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Timothy M. Hogan (004567)
ARIZONA CENTER FOR LAW
IN THE PUBLIC INTEREST
202 E. McDowell Rd., Suite 153
Phoenix, Arizona 85004
(602) 258-8850

Attorneys for Western resource Advocates

BEFORE THE ARIZONA CORPORATION COMMISSION

SUSAN BITTER SMITH, Chairman
BOB STUMP
BOB BURNS
DOUG LITTLE
TOM FORESE

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

NOTICE OF FILING DIRECT TESTIMONY OF KEN WILSON ON BEHALF OF WESTERN RESOURCE ADVOCATES

Western Resource Advocates ("WRA"), through its undersigned counsel, hereby provides notice that it has this day filed the attached direct testimony of Ken Wilson.

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DATED this 9th day of December, 2015.

ARIZONA CENTER FOR LAW IN THE PUBLIC INTEREST

By _____
Timothy M. Hogan
202 E. McDowell Rd., Suite 153
Phoenix, Arizona 85004
Attorneys for Western Resource Advocates

ORIGINAL and 13 COPIES of the foregoing filed this 9th day of December, 2015, with:

Docketing Supervisor
Docket Control
Arizona Corporation Commission
1200 W. Washington
Phoenix, AZ 85007

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

All Parties of Record

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BEFORE THE ARIZONA CORPORATION COMMISSION

COMMISSIONERS

SUSAN BITTER SMITH, CHAIRMAN

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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

TESTIMONY OF

KENNETH L. WILSON ON BEHALF OF

WESTERN RESOURCE ADVOCATES

December 9, 2015

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Q. Please state your name and business address.

A. My name is Kenneth L. Wilson. My business address is 2260 Baseline Road, Suite 200, Boulder, Colorado 80302.

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

A. I am an Engineering Fellow with Western Resource Advocates ("WRA"). WRA is a nonprofit conservation organization working to protect and restore the natural environment of the Interior American West. WRA's Clean Energy Program works to develop and implement policies to reduce the environmental impacts of the electric power industry in the Interior West by promoting the expanded use of renewable energy, energy efficiency, and other clean energy resources in an economically sound manner.

Q. Please give a brief description of your professional experience and education.

A. I am an electrical engineer with over 40 years of experience. I worked at Bell Labs as a systems engineer for 18 years and have been a consulting engineer with my own consulting firm for the past 15 years, and most recently an employee of Western Resource Advocates. For the past seven years I have worked on a number of distribution grid related projects, looking at grid efficiency, Demand Side Management ("DSM"), and renewable energy integration. I have Master's and Bachelor's degrees in Electrical Engineering from the University of Illinois and Oklahoma State University, respectively. My qualifications are included as Attachment KLW-1 to this testimony.

I. Summary

Q. Please summarize your testimony.

A. UNS Electric, Inc. (UNSE) is proposing dramatic changes in the way rates are calculated for residential customers who install Distributed Solar Generation (DSG). Currently, customers who install DSG have all of the energy generated by their system "netted" against their energy consumption. Aside from this net metering, these customers are in the same rate class and are under the same rate structure as other residential customers. UNSE is proposing in this rate case to change the rate structure for customers who install new DSG systems in two ways. First, all energy that is produced by the DSG system and exported to other UNSE customers will be credited at a lower rate. Secondly, UNSE is proposing to assess large demand charges for peak hourly energy use each month.

In the testimony below, I first address the issue of creating a special rate class for residential customers with DSG. Secondly, I address concerns I have with assessing demand charges on residential customers. Third, I propose a minimum bill as an alternative for demand charges. Fourth, I discuss the advantages of Time of Use (TOU) rates. Fifth, I discuss the problems with doubling the monthly service charge. Sixth, I discuss battery storage as a new technology that will need to be considered in rate cases.

Q. Please summarize your recommendations.

A. I recommend that the Commission not create a separate rate structure for customers with DSG systems. The issues associated with whether those customers are providing adequate contributions to fixed costs are no different from the contributions

associated with vacant and seasonal properties and other customers with low energy use. In the alternative, I recommend allowing UNSE to assess a minimum bill to recover a portion of fixed costs from all residential customers and to continue recovering most fixed costs with charges for energy. I also recommend moving all residential customers to TOU rates, and I recommend against a high monthly basic service charge. Finally, if the Commission decides a demand charge is appropriate, it should be modest and should only be assessed for a customer's peak hourly demand during a defined system peak load time of day, each month.

