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BEFORE THE ARIZONA CORPORATION COMMISSION

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- GARY PIERCE, Chairman
- BOB STUMP
- SANDRA D. KENNEDY
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AZ CORP COMMISSION
DOCKET CONTROL

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
TESTIMONY

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Pursuant to the requirements of the July 29, 2011 Procedural Order, on behalf of the
 Arizona Investment Council ("AIC"), attached are:

- The Direct Testimony of AIC President, Gary Yaquinto;
- The Direct Testimony of Steven M. Fetter; and
- The Direct Testimony of Daniel G. Hansen, Ph.D.

RESPECTFULLY SUBMITTED this 18th day of November, 2011.

GALLAGHER & KENNEDY, P.A.

Arizona Corporation Commission
DOCKETED

NOV 18 2011

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18th day of November, 2011, with:

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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

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DESIGNED TO DEVELOP SUCH RETURN.

Docket No. E-01345A-11-0224

Direct Testimony of

Gary Yaquinto

on Behalf of

Arizona Investment Council

November 18, 2011

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1 **INTRODUCTION**

2 **Q. Please state your name, position and business address.**

3 A. Gary M. Yaquinto. I am the President of the Arizona Investment Council ("AIC"). Our
4 offices are located at 2100 North Central Avenue, Phoenix, Arizona 85004.

5
6 **Q. Please summarize your educational background and professional experience.**

7 A. I earned B.S. and M.S. Degrees in Economics in 1974 from Arizona State University. In
8 2005, I received an MBA from the University of Phoenix. From 1975 to 1977, I was
9 employed by the State of Wyoming as an economist responsible for evaluating the
10 economic, fiscal and demographic effects of resource development in Wyoming. From
11 1977 to 1980, I was Chief Research Economist for the Arizona House of Representatives.
12 From 1980 to 1984, I was employed as an economist in the consulting industry. Since
13 1984, I have worked in various capacities in government and the private sector in the area
14 of utility regulation, including positions with the Utilities Division Staff of the Arizona
15 Corporation Commission, a competitive local exchange telephone carrier and as a
16 consultant. I have also served as the Chief Economist at the Arizona Attorney General's
17 Office (2003-2005) and as the Director, Office of Strategic Planning and Budgeting,
18 under Governor Janet Napolitano (2005-2006). I became the AIC President in December
19 of 2006.

20
21 **Q. What is the Arizona Investment Council and what is its mission?**

22 A. The AIC is a non-profit association organized under Chapter 501(c)(6) of the Internal
23 Revenue Code. AIC's membership includes approximately 6,000 individuals—many of

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whom are debt and equity investors in Arizona utility companies and other Arizona businesses.

AIC’s mission is to advocate on behalf of its members’ interests before regulatory and legislative bodies, and specifically to enlarge and maximize the influence of utility investors on public policies and governmental actions that may have an impact on the well-being of investors and their utility investments.

AIC also works with policymakers to support investment in Arizona’s essential backbone infrastructure. We view this aspect of our mission as complementary to our core advocacy of investor interests. Investment in essential, backbone infrastructure is critical in supporting a well-functioning and robust economy. In 2008, AIC published “Infrastructure Needs and Funding Alternatives for Arizona: 2008-2032”—a comprehensive study that examined infrastructure and funding requirements over that 25-year period in four important areas: energy, water, telecommunications and transportation. This report, prepared by economists from Arizona State University, estimated investment requirements of about \$500 billion to meet our growing needs in these four critical areas over the next two and one-half decades. The findings demonstrate Arizona’s continuing need for substantial capital attraction.

1 **Q. Please summarize AIC's interest in this case.**

2 A. Given our mission as the voice of investors, AIC's overriding interest in this case is to
3 help ensure that APS continues to improve its financial health so the company can attract
4 capital on the best possible terms and rates for investment in Arizona's energy future.
5 The testimonies of AIC witnesses Steven Fetter and Dr. Daniel Hansen provide specific
6 recommendations on, and other information in support of, this goal. Mr. Fetter, a former
7 regulator and utility financial analyst with credit rating agency Fitch, describes the
8 importance of ratings in capital attraction for utility companies; the factors rating
9 agencies consider in determining ratings; the challenges APS faces in competing for
10 capital; and how the EIA and ERA proposed by APS can assist it and Arizona in that
11 capital contest. Dr. Hansen also provides testimony in support of APS's proposed EIA
12 decoupler.

13

14 **APS'S POSITIVE ECONOMIC IMPACT**

15 **Q. Is there anything else you would like to bring to the Commission's attention?**

16 A. Yes. APS is Arizona's largest electric utility. It has been providing service to Arizona
17 customers since 1886. With approximately 6,400 Arizona employees on the company's
18 payroll and annual cap-ex programs approaching \$1 billion, APS is a major contributor to
19 Arizona's economy. When you also consider the indirect jobs and income generated
20 through the multiplier effect resulting from APS's direct expenditures, the company's
21 total impact on the State economy is huge. APS, its employees and vendors also pay
22 taxes, which fund public services like education and safety and help support State and
23 local governments in Arizona.

1 While maintaining the company's financial health is important to investors and
2 customers, my point is that a financially strong APS plays an equally important role in
3 Arizona's economy.

4
5 **Q. Is there a study analyzing APS's direct and indirect contribution to Arizona's**
6 **economy?**

7 A. Earlier this year, economists at ASU's W.P. Carey School of Business, the L. William
8 Seidman Research Institute, prepared a study on this subject. The study—titled “The
9 Economic Impact of Arizona Public Service (APS) on the States of Arizona and New
10 Mexico in 2010”—quantifies the value that APS brings to the economies of both states in
11 terms of jobs, commerce and taxes. The study used a well-known computer model called
12 IMPLAN to estimate APS's direct economic contributions, as well as the indirect effects
13 associated with additional rounds of spending or “recycled” income.

14
15 I've attached a copy of this study to my testimony as AIC Exhibit GY-1.

16
17 **Q. What does the study tell us about APS's direct and indirect impacts on jobs in**
18 **Arizona?**

19 A. In 2010, APS employed about 7,500 workers (including positions with contractors) at
20 various sites in Arizona. These are the direct workers associated with APS, as well as
21 those on contractor payrolls. Additionally, APS also supports jobs associated with its
22 purchases from suppliers, which account for an additional 5,600 jobs.

1 The indirect effects of spending by APS employees supported more than 5,300 additional
2 employment positions and the indirect effect of spending by APS suppliers accounted for
3 5,100 more jobs. Finally, the indirect effect of State and local taxes paid by APS
4 supported more than 15,000 jobs in Arizona's government sector.

5
6 The total employment effect of APS operations in 2010 was approximately 39,000 jobs,
7 or about 1.2 percent of total employment in Arizona—a very significant level for one of
8 Arizona's largest native corporations. Another way of looking at its effect on jobs in our
9 State is that for every APS job (including its contractors), another 4.2 positions were
10 supported in Arizona's economy.

11
12 **Q. What are APS's direct and indirect effects on income in Arizona?**

13 **A.** Like its impact on jobs, APS has both direct and indirect income effects.

14
15 The direct income associated with APS operations in 2010 was \$1.3 billion. APS's
16 purchases from vendors accounted for an additional \$463 million.

17
18 Indirect income from consumer spending of APS employees produced \$363 million and
19 indirect income effects related to supplier purchases totaled \$372 million. The indirect
20 income effect related to APS's tax payments to the State and local governments was
21 \$869.4 million.

1 Total income—direct and indirect—traced to APS was \$3.372 billion, or 1.3 percent of
2 the total gross State product.

3
4 **Q. What amount does APS directly contribute to State and local taxes?**

5 A. As Arizonans know, State and local governments have struggled mightily to balance their
6 budgets over the past few years. The precipitous drop in government revenue collections
7 during the Great Recession has created a huge budgetary hole from which we're only
8 now beginning to recover. One constant, however, in tax collections has been the
9 contributions of companies like APS that are both economically stable and rooted in
10 Arizona's communities.

11
12 In 2010, APS paid directly \$122.1 million in property taxes and \$285.5 million in sales
13 and use taxes to all levels of government in Arizona. According to the ASU study, when
14 calculated on a per-employee basis, APS's \$52,000 per employee contribution is 17 times
15 more than the average Arizona business to State and local taxes.

16
17 **Q. Is there an indirect APS effect on State and local taxes?**

18 A. Yes. APS employees pay taxes based on salary, property ownership and retail purchases.
19 Obviously, its vendors and their employees pay taxes as well. The direct and indirect tax
20 effects associated with APS employees and vendors account for an additional \$184
21 million in taxes to Arizona governments.

1 **CONCLUSION**

2 **Q. Mr. Yaquinto, based on the ASU study of the economic impact of Arizona Public**
3 **Service Company, what conclusions do you have with respect to the Commission's**
4 **decision in this docket.**

5 A. First, the role that utility companies like APS play in fueling the State's economy is an
6 often overlooked aspect of rate cases. While the Commission's primary decisionmaking
7 responsibility is to balance the interests of customers and investors, the Commission
8 should also take into consideration how its ratemaking processes and decisions affect the
9 State's macro-economy. As the ASU study clearly shows, the direct and indirect
10 economic effects related to APS's operations are substantial.

11
12 Second, fit-for-purpose infrastructure is an essential component for fostering an efficient
13 and robust State economy—one that can offer prosperity for all Arizonans. Over the next
14 several decades, the infrastructure requirements for meeting Arizona's energy needs will
15 be immense. Failure to make the necessary and proper investments will impair our
16 economic future.

17
18 Therefore, keeping APS and other utility companies financially healthy and stable is a
19 necessary and very important ingredient for attracting capital to invest in essential
20 infrastructure.

21
22 **Q. Does that conclude your testimony?**

23 A. Yes, it does.

**The Economic Impact of Arizona Public Service (APS)
on the States of Arizona and New Mexico in
2010**

**L. William Seidman Research Institute
W. P. Carey School of Business
Arizona State University**

Executive Summary

This report measures the economic impact of Arizona Public Service (APS) operations on employment, total income (i.e., gross state product) and tax revenues in Arizona and New Mexico in 2010. Estimated impacts include both the direct effects of APS operations in each state and multiplier effects that arise when income is recycled within the Arizona and New Mexico economies. The IMPLAN input-output model was used to estimate multiplier effects.

The total impact of APS on the combined economies of Arizona and New Mexico, including the Navajo Nation, is estimated to 46,746 jobs (out of which 39,201 jobs in Arizona and 7,545 jobs in New Mexico) and total income of \$4,137 million (\$3,373 million in Arizona and \$764 million in New Mexico). Table 1 provides a breakdown of direct and indirect effects for the combined economies of Arizona and New Mexico; detailed figures by state are discussed in sections 3 and 4.

Table 1: Impact of APS on the Economies of Arizona and New Mexico

Economic Impacts	Total Income (\$ millions)	Employment
Direct effects from APS operations	1,396.1	7,974.0
Direct effects from supplier purchases	801.1	7,265.1
Indirect effects from consumer spending by APS employees	391.1	5,782.0
Indirect effects related to supplier purchases	575.0	8,191.0
Indirect effects from spending out of new state and local tax revenues	973.3	17,533.4
Total economic impact	4,136.6	46,745.5

Source: L. William Seidman Research Institute, W.P. Carey School of Business, Arizona State University

APS employs 7,974¹ workers in Arizona and New Mexico (7,514 workers in Arizona and 460 in New Mexico) with wage and salary payments amounting to \$756 million (\$694 million in Arizona and \$62 million in New Mexico). The total income – which includes wages, salaries, employee benefits, and business taxes paid by APS² – directly associated with APS operations in both states is \$1,396 million³ (out of which \$1,305 million accrues in Arizona and \$91 million in New Mexico).

APS purchases from Arizona and New Mexico vendors amounted to \$1,537 million (out of which \$945.5 million were from Arizona vendors and \$591 million from New Mexico

¹ This figure includes 1,141 contractors, whose wages and salaries are not included in APS's payroll.

² Capital income is not included because it accrues to shareholders who may live out of state.

³ One should be careful to not divide income by employment and interpret the result as representing salaries and wages per worker. The same applies to income figures displayed in rows 2-6 of Table 1, which would be even more inexact, as these income figures contain business or property income in addition to employee compensation and business taxes.

vendors). The direct employment impacts associated with all vendor purchases are 7,265 jobs in the two states (5,621 jobs in Arizona and 1,644 jobs in New Mexico). The direct income effects are \$801 million of total income in both states (\$463 million of total income in Arizona, and \$338 million of total income in New Mexico). Included in this and other total income figures in the remainder of the table is realized business or property income, in addition to wages, salaries, employee benefits, and business taxes.

In economic impact analysis, estimates are also made of the indirect effects that arise when first-tier suppliers place upstream demands on other producers and when workers either directly or indirectly associated with company operations spend a portion of their incomes in state. Our estimates of these indirect employment effects amounted to 13,973 jobs in Arizona and New Mexico (10,442 jobs in Arizona and 3,531 jobs in New Mexico). The combined income effects for the two states were \$966 million (\$735 million in Arizona and \$231 million in New Mexico).

