electricity. For 2012, the cumulative avoided capacity over the period 2009 to 2012 is about 234 MW. If APS had to build a combined cycle facility to serve this demand, it would have spent about $269 million for the plant (excluding any fuel or other operating costs).

In addition, if the efficiency programs had not been implemented, APS would have had to run its least efficient power plants more to produce electricity that consumers would have wasted. All customers would have faced a higher power supply adjustor rate because APS would have had to produce the additional energy from its most expensive power plants.

III. Decoupling

Q. What factors affect the level of APS' retail sales?

A. APS' retail sales (MWh) depend on the number of its customers, general condition of the economy, weather, energy savings resulting from efficiency programs, the price of electricity, and the characteristics of residential, commercial, and industrial customers. Exhibit DB-3 shows trends in several factors affecting APS' retail sales.

Electricity sales are clearly correlated with the general condition of the economy as measured by Arizona personal income. In recent years, both the growth in number of customers and the growth in state personal income have been much slower than in previous years and APS' electricity sales have flattened. Weather, as measured by cooling degree days,[6] affects the amount of energy used for air conditioning; cooling degree days fluctuate from year to year but show a definite upward trend due to the urban heat island effect and climate change.[7] APS' energy efficiency programs are also beginning to have a noticeable effect on retail sales – in the absence of the efficiency programs, sales would have been greater. Further, residential electricity use per customer increased significantly from 1995 through 2007 and then fell, probably because of the recession and because of

[6] A cooling degree day is defined by the Energy Information Administration as follows: "A measure of how warm a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit. The measure is computed for each day by subtracting the base temperature (65 degrees) from the average of the day's high and low temperatures, with negative values set equal to zero. Each day's cooling degree-days are summed to create a cooling degree-day measure for a specified reference period. Cooling degree-days are used in energy analysis as an indicator of air conditioning energy requirements or use."

[7] Exhibit DB-3, Figure 6 pertains to population-weighted annual cooling degrees for all of Arizona. Figure 8 pertains to June cooling degree days in Phoenix.

energy efficiency programs. Lastly, industrial customers are becoming relatively less important in APS' market and, as these large users of electricity decline, relatively, APS' total sales are smaller, holding other factors constant.

Q. How are electric rates traditionally set by the Commission?

A. Rates are set based on a utility's cost of providing service during a test year. The rates cover the utility's variable costs (primarily fuel costs), plus its fixed costs. Typically, variable costs and a large portion of the fixed costs are recovered through kWh charges.

Q. How does energy efficiency affect a utility's incentives under traditional ratemaking?

A. Because of traditional rate designs, in which utilities recover much of their fixed costs through kWh charges, a decline in kWh sales due to energy efficiency results in revenues decreasing by more than the avoided variable costs. This means that the utility may not fully recover its fixed costs between rate cases and it creates a major financial disincentive to carrying out large scale efficiency programs.[8] As explained below, the incentives under traditional ratemaking run counter to the interests of customers.

Q. How does decoupling help to address the misalignment of financial incentives for APS and customer benefits of energy efficiency?

A. The idea behind decoupling is to remove "the linkage between utility fixed cost recovery and customer energy consumption, thereby eliminating a utility financial disincentive to energy efficiency."[9] Thus, with decoupling, utilities will be willing and earnest partners in implementing energy efficiency programs.

Q. Does decoupling alter the business model under which utilities operate?

A. Yes. Under the traditional utility business model, profits increase as kWh sales increase. The utility has an incentive to sell more electricity. Electric utilities used to help market electric appliances or all-electric homes, for example.[10] They can also let consumers simply waste electricity – the more consumers waste, the more profit utilities can potentially make.

[8] APS' definition of fixed costs can be found in Leland Snook's direct testimony, p. 15.

[9] Supplemental Comments of the Southwest Energy Efficiency Project (SWEEP) on the Draft Policy Statement Regarding Utility Disincentives to Energy Efficiency and Decoupled Rate Structures, filed in Docket Nos., E-0000J-08-0314 and G-00000C-08-0314, filed November 1, 2010.

[10] For example, see APS advertisement, *Prescott Evening Courier*, June 14, 1956, p. 8, http://news.google.com/newspapers?nid=897&dat=19560614&id=2q5aAAAAIBAJ&sjid=6E8DAAAAIBAJ&pg=2549,576951

With decoupling and a strong energy efficiency program overseen by the Commission for cost-effectiveness, a new business model would be created. Under the new business model, utilities no longer have a financial incentive for customers to waste electricity and no longer have a disincentive to engage in large scale energy efficiency programs.

Q. Did the Commission adopt a policy on decoupling?

A. Yes. The Commission's decoupling policy was adopted on December 29, 2010 (Docket Nos. E-00000J-08-0314 and G-00000C-08-0314). It states that a utility may file a proposal for decoupling (including revenue per customer decoupling) or alternative mechanism for addressing utility financial disincentives to energy efficiency in its next general rate case. Among other things, the policy indicates that full decoupling is preferable to partial decoupling.

Q. How can decoupling be carried out?

A. There are a variety of ways in which decoupling can occur. APS has proposed full decoupling. The Regulatory Assistance Project defines full decoupling as insulating a utility's revenue collections from any deviation of actual sales from expected sales regardless of the cause of deviation such as weather, energy efficiency, or the state of the economy.[11]

Q. Could a regulator approve partial decoupling, so as to adjust rates only for the effects of utility energy efficiency programs?

A. In theory, yes. However, the regulator's ability to tease out the effect of efficiency programs while holding constant the effects of all other factors affecting sales such as weather or general economic conditions, is subject to statistical error. Setting a decoupling adjustment under these circumstances is likely to be contentious and distracted by issues other than fostering energy efficiency.

