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BEFORE THE ARIZONA CORPORATION COMMISSION

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IN THE MATTER OF THE APPLICATION OF UNS ELECTRIC, INC. FOR THE ESTABLISHMENT OF JUST AND REASONABLE RATES AND CHARGES DESIGNED TO REALIZE A REASONABLE RATE OF RETURN ON THE FAIR VALUE OF THE PROPERTIES OF UNS ELECTRIC, INC. DEVOTED TO ITS OPERATIONS THROUGHOUT THE STATE OF ARIZONA, AND FOR RELATED APPROVALS.	DOCKET NO. E-04204A-15-0142

Arizona Corporation Commission
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ARIZONA INVESTMENT COUNCIL'S NOTICE OF FILING

Arizona Investment Council ("AIC") hereby provides notice of filing the Direct Testimony of Gary Yaquinto and Daniel Hansen in the above-referenced matter.

RESPECTFULLY SUBMITTED this 9th day of December, 2015.

OSBORN MALEDON, P.A.

By Meghan H. Grabel

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Original and 13 copies filed this 9th day of December, 2015, with:

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Copies of the foregoing mailed this 9th day of December, 2015, to:

All Parties of Record

Debra Huss

BEFORE THE ARIZONA CORPORATION COMMISSION

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Direct Testimony and Exhibits of

Gary Yaquinto

on Behalf of

Arizona Investment Council

December 9, 2015

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I. QUALIFICATIONS

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

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

Q. Please summarize your educational background and professional experience.

A. I earned B.S. and M.S. Degrees in Economics in 1974 from Arizona State University, as well as an MBA from the University of Phoenix in 2005. From 1975 to 1977, I was employed by the State of Wyoming as an economist responsible for evaluating the economic, fiscal and demographic effects of resource development in Wyoming. From 1977 to 1980, I was Chief Research Economist for the Arizona House of Representatives, and from 1980 to 1984, I was employed as an economist in the consulting industry. Since 1984, I have worked in various capacities in government and the private sector in the area of utility regulation, including positions with the Arizona Corporation Commission's ("ACC") Utilities Division Staff, a competitive local exchange telephone carrier, and as a consultant. While a member of the ACC Staff, I served as Director of the Utilities Division from 1988 to 1997. I also served as the Chief Economist at the Arizona Attorney General's Office from 2003-2005 and as the Director of the Governor's Office of Strategic Planning and Budgeting from 2005-2006. I became AIC's President in December of 2006.

II. INTRODUCTION AND PURPOSE

Q. What is AIC and what is its mission?

A. AIC is an association organized under Chapter 501(c)(6) of the Internal Revenue Code. AIC's membership includes approximately 6,000 individuals – many of 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, primarily before regulatory bodies as well as the Arizona Legislature. Specifically, we seek to maintain and support public policies and governmental actions that positively impact investors and protect their investments.

AIC also works with the Commission and policymakers generally to find ways to support investment in Arizona's essential backbone infrastructure, including improvements to, or remediation of, existing facilities. This aspect of our mission is complementary to our core investor interest concerns.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is twofold: (1) to support UNS Electric, Inc.'s ("UNS Electric" or "Company") proposed Economic Development Rider 13, and (2) to oppose the generation buy-through tariff, Rider 14, offered by the Company.

AIC supports the Economic Development proposal because it is targeted at assisting communities within the Company's service territory in attracting new businesses and expanding existing businesses, both of which create new jobs. The bill discounts under the proposed Economic Development Rider would be available only to large

commercial and industrial operations that UNS Electric can serve efficiently, and for which it has available facilities. Because the cost to serve these entities is low relative to other customers, and the power served under the program is new load added beyond the test year, the bill discount will not result in a cost-shift between customer classes. In addition, the new load generated by the Economic Development Rider will help the company make up some of the decline in sales that have occurred since the last rate case. It's a win-win for Mohave and Santa Cruz communities and for the Company.

However, the generation buy-through offering, Rider 14, benefits only those large commercial and industrial customers that have the ability to arrange for generation service from providers other than UNS Electric and are lucky enough to be selected for the program. While existing enterprises that are selected to participate in the program might be able to lower their electricity bills under a buy-through arrangement, the arrangement may not lead to the kinds of community-wide economic benefits that result from the Economic Development proposal. The buy-through rate, unless very carefully designed, also shifts fixed costs onto non-participating customers. Furthermore, like a very similar program implemented on an experimental basis for APS in 2012, the potential effects on the company and its other customers is uncertain. The APS buy-through rate was a pilot, and we have yet to see the data from that program that would inform the design for such a rate in this case. Rather than implement a buy-through rate for UNS Electric now, the Commission should wait until it is able to analyze the performance of the APS pilot AG-1 rate and resolve any attendant pricing or legal issues implicated by such a rate .

III. ECONOMIC DEVELOPMENT RATE, RIDER 13

Q. Mr. Yaquinto have you reviewed the company's proposed bill discount proposal for economic development?

A. Yes.

Q. Please describe the company's economic development proposal.

A. The company is proposing to offer a discount off the total bill for certain large customers who locate new operations or expand existing operations within the company's service territory. Qualifying customers for the discount must also meet eligibility criteria outlined in the proposed tariff, Rider-13, for minimum peak load and load factor. Additionally, availability under Rider-13 is limited to UNS Electric's capacity to serve the new load. Finally, the term of the discount is limited to five years and the amount of the discount is stepped-down each year.