Another important effect to consider is the spending of new tax revenues. APS is estimated to generate, both directly and indirectly, a total of \$667 million in tax revenues for Arizona and New Mexico state and local governments (out of which \$591 million are for Arizona state and local governments, and \$76 million for New Mexico state and local governments). The spending of these tax dollars is responsible for 17,533 jobs in the two states (15,624 jobs in Arizona and 1,909 jobs in New Mexico) and \$973 million of total income (\$869 million of total income in Arizona, and \$104 million of total income in New Mexico).

The economic impact figures listed above are substantial. One of the reasons for the large impacts is that energy exports make up a significant share of APS's net generation. For example, exports to California and Texas make up 46% of the Palo Verde and Four Corners plants' combined net generation. Hence, a large portion of APS's economic impact can be attributed to export activities. Other reasons include a large employment base and large tax payments made by APS.

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The Economic Impact of Arizona Public Service on the States of Arizona and New Mexico, 2010

1. Introduction

Arizona Public Service (APS) is the largest electric utility in Arizona, serving over a million customers throughout the state. Its service area includes 11 counties, concentrated within northern and central Arizona, covering 40% of AZ households⁴. Regulated by the Arizona Corporation Commission, APS is the principal subsidiary of publicly-traded Pinnacle West Capital Corporation. The company has over 7,000 employees. Its large generation fleet includes a diverse mix of energy resources including natural gas, nuclear, coal and a growing number of renewable technologies.

APS's power plants are located mainly in Arizona, with the exception of the Four Corners Power Plant, located on the Navajo Indian Reservation west of Farmington, New Mexico. Power plants located in Arizona include the Palo Verde Nuclear Generating Station about 55 miles west of Phoenix, the Cholla Power Plant located in northeastern Arizona near Holbrook, the Navajo Power Plant in northern Arizona on the Navajo Indian Reservation near Page, the Redhawk Power Station close to Phoenix, the West Phoenix Power Plant, the Ocotillo Power Plant in Tempe, the Sundance Generating Station in Coolidge, the Saguaro Power Plant north of Tucson, the Douglas Power Plant, located in the town of Douglas in southeastern Arizona, and the Yucca Power Plant near Yuma.

The purpose of this report is to measure the economic impact of APS on employment, income and tax revenues in Arizona and New Mexico. Estimated impacts include both the direct effects of APS operations and multiplier effects that arise when income is recycled within the states' economy. Section 2 of the report reviews the economic impact methodology and the primary data used in the calculations. Section 3 provides estimates of the impact of APS operations on the states of Arizona and New Mexico. Section 4 provides estimates of the total impact of APS on state and local tax revenues in Arizona and New Mexico.

2. Data and Methodology

Economic impact analysis traces the full impact, direct and indirect, of an economic activity on jobs and incomes in a local economy. Operations at a company such as APS directly affect an economy through the jobs provided to company workers and the jobs supported among first-tier suppliers. Indirect effects arise when suppliers place upstream demands on other producers, when workers either directly or indirectly associated with the operations spend a portion of their incomes in the local economy, and when

⁴ Arizona's Energy Future: APS Resource Plan 2009 through 2025, January 2009- retrieved from http://www.aps.com/files/various/ResourceAlt/Resource_Plan_-_Presentation_sFinal.pdf on 3/29/2011

governments spend new tax revenues. In the end, the cumulative changes in jobs and incomes are a multiple of the initial direct effects.

Economic impacts were estimated using the Arizona and New Mexico modules of IMPLAN, an input-output model developed and maintained by the Minnesota IMPLAN Group, Inc.

Economic impacts were measured in terms of two variables: total income and employment. Total income is synonymous with gross product or value added. It is the sum of employee compensation (wages, salaries and benefits, including employer contributions to health insurance and retirement pensions), proprietor income, property income, and indirect business taxes. Employment is a count of full- and part-time jobs. It includes both wage and salary workers and the self-employed.

Primary company-level data was provided by APS on total wage and salary payments, benefits, and employment at its plants in Arizona and New Mexico. APS also provided a complete record of payments made to suppliers for goods and services, and taxes paid to state and local governments. Data were for the year 2010. The compensation of APS employees was reported for the state in which the employee works, which may differ from the employee's state of residence (data by residence of employees was not available.)

All monetary amounts in this report are in 2010 dollars.

A technical appendix at the end of this report provides additional details on the data and estimation procedures used in this analysis.

3. Economic Impact of APS

3.1. State of Arizona

APS employs a total of 7,514⁵ workers at sites across the state of Arizona. The total wages and salaries of APS employees who work in Arizona are \$694 million. If health and retirement benefits and government social insurance are included, the total compensation of these employees is \$897 million.

In 2010, total APS transactions with Arizona entities amounted to \$1,352 million, including payments to vendors of goods and services as well as government agencies. After excluding tax-related items, purchases from Arizona vendors amounted to \$945.5 million. Table 2 provides a breakdown by categories.

Table 2: APS Transactions with Arizona Vendors

⁵ This figure includes 1,141 contractors, whose wages and salaries are not included in APS's payroll.

Categories	Amount (\$ millions)	Percent of Total
Construction and maintenance of buildings/ facilities	220.4	23.3%
Manufactured and wholesale goods	171.2	18.1%
Coal mining	165.8	17.5%
Services	159.7	16.9%
Electricity	96.0	10.2%
Government and regulatory	85.9	9.1%
Finance, insurance and real estate	26.2	2.8%
Industrial machinery and equipment rental /maintenance	13.4	1.4%
Natural gas	7.0	0.7%
Total	945.5	100.0%

Source: APS

The most important categories of vendor payments were for construction and maintenance work of APS structures (23 percent), and purchases of manufactured or wholesale goods (e.g. distribution meters, transformers, transmission towers and poles, electrical equipment, steel and fabricated metals; 18 percent). Approximately 18 percent of APS payments were for delivered coal. Services (such as legal, engineering, computer-related and other business services) represented 17 percent of vendor transactions, and 10 percent were for electricity. Nine percent of transactions were for government and regulatory expenses -such as franchise fees that APS pays to municipalities for use of public rights of way, and regulatory assessments. Other important categories of vendor purchases were finance, insurance and real estate transactions (3 percent) and industrial machinery and equipment rental and maintenance (1 percent). Natural gas purchases made up less than 1 percent of vendor transactions in Arizona since this resource is primarily procured from New Mexico.

Table 3 provides a summary of the total economic impact of APS on the state of Arizona. The first line of the table shows the direct contribution of APS operations to resident income and employment in Arizona. These direct effects are estimated to be \$1,305 million in total income and employment of 7,514 workers. Total direct income is the sum of employee compensation APS paid to its employees and business taxes paid directly by APS to state and local governments. Excluded from Arizona total income is the capital income which accrues to APS shareholders.

The second line of the table shows the direct impacts that are generated in the Arizona economy because of APS vendor purchases. In purchasing \$945.5 million of goods and services from Arizona suppliers, APS directly supports 5,621 jobs and \$463 million of total income in the state. Included in this and other total income figures in the remainder of the table is realized business or property income, much of which is likely to accrue to Arizona residents, especially in the case of small and medium-sized businesses.

The third and fourth lines of Table 3 show our estimates of the multiplier effects associated with the consumer spending of APS employees and the indirect effects stemming from APS supplier purchases. These effects are substantial. As measured by

employment, for example, the total of the two multiplier effects is 10,442 jobs, 80 percent as large as the sum of the two direct effects.

A discussion of the impact of APS operations on Arizona tax revenues is presented in section 4.1. Shown in line five of Table 3 are estimates of the economic impacts generated when these tax revenues are spent by state and local governments. APS is estimated to generate, both directly and indirectly, a total of \$592 million in tax revenues for Arizona state and local governments. The spending of these tax dollars is responsible for 15,624 jobs and \$869 million of total income in Arizona. These impacts are large, especially the employment impacts. Indeed, the number of jobs supported by the spending of new tax revenues is larger than the sum of the number of APS employees and the number of workers supported among first-tier suppliers. There are two reasons for the large size of the tax-related impacts. First, the operations of APS generate a large amount of tax revenue per APS job. This is due partly to the high business taxes paid by APS. Secondly, provision of government services is a highly labor intensive activity. A given quantity of dollars spent on government services supports a relatively large number of jobs.

The total impact of APS operations on the Arizona economy is estimated to be 39,201 jobs and total income of \$3,373 million. For perspective, the employment impact is 1.2 percent of total Arizona employment and the income figure is 1.3 percent of Arizona's gross state product.

Table 3: Impact of APS on the Economy of the State of Arizona

Economic Impacts	Total Income (\$ millions)	Employment
Direct effects from APS operations	1,304.8	7,514
Direct effects from supplier purchases	463.0	5,621
Indirect effects from consumer spending by APS employees	363.5	5,308
Indirect effects related to supplier purchases	372.0	5,134
Indirect effects from spending out of new state and local tax revenues	869.4	15,624
Total economic impact	3,372.7	39,201

Source: L. William Seidman Research Institute, W.P. Carey School of Business, Arizona State University

3.2. State of New Mexico

APS employs 460 workers at its Four Corners plant in northwestern New Mexico, on the Navajo Indian Reservation. The total wages and salaries of APS employees at this site is \$62 million. If health and retirement benefits and government social insurance are included, the total compensation of these employees is \$80 million.

In 2010, total APS transactions with New Mexico entities amounted to \$603 million—these include vendors of goods and services as well as government agencies. After excluding tax-related items, purchases from New Mexico vendors amounted to \$591 million; Table 4 provides a breakdown by categories.

Table 4: APS Transactions with New Mexico Vendors

Categories	Amount (\$ millions)	Percent of Total
Coal mining	303.1	51.2%
Extraction of natural gas	269.9	45.6%
Waste management and remediation services	8.2	1.4%
Electricity	5.2	0.9%
Services to buildings	2.8	0.5%
Industrial machinery and equipment rental and leasing	2.2	0.4%
Total	591.4	100.00%

Source: APS

The most important categories of vendor payments were coal mining (51 percent of the total), and extraction of natural gas (46 percent). Waste management services represented 3 percent of vendor purchases, and electricity purchases represented 1 percent. Other categories of vendor purchases, each representing less than 1 percent of total expenditures, were services to buildings, and machinery and equipment rental and leasing.

Table 5 provides a summary of the total economic impact of APS on the state of New Mexico. The first line of the table shows the direct contribution of APS operations to total income and employment. These are \$91 million in income and employment of 460 workers. Total direct income is the sum of employee compensation APS paid to its employees and business taxes paid directly by APS to state and local governments. Excluded from New Mexico total income is the capital income which accrues to APS shareholders.

The second line of the table shows the direct impacts that are generated in New Mexico's economy because of APS vendor purchases. In purchasing \$591 million of goods and services from New Mexico suppliers, APS directly supports 1,644 jobs and \$338 million of total income in the state. Included in this and other total income figures in the remainder of the table is realized business or property income, much of which is likely to accrue to New Mexico residents, especially in the case of small and medium-sized businesses.

The third and fourth lines of Table 5 show our estimates of the multiplier effects associated with the consumer spending of APS employees and the production of goods and services purchased from New Mexico vendors. These effects are substantial. As measured by employment, for example, the total of the two multiplier effects is 3,531 jobs, which is larger than the sum of the two direct effects (2,104).

A discussion of the impact of APS operations on New Mexico tax revenues is presented in section 4.2. Line five of Table 5 shows estimates of the economic impacts generated when tax revenues are spent by state and local governments. APS is estimated to generate, both directly and indirectly, a total of \$76 million in tax revenues for New Mexico state and local governments. The spending of these tax dollars is responsible for 1,909 jobs and \$104 million of total income in New Mexico.

The total impact of APS operations on the New Mexico economy is estimated to be 7,545 jobs and total income of \$764 million. For perspective, the employment impact is 0.7 percent of total New Mexico employment and the income figure is 1 percent of New Mexico's gross state product.

Table 5: Impact of APS on the Economy of the State of New Mexico

Economic Impacts	Total Income (\$ millions)	Employment
Direct effects from APS operations	91.3	460
Direct effects from supplier purchases	338.1	1,644
Indirect effects from consumer spending by APS employees	27.6	474
Indirect effects related to supplier purchases	203.0	3,057
Indirect effects from spending out of new state and local tax revenues	103.9	1,909
Total economic impact	763.9	7,545

Source: L. William Seidman Research Institute, W.P. Carey School of Business, Arizona State University

4. Impact on State and Local Government Tax Revenues

Due to APS's sizeable tax payments, the company makes important contributions to the financing of government services. In this section we report estimates of the impact of APS on the tax revenues of state and local governments in Arizona and New Mexico. The figures include not only the direct business taxes paid by APS, but also the taxes that are associated with the income and spending of APS employees and the economic activity of APS suppliers.

4.1. State of Arizona

Table 6 reports the taxes paid directly by APS. Total Arizona state and local taxes paid in 2010 amounted to \$408 million. Most important were sales and use taxes, which totaled \$286 million, followed by property taxes at \$122 million.