With partial decoupling intended to reflect only the effect of efficiency programs on electricity sales, offsets to sales reductions attributable to efficiency would be ignored. For example, the generally increasing summer temperatures in Arizona shown in Exhibit DB-3 will tend to increase sales for air conditioning and offset decreases in sales due to energy efficiency (Figures 6-8). If the Commission ignores the long term weather effect in calculating a decoupling adjustment, customers' bills will go up in response to energy efficiency savings but that increase will not be offset by consideration of higher air conditioning demand resulting from hotter weather.

[11] Regulatory Assistance Project, *Revenue Decoupling Standards and Criteria*, Report to the Minnesota Public Utilities Commission, 2008, p. 6.

Q. Are there other ways for APS to recover its fixed costs as it increases its energy efficiency programs?

A. Yes. One way is for the Commission to adopt rates that recover most of APS' fixed costs through the basic service charge or kW charges. However, this could radically change many customers' bills even if their energy use stayed about the same. Moreover, it would weaken the price signal for energy (kWh) conservation.

Another way would be to have very frequent rate cases, but doing so would impose large administrative burdens on the Commission, its Staff, APS, and interveners. A third approach would be to use a forward-looking test year that accounts for expected kWh savings from efficiency programs. Even with a true-up mechanism, though, the forward-looking test year approach could be contentious because of statistical errors in measuring energy savings.

Q. Briefly describe APS' decoupling proposal.

A. APS proposes full decoupling. Decoupling is accomplished through APS' proposed Efficiency and Infrastructure (EIA) Account. The decoupling adjustment percentage would be applied to a customer's total bill, as explained below, and would be reset each year.

The calculation of the adjustment is based on revenues per customer. The components of the calculation are summarized below for a particular customer class (residential or commercial & industrial):

- The allowed fixed cost recovery per customer is determined in the rate case by dividing allowed fixed cost recovery for that customer class by the test year number of customers (units = $/customer).
- The allowed fixed cost revenue requirement per customer rate = allowed fixed cost revenue requirement determined in the rate case divided by adjusted test year MWh sales determined in the rate case (units = $/MWh).
- The allowed fixed cost recovery in a future year = actual number of customers in that year multiplied by the allowed fixed cost revenue per customer determined in the rate case (units = customers x $/customer = $). Thus, total fixed costs are assumed to vary in proportion to the number of customers.[12]

[12] In response to WRA data request 4.1, APS indicated that its fixed costs per customer have tended to increase over the period 2000 to 2010, suggesting that APS might not fully recover its actual fixed costs between rate cases as a result of decoupling if the trend continues. A study of distribution costs of municipal electric utilities in Ontario found that for larger utilities (10,000 to 100,000 customers), distribution costs per customer are roughly constant across utility size as measured by number of customers: A. Yatchew, "Scale Economies in Electricity Distribution: A Semiparametric Analysis," *Journal of Applied Econometrics* 15 (2000): 187-210. A study of the total production and delivery costs of US investor owned utilities over the period 1977 to 1992 found that a 1% proportional increase in sales volume and number of customers increased costs by about 1%: H. Thompson, "Cost

- The actual recovery of fixed costs = actual MWh sales multiplied by the allowed fixed cost revenue per customer rate (units = MWh * $/MWh) = $).
- The annual EIA adjustment = the allowed fixed cost recovery minus the actual fixed cost recovery (units = $).
- The above calculations are applied separately to the residential and commercial & industrial classes and the annual EIA adjustments are summed. The resulting summed adjustment is expressed as a percentage of APS' total revenues and the percentage is applied to nearly all customers' bills.

Q. Would APS' decoupling proposal also enable APS to recover fixed costs as its sales decrease because of distributed renewable energy generation such as photovoltaic panels installed on customers' premises as a result of the Renewable Energy Standard?

A. Yes.

Q. Has APS projected EIA revenues?

A. Yes. In response to Staff data request 3.89, APS provided a projection of the total EIA adjustment and total revenues collected from the EIA surcharge assuming an implementation lag. The table below shows APS' projections assuming normal weather, that no rate case takes effect prior to 2016, and a declining average electricity usage per customer due to energy efficiency and distributed generation. Of course, actual weather, economic conditions, response to APS' efficiency and renewable energy programs, and other factors may lead to different results.

	2012	2013	2014	2015
Average kWh per residential customer	13,131	13,074	13,026	12,993
Average kWh per commercial and industrial customer	116,488	113,636	111,303	107,877
Total EIA adjustment	$7,950,000	$34,619,000	$58,290,000	$91,277,000
Revenues from EIA surcharge adjusted for implementation lag	-	$6,625,000	$30,174,000	$54,345,000

Q. Has APS proposed a cap on the maximum allowed recovery of a decoupling adjustment?

A. Yes. Under APS' proposal, the cap limits the amount of increase in the EIA adjustment from one year to the next to 3% of the company's revenues.[13] If the current period EIA adjustment including the deferred balance from previous periods exceeds the amount collected in the current period due to the cap, the excess would be deferred with interest

Efficiency in Power Procurement and Delivery Service in the Electric Utility Industry," *Land Economics* 73 (1997): 287-296. The Yatchew and Thompson studies indicate that costs vary in proportion to the number of customers.

[13] This has the effect of reducing the current period EIA adjustment if the adjustment in the prior period were negative.

and collected in subsequent periods. There is no cap on downward adjustments that would lower bills to customers. Given APS' proposed design of the cap, it is possible that, after several years but before the next rate case, the EIA adjustment paid by customers in a specific year could exceed 3% of APS' revenues in that year.

