Docket No. 14-035-114 2/6/2015
"Investigation of the Costs and Benefits of PacifiCorp's Net Metering Program"

UCARE Technical Conferences Proposal for the Commission's Net Metering Investigation

Utah Citizens Advocating Renewable Energy (UCARE) is a grassroots organization formed in 2014 to challenge Rocky Mountain Power / PacifiCorp's (hereafter, the "Company") efforts to penalize its net metering (NEM) customers. Our goal is to promote clean renewable energy in Utah. UCARE's primary activities have included public education and empowerment. We have also intervened with the Utah Public Service Commission (hereafter, the "Commission"), in Docket 13-035-184, to defend current and potential NEM renewable energy producers from attempts by the fossil fuel industry to discourage NEM investments.

Context in which this proposal is submitted:

UCARE was pleased with the Commission's decision, on August 29, 2014, to deny the Company's solar surcharge request and to announce initiation of "a process for further analysis of the net metering program costs and benefits." The Commission opened a new docket, 14-035-114, with a notice of the investigation's first technical conference on November 5, 2014 to consider the Company's proposed load research study.

UCARE, Utah Clean Energy, The Alliance for Solar Choice, and the Sierra Club, on October 20, 2014, together submitted questions relative to the Company's proposed study. We participated in the November 5 conference. In response to the Commission's notice of November 21, 2014, UCARE and allied groups, along with Pecan Street, Inc., on December 5, 2014 submitted comments recommending improvement of the load research study.

The November 21 notice also stated the Commission's intent to establish an "appropriate analytical framework" for the NEM program investigation that would "include the types of analyses that must be performed, the components of costs and benefits to be included in the analyses, and the sources and time period of data inputs." The same notice set a January 8, 2015 scheduling conference (moved to January 12) to discuss further technical conferences and procedural issues. UCARE circulated a preliminary proposal for technical conferences on January 9 and participated in the January 12, 2015 conference.

UCARE's preferred scope of the investigation:

This document supersedes UCARE's January 9, 2015 preliminary proposal for technical conferences and constitutes our current proposal for technical conferences to inform the scope, methodology, and resources we view as essential to developing an analytical framework appropriate to the Commission's goal of assessing costs and benefits of the Company's net metering program.

UCARE respectfully requests the scheduling of additional technical conferences on dates set aside by the Commission under Docket No. 14-035-114 for the purpose of assessing a full range of relevant cost and benefit variables in the Commission's NEM investigation. A thorough study will incorporate all grid-specific factors as well as the public health, economic, and environmental impacts of the Company's net metering program pursuant to a full and fair determination of the costs and benefits of that program as authorized under Utah Code Ann. § 54-15-105.1

UCARE was especially encouraged when the 2014 Utah Legislature enacted Senate Bill 208, endorsing an assessment of whether net metering costs exceed benefits or whether benefits exceed costs. Legislators also called for determination of "a just and reasonable charge, credit, or ratemaking structure, including new or existing tariffs, in light of the costs and benefits" the Commission's study would reveal.

We feel that the Commission and Legislature have created an opportunity for a thorough analysis of NEM program costs and benefits that can establish an empirical foundation on which near- and long-term policy and regulatory decisions can be based. To maximize this opportunity, the Commission needs to look at the entire net metering program and all variables that relate to the costs and benefits that NEM energy production brings to the Company, its ratepayers, and the general public. A limited focus would fail to yield results needed to objectively determine rates that are "least cost" to the entire grid system and "least cost" to the public. We are reminded that neither the Commission nor the Legislature called for anything less than a complete study.

Proposed technical conferences:

UCARE proposes that the Commission schedule a series of technical conferences for the purpose of identifying, valuating, and assessing for the purpose of rate setting those impacts in the following areas that now result, and may in future reasonably be expected to result, from displacement of the Company's carbon-fueled electricity generation in Utah by electricity generated from the Company's residential and non-residential NEM customers in Utah:

~ grid system costs directly experienced by all parties to the electrical grid
~ health costs linked directly and indirectly to electrical grid operations
~ environmental costs linked directly and indirectly to electrical grid operations
~ economic costs linked directly and indirectly to electrical grid operations

Clarification of terms and definitions:

We recognize that while our proposed technical conferences focus mostly on "costs," those impacts that result in the avoidance of costs should be counted as "benefits." UCARE looks forward to the Commission's upcoming Technical, Status, and Scheduling Conference, set for March 16, 2015, as a forum for discussion and clarification of terms and definitions to be used in subsequent proceedings and documents related to the NEM program costs-benefits investigation.