Table 6: Taxes paid by APS to Governments in the State of Arizona

Arizona Taxes	Amount (\$ millions)
Property Tax	122.1
Sales & Use Tax	285.5
Total	407.6

Source: APS

Public service delivery at the state and local level is driven by population. To appreciate the role APS plays in paying for these services, it is useful to compare APS tax payments per employee with the statewide ratio of total business taxes to employment. The business taxes paid by APS amount to \$54,243 per employee. Estimates of total business taxes paid in the state suggest that the average taxes paid by Arizona businesses are on the order of \$3,200 per worker. On this basis, in Arizona, APS pays 17 times as much in taxes as does the average Arizona business.

APS makes especially important contributions to school districts and other local jurisdictions through the property taxes it pays. To gain some perspective on the relative significance of these tax payments, information on Arizona taxes was obtained for Fiscal Year 2008 from the U.S. Census Bureau's State and Local Government Finances division. This is the most recent year for which detailed tabulations by tax and level of government are available. The property taxes paid in connection with APS operations across the state represent 1.8 percent of all state and local property taxes collected in Arizona. In comparison, APS direct employment of 7,514 represents .2 percent of total Arizona employment.

Table 7 presents our estimates of the total impact of APS operations on Arizona state and local tax revenues. These figures encompass all of the taxes generated throughout the economic impact process, including taxes associated with the incomes and spending of APS employees and the taxes generated when suppliers produce goods and services for use in APS operations. The total tax impact of the company is estimated to be \$592 million. This represents 2.6 percent of all tax revenues collected by state and local governments in Arizona.

Table 7: Impact of APS on Arizona State and Local Tax Revenues

Tax Impacts	Amount (\$ millions)
Taxes paid directly by APS	407.6
Taxes paid directly and indirectly by APS employees	110.8
Taxes generated both directly and indirectly by APS vendor purchases	73.4
Total state and local taxes	591.8

Source: L. William Seidman Research Institute, W.P. Carey School of Business, Arizona State University

4.2. State of New Mexico

Table 8 reports state and local taxes paid directly by APS in New Mexico taxes in 2010, which amounted to \$11.6 million. Most important were taxes paid to the Navajo Nation at \$7.5 million. Sales and use taxes totaled \$2.1 million, while property taxes were \$2 million.

Table 8: Taxes paid by APS to Governments in the State of New Mexico

New Mexico Taxes	Amount (\$ millions)
Property Tax	2.0
Sales & Use Tax	2.1
Taxes paid to the Navajo Nation	7.5
Total	11.6

Source: APS

To assess the role of APS in paying for state and local level public services, it is useful to compare APS tax payments per employee with the statewide ratio of total business taxes to employment. The business taxes paid by APS amount to \$25,314 per employee. Estimates of total business taxes paid in the state suggest that the average taxes paid by New Mexico businesses are on the order of \$3,600 per worker. On this basis, APS pays 7 times as much in taxes as does the average New Mexico business.

To gain some perspective on property taxes paid by APS in New Mexico which contribute to school districts and other local jurisdiction, data on taxes was obtained for Fiscal Year 2008 from the U.S. Census Bureau's State and Local Government Finances division. The property taxes paid in connection with APS operations across the state of New Mexico represent 0.2 percent of all state and local property taxes collected in New Mexico.

Table 9 presents our estimates of the total impact of APS operations on New Mexico state and local tax revenues. These figures encompass all of the taxes generated throughout the economic impact process, including taxes associated with the incomes and spending of APS employees and the taxes generated when suppliers produce goods and services for use in APS operations. The total tax impact of the company is estimated to be \$76 million. This represents approximately 1 percent of all tax revenues collected by state and local governments in New Mexico.

Table 9: Impact of APS on New Mexico State and Local Tax Revenues

Tax Impacts	Amount (\$ millions)
Taxes paid by APS	11.6
Taxes paid directly and indirectly by APS employees	10.7
Taxes generated both directly and indirectly by APS vendor purchases	53.8

Total state and local taxes	76.1
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*Source: L. William Seidman Research Institute, W.P. Carey School of Business,
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Technical Appendix: Data and Economic Impact Methodology

TA.1 Employment and Payroll

APS provided a file containing total wage and salary payments, benefits, and employment for 2010 for its plants in Arizona and New Mexico. The average APS worker- in Arizona and New Mexico- receives health and retirement and government social insurance benefits equal to 29 percent of wages and salaries.

TA.2 Consumer spending

In economic impact analysis, estimates are made of the indirect effects of a company's payroll that are generated when employees spend a portion of their incomes on goods and services produced within the local economy. Based on information in the Bureau of Labor Statistics' annual *Consumer Expenditure Survey* (CES), we assume that 75 percent of the money income of APS employees is spent on consumption. The detailed commodity make-up of these expenditures is based on data from the CES on the spending patterns of households with incomes \$75-100k, which equates approximately \$55.5-74k per worker.

TA.3 Vendor purchases

Companies make potentially significant contributions to the local economy through their purchases of goods and services from local suppliers. APS provided a file containing all vendor purchases in 2010, listing each payment the company made to a vendor during the year. Each record included the category and subcategory of the transaction, the name of the vendor, the amount, and the vendor's state. APS made purchases from both in-state and out-of state vendors. While out-of-state purchases are substantial and represent roughly 50 percent of vendor purchases, for the purpose of this study, only Arizona and New Mexico vendors are of interest. There were a total of 9,120 individual records for Arizona and 989 for New Mexico, excluding government agencies.

To incorporate this information into IMPLAN, it is necessary to assign a detailed industry code to each transaction indicating the nature of the good or service being purchased and produced (e.g., electrical equipment vs. legal services.). To make this task manageable, a sample was drawn consisting of all suppliers who were paid \$1,000,000 or more in at least one transaction. This narrowed the list of transactions to be coded to 146 for Arizona and 9 for New Mexico. This sample provided a high degree of coverage. In 2010, APS made payments to Arizona vendors totaling \$945.5 million (excluding tax payments to governments). The sum of all payments in our coded sample was \$641 million, or 68 percent of the actual total. APS made payments of \$591 million (excluding tax payments to governments) to New Mexico vendors; our coded sample totaling \$575 million covers 97 percent of the total.

To correctly assess the amount of vendor purchases, certain adjustment needed to be made for vendor payments for equipment and fuels that are produced out of state. For every dollar spent on equipment from wholesalers, local business owners and employees receive only 15¢. For natural gas imported from out of state, local distributors receive 10¢. These figures are based on IMPLAN's production functions.

TA.4 Estimating tax revenues

One of the objectives of this report was to estimate the total impact of APS operations on Arizona state and local tax revenues. APS provided information on the taxes paid directly by the company—property, sales and use, etc- in Arizona and New Mexico. While direct taxes paid by APS are easy to know, it is a difficult task to estimate the taxes paid by APS employees and any of the other taxes connected with the economic impact process. Many important taxes are local—for example, the property taxes paid to school districts or sales taxes paid to cities. In theory, to estimate these, one would need to have and utilize information with a high degree of geographic granularity on the incomes and spending of employees, suppliers and anyone else connected with the multiplier process. Such an analysis is beyond the scope of this project.

To make the calculations meaningful, yet manageable, tax revenues generated at any phase of the economic impact process (apart from the business taxes paid directly by APS) were estimated by multiplying the income attributable to production in that phase by the economy-wide ratio of state and local taxes to gross state product. The most recent year for which this data is available from the U.S. Census Bureau is Fiscal Year 2008. In that year, total state and local taxes in Arizona represented 8.8 percent of gross state product; in New Mexico the corresponding figure was 9.9 percent. In other words, on average, income generated from production in Arizona was taxed by state and local governments at a combined rate of 8.8 percent; in New Mexico, similar income was taxed at a rate of 9.9 percent. With this figure in mind, taxes connected with the income earned and spent by APS employees was estimated by taking 8.8 percent of their labor income in Arizona and 9.9 percent in New Mexico. Taxes associated with the production of goods and services that APS purchased from Arizona suppliers were estimated by taking 8.8 percent of the income generated from that production; goods and services that APS purchased from New Mexico suppliers were estimated by taking 9.9 percent of the income generated from that production. Taxes associated with the multiplier process were also estimated in this way.

Inherent in our methodology is an inability to separate state taxes from taxes accruing to local governments. Estimates of tax impacts are reported at the state level only.

TA.5 Exports to other states

APS provided the amount of net generation for its Palo Verde plant, as well as how much of it is used in Arizona, or exported to New Mexico, California and Texas. For the Four Corners plant located in New Mexico, APS provided the amount of electricity used in New Mexico as well as what is exported to the states of California, Arizona, and Texas.

TA.6 The IMPLAN model

IMPLAN is maintained and licensed by the Minnesota IMPLAN Group, Inc. (MIG). The IMPLAN model organizes the economy into 440 separate industries and has comprehensive data on every area of the United States; it is widely used by economists to assess impacts of economic activities on the local economy.

The specific model used in this report was based on IMPLAN's 2007 economic database. In addition to providing estimates of multiplier effects, IMPLAN has a detailed database which makes it possible to estimate the direct jobs and incomes associated with any given dollar amount of vendor purchases.

Type SAM (Social Accounting Matrix) multipliers were used with the amount of recycled spending limited to private sector spending. State and local tax revenues generated during the economic impact process also were assumed to be spent, but these calculations were performed outside of IMPLAN.

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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

GARY PIERCE, Chairman
BOB STUMP
SANDRA D. 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

Direct Testimony of

Steven M. Fetter

on Behalf of

Arizona Investment Council

November 18, 2011

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EXHIBITS: AIC Exhibit SMF-1

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I. INTRODUCTION AND BACKGROUND

Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.

A. My name is Steven M. Fetter. I am President of Regulation UnFettered. My business address is P.O. Box 280, Nordland, Washington 98358.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am President of Regulation UnFettered, a utility advisory firm I started in April 2002. Prior to that, I was employed by Fitch, Inc. ("Fitch"), a credit rating agency based in New York and London. Prior to that, I served as Chairman of the Michigan Public Service Commission ("Michigan PSC"). Earlier, I served as Majority General Counsel to the Michigan State Senate and Assistant Legal Counsel to Michigan Governor William Milliken, and as Acting Deputy Under Secretary of Labor and appellate litigation attorney at the National Labor Relations Board in Washington, D.C.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I graduated with high honors from the University of Michigan with an A.B. in Communications in 1974. I graduated from the University of Michigan Law School with a J.D. in 1979.

Q. PLEASE DESCRIBE YOUR SERVICE ON THE MICHIGAN PUBLIC SERVICE COMMISSION.

A. I was appointed as a Commissioner to the three-member Michigan PSC in October 1987 by Democratic Governor James Blanchard. In January 1991, I was promoted to

1 Chairman by incoming Republican Governor John Engler, who reappointed me in July
2 1993. During my tenure as Chairman, timeliness of commission processes was a major
3 focus and my colleagues and I achieved the goal of eliminating the agency's case backlog
4 for the first time in 23 years.

5
6 **Q. PLEASE BRIEFLY DESCRIBE YOUR ROLE AS PRESIDENT OF**
7 **REGULATION UNFETTERED.**

8 A. I formed a utility advisory firm to use my financial, regulatory, legislative, and legal
9 expertise to aid the deliberations of regulators, legislative bodies, and the courts, and to
10 assist them in evaluating regulatory issues. Since April 2002, I have participated in over
11 85 cases related to utilities, most of the time as an expert witness testifying as to credit
12 rating issues and regulatory climate. My clients have included investor-owned and
13 municipal electric, natural gas and water utilities, state public utility commissions and
14 consumer advocates, non-utility energy suppliers, international financial services and
15 consulting firms, and investors.

16
17 **Q. WHAT WAS YOUR ROLE DURING YOUR EMPLOYMENT WITH FITCH?**

18 A. I was Group Head and Managing Director of the Global Power Group within Fitch. In
19 that role, I served as group manager of the combined 18-person New York and Chicago
20 utility team. I was originally hired to interpret the impact of regulatory, legislative, and
21 political developments on utility credit ratings, a responsibility I continued to have
22 throughout my tenure at the rating agency. In April 2002, I left Fitch to start Regulation
23 UnFettered.

1 **Q. HOW LONG WERE YOU EMPLOYED BY FITCH?**

2 A. I was employed by Fitch from October 1993 until April 2002. In addition, Fitch retained
3 me as a consultant for a period of approximately six months shortly after I resigned.
4

5 **Q. HOW DOES YOUR EXPERIENCE RELATE TO YOUR TESTIMONY IN THIS**
6 **PROCEEDING?**

7 A. My testimony addresses the relationship between regulation and a utility's ability to
8 access capital and manage risk. My background as Chairman and Commissioner on the
9 Michigan PSC and my subsequent professional experience analyzing the electric and
10 natural gas sectors – in jurisdictions involved in restructuring activity as well as those still
11 following a traditional regulated path – have given me solid insight into the importance of
12 a regulator's role in setting rates and also in determining appropriate terms and conditions
13 of service for regulated utilities.