Q. Would customers' bills always be increased by decoupling?

A. In general, no. If sales per customer increase, the decoupling surcharge could be smaller, offsetting the effects of energy efficiency on the decoupling surcharge, and possibly resulting in a credit to customers' bills. A prime reason for increased sales per customer is greater air conditioning due to hotter weather. Exhibit DB-3 shows the trend toward increasingly hotter weather in Arizona (Figures 6 and 8), meaning that air conditioning demand per customer will tend to increase (Figure 7). In addition, if the economy recovers, residential consumers may purchase more electricity-using equipment which increases the demand for electricity per customer, and businesses will increase their production of goods and services, thereby increasing the demand for electricity per business customer.

Pamela Lesh[14] found that "Decoupling adjustments [for gas and electric utilities] tend to be small, even miniscule" and that "Decoupling adjustments go both ways, providing both refunds and surcharges to customers."

This experience is consistent with APS' historical analysis, which is summarized in Exhibit DB-4. If decoupling had been in been in place during the period from 2001 through 2009, APS' adjustments would have been between + 1.7% and -1.5 % of revenue.[15] The average annual adjustment would have been + 0.1%. However, during this period, APS' energy efficiency programs were relatively small compared to the programs it will be implementing over the coming years.

As a final example, the Idaho Public Utilities Commission stated that Idaho Power Company customers received a credit of 0.8 percent in the first year of decoupling and a surcharge of 0.82 percent in the second year; the utility proposed a surcharge of 1.85 percent in the third year.[16] For the period June 2011 to May 2012, the Idaho Public Utilities Commission authorized a decoupling rate of 0.1801 cents per kWh for residential customers and 0.2273 cents per kWh for small commercial customers.[17]

Q. If customers use less electricity due to adoption of energy efficiency measures and practices and if there is an upward decoupling adjustment, would they be rewarded with a lower bill?

[14] Pamela Lesh, "Rate Impacts and Key Design Elements of Gas and Electric Utility Decoupling: A Comprehensive Review," *The Electricity Journal* (October 2009): 65-71. Quotes are from page 67.
[15] APS letter dated May 20, 2010 filed in Docket No. E-00000J-08-0314.
[16] http://www.puc.idaho.gov/internet/press/043010_IPCoFCA.htm, April 30, 2010. See also NARUC, *Decoupling for Electric and Gas Utilities: Frequently Asked Questions (FAQ),* Washington, DC: September 2007.
[17] Idaho Public Utilities Commission Order No. 32251.

A. Yes. Customers can and do manage their electricity bills by adopting energy efficient measures, designs, and practices. Exhibit DB-5 shows some typical savings from common residential energy efficiency measures in Arizona.[18] By doing only a few simple and cost-effective things, a residential customer can reduce energy use and more than offset an increase in rates due to decoupling. For example, if a customer reduced electricity usage in a month only slightly, from 1000 kWh to 950 kWh, due to energy efficiency, and if the price of electricity is $0.12 per kWh plus a 3% surcharge for decoupling, the customer's bill would decrease from $123.60 to $117.42.[19] Without any decoupling and without efficiency savings, the charge for 1000 kWh is $120.

Q. Consumers are concerned about the impact of decoupling on their overall budgets. Are price levels currently increasing in the Phoenix area?

A. At present, inflation is moderate. Exhibit DB-6 shows the consumer price index for all urban consumers in the Phoenix metropolitan area. Since 2008, prices, excluding the volatile food and energy components, changed only slightly from period to period. Food and energy prices bounce around a lot, resulting in greater fluctuations in the index for all items than in the index for all items excluding food and energy.

Q. Do you have any concerns about APS' decoupling proposal?

A. Yes. I have several concerns. First, APS' proposed cap has the potential to result in bill additions in excess of 3%. Whether such an outcome is just and reasonable depends on a variety of factors, including the likelihood that EIA surcharges would continue to exceed 3% of revenues in subsequent years, the causes of the high EIA adjustment (energy efficiency savings, weather, economic conditions, etc.), the level of other adjustors, and APS' ability to recover its fixed costs. Therefore, I recommend that if the total EIA adjustment indicated on Schedule 1 of the EIA Account Adjustment (not the *increase from* the previous year) proposed by APS in its February 1 filings required under the Plan of Administration, Section 5, exceeds 3% of Total Company Revenues, the Commission review APS' proposed Annual EIA Adjustment and that the March 1 decision deadline be set aside if necessary for the Commission to establish the EIA adjustment.

Second, the cap should be tied to changes in Arizona personal income to reduce rate impacts in difficult economic times.[20] I recommend that, if Arizona personal income (in

[18] The savings shown in the Exhibit are average or expected savings. The applicability of any particular measure will depend on what efficiency measures are already in place. Individual customers might see larger or smaller savings depending on house and household characteristics.

[19] Monthly savings = (1000 kWh x $0.12/kWh x 1.03) – (950 kWh x $0.12/kWh x 1.03) = $6.18.

[20] State personal income is defined by the Bureau of Economic Analysis as "income that is received by, or on behalf of, persons who live in the state. It is calculated as the sum of wage and salary disbursements, supplements to wages and salaries, proprietors' income with inventory valuation adjustment (IVA) and private capital

current dollars) declined over the period used to compute the decoupling adjustment, the cap should be temporarily set at one half the otherwise applicable cap (with a deferral of any excess adjustment and associated interest).[21] When the change in personal income becomes positive during the MWh sales measurement period, the cap would revert to the normal cap established by the Commission. Arizona personal income data can be obtained from the Bureau of Economic Analysis on a quarterly basis. The web site for the data is: http://www.bea.gov/regional/index.htm.

Third, the plan of administration needs clarification.[22] Clarification of the plan of administration could be accomplished through discussions between APS, Staff, and other interested parties following a Commission decision adopting decoupling.