Q. Please explain the qualifying conditions imposed in the economic development discount proposal.

A. First, the economic development discount is available to commercial and industrial customers where UNS Electric has available service capacity. Eligibility is restricted to customers with a peak load of at least 1,000 kW and a load factor greater than 75 percent.

Customers applying for the economic development discount must demonstrate they are either locating new operations in the company's service territory or expanding existing operations. Eligibility is determined by providing written documentation to the Company that the customer has qualified for either the State of Arizona's Quality Jobs Credit, or Qualified Facilities Credit. The criteria under the Quality Jobs Credit

include demonstration that a specified level of capital investment is made and that a certain number of jobs are created at specified pay levels and health care benefits. For application within UNS Electric's service territory, the Quality Jobs Credit requires a capital investment of at least $5 million and creation of at least five jobs. The Facilities Credit is available for manufacturing facilities and research and development operations, which create jobs paying 125 percent of the median county wage and cover at least 80 percent of health care premiums.

Q. Are there other limitations attached to the Economic Development proposal?

A. Yes, the program is limited to 50 MW of applicable load.

Q. You mentioned that the amount of discount for each customer served under the Economic Development Rate is stepped down over a five year period. Please explain how the discounts are applied.

A. First, Rider 13 establishes two categories of eligible customer discounts. The categories are Economic Development and Economic Redevelopment. The distinction between the categories is whether new facilities are built and occupied, or if existing vacant facilities are used. The amount of discount is higher for using vacant facilities.

If a qualifying customer is building new facilities, the discounts are:

Year 1:20%; Year 2: 15%; Year 3: 10%; Year 4: 5%; and Year 5: 2.5%

If a qualifying customer is occupying vacant facilities, the discounts are:

Year 1: 30%; Year 2: 25%; Year 3: 20%; Year 4: 10%; and Year 5: 5%.

Q. Mr. Yaquinto, does AIC support the Company's proposed Economic Development Rate?

A. Yes. For several reasons.

First, as Company witness Dallas J. Dukes explains in his testimony, the areas served by UNS Electric have been slower to recover than other areas of the State of Arizona as a whole from the last economic recession, which began in late 2007. Encouraging economic development through incentives like discounted electricity rates is a way of assisting that recovery, which benefits the Company, customers and communities in Mohave and Santa Cruz counties.

In his testimony, Mr. Dukes provided a graph clearly showing that the economies of both Mohave and Santa Cruz counties, where UNS Electric provides service, have lagged behind other areas in Arizona (Direct Testimony, Dallas J. Dukes, p. 31, lines 1:11). If the Economic Development program is successful in encouraging new basic industries to locate or expand operations and bring new direct industry jobs to Kingman or Nogales, for example, jobs in the service sectors of these economies will also increase through the multiplier effect, providing additional economic benefits to these communities.

Attracting new businesses to locate or expand operations in rural or smaller urban communities is difficult. These communities must develop mechanisms to compete with other areas in Arizona and other states that have location amenities and advantages not available in smaller communities. Discounted electricity rates could offer a comparative advantage for attracting new business within UNS Electric's service territory. For high wage industries that are also energy-intensive like mining,

refining and manufacturing, or for data centers, gaining a lower electric bill through a special economic development discount could be the difference in location or expansion decisions.

Second, UNS Electric has sufficient capacity, under the 50 MW load limit to allow the discounts for attracting new business. Additionally, by restricting eligibility to new or expanding operations with high peak load demand and load factor characteristics, the program targets those customers that UNS Electric can most efficiently serve through its facilities. Because the rate is aligned with the cost to serve these more efficient customers, there should be no concern about any resulting cost-shift. Indeed, if UNS Electric is successful in encouraging new business and industry to locate within its service territory, the burden of fixed cost recovery from other customers is lowered, since the program is designed to recover a portion of system fixed costs from new load.

Finally, by piggybacking onto the State's economic development tax credits for eligibility requirements, UNS Electric mitigates some of its administrative costs related to implementing the tariff as well as lessening or defusing potential claims of "free ridership" should customers receive a discount when they might not otherwise be entitled to one.

Q. Do you have a recommendation regarding the company's Economic Development Rate?

A. Yes. I recommend the Commission approve UNS Electric's proposed Rider-13, Economic Development Rate.

IV. BUY-THROUGH RATE, RIDER 14

Q. Have you also reviewed the company's buy-through offering?

A. Yes.

Q. What is your understanding of the origin of the company's buy-through proposal?

A. Provision 31 of the Settlement Agreement reached among parties in Dockets No. E-04230A-14-0011 and E-01933A-14-0011, regarding the acquisition of UNS Energy Corporation by Fortis, Inc. requires the Company to propose a pilot program for a buy-through tariff. It states:

> "31. In their next rate cases, TEP and UNS Electric will propose a pilot program for a "buy-through" tariff available to Large Light and Power Service and Large Power Service customers, respectively." (Exhibit A, Attachment A, UNS Energy Corporation and Fortis, Inc., Joint Notice of Reorganization, Settlement Agreement, p. 5, May 16, 2004).

Q. Did the Commission approve the Settlement Agreement?

A. Yes, in Decision No. 74689.

Q. Did you participate in the Settlement Agreement and were you a signatory to that agreement?

A. Yes.

Q. Does provision 31 in the Settlement Agreement, which requires the Company to propose a pilot program for a buy-through tariff, also require that the Company or any party to the Settlement Agreement support the proposed buy-through tariff?