Proposed technical conference #1: Grid System Impacts

UCARE urges the Commission to schedule a technical conference on Monday, April 27, 2015 to identify, address, and incorporate into its analytical framework all grid systemic cost and benefit factors that come into play when renewable energy from NEM customers offsets the Company's use of fossil fuels to generate electricity. In addition to the Company's load research, the conference agenda should include discussion of methods for factoring reduced market fuel purchases, capacity and other future infrastructure costs, transmission and distribution costs, line energy loss, environmental compliance costs, and other near- and long-term avoidable fixed costs into the NEM program costs-benefits analysis.

While the Company's load research focuses on an important component of the grid sector of the Commission's NEM investigation, it by no means addresses all relevant sector variables. The 2014 NEM study for the State of Mississippi, and others documents listed below, provide useful lists of avoided cost variables that can be aggregated for use in assessing the Company's NEM program.

Tools for the assessment of these costs and benefits could include three of the cost tests the Commission has authorized previously in Docket #09-035-27: the Total Resource Cost Test (TRC), the Ratepayer Impact Measure (RIM), and the Participant Cost Test (PC). The two remaining cost tests referenced in Docket #09-035-27 and in the Companys 2011 Annual Energy Efficiency Report are either insufficient [i.e. TRC with NW "Adder"] or may be biased toward one party, the utility [i.e. UCT]. The TRC, RIM, and PC cost tests will still require modification to include all grid systemic cost-benefit factors. The potential need for such cost test modifications was foreseen by the Commission in its Docket No. 09-035-27 Order of October 7, 2009.

Participants in this technical conference should also consider inclusion of the Company's Integrated Resource Plan (IRP) system optimizer model, tuned to specific avoided cost calculators, and related capacity expansion and adjusted load forecast projection models. The investigation should compare future build-out costs affected by unrestricted NEM expansion with alternative scenarios in which NEM growth is restricted by Company surcharges or punitive rate structures.

To aid in its assessment of the best available methodological approaches for grid systemic cost-benefits research, the Commission should, at its earliest convenience, initiate a survey of NEM, demand side management (DSM), and energy efficiency (EE) cost effectiveness studies conducted by its counterpart regulatory entities in other states. References is listed below include state studies that may prove useful. The Commission will likely find that the best available methodologies thus far employed still require adjustment for specific conditions in Utah.

The body of research available to inform construction of this analytical framework component includes the following:

~ *Analyzing the Costs and Benefits of Distributed Solar Generation in Virginia*, 2014. Stakeholder report facilitated by the Virginia Department of Environmental Quality and the Department of Mines, Minerals, and Energy for the Virginia State Senate.
~ *California Net Energy Metering Ratepayer Impacts Evaluation*, 2013. Energy and Environmental Economics, Inc. (E3) for California Public Utilities Commission.
~ *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*, 2002. Governor's Office of Planning and Research.
~ *Methods for Analyzing the Benefits and Costs of Distributed Photovoltaic Generation to the U.S. Electric Utility System*, 2014. National Renewable Energy Laboratory (NREL).
~ *Net Metering in Mississippi*, 2014. Synapse Energy Economics, Inc. for Public Service Commission of Mississippi.
~ *Nevada Net Energy Metering Impacts Evaluation*, 2014. Energy and Environmental Economics, Inc. (E3) for State of Nevada Public Utilities Commission.

Addressing Externalized Costs

UCARE is aware that while the rate-setting process typically seeks to monetize a limited set of grid-systemic values according to the traditional utility market mechanism, a range of potentially significant costs and benefits is shifted from the utility and its customers to be suffered or enjoyed by the society at large. In our view, traditional costs and benefits test equations are not adequate to the task of valuing these externalized, real societal impacts. We request an investigation that identifies and evaluates key external costs and benefits that are associated with the production, distribution, and use of energy, but are not reflected in market prices or the monetized grid services internal to traditional rate setting processes. We believe the Commission's investigation should look at ways the externality costs can be internalized into the rate making process so that all real-world costs of energy policy decisions and their implementation can be identified, monetized, and fairly apportioned.

UCARE believes that the Utah public's interests will be best served by a robust, comprehensive examination of all costs and benefits externalized by the Company and the ways in which health, environmental, and economic variables are impacted by the Company's NEM program. We believe that such an examination is not only warranted but possible. In its 2009 Order, referenced above, the Commission held that it " maintains its discretion to approve programs that are in the public interest," and that it is committed to providing the Company's additional direction to ensure its programs "continue to be in the public interest". UCARE calls upon the Commission to use the objectives and opportunities occasioned by the current docket to guide the Company's operations and rate setting in accord with "least cost" principles applied to all within-grid and societal variables.