14 Specifically, my experience with Fitch confirmed that regulatory environment is a
15 key factor in utility credit analysis and formulation of individual company credit ratings.
16 Further, it is undeniable that a utility's credit ratings significantly affect the ability of a
17 utility to raise capital on a timely basis and upon reasonable terms. It is also crucial that a
18 regulated utility be in a position to raise capital in all phases of its business cycle and
19 whatever the circumstances within the financial markets and general economy.
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1 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE REGULATORY AND**
2 **LEGISLATIVE BODIES?**

3 A. Since 1990, I have testified on numerous occasions before the U.S. Senate, the U.S.
4 House of Representatives, the Federal Energy Regulatory Commission, federal district
5 and bankruptcy courts, and various state legislative, judicial, and regulatory bodies on the
6 subjects of credit risk within the utility sector, electric and natural gas utility
7 restructuring, fuel and other energy cost adjustment mechanisms, construction work in
8 progress and other interim rate recovery structures, utility securitization bonds, and
9 nuclear energy. I have previously testified before the Arizona Corporation Commission
10 (“ACC” or “Commission”) on behalf of Arizona Public Service Company (“APS” or the
11 “Company”) in Docket Nos. E-01345A-03-0437, E-01345A-05-0816, and E-01345A-06-
12 0009, and on behalf of Southwest Gas Corporation in Docket No. G-01551A-04-0876.

13 My full educational and professional background is presented in AIC
14 Exhibit SMF-1.

15
16 **II. OVERVIEW OF TESTIMONY**

17 **Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?**

18 A. I am testifying on behalf of the Arizona Investment Council in this proceeding and will
19 focus on the following issues:

20 a) building on progress made as a result of the Settlement Agreement
21 approved by the ACC in 2009, the importance of APS continuing to improve its financial
22 health, so as to be able to withstand not only the normal financial risks that accompany
23 day-to-day operation of a regulated utility, but also the extreme stresses that can be

1 brought on by a global and national financial crisis similar to the one starting three years
2 ago and still underway; as part of my analysis, I discuss the Company's current credit
3 ratings and the benefits for both customers and investors that a stronger credit rating
4 profile would provide;

5 b) the Company's proposed decoupling mechanism and how it fits within the
6 context of the broader use of decoupling mechanisms across the U.S.; and

7 c) the Company's proposed infrastructure investment mechanism and how it
8 will assist APS in managing its risks and attracting capital as it invests in maintenance
9 and enhancement of its generation, transmission, and distribution facilities, and also
10 endeavors to meet renewables and energy efficiency mandates.

11 12 **III. CREDIT RATING PROCESS**

13 **Q. PLEASE PROVIDE AN OVERVIEW OF THE CREDIT RATING PROCESS.**

14 A. Credit ratings reflect a credit rating agency's independent judgment of the general
15 creditworthiness of an obligor or the creditworthiness of a specific debt instrument.
16 While credit ratings are important to both debt and equity investors for a variety of
17 reasons, their most important purpose is to communicate to investors the financial
18 strength of a company or the underlying credit quality of a particular debt security issued
19 by that company. Credit rating determinations are made through a committee process
20 involving individuals with knowledge of a company, its industry, and its regulatory
21 environment. Corporate rating designations of Standard & Poor's ("S&P") and Fitch
22 basically have 'AA', 'A' and 'BBB' category ratings within the investment-grade ratings
23 sphere, with 'BBB-' as the lowest investment-grade rating and 'BB+' as the highest non-

1 investment-grade rating. Comparable rating designations of Moody's at the investment-
2 grade dividing line are 'Baa3' and 'Ba1', respectively.

3 Corporate credit ratings analysis considers both qualitative and quantitative
4 factors to assess the financial and business risks of fixed-income issuers. A credit rating
5 is an indication of an issuer's ability to service its debt, both principal and interest, on a
6 timely basis. It also at times incorporates some consideration of the ultimate recovery of
7 investment in case of default or insolvency. Ratings can also be used by contractual
8 counterparties to gauge both the short-term and longer-term health and viability of a
9 company. Credit ratings are very important to institutional investors because rating
10 levels often dictate the types of investments that are appropriate and/or permissible for a
11 specific investor.

12
13 **Q. CAN YOU PROVIDE A BRIEF DISCUSSION ON WHY CREDIT RATINGS ARE**
14 **IMPORTANT FOR REGULATED UTILITIES AND THEIR RATEPAYERS?**

15 A. Yes. A utility's credit ratings have a significant impact on whether that utility will be
16 able to raise capital on a timely basis and upon reasonable terms. As respected economist
17 Charles F. Phillips stated in his treatise on utility regulation:

18 Bond ratings are important for at least four reasons: (1) they are used by
19 investors in determining the quality of debt investment; (2) they are used
20 in determining the breadth of the market, since some large institutional
21 investors are prohibited from investing in the lower grades; (3) **they**
22 **determine, in part, the cost of new debt, since both the interest**

1 **charges on new debt and the degree of difficulty in marketing new**
2 **issues tend to rise as the rating decreases;** and (4) they have an indirect
3 bearing on the status of a utility's stock and on its acceptance in the
4 market.¹

5 Thus, a utility with strong credit ratings is not only able to access the capital
6 markets on a timely basis at reasonable rates – especially during periods of economic
7 turmoil – it also shares the benefit of those attractive interest rates with ratepayers,
8 because the cost of capital is factored into utility rates. Conversely, the lower a regulated
9 utility's credit rating, the more the utility will have to pay to raise funds from debt and
10 equity investors which increases the rates that consumers have to pay. This is especially
11 true for a utility like APS, with its ongoing significant capital investment requirements
12 needed to ensure continuing reliability and safety of service to its ratepayers, as well as
13 the cost of meeting environmental, renewables and energy efficiency mandates.
14 Moreover, in the current markets, there is significant competition for capital, which
15 heightens the importance of APS achieving and then maintaining a favorable rating.

16 **Q. WHAT ARE THE QUALITATIVE FACTORS USED BY THE RATING**
17 **AGENCIES?**

18 **A.** The most important qualitative factors include regulation, management and business
19 strategy, and, for electric and natural gas utilities, access to energy, gas and fuel supply
20 with recovery of associated costs.

21
22 ¹ Phillips, Charles F., Jr., The Regulation of Public Utilities, Arlington, Virginia: Public Utilities Reports, Inc., 1993
23 at p. 250 (emphasis added). *See also* Public Utilities Reports Guide: "Finance," Public Utilities Reports, Inc., 2004
24 at pp. 6-7 ("Generally, the higher the rating of the bond, the better the access to capital markets and the lower the
interest to be paid.").

1 **Q. WOULD YOU ALSO IDENTIFY THEIR KEY QUANTITATIVE MEASURES?**

2 A. The three major rating agencies use several financial measures within their utility
3 financial analysis. S&P currently highlights the following three ratios as its key
4 indicators: Funds from Operations / Debt (“FFO/Debt”); Debt / Earnings Before Interest,
5 Taxes, Depreciation and Amortization (“Debt/EBITDA”); and Debt / Capital.² Rating
6 agencies may adjust these key ratios to reflect imputed debt and interest-like fixed
7 charges related to operating leases and certain other off-balance sheet obligations. While
8 all three ratios are important, S&P has noted the agency’s greater emphasis on level of
9 cash flow, as indicated by the FFO / Debt ratio: “Cash flow analysis is the single most
10 critical aspect of all credit rating decisions.”³

11
12 **Q. YOU MENTIONED REGULATION AS A KEY COMPONENT OF THE CREDIT**
13 **RATING PROCESS. PLEASE EXPAND ON THE ROLE REGULATION PLAYS**
14 **IN THE RATING PROCESS.**

15 A. Regulation is a critical factor in assessing the utility’s credit profile because a public
16 utility commission determines rate levels (recoverable expenses including depreciation
17 and operations and maintenance, fuel cost recovery, and return on investment) and the
18 terms and conditions of service.

19 Regulation has become an even more important factor as the nature of a utility’s
20 responsibilities in providing energy services to ratepayers has undergone dramatic
21 change. This affects utility investors’ decisions because – before major investors are
22 willing to put forward substantial sums of money – they want comfort that regulators

23 ² S&P Research: “Criteria Methodology: Business Risk/Financial Risk Matrix Expanded,” May 27, 2009.

24 ³ S&P Research: “A Closer Look at Ratings Methodology,” November 13, 2006.

1 understand the economic requirements and the financial and operational risks of a rapidly
2 changing industry and that their decision-making will be fair with a significant degree of
3 predictability.

4 For these reasons, rating agencies look for the consistent application of sound
5 economic regulatory principles by utility regulators. If a regulatory body encourages a
6 company to make investments based upon an expectation of the opportunity to earn a
7 reasonable return and then does not apply regulatory principles in a manner consistent
8 with such expectations, investor interest in providing funds to such a utility declines, debt
9 ratings suffer, the utility's cost of capital increases and, correspondingly, so do rates.

10
11 **Q. HAVE THE RECENT FINANCIAL AND OPERATIONAL CHALLENGES**
12 **FACING ALL UTILITIES INCREASED THE FINANCIAL COMMUNITY'S**
13 **FOCUS ON THE ACTIONS OF UTILITY REGULATORS?**

14 A. Without a doubt. The recent and ongoing turmoil in the financial markets has tested the
15 financial standing of the utility sector like never before. Liquidity – or access to cash
16 when needed – has always been a major issue for regulated utilities, but it has leaped to
17 the forefront of utility financial and operational concerns. As the Wall Street Journal
18 reported at the beginning of the financial crisis, “Disruptions in credit markets are jolting
19 the capital-hungry utility sector, forcing companies to delay new borrowing or to come
20 up with different – and often more costly – ways of raising cash.”⁴ Credit spreads for
21 “BBB”-rated debt issuers are higher than for “A”-rated issuers, and significantly higher
22 when credit markets are in distress. Clearly, the negative global economic crisis that

23
24 ⁴ “Utilities’ Plans Hit by Credit Markets,” Wall Street Journal, October 1, 2008.

1 started during the Fall of 2008 has illustrated that “BBB” category utilities are much
2 more vulnerable than “A” category utilities when capital markets are in a state of
3 upheaval. Diminished investor interest and higher costs to serve ratepayers are the two
4 major threats to their operational efficiency and financial stability.

5 Thus, while “Regulation” has always garnered close scrutiny by the financial
6 community, years ago, it was a focus only during the days leading up to a regulator’s rate
7 case decision. This began to change about the time that Fitch hired me in 1993 to serve
8 in the role of regulatory analyst to assess other regulatory, legislative and political factors
9 that could affect a utility’s financial strength. When California announced its ultimately
10 ill-fated restructuring plan in 1994, the entire financial community took much greater
11 notice of regulators and how they carried out their responsibilities, not just with regard to
12 rate-setting, but also the manner in which they considered various restructurings of and
13 new mandates affecting the entire utility industry. And, of course, the recent stresses
14 within credit markets with their huge financial repercussions have increased the stakes
15 substantially as well.

16
17 **Q. DO THE RATING AGENCIES AGREE THAT UTILITY REGULATORS AND**
18 **THEIR DECISION-MAKING CONTINUE TO BE IMPORTANT WITHIN THE**
19 **CREDIT RATING PROCESS?**

20 **A.** Yes. S&P highlighted the critical role that regulators play in a November 26, 2008 report
21 entitled “Key Credit Factors: Business and Financial Risks in the Investor-Owned
22 Utilities Industry”:
23
24

1 Regulation is the most critical aspect that underlies regulated integrated
2 utilities' creditworthiness. Regulatory decisions can profoundly affect
3 financial performance. Our assessment of the regulatory environments in
4 which a utility operates is guided by certain principles, most prominently
consistency and predictability, as well as efficiency and timeliness. For a
regulatory process to be considered supportive of credit quality, it must
limit uncertainty in the recovery of a utility's investment.

5 As discussed below, this view by the rating agencies has been more recently confirmed in
6 connection with APS' credit evaluation and the weight given the Commission's actions in
7 that process.

8 9 **IV. APS' CREDIT RATING**

10 **Q. WHAT ROLE CAN WE EXPECT THE POLICIES OF THE ARIZONA**
11 **CORPORATION COMMISSION TO PLAY IN THE RATING AGENCIES'**
12 **ANALYSIS OF APS?**

13 **A.** The rating agencies' close focus on regulatory decisions means that a supportive decision
14 here – consistent with the Commission's approval of the 2009 Settlement Agreement –
15 would be viewed favorably by the financial community. As can be seen in the following
16 agency statements, regulatory policies of this Commission are a major factor in the credit
17 rating analytical process. S&P, when upgrading the Company's corporate credit rating
18 from 'BBB-' (the lowest investment-grade level) to 'BBB' (with continuation of a
19 'Positive' outlook) in June 2011, highlighted the key role that a constructive regulatory
20 environment plays in supporting higher credit ratings:

21 The positive outlook reflects our view that we could raise the long-term
22 credit rating another notch if regulatory dealings remain constructive ...
23 APS' progress in managing its regulatory agenda in Arizona provides a
24

1 platform for higher ratings contingent on financial prudence in containing
2 costs and financing capital investments.⁵

3 **Q. BEFORE WE MOVE ON TO MOODY'S VIEW, DOES THE ACTION BY S&P**
4 **SURPRISE YOU AT ALL?**

5 A. Yes it does, but not necessarily as to the fact that a constructive regulatory decision led to
6 a credit rating upgrade. That makes a lot of sense to me. The surprise was that S&P not
7 only upgraded APS' rating, but also continued its "Positive" outlook. During my eight-
8 and-a-half years rating utilities at Fitch, I would guess that an upgrade accompanied
9 simultaneously by a *continued outlook* of 'Positive' did not occur more than a handful of
10 times.