A. No. The Company makes it clear it is only proposing the buy-through tariff pilot to comply with the Settlement Agreement. As stated by Company witness Craig Jones in his pre-filed direct testimony:

> **To be clear, UNS Electric is merely presenting this experimental rider in order to comply with the settlement agreement and is neither endorsing the concept nor approval of this specific tariff (Direct Testimony of Craig Jones, p. 6, May 5, 2015).**

Q. Mr. Yaquinto, as a signatory to the Settlement Agreement, do you believe you are required to support or otherwise endorse the pilot program buy-through tariff proposed in this case?

A. No. In fact, I oppose the experimental buy-through tariff.

Q. What is your general understanding of the proposed buy-through proposal?

A. UNS Electric's buy-through pilot program is generally modeled, with some differences, after a similar experimental pilot program in place for Arizona Public Service Company since 2012.

The UNS Electric buy-through proposal is an experimental pilot program that would allow certain large customers the opportunity to arrange for purchase of generation capacity from an alternative provider. UNS Electric would then enter into an agreement with the alternative provider to acquire the power on behalf of the customer, which UNS Electric would deliver to the customer over its facilities. The customer would be charged for services provided by UNS Electric, but would not be subject to power supply charges and purchased power and fuel adjustment charges. Additionally, the UNS Electric pilot program is limited to 10 MW and would run for a period of 4 years.

Q. Why do you oppose the experimental buy-through tariff?

A. I oppose it in this case for several reasons.

First, as its name clearly indicates, the tariff is experimental and, in fact, is the second experiment of this nature proposed to the Commission. The Commission has previously authorized a similar experimental buy-through tariff, AG-1, for Arizona Public Service Company in Decision No. 73183 (May 24, 2012). That Decision, which approved a Settlement Agreement reached by the parties in APS's last rate case, requires APS in its next rate case to explain whether its experimental buy-through rate led to any unrecovered fixed costs.

Furthermore, in provision 17.2 of the APS Settlement Agreement (Decision No.73183), if the APS buy-through tariff results in unrecovered fixed costs, residential customers will be held harmless – the implication being that other commercial and industrial customers or shareholders must bear the burden of those unrecovered fixed costs.

> **"17.2 . . . Because AG-1 is an experimental program that may benefit certain General Service customers, and because residential customers cannot participate in the program, any APS proposal in APS's next general rate case that seeks to collect lost fixed generation costs related to the AG-1 experimental rate shall not propose to recover such costs from residential customers".**

Arizona Public Service Company, Proposed Settlement Agreement, Docket No. E-01345A-11-0224, January 6, 2012.

The purpose of any experimental program is to determine whether the results obtained from the experiment match program goals or expectations.

Alternatively, an experiment also tests whether any adverse consequences occur.

The APS buy-through experiment is now approaching its four-year target life, and APS will be filing its examination of the AG-1 experimental pilot program in its next rate case, now expected in mid-2016. At this point, we do not know the relative size of benefits or costs, nor the risks imposed on other stakeholders by the pilot program.

Before launching a similar experiment for UNS Electric, the Commission should first consider the results of the original buy-through experiment introduced through APS and whether extension to other Arizona regulated electric utilities is appropriate or warranted.

Q: Mr. Yaquinto, you mentioned that the experimental pilot program introduced in this case by the Company is similar to the experimental pilot program authorized by the Commission for APS. You also mentioned that the UNS Electric buy-through offering contains some differences. Generally, what are the major differences introduced by UNS Electric?

A: While the general provisions of the two programs are very similar, a few notable differences exist.

The UNS Electric pilot program attempts to recover a greater share of fixed costs from customers who participate in the pilot program. In UNS Electric's program, participating customers would be responsible for a Reserve Capacity

charge of 100 percent of the company's generation-related charges in the first year and 25 percent of generation related costs in the remaining years of the experiment. The 75 percent of unrecovered generation-related fixed costs after the first year on Rider 14 would be recovered from other customers through the Lost Fixed Cost Recovery mechanism.

Additionally, the UNS Electric experimental pilot program is limited to 10 MW of total load, while APS, being a much larger company, has a limit of 200 MW.

Q: Are the differences in the two pilot programs and the additional restrictions imposed within the UNS Electric experimental program sufficient reason for the Commission to authorize the UNS Electric program?

A: No. I agree with Company witness Craig Jones' observation that the pilot program introduced by UNS Electric enables large customers to "cherry pick" power supply based on the economics of currently available capacity. (Craig Jones, Direct Testimony, p. 56, 9:14). It results in costs being shifted onto other customers who do not have the same "shopping" advantages or privileges as those of the Company's largest customers who might be lucky enough to grab a share of the 10 MW dedicated to the pilot program. Although UNS Electric has attempted to structure its experimental pilot program to mitigate the exposure of other customers to increased rates, the pilot program nevertheless would likely continue to expose other customers to an unfair cost shift. The pilot program increases risks for a relatively small

utility and for other customers, and provides unfair advantages to a few, very large customers. The public interest simply is not served by a rate program that gives a competitive advantage to some customers to the detriment of all others.

Q: Do you have other concerns with the proposed buy-through rate?

A: Yes.

A major thrust of this rate case filing is to modernize rate design in a way that moves customer classes closer to their cost of service. Alternatively stated, the rate designs proposed by the Company partially remove the cross-subsidization among customer classes that results from the current rate design. The buy-through pilot program moves in precisely the opposite direction, imposing a new set of cost shifts onto non-participating customers.