Proposed technical conference #2: Externalized Health Costs

UCARE urges the Commission to schedule a technical conference on Tuesday, May 12, 2015 to identify, address, and incorporate into its analytical framework all health cost factors that come into

play when renewable energy from NEM customers offsets the Company's use of fossil fuels to generate electricity. As noted by the Minnesota Center for Environmental Accuracy, "[E]lectricity generation contributes significant quantities of air pollution that have serious health and environmental costs. The costs are caused by the emission of criteria air pollutants that have impacts on human health and the environment and greenhouse gases (GHG) that have impacts on climate change. The most severe impacts from criteria air pollutant emissions are infant and adult mortality and morbidity."

A 2010 Synapse Energy Economics report for the State of Utah estimated that air pollution from our carbon-fired power plants is responsible for over 200 premature deaths per year and more than $1 billion in additional health care and environmental costs. The report noted that "approximately 86% of these deaths occur in downwind states from particulates and pollution emitted from generators in Utah."

UCARE is concerned that the Company's fossil fuel emissions are not only having negative impacts in Utah, but may be bringing harm to Coloradans and other downwinders. NEM program contributions toward reducing the severity of health impacts they may be experiencing should be included in the Commission's costs-benefits analysis. Reduced fossil fuel operations in Utah could significantly reduce the carbon dioxide, nitrous oxides, sulfur dioxide, mercury, ozone, and fine particulate intakes that downwind residents outside Utah now suffer to breathe. Perhaps the Company may have to include future litigation costs in its portfolio should fossil fuel pollutants with Utah signatures be linked to out-of-state mortality and morbidity costs.

The conference agenda should include discussion of methods for factoring into the analytical framework the results of established local, state, national, and international epidemiological studies of fossil fuel combustion impacts on public health. The impacts of specific coal- and gas-related morbidity and mortality agents, such as cardiovascular and lung diseases, should be quantified demographically to show the extent of human physical damage and monetized to show social and economic costs to individuals, families, and communities. Monetization of health costs factors, including doctor and hospital visits, work days lost, and the value of statistical life losses should be calculated to demonstrate their mitigation by NEM program contributions to the grid.

This conference might be divided into two half-day sessions: one session focusing on within-state direct and indirect health impacts and a second session focusing on health impacts of Utah emissions migrating to Colorado and other downwind states. The second session should also address potential impacts of reducing Utah's greenhouse gas (GHG) emissions that contribute to climate change and the associated consequences for human health.

<u>Proposed technical conference #3: Externalized Environmental Costs</u>

UCARE urges the Commission to schedule a technical conference on Thursday, June 25, 2015 to identify, address, and incorporate into its analytical framework all environmental cost factors that come into play when renewable energy from NEM customers offsets the Company's use of fossil fuels to generate electricity. With coal dominant in the Company's energy fuel mix for Utah, the

environmental impacts sector of the NEM program investigation should examine how the addition of net metered energy affects costs associated with air, land, and water contaminants from coal mining, destruction of local habitat and biodiversity to develop mine sites, emissions from transport vehicles, combustion releases of criteria pollutants and heavy metals, and environmental degradation from acid rain, ozone, and coal ash.

Similarly, the externality costs and benefits of the NEM program's reduction of extraction, transportation, combustion, and remediation impacts associated with the Company's natural gas-based electrical generation need to be incorporated into the Commission's analysis framework.

This seems an appropriate point at which to state UCARE's concern about utility prioritization of fossil fuels displacement and facilities replacement due to grid inputs from net metering customers and other renewable energy providers. According to the National Research Council's 2010 report "Hidden Costs of Energy", "damages associated with electricity generation from natural gas are an order of magnitude lower than damages from coal-fired electricity generation." However, some previous studies have suggested that clean renewable energy will displace natural gas before displacing coal, as utilities scale back their more expensive gas facilities before cutting coal combustion: even though coal is the dirtier and more dangerous fuel. With this prospect in mind, the Commission's analytical framework should address, for all three externalized cost categories, how differences between the costs of generating power from coal and the costs of generating power from natural gas affect the order and extent of their displacement by NEM generated power, and how this affects NEM program values.