II. Separate Rate Structures for DSG Customers

Q. Should DSG customers be treated as a separate rate class?

A. No. I do not believe it is necessary or desirable to create a separate rate class for customers who self-generate electricity. Much of the energy they generate is used on-site, lowering their load in a manner similar to customers utilizing energy efficiency measures. The method of appropriately assessing the utility's fixed costs to DSG customer and non-DSG customers can be identical. When the issue of exported energy is removed from the discussion, DSG customers look like other customers with relatively low energy use.

Q. In what way is energy generated by DSG similar to energy efficiency measures?

A. Much of the energy generated by DSG is used on-site to power part of the customer's use of air-conditioning systems, refrigerators, etc. To the UNSE system, this

has the appearance of a load reduction similar in nature to putting in a more efficient air-conditioning system, a more efficient refrigerator, etc.

Q. Do we need a separate rate structure for customers who implement energy efficiency measures?

A. No. To the best of my knowledge, no state has proposed creating a separate rate class for customers who implement energy efficiency measures.

Q. Is a separate rate class needed to assess a fair share of the utility's fixed costs for distribution, transmission and generation to DSG customers?

A. No. I discuss the pros and cons of alternative rate structures below, such as demand charges, minimum bill, and TOU rates that can be used equitably for all customers, including DSG and non-DSG customers. Both sets of residential customers would have the same issues with these rate structures and there is no need to treat them in separate classes.

Q. Do your comments on these rate structure issues apply to all customers or just DSG customers?

A. My comments on demand charges, minimum bill, time of use rates and monthly customer charges apply to all customers and not just DSG customers. I will be discussing pros and cons for various rate structure elements that apply generally to all residential customers.

III. Demand Charges

Q. What are your concerns regarding UNSE's proposal to assess demand charges on residential customers who have DSG?

A. One concern is that residential customers will not understand demand charges and will not have the information necessary to change behavior in a manner that will control the level of demand charge they are assessed. I believe it will increase bills for low income customers and customers with electric heating. I am also concerned that a demand charge for residential customers will act like very high fixed charge and will surprise many customers with much more erratic, unpredictable, and unmanageable bills.

Q. What is the basis for your concern that residential customers will not understand demand charges?

A. There is a big difference between understanding how much electricity you use each month and how fast you use electricity in an hour. I look at my electricity bill each month to see how many kilowatt hours (kWh) I have used and compare it to previous months and the previous year. As an electrical engineer I understand philosophically that I have peak use hours during the month, but I generally have little control over how high that peak is. This was especially true when my two teenage daughters were living at home with my wife and me. I didn't know, and they didn't know, when various appliances get turned on and how that interacts with air conditioning, washing machines, dishwashers, refrigerators and other appliances that may be operating. To effectively manage their demand charge, customers would need to monitor individual appliances that

they turn on at the same time during every hour of the day and know when large, automatic appliances (like air conditioners) are already running.

Q. Will this lack of understanding about the rate of electric use result in surprises when the electricity bill arrives each month?

A. I believe it will. I think customers could easily see demand charges vary by a factor of 2 or even 3 from one month to the next. It all depends on the simultaneous use of appliances, some automatic and some controlled by the customer, being very different from one month to the next. If your family happens on one day to all arrive home at the same time and start using various appliances, it can be very different from the average use during that month and other months. The demand charge that would be assessed is seemingly random from the point of view of the customer.

Q. Do the hourly peak demands by various residential customers occur during the same hour during the month?

A. No, the peak demand by any random group of residential customers would rarely be during the same hour in a month. The peak load hour during a month for my house is unlikely to be the peak load time for my neighbor's house. While there is some correlation with respect to average peak hours, the actual peak hours are unlikely to be at the same time of day on the same day of the month. What this means is that if you take the hourly peak kW in a month for each residential customer and add them all up, the total will be far more than the actual peak load presented by residential customers to the UNSE system. This is also true at the feeder and substation level. As a result, UNSE's

demand charge proposal presents a very real risk of overcharging residential customers for demand in excess of the costs the utility incurs to satisfy that demand.

Q. Does the demand assessment for a month have the potential to penalize a customer with respect to the coincident peak load of other residential customers and with peak load on the UNSE system?