Additionally, because outcomes under pilot programs are generally uncertain, they are typically limited in duration so that the results of the program can be assessed. Experimental programs, like the buy-through pilot, can benefit some stakeholders, but harm others. Before extending or expanding these experimental buy-through programs, the Commission should understand whether they pose any unintended consequences.

Although the UNS Electric buy-through program is limited to four years (a sufficient period for proper assessment of the program), those few customers lucky enough to derive benefit from the program have a vested interest in seeking extension beyond the pilot program's scheduled life, or in advance of a full evaluation of the program. This is particularly true if the rate design

does not adequately recover all of the capacity-related, administrative, and other costs that UNS Electric will incur related to the buy-through customers, thereby giving those customers an undeserved windfall that might prove difficult to unwind in future rate cases.

Ultimately, the buy-through rate is one way for a few lucky customers to circumvent current restrictions on retail electricity competition, which many believe may not be ripe for consideration in Arizona, or constitutionally permissible. There are other, better ways to stimulate economic growth and encourage large companies to locate in Arizona, such as the Economic Development Rider that UNS Electric has proposed.

Q: Do you have a recommendation regarding the experimental buy-through Rider 14?

A: Yes. I recommend that the Commission reject the implementation of an experimental buy-through rate for UNS Electric.

Unlike the Economic Development rate proposed by the Company, the buy-through rate is clearly a "free ride" of sorts for a few existing customers. It is unlikely that a properly designed buy-through rate will provide enough price incentive to encourage certain large customers to locate or expand operations in Arizona, and any improperly designed rate that would give those customers such a price incentive will simply result in a non-cost based cost shift benefiting a select group of privileged, large customers. Simply put, the buy-through program enables a handful of elite corporate entities doing business in

UNS Electric's service territory to obtain cheap power from out-of-state energy providers at the expense of other customers and stakeholders.

AIC strongly encourages economic development – but that goal is not accomplished through a buy-through rate. Other rate mechanisms exist that will encourage economic development and create new jobs for the community, without the cost-shift and other risks attending a buy-through rate design.

V. Conclusion

Q: Does this conclude your testimony?

A: Yes.

BEFORE THE ARIZONA CORPORATION COMMISSION

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Direct Testimony and Exhibits of

Daniel G. Hansen

on Behalf of

Arizona Investment Council

December 9, 2015

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I. INTRODUCTION AND PURPOSE

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

A. My name is Daniel G. Hansen. I am a Vice President at Christensen Associates Energy Consulting, LLC located at Suite 400, 800 University Bay Drive, Madison, Wisconsin 53705.

Q. Have you previously testified in utility regulation proceedings?

A. Yes. I have testified on issues related to utility fixed cost recovery in Arizona, Connecticut, Minnesota, New Mexico, Nevada, Oregon, and Utah. In these proceedings, I represented a broad range of clients, including a regulator, an environmental organization, a non-profit organization of utility investors, and investor-owned utilities. My education and work experience are described in AIC Exhibit DGH-1.

Q. On whose behalf are you testifying in this docket?

A. I am testifying on behalf of the Arizona Investment Council ("AIC").

Q. What is the purpose of your direct testimony?

A. The purpose of my testimony is to support two proposals of UNS Electric, Inc. ("UNS Electric"): the introduction of a three-part rate (which has a demand charge in addition to the basic service charge and energy charge) that is optional for all residential and small commercial customers and mandatory for new net metering

customers (where "new" is defined as beginning service on the Net Metering Rider R-10 after June 1, 2015); and the introduction of a new net metering rider (Rider R-10) that is applicable to new net metering customers (defined as those that completed an application for interconnection to UNS Electric's grid facilities after June 1, 2015) that changes the way net metered customers are compensated for excess generation relative to the current net metering rider (Rider R-4). Specifically, in the sections that follow, I will discuss:

- What demand charges are;
- Where demand charges have been used;
- Why a three-part rate is appropriate for UNS Electric;
- A description of UNS Electric's proposed net metering modifications; and
- Why the proposed net metering modifications are appropriate for UNS Electric.

II. DEMAND CHARGE DEFINITION, BENEFITS, AND APPLICATIONS

Q. Please describe UNS Electric's three-part rate proposals.

A. UNS Electric has proposed four new three-part rates, differentiated by their application to residential versus small commercial customers as well as whether the energy charges are differentiated by time-of-use ("TOU") pricing period. Specifically, the proposed tariffs are:

- Residential Service Demand (RES-01 Demand): optional for Residential Service customers, but mandatory for non-TOU Residential Service customers taking

service under Net Metering Rider R-10 (UNS Electric's proposed net metering rider, which is also discussed in this testimony) beginning after June 1, 2015.

- Residential Service Demand Time-of-Use (RES-01 Demand TOU): an optional version of the RES-01 Demand rate that contains energy charges that are differentiated by time-of-day and season. The rate is mandatory for Residential Service TOU customers taking service under Net Metering Rider R-10 beginning after June 1, 2015.
- Small General Service Demand (SGS-10 Demand): optional for Small General Service customers, but mandatory for non-TOU Small General Service customers taking service under Net Metering Rider R-10 beginning after June 1, 2015. Small General Service rates apply to customers with maximum demand below 40 kW.
- Small General Service Demand Time-of-Use (SGS-10 Demand TOU): an optional version of the SGS-10 Demand rate that contains energy charges that are differentiated by time-of-day and season. The rate is mandatory for Small General Service TOU customers taking service under Net Metering Rider R-10 beginning after June 1, 2015.