11
12 **Q. DO YOU SEE THAT AS SIGNIFICANT?**

13 A. Very much so. That continuing 'Positive' outlook leads me to believe that another
14 constructive result in this rate case could very well result in APS being upgraded again to
15 'BBB+'. I have consistently testified that that highest notch within the 'BBB' category
16 provides downside protection for a regulated utility operating during volatile economic
17 times, and places it just below the 'A' category – my ultimate recommended level, since
18 a rating in the 'A' category should ensure that a utility will be able to access the capital
19 markets even during financial crises and without having to pay exorbitant interest rates.
20 Each of these results is very good news, not only for APS, but for the Commission and
21 ratepayers in these times of continuing economic stress.

22
23 ⁵ S&P Research Update: "Pinnacle West Capital Corp. and Arizona Public Service Co. Ratings Raised to 'BBB',
24 June 24, 2011.

1 **Q. HOW DOES MOODY'S VIEW APS' SITUATION?**

2 A. Moody's has assigned APS an issuer rating of 'Baa2', which is comparable to the S&P
3 rating, but with a 'Stable' outlook. One of Moody's major concerns is that while the
4 ACC's "[r]egulatory supportiveness [is] showing signs of improving ... significant
5 regulatory lag and uncertain timing of rate case resolutions" lead Moody's to view APS'
6 regulatory environment as well below the supportiveness needed for consistency with a
7 'Baa' category credit rating.⁶

8
9 **Q. YOU DESCRIBED EARLIER THREE KEY QUANTITATIVE MEASURES –**
10 **FFO/DEBT, DEBT/EBITDA AND DEBT/CAPITAL – USED BY THE RATING**
11 **AGENCIES. PLEASE DISCUSS HOW S&P FRAMES THE QUALITATIVE**
12 **AND QUANTITATIVE FACTORS INTO A MATRIX TO ASSIST ANALYSTS**
13 **AND INVESTORS.**

14 A. As seen in the rating agency statements above, financial performance continues to be a
15 very important element in credit rating analysis. Building upon the three indicative
16 ratios, S&P has explained how it views the interplay between quantitative and qualitative
17 factors. As part of its utility credit rating process, S&P arrives at a "Business Risk
18 Profile" designation that it considers in concert with its "Financial Risk Profile."
19 Financial Risk is assessed based upon indicative ratios for the three key credit measures
20 described above; the weaker the Business Risk Profile designation, the stronger the
21 financial ratios must be in order to support an investment-grade rating.⁷

22
23 ⁶ Moody's Credit Opinion: "Arizona Public Service Company," February 25, 2011.

24 ⁷ S&P Research: "Criteria Methodology: Business Risk/Financial Risk Matrix Expanded," May 27, 2009.

1 **Q. WHAT DOES S&P'S BUSINESS RISK PROFILE DESIGNATION REFLECT?**

2 A. The Business Risk Profile designation reflects S&P's assessment of qualitative factors
3 such as country risk, industry risk, competitive position, and profitability / peer group
4 comparisons. In the past, S&P explained that assessment of regulation, markets,
5 operations, competitiveness, and management enters into the determination of a Business
6 Risk designation.⁸ Under the S&P Methodology, Business Risk Profiles range from
7 'Excellent' to 'Vulnerable'. Similarly, under S&P's current framework, the Financial
8 Risk designation captures risks related to accounting, financial governance and policies /
9 risk tolerance, cash flow adequacy, capital structure / asset protection and liquidity /
10 short-term factors. Financial Risk Profile descriptions move from 'Minimal' to 'Highly
11 Leveraged' – words that are used more for ranking than as descriptions of the strategies
12 adopted by regulated utilities or the actions taken by their regulators.

13 APS has been assigned an S&P Business Risk Profile of 'Excellent' and a
14 Financial Risk Profile of 'Aggressive'. As shown in S&P's Table 1 printed below, the
15 Company's risk profile is consistent with its current corporate rating of 'BBB'. Because
16 S&P does not assign ratings solely on this matrix, but uses it as a guide, most rating
17 outcomes then will fall within a range of one notch on either side of the indicated rating.
18 APS' current corporate credit rating of 'BBB' stands right at the midpoint of the
19 "Excellent" / "Aggressive" range.⁹

22 ⁸ S&P Research: "U.S. Utilities Ratings Analysis Now Portrayed in the S&P Corporate Ratings Matrix,"
November 30, 2007.

23 ⁹ S&P Research: "Issuer Ranking: U.S. Regulated Electric Utility Companies, Strongest to Weakest," October 4,
2011.

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Table 1

Business And Financial Risk Profile Matrix

	Business Risk Profile			Financial Risk Profile		
	Minimal	Modest	Intermediate	Significant	Aggressive	Highly Leveraged
Excellent	AAA	AA	A	A-	BBB	--
Strong	AA	A	A-	BBB	BB	BB-
Satisfactory	A-	BBB+	BBB	BB+	BB-	B+
Fair	--	BBB-	BB+	BB	BB-	B
Weak	--	--	BB	BB-	B+	B-
Vulnerable	--	--	--	B+	B	CCC+

Q. WHY IS S&P'S METHODOLOGY MEANINGFUL TO YOU?

A. S&P's methodology helps facilitate a general understanding of how a credit rating agency carries out the process of formulating a credit rating and the factors that go into that determination.¹⁰

Q. PLEASE DISCUSS HOW S&P'S METHODOLOGY PROVIDES GUIDANCE FOR THE COMMISSION IN THIS CASE.

A. As a former head of the Fitch utility ratings practice, I certainly appreciate that the credit rating process goes beyond the mere matching up of ratios with rating ranges. However,

¹⁰ I focus here on S&P's ratings methodology, as opposed to those at Moody's or Fitch, due to the greater transparency of S&P's ratings process owing to its explanation of the methodology and how it is implemented in published reports.

1 the S&P Financial Risk Indicative Ratios (Table 2 below) combined with the business
 2 and financial risk profiles (in Table 1) are very helpful with regard to indicating rating
 3 trends. The Commission can use S&P's quantitative factors (in the form of financial
 4 ratios) and qualitative assessments (in the form of a business risk profile ranking) as a
 5 guide in assessing potential credit rating outcomes for individual utility companies.

6
 7 **Table 2**
 8 **Financial Risk Indicative Ratios (Corporates)**

	FFO/Debt (%)	Debt/EBITDA (x)	Debt/Capital (%)
Minimal	greater than 60	less than 1.5	less than 25
Modest	45-60	1.5-2	25-35
Intermediate	30-45	2-3	35-45
Significant	20-30	3-4	45-50
Aggressive	12-20	4-5	50-60
Highly Leveraged	less than 12	greater than 5	greater than 60

16
 17
 18 **Q. WHERE IS APS IN THE S&P MATRIX?**

19 A. With S&P placing APS in the highest qualitative ranking of "Excellent," my view is that
 20 further movement for the Company toward the 'BBB+' level will only come from a
 21 financially supportive decision in this case, coupled with continued financial vigilance on
 22 the part of Company management. Or, as S&P describes it, higher ratings are:

1 ... contingent on financial prudence in containing costs and financing
2 capital investments. Specifically, we may raise the ratings one notch if the
3 company demonstrates sustained financial performance above our forecast
4 levels of adjusted FFO to debt of 20% and adjusted debt to capital of 55%.
5 Minimizing rate lag and earning close to authorized equity returns would
6 help achieve such financial metrics.¹¹

7 **Q. HOW DO YOU BELIEVE THE RATING AGENCIES WOULD REACT TO A**
8 **NEGATIVE DECISION FROM THIS COMMISSION?**

9 A. As I explained earlier, a continuing 'Positive' outlook after an upgrade is very unusual. I
10 expect that a less supportive decision in this case would lead S&P to lower the
11 Company's outlook to the more normal designation of 'Stable.' That would represent a
12 significant missed opportunity for the Commission and the Company to take actions that
13 accrue to the benefit of both customers and investors. Moody's expects APS' rating to
14 remain stable during the near-to-medium term, but does note that, longer term, "an
15 upgrade could be possible if there is consistent supportive regulatory treatment resulting
16 in material, timely rate increases." Conversely, a "downgrade could result if regulatory
17 lag for capital spending becomes more pronounced."¹²

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23 ¹¹ S&P Research Update: "Pinnacle West Capital Corp. and Arizona Public Service Co. Ratings Raised to 'BBB',
June 24, 2011.

24 ¹² Moody's Credit Opinion: "Arizona Public Service Company," February 25, 2011.

1 Commitment to and early implementation of decoupling should precede
2 significant decoupling-specific adjustments to cost of capital The
3 review of the initial three-year period following adoption of revenue per
4 customer decoupling should include analysis and discussion of possible
5 adjustments to cost of capital to recognize any modified risk at the
6 utilities ...

7 Full decoupling is preferable to partial decoupling as it contributes to
8 greater rate stability which would encourage improvements in financial
9 ratings, is administratively more manageable, and offers opportunities for
10 rate relief following extreme weather events.

11 **Q. DO YOU AGREE WITH THE APPROACH THE ACC PROPOSES IN ITS**
12 **POLICY STATEMENT?**

13 A. Yes I do. Decoupling has spread significantly during the past decade with Regulatory
14 Research Associates, a respected commentator on utility regulatory policies, reporting in
15 April 2011 that electric decoupling is being utilized in 18 states across the U.S., with gas
16 decoupling authorized in 29 states.¹³ Thus, use of decoupling is becoming more and
17 more the norm with each passing year. To me, it is clear that if the ACC were to move
18 forward with revenue-based decoupling consistent with its Policy Statement, such action
19 would be wholly consistent with the national regulatory trend. In addition, holding off on
20 any negative adjustment to cost of capital as a result of approval of decoupling makes
21 sense until an assessment can be made of how the treatment of Arizona's electric and gas
22 utilities with regard to decoupling compares to the situations that regulated utilities in
23 other jurisdictions are facing.

24 ¹³ Regulatory Research Associates, "Regulatory Focus: Decoupling Mechanisms/Straight-Fixed-Variable Rate Design," April 5, 2011.

1 **Q. SO YOU AGREE WITH APS THAT A DECOUPLING MECHANISM SHOULD**
2 **BE APPROVED WITHIN THIS RATE CASE?**

3 A. Yes and I note that APS witness Leland Snook has described in his testimony a proposed
4 decoupling mechanism that tracks the ACC Policy Statement very closely. While there
5 are small differences, Mr. Snook has explained the Company's rationale for diverging
6 from that Policy Statement in those areas. Action on decoupling now is an appropriate
7 step for this Commission – especially in light of its ambitious energy efficiency goals –
8 and the APS proposal deserves serious consideration. Also, the testimony of AIC witness
9 Dr. Daniel Hansen highlights the need for a decoupling mechanism to overcome the
10 financial disincentive embedded in the Company's current rate design and the manner in
11 which APS' proposal will align the utility and customer interests to achieve energy
12 efficiency without depriving APS of a reasonable opportunity to recover its authorized
13 rate of return.

14
15 **Q. HOW DO YOU EXPECT THE RATING AGENCIES WOULD VIEW APS'**
16 **PROFILE IF THIS COMMISSION APPROVES THE COMPANY'S**
17 **DECOUPLING PROPOSAL?**

18 A. Quite favorably. In fact, Moody's just released a Special Comment entitled "Decoupling
19 and 21st Century Rate Making – Increased usage of decoupling mechanisms is credit
20 positive" on November 4, 2011:

21 Prospectively, we see utilities and regulators increasingly working
22 together to find solutions that accomplish two key objectives: providing
23 timely cost recovery for utilities and managing the all-in rate increases for
24

1 consumers. To that end ... increasing acceptance of various revenue
2 decoupling mechanisms accompanying energy efficiency/conservation
3 programs, would be widely viewed to be credit positive.