A. Yes. The demand charge that UNSE is proposing does not take into account whether the customer's peak demand coincides with peak load on the UNSE system. A particular customer's peak load could occur in the morning, when system load is average, during evening when peak load is high, or during the night time when peak load is low. It may also not correspond to the peak load times of their neighbors on the same feeder.

Q. Does the demand charge that would be assessed on a residential customer correspond to the peak load on the substation and feeder that serves that customer?

A. No, not necessarily. A particular customer's peak demand during a month may be far removed from the time of peak demand on the feeder or substation serving that customer. One of the main components of fixed costs that UNSE wants to recover is the cost of the distribution grid, which include costs such as the service transformer, actual poles and wires of the feeder, and all of the components of the substation. To more accurately assess demand charges in line with established principles of rate design, UNSE should have a portion of the demand charge that is based on the time of day and day of the week when the customer's substation experiences peak load and the customer's feeder experiences peak load. This would match the customer's peak load

with the peak loading on the feeder and substation serving them. While a demand rate structure with this level of detail would be more accurate in assessing costs, it would still be unpredictable for the customer.

Q. Is it possible for UNSE to assess a portion of demand charges based on the customer's substation and feeder?

A. Yes. UNSE should have hourly load data for all feeders and substations. The times during the day when feeder and substation loads are at peak could be used, along with the information on the customer's peak hours of use, to correctly assess and bill for a portion of the customer's peak demand based on the customer's peak substation and feeder load. The portion of the customer's demand based on these distribution grid peaks could be prorated with the customer's peak load during system peak load.

Q. How would demand charges impact customers with all electric heating?

A. Customers with all electric heating have some unique problems with demand charges. Electric heating loads peak in the winter, when systems loads are not at peak. Peak heating load hours for a customer can occur during the night time, when temperatures are low, and the system load is low. Assessing high demand charges for night time peaks during winter months unduly penalizes customers with electric heat and does not accurately represent the utility's costs for capacity at the system or distribution grid level.

Q. Will demand charges increase bills for low income customers?

A. It is likely. Essentially, demand charges act like increased fixed monthly charges. Even customers with small homes and relatively low energy use still have air conditioners, refrigerators, washing machines, televisions and other household appliances. Many times they also have the least efficient appliances, causing higher loads than other customers. I would expect demand charges to unduly penalize low income customers.

Q. Do demand charges disincentivize energy efficiency?

A. Yes, they can cause energy efficiency to be disincentivized. For example, a family could have several zones of central air conditioning with setback thermostats to let the house warm up a bit when the family is gone. When the setback thermostats trigger the air conditioners to turn on when the family is to return, all the zones could be full on for more than an hour. This can cause a spike in demand. A home with several window air conditioners can have the same problem, when they are all turned on at once. In addition, the fixed charge nature of demand charges will reduce the financial incentive to save energy because a reduction in volumetric consumption will have a smaller impact on their overall bill. When more of the bill is in a fixed monthly customer charge and a demand charge, as UNSE is proposing, less of their monthly bill will be due to actual energy use. In other words, because demand charges essentially function as higher fixed charges for residential customers, the energy or volumetric price must be correspondingly reduced. Reducing the volumetric rate has been shown to increase residential energy consumption.

Q. Do demand charges help collect a fair share of revenue from vacant and seasonal homes?

A. No. The demand charge for a vacant home will be minimal, as will a home that is vacant for months at a time. UNSE has stated in testimony that vacant homes and seasonally occupied homes are not paying their fair share for connection to the system. They are making a fair observation, but their solution of demand charges does not address the issue. As I will address in the next section, a minimum bill can more effectively address this issue.

Q. How would demand charges impact electric vehicles?

A. Demand charges are bad for electric vehicles charging. This is especially true for Level II chargers that charge the vehicles quickly. Charging an electric vehicle puts a substantial load that lasts for several hours. Even if the vehicle is only charged at night, it could represent a customer's peak load for the month. If the customer needs to charge their electric vehicle during the day, when an air-conditioner is running, their demand would be very high, incurring a large spike in their utility bill under the UNSE rate structure for DSG customers. It is far better to use TOU pricing as I will explain below.

Q. If the Commission decides demand charges are appropriate for DSG customers, how should the demand charges be structured?