Q. What is a demand charge?

A. A demand charge bills the customer based on its maximum usage defined over a short time interval. Demand charges are in units of dollar-per-kW. The measure of demand used to calculate the customer's bill (called billing demand) can vary

across utilities and tariffs. For example, UNS Electric has proposed to base its residential and small commercial billing demand on the highest single hour of energy usage during the customer's billing month. Many demand-based rates (including UNS Electric's Large Power Service and Large General Service) measure billing demand over a 15-minute or 30-minute time interval. In addition, billing demand can be based on usage in previous billing months in addition to the current billing month (e.g., billing demand equals the greater of the maximum demand in the current month or 75 percent of the maximum demand in the previous eleven billing months). This is called a "ratcheted" demand charge. (UNS Electric has not proposed a ratcheted demand charge for its residential and small commercial customers.)

Q. What are the benefits of including a demand charge in retail rates?

A. Including a demand charge (in addition to a basic service charge and energy charges) in a retail rate provides customers with rates that better reflect the way utility costs are incurred. As I will describe below, this has several potential benefits, including:

- Giving customers appropriate incentives to manage their demand, thereby promoting a more efficient use of the system;
- Encouraging customers to adopt (and third parties to produce innovations in) capacity-saving technologies;

- Preventing the need for future rate modifications in response to emerging issues;
- Reducing intra-class cross subsidies; and
- Allowing UNS Electric to obtain more renewable energy for the same (or lower) total cost by purchasing (or building) at the utility scale.

Q. How does UNS Electric's three-part rate design better reflect the way utility costs are incurred?

A. UNS Electric's three-part rate has charges that better reflect the way utility costs are incurred, relative to the comparable non-demand rate. It is commonly accepted in utility cost-of-service studies that costs within functions (generation, transmission, distribution, and customer service) can be classified according to their primary driver, which can be one of the following:[1]

- **Customer-related costs**, which increase as the utility serves more customers, regardless of the amount of energy the customers use;
- **Energy-related costs**, which vary with the amount of energy used by customers; and
- **Demand-related costs**, which are associated with the maximum amount of energy used during a specified time interval (e.g., 15 to 60 minutes).

UNS Electric's demand rates contain charges that correspond to each of these cost drivers.

[1] National Association of Regulatory Utility Commissioners, Electric Utility Cost Allocation Manual, January 1992, pages 20-22.

Q. How can customers benefit from managing their demand on a three-part rate?

A. When customers who take service on a three-part rate reduce their billed demand, they can reduce their bill while at the same time contributing to lower utility costs in the short- and/or long-run. Customers can reduce billing demand by avoiding using electricity intensive appliances at the same time, ensuring that their demand stays low even if their total energy consumption changes little (e.g., by delaying washing clothes when the dishwasher is running).

Q. How do three-part rates encourage adoption of capacity-saving technologies?

A. Enabling technology can assist customers in managing their end uses to minimize billed demand. For example, the Residential Demand Control program at Otter Tail Power Company includes a demand controller and radio receiver to automate control of the end-uses during "control periods," which are called by the utility. In addition, the Rocky Mountain Institute (RMI) recently released a report on this topic called "The Economics of Demand Flexibility."[2] This study simulated the potential for customer bill savings on a variety of residential rates, with the largest simulated benefits coming from Salt River Project's residential demand rate. In addition, demand-based rates give customers with rooftop solar installations an incentive to invest in battery storage technologies, which can be used to help the customer manage its billing demand. This technology has the ability to effectively

[2] "The Economics of Demand Flexibility", Rocky Mountain Institute, August 2015. The report is available for download at RMI's web site: http://www.rmi.org/electricity_demand_flexibility.

turn distributed solar power from an intermittent resource into a dispatchable resource. In the absence of the demand charge (or TOU pricing), a net-metered customer has little reason to invest in battery storage.[3]

Q. How do three-part rates reduce the need for future rate modifications in response to emerging issues?

A. Demand-based rates have the potential to reduce the need for future rate modifications in response to emerging issues because they better reflect the way utility costs are incurred. That is, a well-designed retail rate is more likely to function well in a variety of circumstances. For example, while the current two-part rate design (with inclining block energy charges) is beneficial for customers installing PV solar, it serves as a barrier to the proliferation of electric vehicles ("EVs"). By shifting cost recovery away from energy charges and toward demand charges, three-part rates have the potential to reduce the cost of charging EVs at home. That is, by charging an EV within the confines of the customer's existing demand, a customer could significantly reduce the cost of charging the EV relative to a two-part rate. It is not hard for me to imagine stakeholders calling for UNS Electric to implement a dedicated "EV Rate" (or an EV discount to its standard residential rate) after technological improvements reduce EV prices (thus increasing the quantity of EVs demanded). UNS Electric's proposed RES-01 Demand TOU rate removes the need for such a rate or rider. That is, that rate

[3] In this case, the customer's incentive to invest in battery storage would likely be limited to improved reliability (in case of service interruption).

would provide EV customers with the appropriate incentives to manage their demand and charge during off-peak hours.