4 **VI. APS' PROPOSED INFRASTRUCTURE ADJUSTOR**

5 **Q. APS HAS ALSO PROPOSED AN ENVIRONMENTAL AND RELIABILITY**
6 **ACCOUNT ("ERA") MECHANISM. DO YOU HAVE VIEWS ON THIS**
7 **CONCEPT?**

8 A. As described by APS witness Mr. Snook, the ERA mechanism "is intended to recover the
9 revenue requirement of generation plant capacity acquisitions, efficiency projects and
10 environmental improvement projects on a more concurrent basis between rate cases."
11 That concept is very attractive for customers, the Commission and the Company because
12 it would encourage APS to enhance its infrastructure regularly and in a way that would
13 reap reliability and safety gains, while simultaneously promoting the efficiency goals of
14 this Commission. As a former regulator, I would want to be comfortable with the
15 following aspects of the ERA before approving it: 1) are the investments covered by the
16 ERA easier to quantify and timely reflect in rates outside the bounds of a traditional rate
17 case; 2) are the investments undertaken between rate cases beneficial for customers; 3)
18 are customers being called on to pay no more than actual prudent costs for those
19 infrastructure enhancements; and 4) will the ERA minimize the need for frequent and
20 costly base rate cases? If the answer to all of these questions is "Yes", approval of the
21 ERA will be beneficial to all concerned.
22
23
24

1 **Q. ARE ADJUSTMENT MECHANISMS SUCH AS THE EIA AND THE ERA**
2 **TARGETING PARTICULAR ASPECTS OF UTILITY OPERATIONS GAINING**
3 **FAVOR WITH REGULATORS ACROSS THE U.S.?**

4 A. Yes. Of course, adjustment mechanisms for fuel and purchased power cost recovery are
5 by far the norm across the U.S. They are in place in more than 40 jurisdictions. And,
6 possibly because of the familiarity of operation and proven value of such tried-and-true
7 mechanisms, adjustment mechanisms outside the fuel realm are becoming much more
8 prevalent. In 2006, the Brattle Group, a respected Cambridge, Massachusetts-based
9 energy consulting firm, prepared a report for the Edison Electric Institute on the potential
10 for “automatic adjustment clauses” (“AACs”) of all types to provide benefits to both
11 utilities and their consumers:

12 The circumstances justifying AACs as beneficial to utilities and their
13 customers are more pronounced today than ever: more volatile fuel and
14 wholesale power prices, more vertical unbundling and consequent
15 outsourcing of supply needs, reduced credit ratings of many utilities, and
16 an increasing number of new or emerging cost items which utilities cannot
17 control and from which they do not profit.¹⁴

18 Evolving expense costs falling into these categories identified by Brattle include those
19 related to DSM and energy efficiency; environmental expenditures related to control of
20 emissions beyond those already tracked; electric and gas distribution and transmission
21 upgrades; renewable resource development; needed infrastructure investment costs; and
22 other costs precipitated by governmental compliance requirements. As Moody’s noted in

23 ¹⁴ The Brattle Group, “Electric Utility Automatic Adjustment Clauses: Benefits and Design Considerations,”
24 November 2006. (Emphasis added.)

1 its recent “decoupling” report, “a more deliberate transition towards single-issue rate
2 riders [and] trackers ... would be widely viewed to be credit positive.”¹⁵

3 Speaking as a former bond rater, I can attest to the fact that the rating agencies
4 view fuel and other adjustment mechanisms positively within their credit rating analyses,
5 owing to their effect of: (1) more closely aligning prudently-incurred utility expenses
6 with ultimate recovery of actual costs from customers; (2) reducing regulatory lag
7 between time of expenditure and when cost recovery occurs; and (3) decreasing the
8 number of time-consuming and costly rate cases. Good credit quality is in the best
9 interests of both customers and shareholders. Accordingly, if the ACC finds that the
10 Company’s ERA lines up well on the questions I highlight above, I urge its serious
11 consideration.

12
13 **VII. CONCLUSION**

14 **Q. DO YOU HAVE CONCLUDING THOUGHTS?**

15 A. Yes. The concept of utility regulation is to provide a surrogate for the competitive
16 market that is not present when a company possesses monopoly or near-monopoly status
17 with regard to an essential good, such as utility service. The EIA decoupling mechanism
18 and ERA infrastructure investment mechanism attempt to align the costs that a utility is
19 required to expend by law or regulation with its recovery of those costs on a timely basis
20 – without need for frequent rate cases to recognize regulatory mandated changes in sales
21 levels and/or beneficial rate base additions.

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23 ¹⁵ Moody’s Research: “Decoupling and 21st Century Rate Making – Increased usage of decoupling mechanisms is
24 credit positive,” November 4, 2011.

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Base rate cases with their high expense – for all participants – and lengthy duration are ill-suited to deal with cost recovery that will vary as customer energy efficiency gains are realized, or where a utility is continually undertaking plant investment to ensure reliability and safety, as well as to meet evolving environmental mandates. As compared to full-blown rate cases, the EIA and ERA mechanisms clearly will be more efficient in providing timely recovery of prudent expenditures and allow for ongoing investment without undue regulatory lag.

In closing, it is wholly consistent with rational utility economics for customers to pay the fixed costs of reliable utility service, prudently incurred, especially when such costs are affected by regulatory policies or beneficial infrastructure enhancement. Approval of the EIA and ERA mechanisms seeks to achieve that goal, by allowing recovery of actual incurred costs on a timely basis, without need for frequent rate cases. This, in turn, helps to improve the financial stability of APS, a status which will benefit all stakeholders in the regulatory process.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

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Education University of Michigan Law School, J.D. 1979
Bar Memberships: U.S. Supreme Court, New York, Michigan
University of Michigan, A.B. (Communications) 1974

April 2002 – Present

President – REGULATION UnFETTERED – Henderson, NV / Nordland, WA

Founder of advisory firm providing regulatory, legislative, financial, legal and strategic planning advisory services for the energy, water and telecommunications sectors, including public utility commissions and consumer advocates; federal and state testimony; credit rating advisory services; negotiation, arbitration and mediation services; skills training in ethics, negotiation, and management efficiency.

Service on Boards of Directors of: CH Energy Group (Chairman, Governance and Nominating Committee; Member, Audit Committee; Previous Lead Independent Director and Chairman, Audit Committee and Compensation Committee), National Regulatory Research Institute, Keystone Energy Board, and Regulatory Information Technology Consortium; Member, Wall Street Utility Group; Participant, Keystone Center Dialogues on RTOs and on Financial Trading and Energy Markets.

October 1993 – April 2002

**Group Head and Managing Director; Senior Director – Global Power Group,
Fitch IBCA Duff & Phelps – New York/Chicago**

Manager of 18-employee (\$15 million revenue) group responsible for credit research and rating of fixed income securities of U.S. and foreign electric and natural gas companies and project finance; Member, Fitch Utility Securitization Team.

Led an effort to restructure the global power group that in three years time resulted in 75% new personnel and over 100% increase in revenues, transforming a group operating at a substantial deficit into a team-oriented profit center through a combination of revenue growth and expense reduction.

Achieved national recognition as a speaker and commentator evaluating the effects of regulatory developments on the financial condition of the utility sector and individual companies; Cited by Institutional Investor (9/97) as one of top utility analysts at rating agencies; Frequently quoted in national newspapers and trade publications including The New York Times, The Wall Street Journal, International Herald Tribune, Los Angeles Times, Atlanta Journal-Constitution, Forbes and Energy Daily; Featured speaker at conferences sponsored by Edison Electric Institute, Nuclear Energy Institute, American Gas Assn., Natural Gas Supply Assn., National Assn. of Regulatory Utility Commissioners (NARUC), Canadian Electricity Assn.; Frequent invitations to testify before U.S. Senate (on C-Span) and House of Representatives, and state legislatures and utility commissions.

Participant, Keystone Center Dialogue on Regional Transmission Organizations; Member, International Advisory Council, Eisenhower Fellowships; Author, "A Rating Agency's Perspective on Regulatory Reform," book chapter published by Public Utilities Reports, Summer 1995; Advisory Committee, Public Utilities Fortnightly.

March 1994 – April 2002

Consultant – NYNE – New York, Ameritech – Chicago, Weatherwise USA – Pittsburgh

Provided testimony before the Federal Communications Commission and state public utility commissions; Formulated and taught specialized ethics and negotiation skills training program for employees in positions of a sensitive nature due to responsibilities involving interface with government officials, marketing, sales or purchasing; Developed amendments to NYNEX Code of Business Conduct.

October 1987 – October 1993

Chairman; Commissioner – Michigan Public Service Commission – Lansing

Administrator of \$15-million agency responsible for regulating Michigan's public utilities, telecommunications services, and intrastate trucking, and establishing an effective state energy policy; Appointed by Democratic Governor James Blanchard; Promoted to Chairman by Republican Governor John Engler (1991) and reappointed (1993).

Initiated case-handling guideline that eliminated agency backlog for first time in 23 years while reorganizing to downsize agency from 240 employees to 205 and eliminate top tier of management; MPSC received national recognition for fashioning incentive plans in all regulated industries based on performance, service quality, and infrastructure improvement.

Closely involved in formulation and passage of regulatory reform law (Michigan Telecommunications Act of 1991) that has served as a model for other states; Rejuvenated dormant 12-year effort and successfully lobbied the Michigan Legislature to exempt the Commission from the Open Meetings Act, a controversial step that shifted power from the career staff to the three commissioners.

Elected Chairman of the Board of the National Regulatory Research Institute (at Ohio State University); Adjunct Professor of Legislation, American University's Washington College of Law and Thomas M. Cooley Law School; Member of NARUC Executive, Gas, and International Relations Committees, Steering Committee of U.S. Environmental Protection Agency/State of Michigan Relative Risk Analysis Project, and Federal Energy Regulatory Commission Task Force on Natural Gas Deliverability; Eisenhower Exchange Fellow to Japan and NARUC Fellow to the Kennedy School of Government; Ethics Lecturer for NARUC.

August 1985 – October 1987

Acting Associate Deputy Under Secretary of Labor; Executive Assistant to the Deputy Under Secretary – U.S. Department of Labor – Washington DC

Member of three-person management team directing the activities of 60-employee agency responsible for promoting use of labor-management cooperation programs. Supervised a legal team in a study of the effects of U.S. labor laws on labor-management cooperation that has received national recognition and been frequently cited in law reviews (U.S. Labor Law and the Future of Labor-Management Cooperation, w/S. Schlossberg, 1986).

January 1983 – August 1985

Senate Majority General Counsel; Chief Republican Counsel – Michigan Senate – Lansing

Legal Advisor to the Majority Republican Caucus and Secretary of the Senate; Created and directed seven-employee Office of Majority General Counsel; Counsel, Senate Rules and Ethics Committees; Appointed to the Michigan Criminal Justice Commission, Ann Arbor Human Rights Commission and Washtenaw County Consumer Mediation Committee.

March 1982 – January 1983

Assistant Legal Counsel – Michigan Governor William Milliken – Lansing

Legal and Labor Advisor (member of collective bargaining team); Director, Extradition and Clemency; Appointed to Michigan Supreme Court Sentencing Guidelines Committee, Prison Overcrowding Project, Coordination of Law Enforcement Services Task Force.

October 1979 – March 1982

Appellate Litigation Attorney – National Labor Relations Board – Washington DC

Other Significant Speeches and Publications

The “A” Rating (Edison Electric Institute Perspectives, May/June 2009)

Perspective: Don’t Fence Me Out (Public Utilities Fortnightly, October 2004)

Climate Change and the Electric Power Sector: What Role for the Global Financial Community (during Fourth Session of UN Framework Convention on Climate Change Conference of Parties, Buenos Aires, Argentina, November 3, 1998) (unpublished)

Regulation UnFettered: The Fray By the Bay, Revisited (National Regulatory Research Institute Quarterly Bulletin, December 1997)

The Feds Can Lead...By Getting Out of the Way (Public Utilities Fortnightly, June 1, 1996)

Ethical Considerations Within Utility Regulation, w/M. Cummins (National Regulatory Research Institute Quarterly Bulletin, December 1993)

Legal Challenges to Employee Participation Programs (American Bar Association, Atlanta, Georgia, August 1991) (unpublished)

Proprietary Information, Confidentiality, and Regulation’s Continuing Information Needs: A State Commissioner’s Perspective (Washington Legal Foundation, July 1990)

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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

GARY PIERCE, Chairman
BOB STUMP
SANDRA D. 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

Direct Testimony of

Daniel G. Hansen, Ph.D.

on Behalf of

Arizona Investment Council

November 18, 2011

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EXHIBITS: AIC Exhibit DGH-1

1 **1. INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME AND ADDRESS.**

3 A. My name is Daniel G. Hansen. My business address is 800 University Bay Drive,
4 Suite 400, Madison, Wisconsin 53705.