Q. Please summarize the customer benefits of energy efficiency.

A. Customers are far better off with APS' efficiency programs than without them. Energy efficiency benefits customers in the aggregate because it reduces the needless waste that occurs in the inefficient consumption of electricity. Consequently, in the aggregate, customers' costs for electric energy services decrease. Also, efficiency program participants' energy costs will decrease because they reduce the amount of electricity that is wasted in their homes or businesses. And, as noted above, air pollution decreases as less electricity is wasted.

Q. Please summarize the benefits of decoupling.

A. Traditional ratemaking works against energy efficiency and associated customer benefits. Decoupling removes the key financial disincentive to utilities engaging in energy efficiency programs – the risk that they will fail to fully recover their fixed costs between rate cases as efficiency reduces kWh sales. With decoupling, utilities will more actively promote cost-effective energy efficiency through their efficiency programs. Without decoupling, utilities will not enthusiastically pursue efficiency programs.

consumption adjustment (CCAdj), rental income of persons with CCAdj, personal dividend income, personal interest income, and personal current transfer receipts, less contributions for government social insurance. Estimates of state personal income are presented by the place of residence of the income recipients."

[21] Given the lag in reporting personal income, the period over which personal income is measured may have to be lagged one quarter. For example, if the sales measurement period is the year 2013, the personal income measurement period could be from the third quarter of 2012 to the third quarter of 2013.

[22] For instance, the selection of the interest rate to be applied in Schedule 5 is not clear; which value of the one year Nominal Treasury Constant Maturities rate contained in the Federal Reserve Statistical Release H15 is to be used -- the value for a particular day, a particular week, a particular month, or a particular year? See http://www.federalreserve.gov/releases/h15/data.htm. In addition, Schedule 4 of the Plan of Administration should be clarified to indicate the differences in the calculations that would occur depending on whether or not the cap is exceeded; see APS' response to WRA data request 4.2.

IV. Recovery of DSM Costs in Rates

Q. How are demand side management (DSM) program costs recovered by APS?

A. At present, $10 million is recovered in base rates. The rest is recovered through the Demand Side Management Adjustment Charge (DSMAC).

Q. Should the amount of DSM program costs recovered in base rates be increased in this rate case?

A. Yes. Exhibit DB-2 shows that APS' energy efficiency program costs are steadily increasing to meet the Commission's energy efficiency standard. Because the specific amount to be recovered cannot be projected precisely, it is also appropriate to recover some of the costs through the DSMAC. In addition, with the adoption of the energy efficiency standard by the Commission, it is reasonable to regard energy efficiency programs as part of the basic set of services offered by APS. Energy efficiency is not a frill – it is an essential component of a modern utility's services.

Q. How much should be included in base rates?

A. Based upon the program costs shown in Exhibit DB-2, and APS' proposed 2012 DSM Implementation Plan (for which the total revenue requirement in excess of the $10 million to be recovered in base rates is about $84.8 million),[23] I recommend that $70 million of DSM program costs be included in base rates. Any deviations between actual program costs and the amount in base rates would be recovered through the DSMAC.

Q. It may be argued that customers should know how much of their bill goes toward DSM. Should that affect the amount of DSM costs recovered in base rates versus the DSMAC?

A. No. If the Commission wants APS to report to customers how much of their bills goes toward DSM programs, APS could simply provide that information on the bill. It is not necessary to collect all DSM costs through a separate adjustor to provide this information. If the Commission desires to inform customers of the portion of their bills that goes toward DSM programs, I believe that APS should also provide moderately detailed information about where the rest of their bill goes – the chart on page 8 of Don Robinson's testimony provides a good way to display this information. Knowing only that DSM programs account for X% of the bill doesn't give customers any context.

[23] APS 2012 Revised Demand Side Management Implementation Plan, Table 9 (Docket No. E-01345A-11-0232).

V. Recommendations

Q. Should the Commission adopt decoupling for APS?

A. Yes. The Commission should adopt full decoupling to remove the financial disincentive to APS of large scale energy efficiency programs. This disincentive is very large – millions of dollars per year of potentially unrecovered fixed costs (Leland Snook direct testimony, p. 7). Decoupling minimizes the disincentive. Customers in general benefit from APS' energy efficiency programs because APS is able to avoid costs of generating electricity that is simply wasted. Moreover, customers who participate in APS' efficiency programs also benefit from the savings produced by energy efficiency measures and activities. Full decoupling is preferable to partial decoupling because implementing partial decoupling is complex and potentially contentious while full decoupling is far simpler to execute.

Q. Is APS' proposed revenue per customer decoupling mechanism acceptable?

A. Yes, with the exceptions discussed below. While there are several ways full decoupling adjustments could be calculated and applied, APS' proposal has the virtue of simplicity.

Q. Do you have any recommendations regarding the design of APS' Energy and Infrastructure Account?

A. I recommend that if the total EIA adjustment indicated on Schedule 1 of the EIA Account Adjustment (not the increase from the previous year) proposed by APS in its February 1 filings required under the Plan of Administration, Section 5, exceeds 3% of Total Company Revenues, the Commission review APS' proposed Annual EIA Adjustment and that the March 1 decision deadline be set aside if necessary for the Commission to establish the EIA adjustment. In addition, I recommend that if Arizona personal income (in current dollars) declined over the period used to compute the decoupling adjustment (lagged by one quarter if necessitated by the availability of income data), the cap should be temporarily set at one half the otherwise applicable cap with a deferral of any excess adjustment and associated interest. When the change in personal income becomes positive during the MWh sales measurement period, the cap would revert to the normal cap authorized by the Commission.