Q. How do three-part rates reduce intra-class cross subsidies?

A. Three-part rates reduce intra-class cross subsidies by making the charges customers pay more closely reflect the way utility costs are incurred. UNS Electric has to have enough generating capacity (through ownership or purchase agreements) and network capability to serve peak demands. Under two-part rates, these demand-related costs are included in the energy charges. Therefore, customers who have relatively low levels of energy use contribute little to fixed-cost recovery regardless of the level of their maximum demand. A customer with low energy use relative to its demand level is referred to as a "low load factor" customer.[4] Under two-part rates, low load factor customers tend to be subsidized by high load factor customers (those whose average usage is closer to their maximum demand). A customer's low load factor may be caused by a high proportion of AC load, seasonal occupation of a residence (reducing the customer's annual load factor), or the installation of on-site DG. By reflecting the customer's load factor in their rates (as three-part rates do), high load factor customers will pay a lower average rate than low load factor customers (all else equal), which is consistent with utility cost-of-service methods. That is, demand-based rates give customers an incentive to use the utility's assets more efficiently

[4] Load factor is defined as the average usage over a period of time divided by the customer's maximum demand over that same period of time (where the period of time is typically one month or year).

(e.g., helping prevent the need for a generating unit designed to serve a low number of peak hours each year).

Q. Can the use of three-part rates for net metering customers allow for the acquisition of more renewable power?

A. Yes. A potential benefit of implementing three-part rates for net metered customers is that UNS Electric may be able to obtain more renewable energy for the same total cost. As described in Section III, the most recent renewable energy purchase power agreement by UNS Electric's sister company (Tucson Electric Power) was priced at 5.84 cents/kWh. As I describe later, there is some evidence that this is a high cost relative to more current purchase power agreements in the region. UNS Electric's volumetric retail rate is much higher than that. The lost fixed cost recovery that results from applying retail rates to net metered generation eventually increases rates to all customers in the rate class (through some combination of the LFCR and a subsequent rate case). Instead of incurring this rate increase to subsidize customer-sited DG, that amount of money could have been put toward more economic utility-scale renewable power purchases or facility construction. Given recent market costs, UNS Electric could have obtained more total renewable energy by purchasing it through wholesale transactions rather than from its customers through net metering. Put slightly differently, the existing net metering framework coupled with the two-part rate design (in which demand-related costs are recovered through energy charges)

causes customers to overpay for renewable resources. Note that a three-part rate does not prevent an interested customer from installing PV solar, it simply reduces the amount of the subsidy that other customers are compelled to pay them if they do so. While the current subsidies embedded in UNS Electric's two-part rates may be the main factor behind some customer's decision to install PV solar, there are other customers would likely make the same decision in the absence of the subsidy. My preference for green power led me to enroll in a program in which I pay a 2.44 cent/kWh premium to offset 100 percent of my energy usage with green power.[5] This program, which is not subsidized by non-participants, provides an example in which customers purchased green power in the absence of a subsidy from other ratepayers.

Q. Are demand charges commonly used in electricity pricing?

A. Yes, demand charges are a common feature of electric tariffs. They are most commonly found in tariffs for medium and large commercial and industrial customers. For example, UNS Electric's Large General Service and Large Power Service rates include demand charges. Demand charges have also been applied to residential and small commercial customers for decades, and interest in applying demand charges to these customers appears to be growing. I am currently aware of 19 service territories in the United States in which the utility offers rates with demand charges to residential customers, including utilities in Alabama, Alaska,

[5] This is Madison Gas & Electric's Green Power Tomorrow program, which is described here: www.mge.com/environment/green-power/gpt/.

Arizona, Colorado, Georgia, Kansas, Minnesota, North Carolina, North Dakota, South Carolina, South Dakota, Vermont, Virginia, and Wyoming.[6] These rates are listed in AIC Exhibit DGH-2. Demand rates for these customer classes are also common in certain European countries and are being considered in Australia.

Q. Have residential rates with demand charges been approved in Arizona?

A. Yes, residential rates with demand charges have been approved for Arizona Public Service (APS) and Salt River Project (SRP). The Arizona Corporation Commission first approved a three-tiered residential demand rate for APS in 1980. Currently, APS's Rate Schedule ECT-2 (Residential Service Time-of-Use with Demand Charge Combined Advantage 7PM-Noon) has more than 110,000 enrolled residential customers.[7] In February 2015, SRP's board approved the Customer Generation Price Plan (E-27), which is a mandatory demand-based rate for customers that install on-site generation after December 8, 2014.[8] There is a corresponding voluntary pilot program for customers without on-site generation (E-27 P).

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[6] In addition to the rates contained in AIC Exhibit DGH-2, the Glasgow Electric Plant Board in Kentucky recently received approval to implement a mandatory residential demand rate in which the demand charge is based on the utility's monthly coincident peak. That is, the customer is billed based on their usage during the hour in which the entire utility's load is at its highest level. The rate will go into effect in January 2016.

[7] Snook and Grabel, "There and Back Again", Public Utilities Fortnightly, November 2015, pages 47-50.

[8] The press release for the board approval can be found at this link: http://www.srpnet.com/newsroom/releases/022615.aspx. The E-27 tariff can be found at this link: http://www.srpnet.com/prices/pdfx/April2015/E-27.pdf.

Q. What factors do you believe contribute to the increasing interest in the application of demand charges to residential and small commercial customers?