5
6 **Q. WHAT IS YOUR PROFESSION AND BACKGROUND?**

7 A. I am a Vice President at Laurits R. Christensen Associates, Inc. I received a Ph.D. in
8 Economics from Michigan State University in 1997, at which time I joined Laurits R.
9 Christensen Associates, Inc. I have worked primarily with and for regulators,
10 intervenors, and the energy industry during my 14 years of consulting experience. In
11 recent years, I have, on several occasions, analyzed and testified on some of the key
12 issues raised in this docket. Specifically, in 2005, I conducted independent evaluations of
13 Northwest Natural Gas's decoupling and weather normalization mechanisms in Oregon,
14 as required by that Commission's orders approving the mechanisms. In 2007, I provided
15 testimony on behalf of the Utah Division of Public Utilities regarding Questar Gas
16 Company's decoupling mechanism. On behalf of Environment Northeast (a non-profit
17 environmental organization), I provided testimony regarding a decoupling mechanism
18 proposed by Connecticut Light & Power and also served on a panel before the
19 Massachusetts Department of Public Utilities to discuss the merits of decoupling
20 mechanisms (Docket No. 07-50). In 2009, I conducted an independent evaluation of
21 decoupling mechanisms in place at New Jersey Natural Gas and South Jersey Gas. Most
22 recently, I was retained and am in the process of evaluating Columbia Gas of Ohio's pilot
23

1 program concerning the implementation of straight fixed variable pricing. My resume is
2 attached as AIC Exhibit DGH-1.

3
4 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

5 A. The Arizona Investment Council (“AIC”) has retained Christensen Associates Energy
6 Consulting, LLC, a subsidiary of Laurits R. Christensen Associates, Inc., to provide
7 testimony regarding the Efficiency and Infrastructure Account (“EIA”) proposed by
8 Arizona Public Service Company (“APS” or the “Company”). My testimony describes
9 the reasons why AIC strongly supports the adoption of the EIA.

10
11 **Q. HOW IS YOUR TESTIMONY ORGANIZED?**

- 12 A. Following this introduction, I will describe:
- 13 • Section 2: Why the EIA is needed;
 - 14 • Section 3: How the EIA works;
 - 15 • Section 4: How the EIA is consistent with the ACC’s December 28, 2010
16 Decoupling Policy Statement¹ and other revenue decoupling mechanisms
17 currently in use;
 - 18 • Section 5: Why the EIA is preferred to alternative methods of addressing the
19 throughput incentive problem;
 - 20 • Section 6: The impact of the EIA on APS’ customers; and
 - 21 • Section 7: Summary of my analysis and recommendations.
- 22

23 ¹ ACC Policy Statement Regarding Utility Disincentives to Energy Efficiency and Decoupled Rate Structures (the
24 “Policy Statement”).

1 **2. THE COMPANY'S NEED FOR THE EIA**

2 **Q. WHAT IS THE PURPOSE OF A DECOUPLING MECHANISM?**

3 A. Decoupling mechanisms are primarily intended to reduce or eliminate a utility's strong
4 financial disincentive to promote conservation and energy efficiency. For this reason,
5 environmental organizations such as the Natural Resources Defense Council and
6 Environment Northeast support decoupling. Decoupling mechanisms also reduce the
7 variability of utility revenue which is intended to allow them to recover their fixed costs
8 ("fixed-cost revenue"). In the case of APS' proposed EIA, the Company would recover a
9 fixed amount of revenue per customer served.

10

11 **Q. PLEASE DESCRIBE THE COMPANY'S DISINCENTIVE TO PROMOTE**
12 **CONSERVATION AND ENERGY EFFICIENCY THAT EXISTS UNDER ITS**
13 **CURRENT RATES.**

14 A. The disincentive is created because traditional rate designs require the utility to recover
15 the majority of its fixed costs, such as distribution costs, through volumetric rates. A
16 reduction in sales leads to a reduction in revenue, but it does not lead to a similar
17 reduction in costs. Therefore, under traditional rate design, the Company's realized rate
18 of return is tied to commodity sales levels. Lower kWh sales levels lead to a lower rate
19 of return and higher sales levels lead to a higher rate of return. This traditional design is,
20 at best, a game of chance as to whether customer usage patterns will actually allow the
21 utility to recover its fixed costs. Those costs remain constant regardless of how much or
22 how little energy is actually used. Moreover, the tie between its opportunity to recover

23

24

1 fixed costs and the level of customer usage of electricity incentivizes the Company to
2 encourage increased use per customer, not conservation.

3
4 **Q. IS REVENUE DECOUPLING RELEVANT FOR APS GIVEN ITS CURRENT**
5 **CIRCUMSTANCES?**

6 A. Yes. There are two factors that make revenue decoupling particularly important to and
7 relevant for APS. First, this Commission has established a requirement to reduce
8 electricity sales by 22% by 2020. Second, APS recovers a very large share of its fixed
9 costs through volumetric rates. Specifically, APS witness Mr. Leland Snook testified
10 that, for residential customers in the 2010 test year, 73% of APS' fixed costs were
11 recovered through a volumetric rate.²

12 The fact that a large share of APS' fixed costs are recovered through per-kWh
13 rates means that – absent a change in the way those costs are recovered – APS has a
14 significant disincentive to support the conservation goal established for Arizona. The use
15 of revenue decoupling via the EIA will align APS' interests with the interests of its
16 customers, making it more likely that the Company will meet the conservation mandate.

17 As or perhaps more importantly, even if we assume that APS can overcome its
18 disincentive and effectively implement energy efficiency programs without a decoupling
19 mechanism, the EIA remains relevant on fairness grounds. Without a modification to the
20 rate design, APS will continue to incur fixed costs, but will be unable to recover them
21 because of the significant reductions in energy usage. Without the EIA, the Company is
22 no longer being afforded a realistic opportunity to earn its authorized rate of return.

23 _____
24 ² Direct Testimony of Leland R. Snook, p. 3.

1 **Q. HOW DOES THE EIA ADDRESS THE COMPANY'S DISINCENTIVE TO**
2 **PROMOTE CONSERVATION AND ENERGY EFFICIENCY?**

3 A. The EIA removes the link between the Company's sales and revenue. Under the EIA,
4 APS recovers the level of revenue per customer approved by the Commission in this rate
5 case, regardless of the level of sales per customer. Therefore, when the EIA is in place,
6 the Company's realized rate of return is not adversely affected by the success of required
7 and Commission-approved conservation or energy efficiency programs. In my
8 experience, the removal of this disincentive changes the way utilities operate, making
9 them active advocates of energy efficiency and increasing customer satisfaction ratings.

10
11 **3. OVERVIEW OF APS' PROPOSED DECOUPLING MECHANISM**

12 **Q. PLEASE DESCRIBE THE EIA.**

13 A. The EIA is a revenue per customer decoupling mechanism in which the Company's
14 *allowed* revenue toward the recovery of fixed costs is equal to the allowed revenue per
15 customer (calculated using test year data) multiplied by the number of customers served
16 in the current year (based on the average number of customers across billing months).
17 The EIA compares the *allowed* revenue to the *actual* revenue billed. Any difference is
18 used to adjust rates in the following year. An over-recovery of fixed-cost revenue (i.e.,
19 when actual revenue exceeds allowed revenue) produces a reduction in customer rates in
20 the following year. An under-recovery of fixed-cost revenue (i.e., when actual revenue is
21 less than allowed revenue) produces an increase in customer rates in the following year.

1 **Q. HOW ARE RATES ADJUSTED TO ACCOUNT FOR THE DIFFERENCE**
2 **BETWEEN ALLOWED AND ACTUAL REVENUE?**

3 A. The EIA rate adjustments are set to ensure that each eligible rate class receives the same
4 percentage change in rates. The percentage change is determined by first calculating the
5 difference between allowed and actual revenue and then dividing that difference by total
6 Company revenue. The percentage adjustment is applied to certain billing components
7 (i.e., the customer charge, energy rates and demand charges) of eligible customer bills
8 resulting in either a surcharge or customer credit. The EIA contains a 3% cap on the
9 surcharge, but no cap on customer credits, i.e., how much the customer's bill can go
10 down.

11

12 **4. CONSISTENCY WITH THE COMMISSION'S POLICY STATEMENT AND**
13 **THE NATIONWIDE MOVE TOWARD DECOUPLING**

14 **Q. HAS THE REVENUE PER CUSTOMER DESIGN PROPOSED BY APS BEEN**
15 **USED IN OTHER JURISDICTIONS?**

16 A. Yes, the revenue per customer design is the most common form of decoupling that I have
17 observed. The per-customer concept has been used by several utilities throughout the
18 country, including United Illuminating in Connecticut; Idaho Power; Delmarva Power in
19 Maryland; Detroit Edison in Michigan; Portland General Electric in Oregon; PEPCO in
20 Washington DC and Maryland; and Wisconsin Public Service Company. Although each
21 decoupling mechanism has its own design and implementation characteristics, they are all
22 based on allowed revenue per customer.

23

24

1 **Q. IS THE EIA CONSISTENT WITH THE COMMISSION'S POLICY**
2 **STATEMENT?**

3 A. Yes, the EIA proposed by APS is consistent with the Policy Statement, including the
4 following design attributes:

- 5 • The use of a revenue per customer design;³
- 6 • Implementation as a full, non-pilot program;⁴
- 7 • Full decoupling, as opposed to partial decoupling;⁵
- 8 • The inclusion of weather effects in decoupling deferrals;⁶
- 9 • Broad participation across customer classes;⁷
- 10 • Decoupling adjustments are blended across customer classes;⁸ and
- 11 • The use of a 3% cap on rate increases.⁹

12 The Policy Statement was the result of careful consideration on the part of the ACC,
13 which included three stakeholder workshops and a study conducted by the Lawrence
14 Berkeley National Laboratories. APS obviously took this process seriously by aligning
15 its proposed EIA so closely with the recommendations of the Policy Statement.
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17
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21 ³ Policy Statement, Statement 4, p. 30.
22 ⁴ Policy Statement, Statement 5, p. 30.
⁵ Policy Statement, Statement 8, p. 31.
⁶ Policy Statement, Statement 9, p. 31.
⁷ Policy Statement, Statement 11, p. 31.
23 ⁸ Policy Statement, Statement 12, p. 31.
⁹ Policy Statement, Statement 14, pp. 31-32.

1 **Q. WHAT ARE YOUR THOUGHTS REGARDING APS' ANALYSIS OF THE**
2 **APPROPRIATE RETURN ON EQUITY ("ROE") IN LIGHT OF THE**
3 **DECOUPLING MECHANISM?**

4 A. As explained by Mr. Snook, APS is proposing that no automatic adjustment be made to
5 the Company's ROE simply due to the adoption of the EIA.¹⁰ Consistent with the Policy
6 Statement, AIC agrees that there should be no downward adjustment. Further, contrary
7 to the notion that a decoupling mechanism allows a utility to operate "risk free," the
8 reality is that the Company continues to face substantial risks associated with, among
9 other things, changes in the economy, regulatory or environmental policy shifts and
10 increased costs that are outside APS' control.

11
12 **5. ANALYSIS OF OTHER ALTERNATIVE RATE DESIGNS**

13 **Q. ARE ALTERNATIVES TO REVENUE DECOUPLING AVAILABLE FOR**
14 **ADDRESSING THE UTILITY'S DISINCENTIVE TO PROMOTE**
15 **CONSERVATION AND ENERGY EFFICIENCY?**

16 A. I am familiar with two primary alternatives: Straight-Fixed Variable ("SFV") pricing and
17 Lost Revenue Adjustment ("LRA") mechanisms.

18
19 **Q. PLEASE DESCRIBE LRA MECHANISMS.**

20 A. LRA mechanisms attempt to compensate the utility only for revenue lost because of
21 utility-sponsored conservation and energy efficiency programs. An LRA mechanism
22 accomplishes this through measurements (or estimates) of usage reductions linked to

23 _____
24 ¹⁰ Direct Testimony of Leland R. Snook, pp. 22-23.

1 specific utility-sponsored programs. It then compensates the utility for the fixed-cost
2 revenue lost because of those usage reductions.

3
4 **Q. WOULD YOU RECOMMEND THE USE OF AN LRA MECHANISM FOR APS?**

5 A. No. LRA mechanisms have several disadvantages when compared to the EIA. First,
6 because the LRA mechanism ties the level of utility revenue directly to estimates of
7 program-based usage reductions, those estimates become fertile ground for significant
8 disputes. These disputes increase costs to ratepayers and shareholders and likely will
9 reduce the utility's confidence that lost revenue will be recovered, which reduces its
10 incentive to fully support those programs.

11 Second, LRA mechanisms do not address the utility's financial incentive to
12 *increase* customer usage levels. Under its current rate structure, APS has an incentive to
13 encourage load growth in order to increase its revenues and, by doing so, better cover its
14 fixed costs. Under an LRA mechanism, the utility continues to receive more revenue
15 from increased customer usage as well as from successful energy efficiency programs. In
16 contrast, revenue decoupling removes the link between sales and revenue, so that the
17 utility is financially indifferent to increases *and* decreases in customer usage.

18 Third, LRA mechanisms may limit the range of energy efficiency programs that
19 the utility is willing to support. Because LRA mechanisms require estimates of usage
20 reductions, programs for which the usage reductions are not easily measured are unlikely
21 to be supported by the utility. For example, marketing materials or a web site that
22 provides conservation tips may be effective in getting customers to adopt conservation
23

1 measures, but it may not be possible for the utility to demonstrate how many customers
2 acted on the materials or the actions that customers took based on them.

3 In contrast, revenue decoupling does not require measurements of program-
4 specific load reductions, so the utility can be confident that any positive effects associated
5 with marketing materials or its web site will be addressed through the decoupling
6 mechanism.