A. While I do not recommend using a rate structure with demand charges for residential customers, if the Commission determines that demand charges are appropriate,

I have the following recommendations. UNSE has proposed a demand rate that uses an hourly average for an individual customer's peak demand. Using an hourly average is better than using a shorter time period. I would recommend against using a shorter period. The UNSE demand charge could be improved by using only those customer peak demand hours that occur within system peak load hours. This would reduce problems of setting demand charges during night time hours when system load is low. For example, if a customer hit a peak demand during one night time hour of 10 kW due to winter heating load, but their maximum load for the month during a system peak load hour was 5 kW, the demand charge for the month should be 5 kW and not 10 kW.

The Commission should also consider requiring that a portion of the demand charge be calculated during the peak load hour for the customer's feeder and substation.

Finally, if demand charges are used, they should be set at a rate much lower than those proposed by UNSE. Most of UNSE's fixed costs should be recovered from the customer's volumetric energy use. Using a much lower demand charge than proposed by UNSE would reduce, but not eliminate, the problems with demand charges that are described above.

IV. Minimum Bill – A Better Alternative

Q. What is a minimum bill and how does it differ from fixed customer costs and demand charges?

A. Charging customers a minimum bill each month is an alternative way to recover a portion of fixed costs that would otherwise not be recovered from very low use customers. A minimum bill is a fixed charge each month that includes a charge for a

minimum amount of energy as well as the traditional fixed customer charge. For example, if the fixed customer charge is $10 per month and retail energy charges are $0.10 per kWh, a minimum bill of $30 per month would include 200 kWh of electricity. This guarantees that a portion of the utility's fixed costs are covered by all customers.

Q. Should the minimum bill cover all fixed costs?

A. No. Covering all of the fixed costs of the utility with a minimum bill would make the minimum bill too high. Most of the utility's fixed costs should continue to be collected with energy charges. The minimum bill just assures that all customers pay a share of the fixed charges, whether or not they actually use the electricity that is included in the minimum bill. One benchmark for setting a minimum bill is to look at how much electricity low use, low income users typically use. Monthly bills for low income, low use customers should not go up.

Q. Is this a better solution for low income customers?

A. Yes. Compared to a demand charge, a minimum bill provides far more financial predictability. The amount of the minimum bill should be set with low income customers in mind, such that very few of them would see an increase in their overall monthly bill.

Q. Does a minimum bill help with the problem of vacant and seasonally occupied properties not paying their fair share of fixed costs?

A. Yes, a minimum bill can be used with all residential customers and would certainly be assessed on vacant and seasonally occupied properties, whether or not the properties use the full kWh included in the minimum bill.

Q. Does a minimum bill help allocate costs to DSG customers?

A. Yes. For DSG systems that are producing a large percentage of the customer's yearly energy use, the minimum bill would still assess them a charge that would cover some portion of fixed costs.

Q. Is a minimum bill easier for customers to understand?

A. Yes, a minimum bill is a quantity that is easy to know and easy to understand, unlike demand charges. There would be no surprises with a minimum bill. This is very different from demand charges, which can be quite variable from month to month, making it difficult for customers to budget and, potentially, to pay.

V. Time of Use Rates

Q. Should UNSE transition to Time of Use rates for all customers?

A. Yes. Many of the issues that UNSE is raising about the need to match cost recovery to cost causation can be handled by using TOU rates for all residential customers. The costs of generation vary by time of day and day of week, and so does the need for capacity on the UNSE grid. Setting prices based on when the energy is used by

the customer can better capture the cost to provide that energy and the capacity on the grid to deliver that energy to the customer.

Q. Is this true for all residential customers, or just customers with DSG?

A. In the long run, it will be better for all residential customers to be on TOU rates. TOU rates better reflect the actual cost of service.

Q. Why?

A. The cost of generation is low at night and high during the late afternoon and early evening hours, with generation costs somewhere in between during the morning and into the early afternoon. Having three different rates for the three periods of the day can reflect the relative cost of service delivery during different times of the day.

Q. What about rates during the weekend?

A. Weekend energy use is generally not as high as energy use on the weekday. A special weekend rate could be developed, or you could simply use one of the weekday rates.

Q. Does the cost to deliver energy over the grid change with time of day and day of week?

A. Yes. The energy grid, at both the transmission and distribution level, must have the capacity to deliver power during peak load conditions. Customers who use the system more during those peak periods should pay more. TOU rates do just that.