This environmental impacts conference might also be divided into two half-day sessions: one session focusing on within-state direct and indirect environmental impacts and a second session focusing on the environmental impacts of Utah emissions migrating to Colorado and other downwind states. The second session should also address potential impacts of reducing Utah's greenhouse gas (GHG) emissions that contribute to climate change and its associated consequences for the human and natural environments.

Conferees might reference the Intergovernmental Panel on Climate Change's (IPCC) 2014 "Mitigation of Climate Change" report which notes that the largest lifecycle greenhouse gas (GHG) emissions are associated with the combustion of coal.

<u>Proposed technical conference #4: Externalized Economic Costs</u>

UCARE urges the Commission to schedule a technical conference on Wednesday, July 8, 2015 to identify, address, and incorporate into its analytical framework all economic cost factors that come into play when renewable energy from NEM customers offsets the Company's use of fossil fuels to generate electricity. Many of the externalized economic costs will have been quantified for inclusion in the Commission's investigation of health and environmental impacts considered in the two previous conferences.

Additional economic variables that could be affected by a grid shift to NEM power include federal and state subsidies for coal and gas extraction, economic stability in extraction communities, job retraining, costs of fossil fuel industry litigation, effluent damages to farmland, recreation areas, culinary and irrigation water, haze impacts on tourism income, and maintenance and upgrades of transportation infrastructure.

The shift from fossil fuels to solar, wind, and other net metered renewable energy sources involves "green" jobs linked to research and development of electrical production, storage, and infrastructure equipment, manufacturing, sales, installation, maintenance, and training. The Commission's investigation should compare the economic values of current and projected future employment opportunities in Utah's fossil fuel sector with those of the renewable energy sector.

This economics impacts conference might also be divided into two half-day sessions: one session focusing on within-state direct and indirect economic impacts and a second session focusing on the economic impacts of Utah emissions migrating to Colorado and other downwind states. The second session should also address potential impacts of reducing Utah's greenhouse gas (GHG) emissions that contribute to climate change and its associated consequences for local, state, and national economies.

Evaluating Research Models:

Developing a functionally effective methodology for analyzing the NEM program's costs and benefits external to the Company's current rate setting mechanisms will likely prove more challenging than using models drawn from the Commission's existing suite of cost effectiveness tests available to facilitate a thorough assessment of NEM costs and benefits internal to the grid system. UCARE found that none of the five cost effectiveness tests referenced in the Commission's Comments and Scheduling Order --and as described in the Company's 2011 Annual Energy Efficiency Report-- will be adequate to the full analysis we recommend.

We found that the Total Resource Cost Test (TRC) for energy efficiency, from the California Standard Practice Manual, measures costs for program participants and the utility, and measures benefits as avoided costs of supply-side resources. However, the TRC does not include costs that the Company shifts ("externalizes") from rate setting processes to the general public. The TRC with a Northwest convention 10% "adder" for avoided costs is a step in the right direction, but is unacceptable because it arbitrarily assigns value to environmental and other externalized impacts without itemized quantification. The Utility Cost Test (UCT), which is granted preference in the Commission's 2009 Order, unfortunately looks only at resource costs paid directly by the utility. It ignores costs to utility customers and the general public. We also have reservations about the Ratepayer Impact Measure (RIM) and the Participant Cost Test (PC), since both limit their foci to monetary impacts on the utility, its customers, and program participants. Both tests focus on variables internal to the Company's traditional rate setting equation.

The Commission's 2009 Order, in Docket 09-035-27 on demand side resource performance standards, held that all five tests should be employed in determining program costs. However, The 2009 order acknowledged that the five-test suite for determining energy efficiency and load management may be considered provisionally applicable "until other economic tests are available." UCARE contends that the five-test suite does not provide a determinative basis for analysis, and that resources for constructing a better test that analyzes all factors and is Utah-specific are available.

Synapse Energy Economics, which has previously conducted energy research in Utah and Nevada, rated several cost tests for their potential contributions to an optimum distributed energy resource (DER) cost-benefit analysis framework in a 2014 report for the Advanced Energy Economy Institute. Synapse determined that the standard cost-effectiveness tests are too narrowly defined and recommended a Societal Cost Test (SCT) tailored to state-specific parameters. The preference for a SCT is echoed in a 2014 National Efficiency Screening Project report for the National Home Performance Council.

Other analytical models to consider for constructing thorough, quantitative cost-benefits tests include a truly Total Resource Cost Test that incorporates all factors associated with impacts both internal and external to the traditional utility system models. Such a model would identify and assess all quantifiable costs and benefits regardless of who accrues them. Alternatively, the traditional TRC could be augmented with a Societal Costs Test (SCT) that separately measures, then aggregates external health, environmental, and economic impacts to determine the total societal value of net metered energy production.