A. There are two likely causes for the increasing interest in offering demand charges to residential and small commercial customers. The first cause is the increasing ability of utilities to be able to bill a demand-based rate for smaller customers without incurring additional metering costs. Billing a rate that contains demand charges requires the ability to meter customer demand. In the past, energy-only meters have been in place for smaller customers. These meters are capable of measuring the total amount of energy consumed in a given billing period, but are not able to record the maximum amount of energy usage during any one short interval (e.g., a 15- to 60-minute period). In these cases, a separate demand meter is required to bill the demand-based rate, which entails additional meter costs. However, it has become more common for utilities to install advanced metering infrastructure (AMI) of some kind throughout their service territories, which is typically capable of recording customer usage on an hourly (or sub-hourly) basis.

Q. What is the second factor you believe contributes to the increasing interest in the application of demand charges to residential and small commercial customers?

A. The second factor contributing to increased interest in applying demand charges to smaller customers is the increase in distributed generation, particularly rooftop

solar installations. Standard residential and small customer rate designs, which typically contain only a basic service charge and volumetric energy charges, tend to recover a significant share of fixed costs through the energy charge (i.e., the basic service charge is set well below the level required to recover all fixed costs). When a customer generates energy on-site and offsets the energy purchased from the utility, it correspondingly avoids paying the fixed costs included in the energy charge. This can lead to utility fixed cost under-recovery and/or a shift of fixed cost recovery to other customers. When a demand charge is added to the rate design, all or a portion of the fixed costs are removed from the energy charge (which is thereby lowered) and recovered through the demand component and basic service charge. The result is that all customers, those with and without on-site generation, pay for the infrastructure costs that they use.

Q. What are the proposed charges in UNS Electric's Residential Service Demand rate?

A. The Residential Service Demand rate contains three types of charges: a basic service charge of $20 per month; an energy charge of $0.059260 per kWh; and a tiered demand charge of $6.00 per kW for zero to 7 kW and $9.95 per kW for kW in excess of 7 kW. The inclusion of these three types of charges is why UNS Electric refers to its proposed demand rates as "three-part" rates. By comparison, its non-demand Residential Service and Small General Service rates could be

considered "two-part" rates, because they include only a basic service charge and energy charges.

Q. Is UNS Electric's proposal to increase the basic service charge from $10 to $20 appropriate?

A. Yes. UNS Electric Witness Jones describes the proposed increase in the basic service charge as "consistent with the results of the COSS and equitable fixed cost recovery."[9] While the proposed $10 per month increase in the basic service charge improves the extent to which UNS Electric's rates reflect the cost to serve, the resulting $20 per month charge is still well below both the $54.46 per month basic service charge that would be required to recover all fixed costs.[10]

Q. How is the billing demand kW amount measured?

A. The kW amount that is used for customer billing purposes is based on the highest one-hour metered demand during the billing month. Intuitively, the billing demand represents the hour of the billing month in which the customer uses the most electricity. By basing billing demand on the maximum one-hour demand for the current billing month, UNS Electric has chosen a comparatively customer-friendly definition of billing demand. As AIC Exhibit DGH-2 shows, 26 out of 30 listed demand rates define billing demand using a 15- or 30-minute maximum demands (including SRP, which uses a 30-minute demand measure). Basing

[9] Direct Testimony of Craig A. Jones, page 34, lines 12-13.
[10] Direct Testimony of Craig A. Jones, page 41, lines 1-4.

demand on a shorter time period increases the chance that a customer will have their billing demand increased by simultaneously using a set of electricity-intensive but short duration end uses. For example, a hair dryer or microwave oven can draw a relatively large amount of power, but they are not likely to be used for an extended period of time. Basing billing demand on longer periods of time helps smooth out the effect of some of these short-duration end uses.

Q. How do the proposed charges in the Residential Service Demand rate compare to the proposed charges in the Residential Service rate (RES-01)?

A. The demand and non-demand versions of the Residential Service rate contain the same basic service charge of $20 per month. The "standard" Residential Service rate excludes the demand charges, but contains higher (and tiered) energy charges. Specifically, the customers pay $0.08007 per kWh for the first 400 kWh consumed in a month and $0.10007 per kWh for kWh in excess of 400 kWh.

Q. Why is UNS Electric proposing to make its three-part rate design mandatory for customers who install distributed generation (DG)?

A. UNS Electric is proposing to make three-part rates mandatory for its new net metered customers (customers who install rooftop solar after June 1, 2015) due to the issues with respect to utility fixed cost recovery and customer cost shifting discussed above. Specifically, UNS Electric's two-part rates (e.g., RES-01) are designed to recover a significant amount of fixed costs through volumetric energy

charges. According to the Direct Testimony of UNS Electric Witness Jones, the Residential basic service charge would need to be $54.46 per month in order to recover all of UNS Electric's fixed costs (which include customer-related and demand-related costs).[11] In contrast, UNS Electric is proposing a $20 per month basic service charge and currently has a $10 per month basic service charge. The remainder of the fixed costs (i.e., the difference between the revenue that would be recovered with a $54.46 basic service charge and the proposed $20 per month basic service charge) is recovered through the energy charge. As a result, the amount of fixed cost recovery UNS Electric obtains is affected by the amount of energy sold to its customers.