Q. Do you have any recommendations on the Plan of Administration for the Efficiency and Infrastructure (decoupling) Account?

A. I believe that the Plan of Administration needs clarification and recommend that APS work with Staff and other interested parties to finalize the Plan, if the Commission adopts decoupling.

Q. Should the amount collected in base rates for DSM programs be increased?

A. Yes, to $70 million.

Q. Does this conclude your direct testimony?

A. Yes.

Exhibit DB-1: Qualifications of David Berry

Experience

Western Resource Advocates (Scottsdale, AZ), Chief of Policy Analysis and 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

Referee for Peer-Reviewed Publications

International Regional Science Review, Annals of the Association of American Geographers, Ecological Economics, Energy Policy, Energy Economics, University of Pennsylvania Press

Testimony and Public Comment Before:

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

Selected Publications

Solar Solutions: Incorporating Photovoltaics into Public Infrastructure, Western Resource Advocates, 2011.
"Delivering Energy Savings through Community-Based Organizations," *The Electricity Journal,* vol. 23 (November 2010): 65-74.
Phoenix Green: Designing a Community Tree Planting Program for Phoenix, Arizona, Western Resource Advocates, 2009.
"Innovation and the Price of Wind Energy in the US," *Energy Policy,* vol. 37 (November 2009): 4493-4499.
Investment Risk of New Coal-Fired Power Plants, Western Resource Advocates, 2008.
"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 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.

"Least Cost Planning and Utility Regulation," *Public Utilities Fortnightly*, vol. 121 no. 6 (March 17, 1988) 9-15.

"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.

"The Impact of Municipal Water Quality Improvements on Household Water Bills," *Water International*, vol. 10 (1985) 146-150.

(with Cathy Cox and Peter Wolff) "River Recreation Management: Rafting in the Northeast," *Water Spectrum*, (Spring 1983) 10-17.

"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 Robert E. Coughlin and Pat Cohen) *Modeling Recreation Use in Water-Related Parks*, US. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, 1978.

(with Robert E. Coughlin et al.) *Saving the Garden: The Preservation of Farmland and Other Environmentally Valuable Land*, Regional Science Research Institute Report to the National Science Foundation -- Research Applied to National Needs, 1977.

(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 John C. Keene, Robert E. Coughlin, Ann Louise Strong, James Farnam, Eric Kelly, and Thomas Plaut) *Untaxing Open Space*, Washington, D.C.: Council on Environmental Quality, 1976.

(with Gene Steiker) "The Concept of Justice in Regional Planning," *Journal of the American Institute of Planners*, vol. 40 (November 1974) 414-421.

Exhibit DB-2

Overview of APS Energy Efficiency Programs 2009-2012

a Factor	b 2009 Program	C 2010 Program	d 2011 Program as Planned	e Proposed 2012 Program	f Cumulative Effect as of 2012
1. Program cost (including MER & performance incentive)	$25,562,141	$49,831,722	$68,258,000	$78,136,000 (includes codes & standards & EE/RE pilot)	$221,787,863
2. Annual MWh savings from measures installed in year	208,917	319,507	352,000	480,000*	1,360,424
3. Lifetime MWh savings from measures installed in year	2,084,062	3,514,998	3,683,000	4,995,000	14,277,060
4. Capacity savings (MW)	33.9	46	68.2	85.5	234
5. Program cost per lifetime MWh saved ($/MWh)	$12.27	$14.18	$18.53	$15.64	$15.53
6. Societal net benefits from measures installed in year	$60,516,370	$156,454,183	$124,846,000	$194,581,000	$536,397,553
7. Avoided SO_2 emissions over lifetime of measures installed in year (metric tons)	4	7	7	10	28
8. Avoided NOx emissions over lifetime of measures installed in year (metric tons)	161	135	141	192	629
9. Avoided CO_2 emissions over lifetime of measures installed in year (metric tons)	857,752	1,433,367	1,500,953	2,037,104	5,829,176

* In addition, APS expects to engage in demand response activities which will increase its credit for savings in 2012 to 533,000 MWh.

Exhibit DB-3: Factors Affecting APS' Retail Sales
(page 1 of 2)