Q. How will TOU rates impact low income customers?

A. I would not expect TOU rates to impact low income customers adversely. If low income users use less air conditioning, TOU rates could actually lower their monthly bill during summer months.

Q. Will TOU rates be understandable by residential customers?

A. Yes, they should be. It would be easy for customers to understand that electricity is expensive from late afternoon into the early evening and cheaper at night.

Q. Do TOU rates give customers an opportunity to save money on their utility bill?

A. Yes. Customers can choose to use less energy during peak hours and more energy during low load hours.

Q. How do TOU rates impact customers with DSG?

A. It depends on the time periods that are used and the generation patterns of DSG in the UNSE service territory. Generally, DSG produces maximum output when the sun is high in the sky, around the noon hour. In the summer, on a cloudless day, DSG will have good production into midafternoon when demand is fairly high. DSG starts falling off in late afternoon and early evening, when demand is usually the highest. If TOU rates follow system demand, and the DSG customer's use patterns are consistent with that

pattern, then the energy from the DSG system that is used on-site will be more valuable than it would be in a rate structure that has no TOU.

Q. Do TOU rates encourage adoption of energy efficiency measures?

A. Yes. As mentioned above, TOU rates will encourage customers to move some of their energy consumption to hours of the day when energy is cheaper, saving them money. TOU rates will stimulate Demand Response applications such as air conditioning systems that make ice at night and use it for cooling during the heat of the day, when energy prices are high.

Q. How will TOU rates impact electric vehicle charging?

A. TOU rates are ideal for incentivizing efficient electric vehicle charging. The EV charges can be set to charge at night, when energy prices are low. EV owners who charge during peak load hours will pay a higher price, as they should.

VI. Basic Service Charge

Q. UNSE is proposing to raise the basic service charge for residential customers from $10 per month to $20 per month. Do you think this is appropriate?

A. No. The basic service charge should remain at the $10 level. Doubling the basic service charge, or raising it significantly, is not necessary and does not incentivize economically efficient customer behavior.

Q. Why is raising the basic service charge unnecessary?

A. UNSE can continue to collect adequate revenues from charges for energy use, as it has done successfully in the past. If UNSE is concerned about inadequate funding of fixed costs from vacant properties, seasonally occupied properties and customers with DSG, they can adapt a minimum bill rate element as described above.

Q. Why is a minimum bill preferable to increasing the basic service charge?

A. A minimum bill includes some amount of energy that is essentially "prepaid." For example, a minimum bill of $35 could include 250 kWh of electricity. The basic service charge does not include a minimum level of electricity. For low income users this can make a difference. For vacant and seasonally occupied properties and for DSG customers, the minimum bill accomplishes the same goal as a higher basic service charge.

Q. Does a high basic service charge discourage energy efficiency?

A. Yes. High basic service charges discourage energy efficiency by reducing the amount of the customer's bill associated with volumetric energy consumption. When the customer reduces their use, it has less impact on their bill. The overall impact is to increase customer bills and disincentivize energy efficiency.

Q. What cost elements are generally considered appropriate to collect in the basic service charge?

A. The basic service charge should only include costs that are directly associated with the customer, such as billing, collections, and the service drop.

VII. Battery Storage

Q. Should the Commission begin consideration of customer sited battery storage in rate designs?

A. Yes. In the next few years we will see behind the meter, customer owned battery storage that is integrated with DSG. There may also be applications for such storage that is not associated with DSG.

Q. Is battery storage good for the grid and the UNSE system?

A. Yes. Battery storage can be used to reduce peak loads and to shift energy from morning hours when energy is less valuable to evening hours when it is more valuable. Both of these applications help the UNSE system. Generation costs for UNSE are much higher during peak load times. Battery storage, when it is used to shift energy to peak load times, helps to reduce the need for more expensive generation. It also can help relieve congestion on the distribution grid.

Q. Can battery storage be used to reduce a customer's peak demand and thereby reduce demand charges?

A. One application for battery storage is certainly to reduce peak customer load and thereby reduce demand charges. This is being done today by commercial customers in California and Pennsylvania, where demand charges are high. However, the economics of using battery storage to reduce residential demand charges are not as favorable.

Q. If the Commission implements the demand charges UNSE is proposing for DSG customers, can the customers use battery storage to reduce the demand charges?

A. They can, but with the current price of battery systems, it is unlikely to be cost effective. Very few customers today would be able to afford a battery system that would significantly reduce the demand charges that UNSE is proposing.