7
8 **Q. PLEASE DESCRIBE SFV PRICING.**

9 A. SFV pricing uses fixed monthly charges to recover all fixed costs. The adoption of SFV
10 pricing would lead to a significant increase in the monthly customer charge and a
11 reduction in the volumetric rates, relative to current rates. As Mr. Snook states in his
12 testimony,¹¹ that charge for residential service would have to be increased to more than
13 \$90 per month for APS to have the opportunity to recover its fixed costs while also
14 meeting the 22% conservation requirement.

15
16 **Q. WOULD YOU RECOMMEND THE USE OF SFV PRICING FOR APS?**

17 A. No. While both revenue per customer decoupling and SFV pricing accomplish the goal
18 of removing the link between utility sales and revenue, obviously SFV pricing leads to
19 very large bill increases for low-use customers. To the extent that low-use customers are
20 also low-income customers, SFV would adversely affect customers who can least afford
21 to deal with bill increases. In addition and as importantly, by reducing the per-kWh rate,
22 SFV pricing reduces each customer's incentive to conserve energy.

23
24 ¹¹ Direct Testimony of Leland R. Snook, p. 8.

1 In contrast, the EIA does not alter the relationship between fixed charges and
2 volumetric rates, so it does not affect bills according to customer usage levels. In
3 addition, the EIA does not reduce the customer-level incentive to conserve.
4

5 **6. EIA IMPACT ON CUSTOMERS**

6 **Q. PLEASE DESCRIBE WHY DECOUPLING DOES NOT REDUCE THE**
7 **RATEPAYERS' INCENTIVE TO ENGAGE IN CONSERVATION OR ENERGY**
8 **EFFICIENCY.**

9 A. Decoupling has no detrimental effect on an individual ratepayer's incentive to conserve
10 energy and it may actually increase the customer-level incentive to conserve. This is
11 because the only thing a ratepayer can control is whether he or she engages in
12 conservation or energy efficiency activities and the customer's own activities do not lead
13 to decoupling deferrals that are large enough to change rates.

14 When the customer engages in conservation efforts, he or she receives the
15 immediate benefit of a reduced bill. That individual's incentive to conserve is not
16 directly affected by the "true-up" of fixed-cost revenue that is lost as a result of his or her
17 individual conservation because the true-up in the following year is spread across the
18 entire pool of several hundred thousand eligible customers. Also, while decoupling could
19 lead to an increase in rates in a year following significant conservation by enough
20 customers, that higher rate only *increases* the individual customer-level incentive to
21 engage in long-term conservation and energy efficiency activities.
22
23
24

1 **Q. IT SEEMS COUNTER-INTUITIVE THAT DECOUPLING COULD INCREASE**
2 **THE CUSTOMER-LEVEL INCENTIVE TO CONSERVE. PLEASE EXPLAIN**
3 **THIS IN MORE DETAIL.**

4 A. Yes. Consider an example in which a conservation program causes 20% of the customers
5 to reduce usage by 10% each, which would lead to a 2% decrease in total usage ($= 0.2 \times$
6 -0.1). Assume that this leads to a reduction in fixed-cost revenue of 2% (this is an over-
7 estimate because some fixed-cost revenue is recovered through fixed charges). All of the
8 customers, including the 20% who conserve and the 80% who do not, will pay the
9 standard tariff rates in the current year. In the following year, the fixed-cost portion of
10 the retail rates increases by approximately 2% for all customers. This rate increase
11 actually *increases* an individual customer's incentive to conserve in the following year.

12 While it may seem counter-intuitive that decoupling increases the customer-level
13 incentive to conserve, consider the decision-making process for one customer. Suppose
14 that this customer knows that (1) the conservation program is in place, (2) it will likely
15 lead others to reduce their usage levels and (3) therefore the program will cause a slight
16 increase in rates in the following year. The customer in this example will pay the higher
17 rate in the following year regardless of whether he or she chooses to conserve.

18 Therefore, the customer will evaluate the benefits of conserving energy by considering
19 the immediate bill benefit in the current year, as well as the small rate increase in the
20 following year caused by class-wide conservation. This *increases* the incentive (relative
21 to current rates in the absence of decoupling) to engage in long-term conservation
22 activities.

1 **Q. HOW ELSE MIGHT THE EIA POSITIVELY IMPACT APS' CUSTOMERS?**

2 A. As explained in the testimony of AIC witness Steven Fetter, credit rating agencies and
3 the financial community view the adoption of the EIA as a favorable event. An improved
4 credit rating will lead to better access to capital, both with regard to timing and terms.
5 That, in turn, benefits ratepayers as well as investors.

6

7 **7. SUMMARY**

8 **Q. WHAT ARE YOUR RECOMMENDATIONS REGARDING THE EIA?**

9 A. I recommend that the Commission approve the EIA. The EIA removes a disincentive
10 that APS faces in supporting conservation and energy efficiency programs. The EIA has
11 several advantages relative to alternative methods of addressing the Company's
12 disincentive to promote conservation and energy efficiency, including:

- 13 • Minimizing bill impacts on customers;
- 14 • Increasing the customer-level incentive to conserve;
- 15 • Eliminating the Company's incentive to *increase* customer usage levels; and
- 16 • Instead, encouraging APS to support the full range of energy efficiency
17 programs and public policies.

18 Finally, the EIA will afford APS an opportunity to recover its fixed costs, while the
19 traditional rate design, coupled with the Commission's energy efficiency mandates, will
20 not.

21

22 **Q. DOES THIS COMPLETE YOUR TESTIMONY?**

23 A. Yes.

24

Daniel G. Hansen

RESUME

January 2011

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Academic Background:

Ph.D., Michigan State University, 1997, Economics
M.A., Michigan State University, 1993, Economics
B.A., Trinity University, 1991, Economics and History

Positions Held:

Vice President, Laurits R. Christensen Associates, Inc. 2006-present
Senior Economist, Laurits R. Christensen Associates, Inc., 1999-2005
Economist, Laurits R. Christensen Associates, Inc., 1997-1999
Research Assistant to David Neumark, 1995-1997
Instructor, School of Management, University of Michigan-Flint, spring 1996:
MBA Business Economics

Professional Experience:

I work in a variety of areas related to retail and wholesale pricing in electricity and natural gas markets. I have used statistical models to forecast customer usage, estimate customer load response to changing prices, and estimate customer preferences for product attributes. I have developed and priced new product options; evaluated existing pricing programs; evaluated the risks associated with individual products and product portfolios; and developed cost-of-service studies. I have conducted evaluations and provided testimony regarding revenue decoupling and weather adjustment mechanisms.

Major Projects:

- Evaluated the cost effectiveness of automated demand response technologies.
- Evaluated and modified short- and long-term electricity sales and demand forecasting models.
- Created a short-term electricity demand forecasting model.
- Prepared testimony regarding the return on equity effects associated with natural gas revenue decoupling mechanisms.
- Conducted an independent evaluation of two natural gas revenue decoupling mechanisms.
- Created forecasts of load impacts from electricity demand response programs.
- Estimated historical load impacts from electricity demand response programs.
- Prepared testimony regarding a proposed natural gas decoupling mechanism.
- Prepared testimony regarding the weather normalization of test year sales and revenues.
- Participated on a regulatory proceeding panel to discuss decoupling mechanisms.
- Prepared testimony regarding a proposed electricity decoupling mechanism.
- Prepared a report and testimony regarding a natural gas decoupling mechanism.
- Evaluated a model that estimated the costs associated with removing and relicensing hydroelectric facilities.
- Assisted an electric utility in evaluating new rate options for commercial and industrial customers.
- Designed and evaluated time-of-use and critical-peak pricing rates for an electric utility.
- Reviewed cost-of-service study for a municipal electric utility.
- Produced a report on rate design methods that provide appropriate incentives for demand response and energy efficiency.
- Assisted in wholesale power procurement process.
- Evaluated a weather-adjustment mechanism for a natural gas utility.
- Assessed weather-related fixed cost recovery risk for an electric utility.
- Evaluated a revenue decoupling mechanism for a natural gas utility.
- Estimated price responsiveness of real-time pricing customers.
- Evaluated the need for electricity transmission and distribution standby rates for a utility.
- Developed a market share simulation model using conjoint survey results of electricity distributors.

Conducted conjoint surveyed of electricity distributors regarding rate structure preferences.

Developed a method to calculate a retail forward contract risk premium.

Prepared a report on the performance of Financial Transmission Rights (FTRs) in the PJM electricity market.

Reviewed a retail pricing model for use in a competitive electricity market.

Provided support in a natural gas rate case filing.

Simulated outcomes associated with alternative wholesale rate offers to electricity distributors.

Developed a business case to support a natural gas fixed bill product.

Assessed the accuracy of a natural gas fixed bill pricing algorithm.

Audited an evaluation of the costs associated with implementing a renewable portfolio standard.

Developed a model to value interruptible provisions in a long-term customer contract.

Performed a study on the determinants of electricity price differences across utilities and regions.

Developed long-term demand and energy forecasts.

Conducted market research to assess customer interest in new product options.

Recommended new retail pricing products for commercial and industrial customers.

Prepared a report on the fundamentals of retail electricity risk management.

Prepared a report that presented a taxonomy of retail electricity pricing products.

Presented at a workshop in Africa regarding deregulated electricity markets.

Prepared a report on the effectiveness of distributed resources in mitigating price risk.

Performed a valuation of energy derivatives consistent with FAS 133.

Created an electricity market share forecasting model.

Developed standby rates for an electric utility.

Developed an electricity wholesale price forecast.

Forecasted retail customer loads for an electric utility.

Assisted in mediating a new product development process with a utility and its industrial customers.

Developed a model that simulates wholesale market price changes due to retail load response.

Developed a pricing model for an innovative financial product.

Estimated changes in wholesale electricity prices due to customer load response.

Oversaw creation of software that estimates customer satisfaction with utilities.

Developed a model to economically evaluate a capital addition to a generator.

Developed a wholesale version of the Product Mix Model.

Evaluate Risk Implications of New Product Offering.

Mixed Logit Estimation of Customer Preferences.

Estimation of Customer Price Responsiveness.

Product Mix Model Workshops.

Unbundling and Rate Design.

Development of a Computer Program.

Large Commercial and Industrial Customer Rate Analysis.

Residential Customer Rate Analysis.

Survey of Power Marketers.

Development of Multi-Period Analysis Tool.

Evaluating the Effect of Alternative Rates on System Load.

Estimating the Persistence of Weather Patterns.

Electricity Customer Survey Data Analysis.

Product Mix Analysis for Small Customers.

Survey of Postal Facilities.

Professional Papers:

“A Review of Natural Gas Decoupling Mechanisms and Alternative Methods for Addressing Utility Disincentives to Promote Conservation,” June 2007.

“Evaluation of the Klamath Project Alternatives Analysis Model: Reply to Addendum A of the Consultant Report Prepared for the California Energy Commission Dated March 2007,” May 2007, with Laurence D. Kirsch and Michael P. Welsh.

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“Worker Performance and Group Incentives: A Case Study,” *Industrial and Labor Relations Review*, Vol. 51, No. 1, pp. 37-49, October 1997.

“Worker Quality and Profit Sharing: Does Unobserved Worker Quality Bias Firm-Level Estimates of the Productivity Effect of Profit Sharing?” Working Paper, May 1996.

“Supervision, Efficiency Wages, and Incentive Plans: How Are Monitoring Problems Solved?” Working Paper, November 1996, presented at the Western Economics Association Meetings, 1997.

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Southwest Gas Corporation, Nevada Docket No. 09-04003: Testimony regarding a return on equity effects associated with a proposed revenue decoupling mechanism on behalf of Southwest Gas Corporation, 2009.

Southwest Gas Corporation, Arizona Docket No. G-01551A-07-0504: Testimony regarding a proposed revenue decoupling mechanism on behalf of the Arizona Investment Council, 2008.

Otter Tail Power Company, Minnesota Docket No. E-017/GR-07-1178: Testimony regarding the weather normalization of test year sales and revenues in a general rate case on behalf of Otter Tail Power Company, 2008.

Massachusetts Department of Public Utilities, Docket No. DPU 07-50: Participation in a panel regarding an “Investigation into Rate Structures that will Promote Efficient Deployment of Demand Resources,” on behalf of Environment Northeast, 2007.

Connecticut Light & Power Company, Docket No. 07-07-01: Testimony regarding a proposed electricity revenue decoupling mechanism on behalf of Environment Northeast, 2007.

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PacifiCorp, FERC Docket No. 2082: "Evaluation of the Klamath Project Alternatives Analysis Model," March 2007, with Laurence D. Kirsch and Michael P. Welsh.

Northwest Natural Gas Company, Oregon Docket UG 163: Testimony relating to an investigation regarding possible continuation of Distribution Margin Normalization, May 2005.

Northwest Natural Gas Company, Oregon Docket UG 152: Submitted a report in compliance with a requirement to evaluate the functioning of the Weather Adjusted Rate Mechanism, October 2005.