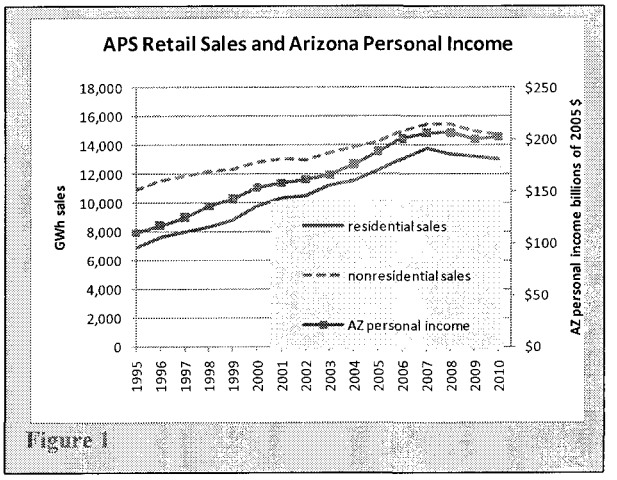


Figure 1

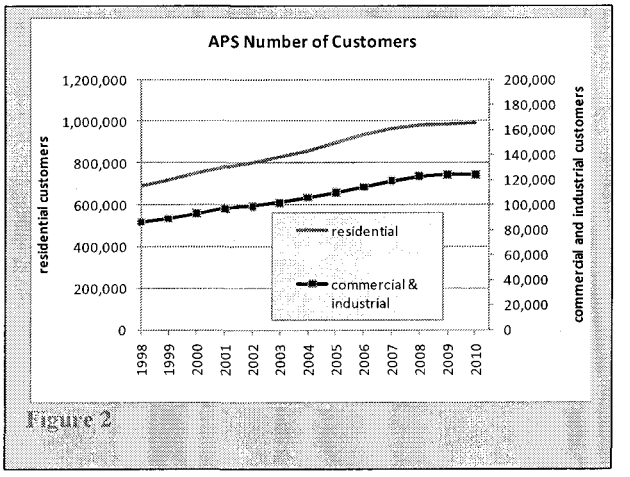
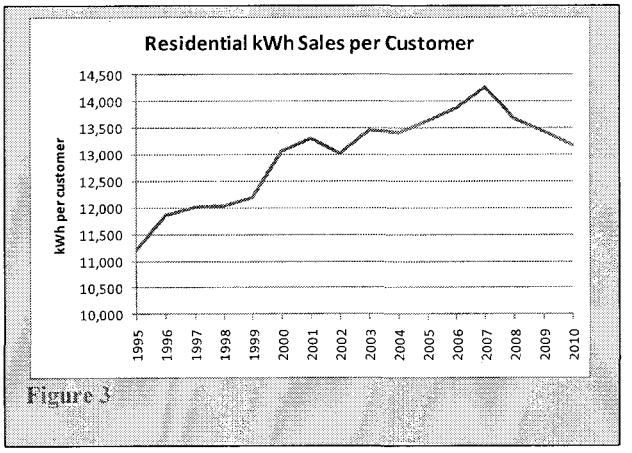


Figure 2



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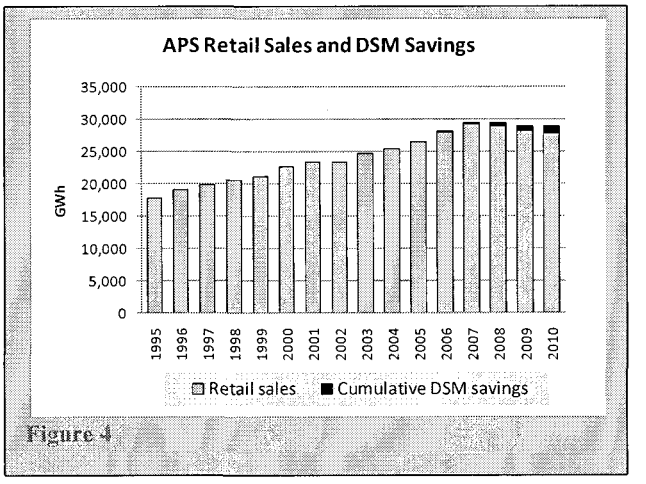

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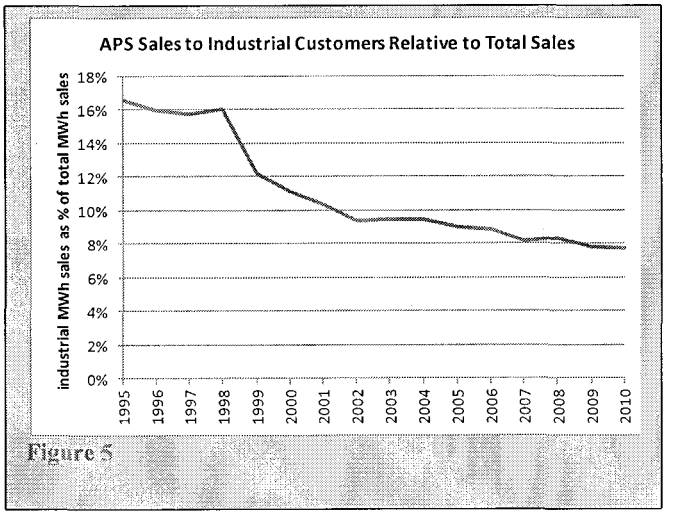
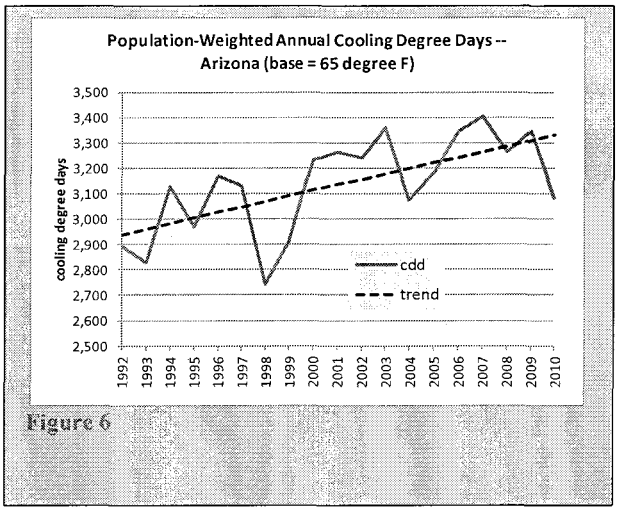


Figure 5

Exhibit DB-3: Factors Affecting APS' Retail Sales
(page 2 of 2)



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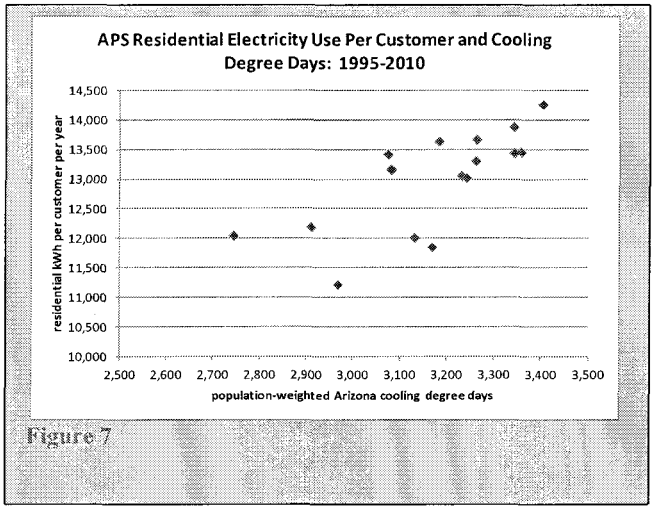