Q. What problems are caused by recovering fixed costs through energy charges for net metering customers?

A. When net metered rates recover fixed costs through volumetric charges (such as RES-01 plus Rider R-4), the reduction in billed sales to the net metered customers reduces utility fixed-cost recovery, which leads to a combination of cross-subsidies (i.e., an increase in rates to non-net metered customers) and reduced opportunity for the utility to earn its authorized rate of return. That is, some of the lost fixed cost recovery from net metering will be shifted to other customers through the Lost Fixed Cost Revenue Recovery (LFCR) Rider (R-8). Remaining unrecovered fixed costs that are not shifted to other customers through the LFCR

[11] Direct Testimony of Craig A. Jones, page 41, lines 1-4.

are borne by the utility until rates are re-set during UNS Electric's next rate case. In the rate case, the reduced level of test-year billed sales associated with DG leads to an increase in the energy charges that are paid by all customers in the rate class. That is, the fixed cost recovery will be spread across fewer billing units, so the resulting energy charge (which is the test-year revenue requirement divided by the test-year sales) is higher. While this rate reset theoretically makes the utility whole for net metering at test-year sales going forward, the class-wide increase in rates that results from net metered output from customer-sited DG perpetuates the shift of fixed-cost recovery from net metered customers to non-net metered customers.

III. PROPOSED NET METERING RIDER R-10

Q. Is UNS Electric proposing a new net metering rider?

A. Yes, UNS Electric has proposed Net Metering Rider R-10, which applies to customers taking service on one of the three-part rates proposed by UNS Electric. As such, this rider will only apply to customers who begin net metered service after June 1, 2015.

Q. How does Rider R-10 differ from the existing Net Metering Rider R-4?

A. The proposed R-10 differs from the existing net metering rider (R-4) in two ways: it replaces the "banking" of excess generation (the amount of generation during a billing month in excess of the customer's use) in favor of a bill credit calculated

in the current month; and R-10 compensates customers for excess generation at the Renewable Credit Rate, whereas R-4 compensated customers at UNS Electric's avoided costs for any banked excess generation that remained when the October bill is calculated.[12]

Q. How is the Renewable Credit Rate set?

A. According to the direct testimony of UNS Electric Witness Tilghman, the Renewable Credit Rate is based on "the most recent comparable utility scale purchased power agreement for renewable energy that is connected to the Company's or TEP's distribution system."[13] The proposed value is 5.84 cents per kWh, which is based on a recent agreement with Tucson Electric Power (TEP).

Q. Does the proposed Renewable Credit Rate appear to be reasonable?

A. Yes, the proposed Renewable Credit Rate of 5.84 cents/kWh appears reasonable based on recent reports I have seen. For example, according to a recent article in Megawatt Daily,[14] the New Mexico Public Regulation Commission approved two 25-year, 70-MW solar contracts (on October 7, 2015) at levelized costs of 4.155 cents/kWh and 4.208 cents/kWh. The article goes on to say that the pricing of these contracts is "part of a national trend, with recent levelized PPA prices in the

[12] The R-4 tariff describes the avoided cost calculation as "the simple average of the hourly Market Cost of Comparable Conventional Generation (MCCCG) Rider R-3 for the applicable year."

[13] Tilghman Direct, p. 8, lines 7-9.

[14] "New Mexico PRC OKs $42/MWh solar contracts", Megawatt Daily, October 12, 2015, pages 13-14.

Southwest landing in the $40/MWh [4.0 cents/kWh] range, down from around $105/MWh [10.5 cents/kWh] on average in 2011, according to an annual report from the Lawrence Berkeley National Laboratory."

Q. Does the downward trend in PPA prices referenced in that article indicate a potential benefit for customers from the proposed Renewable Credit Rate methodology?

A. Yes, if recent trends continue, net metering customers can expect to benefit from UNS Electric's proposal to only update the Renewable Credit Rate when UNS Electric or TEP has entered into a new purchase power agreement or two years have passed, whichever comes first. That is, it is possible that UNS Electric customers will be paid a Renewable Energy Credit that is based on a purchased power agreement that is as much as two years old, in a market that has experienced significant recent cost/price reductions in recent years.

Q. Do you agree that UNS Electric should compensate net metered customers for excess generation using the proposed Renewable Credit Rate?

A. Yes. The proposed Renewable Credit Rate is consistent with UNS Electric's current practice of paying a premium for renewable energy in order to meet its renewable energy targets.

Q. Do you agree with UNS Electric's proposal to end the "banking" contained in the current net metering rider (R-4) and replace it with current-month credits at the Renewable Credit Rate?

A. Yes, I agree that the proposed current-month credits are preferred to the banking in the existing net meter rider (R-4). Compensating customers for excess generation in the current month at the Renewable Credit Rate is more reasonable than allowing customers to virtually store the excess generation in order to be compensated for it at their retail rate in a future month. This virtual storage does not correspond to any actual benefit provided by the customer-sited DG. I expect banking to be effective at increasing the cross subsidy that net metered customers receive, but that is not a policy goal I support.

IV. CONCLUSIONS

Q. Do you have any concluding observations?

A. Yes, I conclude that the Arizona Corporation Commission (ACC) should approve UNS Electric's proposed three-part rates and net metering riders. The three-part rates have several benefits: they provide customers with incentives to change their behavior in ways that reduce system costs; they provide a pricing template that is appropriate for a wide range of circumstances; they reduce intra-class customer cross-subsidies; they send price signals that create a market for demand control, energy storage, and other third-party technologies; and they may allow UNS Electric to obtain more renewable energy at the same total cost. I also recommend

that the ACC approve UNS Electric's proposed net metering rider, which provides a more sensible means of compensating customers for excess generation than the current banking arrangement, while maintaining a subsidy (relative to UNS Electric's avoided costs) that encourages further adoption of renewable resources.

Q. Does this conclude your direct testimony?

A. Yes.