Q. Can customers use battery storage to help lower their bills if TOU rates are implemented?

A. Yes. Battery storage can be used to store energy that would have been exported from the customer's DSG system to the UNSE grid and then use that energy in the evening when the sun is down to power the customer's energy needs. This helps the customer by using more of the energy generated by the customer's DSG system on-site instead of exporting the energy to the UNSE system. And it also leads to a more efficient overall system.

Q. Is it better for the UNSE system for battery storage to be used in reducing the customer's demand charges or during a time when UNSE needs additional energy to meet total customer demand?

A. This is an interesting question that gets back to my earlier discussion about the fact that a customer's peak demand may not be coincident with the UNSE system's peak load. It would be better for the UNSE system for battery storage to discharge into the grid during system peak demand conditions, rather than trying to reduce the customer's individual peak demand that is not coincident with system peak demand. If demand charges are imposed on residential customers, operating the battery to help the customer reduce their bill may not be in the best interest of the UNSE system.

Q. How could this conflict be solved?

A. It would be better if behind the meter customer owned battery storage systems were controlled by the utility than by the customer. The utility knows when the energy is needed and can operate the battery most efficiently. However, if the battery is operated in this manner, the customer should get any demand charges waived or dramatically reduced.

Q. What are you recommending the Commission do in this rate case with respect to battery storage?

A. I am bringing this issue to the Commission's attention as I see it becoming a significant issue in the not too distant future. I don't think that changes need to be made immediately in rate structures to accommodate battery storage. However, the

Commission should be thinking about this issue for the future, when consideration should be given to battery storage in utility rates.

Q. Does this conclude your testimony?

A. Yes.

KENNETH WILSON
Western Resource Advocates
2260 Baseline Rd, Suite 200
Boulder CO 80302
Ken.Wilson@westernresources.org
720-763-3739

WORK EXPERIENCE

Western Resource Advocates Boulder, Colorado
Engineering Fellow (2013 – present)
Mr. Wilson has worked as a consultant, and most recently on staff for Western Resource Advocates (WRA). As WRA's Engineering Fellow, Mr. Wilson has provided testimony, filed comments and presentations in Colorado, Nevada, Arizona and Utah on distribution grid improvements and issues surrounding distributed solar generation.

TransGrid Consulting Boulder, Colorado
Energy Consultant (2007-2012)
Mr. Wilson has worked as a consultant in smart grid systems engineering, project management and business development for companies and NGOs working on grid efficiency, renewable energy, and renewable integration. In 2009 Mr. Wilson was the Project Manager for a $200 million smart grid grant proposal to DOE that included CSU, CU, NREL, Sandia Labs, Lincoln Labs, Spirae and other participants. Mr. Wilson was a consultant with Power Tagging, Inc. during 2010 – 2012, working on applications for a new smart grid communication technology. He has also done engineering consulting for renewable energy projects, including solar gardens, and electric vehicle companies.

Boulder Telecommunications Consultants Boulder, Colorado
Expert Witness and Engineering Consultant (1998-2007)
Expert witness in telecommunications including testimony and case preparation at state and federal level with major telecommunications firms (AT&T, MCI, Level 3, and major CLECs). This work also included contract development and negotiations support.

AT&T Denver, Colorado
Technical Negotiations Director (1995-1998)
Technical leader of negotiations and witnessing team responsible for all aspects of AT&T's contracts in 14 states with US WEST. AT&T's lead expert in Section 271 cases in 14 states. Led technical planning for local infrastructure and Operations Support Systems "OSS" interfaces.

AT&T Bell Labs Bedminister, New Jersey
Director – Local Infrastructure Planning (1994-1995)
Local infrastructure development and business analysis – Technical lead for team evaluating local infrastructure alternatives and OSS. Helped develop AT&T's proposals to the FCC for unbundling the telecommunications network.

AT&T Bell Labs Holmdel, New Jersey
Director Network Deployment and Asset Management (1992-1994)
Key team leader on AT&T project to optimize network infrastructure by changing engineering rules and OSS processes. The project saved AT&T over $2B in avoided investments and expenses.

AT&T Bell Labs Holmdel, New Jersey

Member of Technical Staff Supervisor (1988-1992)
Led team responsible for network design and performance of the AT&T long distance network for business customers. Network performance planning for new business customer features. Competitive testing and analysis of multiple vendor networks.