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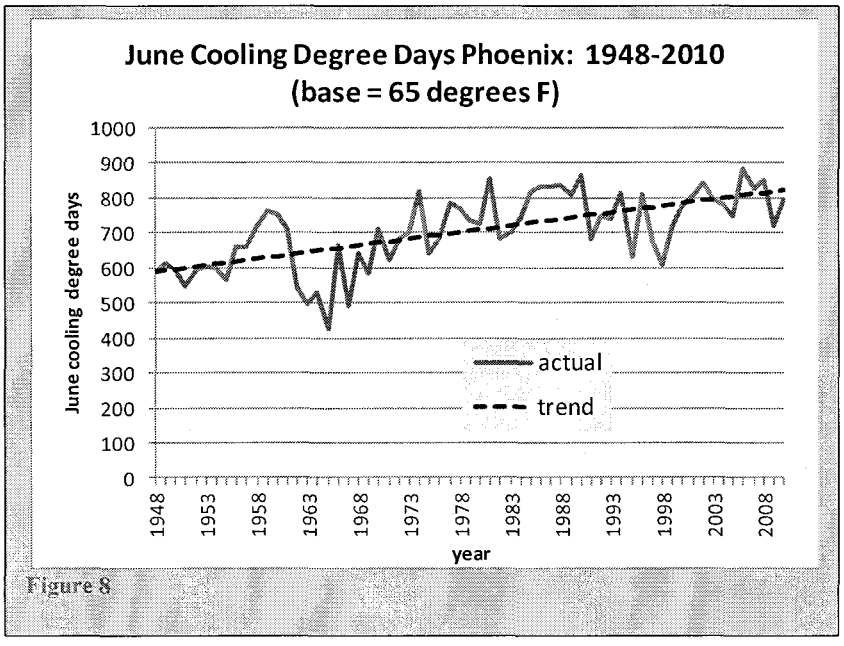
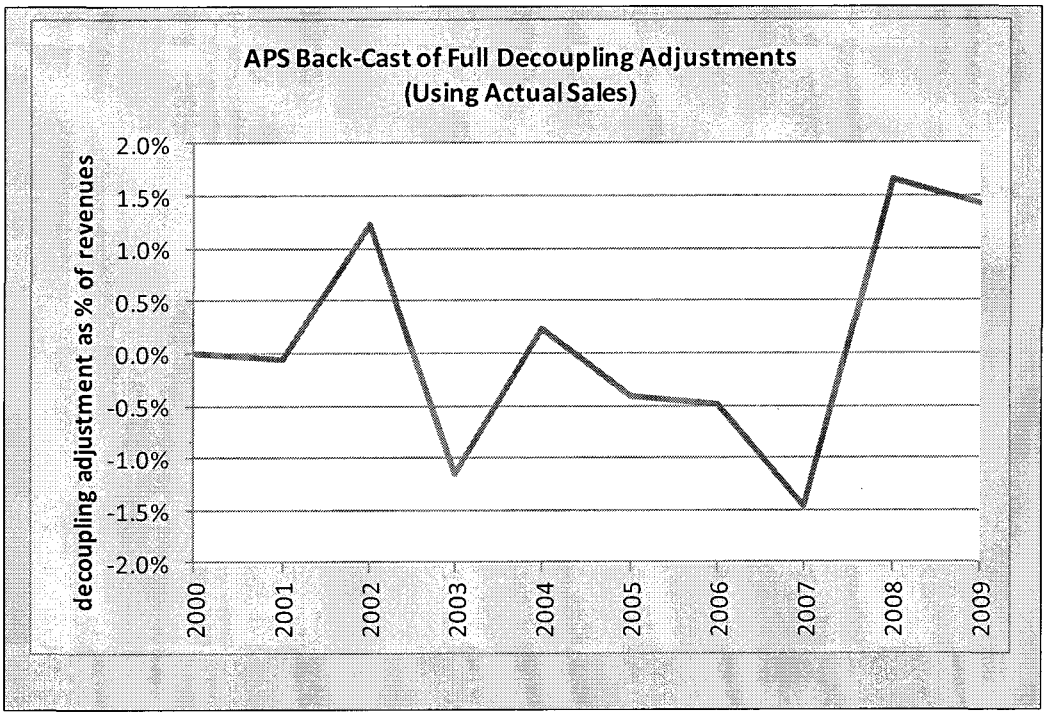


Figure 8

Exhibit DB-4: APS Historical Analysis of Decoupling



Source: APS letter dated May 20, 2010 filed in Docket No. E-00000J-08-0314.

Exhibit DB-5: Typical Residential Energy Savings for Common DSM Measures in Arizona

Measures for existing homes	Annual kWh savings*	Annual savings as % of average annual use**	Data sources
8 CFLs	280-330	2-3%	APS Existing Homes Residential Program: Home Performance with Energy Star, July 15, 2009, Table 5. *SRP Supporting Cleaner Power and Energy Efficiency,* 2009, p. 8.
3 mature shade trees on sun-struck sides of house	640	5%	Western Resource Advocates, *Phoenix Green: Designing a Community Tree Planting Program for Phoenix, Arizona,* 2009, Table 1.
Shade screens	1500	11%	APS Existing Homes Residential Program: Home Performance with Energy Star, July 15, 2009, Table 5
Low flow showerhead	220	2%	APS Existing Homes Residential Program: Home Performance with Energy Star, July 15, 2009, Table 5
Duct test and repair	1180	9%	APS Existing Homes Residential Program: Home Performance with Energy Star, July 15, 2009, Table 5
Second refrigerator recycling	800-970	6-7%	APS Appliance Recycling Program, July 15, 2009, Table 3. *SRP Supporting Cleaner Power and Energy Efficiency*, 2009, p. 7
Residential conservation behavior program		2%	Savings data pertain to Sacramento program. Ian Ayres, Sophie Raseman, and Alice Shih, "Evidence from Two Large Field Experiments that Peer Comparison Feedback Can Reduce Residential Energy Usage," Yale Law School, 2009. Summit Blue Consulting, *Impact Evaluation of OPower SMUD Pilot Study*, September 24, 2009
Solar hot water†	800-1350	6%-10%	SRP E23 Calculation Chart, Nov. 2008; Florida Solar Energy Center http://www.fsec.ucf.edu

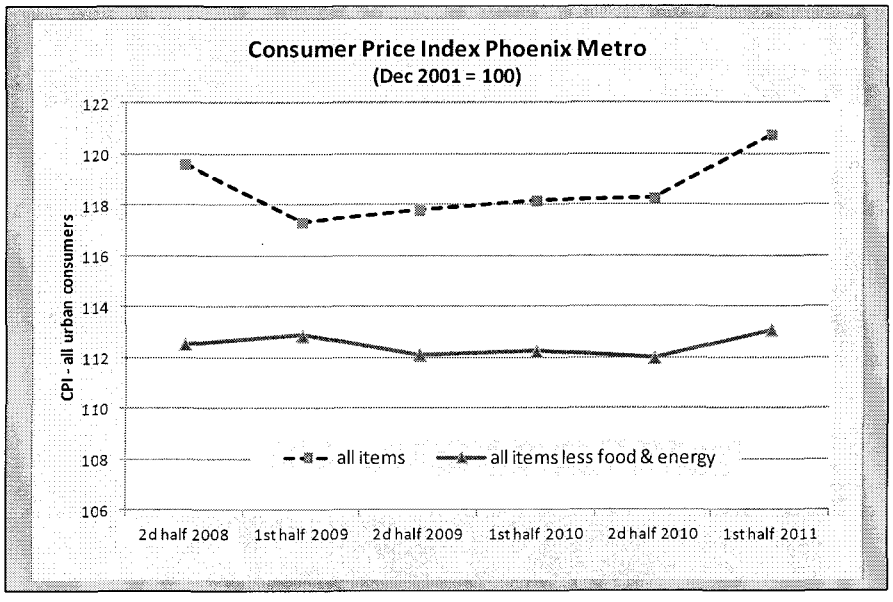
* Measured at the customer's meter. Note that some utility savings estimates include avoided losses. Avoided losses are not included in the figures in this table.

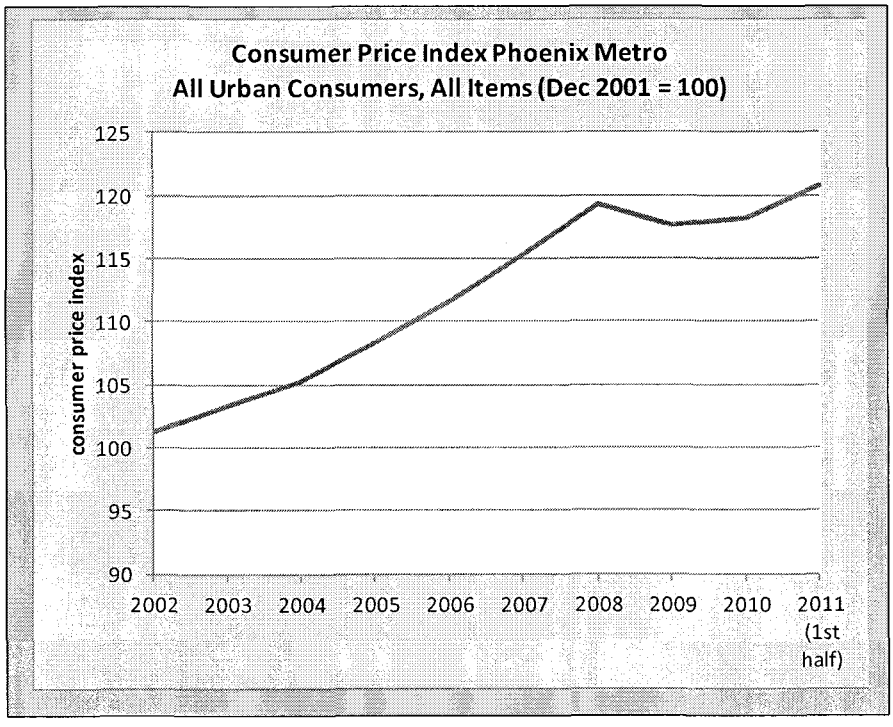
** Assumes average residential use of 13,191 kWh in 2010, per APS SFR, Schedule E7.

† APS' Solar hot water program is part of its Renewable Energy Standard program and is not subject to a test of cost-effectiveness.

Exhibit DB-6: Consumer Prices

Top Panel: Detail 2008 - 2011
Bottom Panel: Long term trend





Sources: Bureau of Labor Statistics, http://www.bls.gov/cpi/#data. Bureau of Labor Statistics, *Consumer Price Index Detailed Reports*, July 2011, January 2011, July 2010, January 2010, July 2009, January 2009, Table 34.