AT&T Bell Labs Holmdel, New Jersey
Member of Technical Staff and MTS Supervisor (1984-1987)
Member of the Cellular Telephone Development group. Led team responsible for systems requirements and systems testing of the first cellular telephones. Made test calls to the first cell site in the US.

AT&T Bell Labs Holmdel, New Jersey
Member of Technical Staff (1980-1984)
Systems engineer in the team responsible for 4ESS switch feature and architecture planning.

Small Business Startups (1977–1980) Red Bank, New Jersey
Software, hardware and manufacturing engineering in two small companies.

EDUCATION

ABD for PhD (1976): University of Illinois, Champaign, Illinois
All but dissertation for PhD in Electrical Engineering

M.S. (1974): University of Illinois, Champaign, Illinois
Master of Science in Electrical Engineering

B.S. (1972): Oklahoma State University, Stillwater, Oklahoma
Bachelor of Science in Electrical Engineering

M.A. (2014): University of Colorado, Boulder, Colorado
Master of Arts in Biology with a specialization in Microbiology

ELECTED AND APPOINTED POSITIONS

Mr. Wilson was elected to Boulder City Council in a special election in June 2007 and reelected in November 2007 and November 2011, retiring from Council when his term expired in November 2013. While in this position he had the opportunity of evaluating Xcel Energy's Smart Grid City and was involved in Boulder's attempt to form a municipal utility. Mr. Wilson was appointed to Boulder's Water Resources Advisory Board by Boulder City Council in 2002 and served until March 2007.

RECENT FILINGS ON BEHALF OF WESTERN RESOURCE ADVOCATES

Arizona

Docket RE-00000A-07-0609 – Proposed Rulemaking Regarding Interconnection of Distributed Generation Facilities. Comments of Western Resource Advocates, 7/24/15.

Docket E-00000V-13-0070 – In the Matter of Resource Planning and Procurement in 2013 and 2014. Comments of Western Resource Advocates, 7/1/15.

Docket E-01933A-15-0100 – In the Matter of Tucson Electric Power Company for (1) Approval of a Net Metering Tariff and (2) Partial Waiver of the Net Metering Rules. Motion to Intervene of Western Resource Advocates, 4/29/15.

Docket E-04204A-15-0142 – Application of UNSE Electric for the Establishment of Just and Reasonable Rates and Charges… Motion to Intervene of Western Resource Advocates, 6/12/15.

Docket E-00000J-14-0023 – In the Matter of the Commission's Investigation of Value and Cost of Distributed Generation. Petition for Leave to Intervene of Western Resource Advocates, 11/19/15.

Docket E-00000J-13-0375 – Innovations and Technological Developments. PowerPoint presentation to Commissioners during workshop, 5/28/14.

Colorado

Proceeding 14M-0234E – In the Matter of Commission Consideration of Retail Renewable Distributed Generation and Net Metering. Comments of Western Resource Advocates on Distribution System Design and Ancillary Benefits for April 23, 2015 Net Metering Panel. Also PowerPoint presentation to Commissioners.

Proceeding 14A-1057EG – In The Matter of the Application of Public Service Company of Colorado for Approval of Its Electric and Natural Gas Demand Side Management (DSM) Plan for Calendar Years 2015 and 2016 and to Change Its Electric and Gas DSM Cost Adjustment Rates Effective January 1, 2015. Answer Testimony on behalf of Western Resource Advocates, 2/13/15.

Proceeding No. 13A-0686EG – In the Matter of the Application of Public Service Company of Colorado for Approval of a Number of Strategic Issues Relating to Its Demand Side Management Plan. Testimony on behalf of Western Resource Advocates: Answer 10/16/13, Cross-Answer 12/20/13, Surrebuttal 1/21/14.

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Docket 12-10013 – Investigation Regarding Voltage and Volt-Ampere Reactive (VAR) Control and Optimization. Comments of Western Resource Advocates, 2/20/14.

Docket 14-02004 – Application of NV Energy for Approval of Annual Plans for the Solar Energy Systems Incentive Program, the Wind Energy Systems Demonstration Program, and the Waterpower Energy Systems Demonstration Program for Program Period 2014-2015. Direct Testimony on behalf of Nevadans for Clean Affordable Reliable Energy (NCARE), 4/25/14.