The Commission might also authorize development of a Computable General Equilibrium (CGE) or a Hybrid cost test model constructed so that all relevant sectoral variables and related data sets that can be used for measuring near- and long-term impacts of market and policy changes. Other analytical models worthy of consideration include the National Renewable Energy Lab's (NREL) Jobs and Economic Development (JEDI), although it does not include net economic impacts, and the Regional Economic Models, Inc. (REMI) Hybrid model, although REMI fails to include such factors as avoidance of damage from reduced greenhouse gases.

To aid in its assessment of the best available methodological approach(es) for external cost-benefits research relevant to NEM program effects, the Commission is urged, at its earliest convenience, to initiate a survey of state, national, and international studies that identify, quantify, and monetize the health, environmental, and economic impacts of fossil fuel combustion for electrical generation. Several such studies are previously listed. The Commission may find that the best available methodologies thus far employed still require adjustment for specific conditions in Utah.

UCARE position on externalized costs:

UCARE's position on the status and disposition of externalized costs of carbon mirrors that of the Minnesota Center for Environmental Accuracy, to wit: "Electricity generated by burning coal and natural gas produces significant quantities of air pollution. This air pollution leads to serious environment and human health impacts. These impacts impose costs on society that are generally not paid by electricity producers or consumers ("external costs"). Without regulation, external costs are not considered in the production decisions of electricity producers or consumption decisions of electricity users. These external costs can be significant compared with the private costs of producing electricity. If electricity producers were made to internalize the external costs, by paying for the damages inflicted on others, there would likely be a shift in the energy mix for producing electricity from dirtier to cleaner energy sources."

Suggested presenters and participants:

UCARE looks forward to working with fellow parties to the NEM investigation docket to identify specialists and institutions whose specific topical expertise would contribute to achieving the best analytical framework. Our suggestions for conference participation, in-person or by phone, include the following.

In view of its previous work on energy issues in Utah, its familiarity with Utah government agencies and energy businesses, and its experience conducting cost-benefit analyses involving renewable energy, demand side management, and energy efficiency in several states, Synapse Energy Economics should be invited to participate in all technical conferences of this investigation. Synapse Energy's Jeremy Fisher and Jon Levy (Harvard School of Public Health) were principal researchers in the Utah study, and Synapse Vice President Tim Woolf was a principal researcher in the Advanced Energy Economy Institute study.

The technical conference on externalized health costs would be enhanced by the participation of C. Arden Pope III (Brigham Young University), who has written extensively on impacts between air pollution and public health, and Dr. Edward Clark (Primary Children's Hospital in Salt Lake City), who headed the NIH's National Children's Study research team in Utah that examined health impacts of environmental degradation.

The technical conference on externalized environmental costs would be enhanced by the participation of Bryce Bird (Director, Utah Division of Environmental Quality), Larry Wolk (Executive Director, Colorado Department of Public Health & Environment), and Shaun McGrath (Administrator, EPA Region 8).

The technical conference on externalized economic costs would be enhanced by the participation of Pamela Perlich (Bureau of Economic and Business Research, Univ. of Utah), who specializes in applied regional economic studies and economic modeling, David Keyser (Research Analyst, NREL

Strategic Energy Analysis Center), who develops labor economic impact models, and Peter Howard (Economics Director, NYU Law School's Institute for Policy Integrity) whose research foci include social costs of carbon.

In conclusion:

We hope that the Commission will take full advantage of this unique opportunity to address the entire spectrum of relevant cost and benefit variables in its investigation. This means incorporating all grid-specific factors as well as the public health, economic, and environmental impacts resulting when renewable energy from customers offsets the utility's use of fossil fuels to generate electricity.

With the attention of our state and nation drawn to serious energy policy questions, the public is well served when regulatory bodies like the Commission endeavor to establish a solid foundation of evidence from which fact-based options can be identified and rational choices made for the common good. The breadth and depth of your inquiry into the value of net metered renewable energy will have significant implications for Utah's energy future.

Thank you for your kind attention to the many points and recommendations we have put forward in this public comment.

Submitted by Stanley T. Holmes
for Michael Rossetti and UCARE,
Utah Citizens Advocating Renewable Energy

Additional references:

~ *Benefit-Cost Analysis for Distributed Energy Resources: A Framework for Accounting for All Relevant Costs and Benefits*, 2014. Synapse Energy Economics; for Advanced Energy Economy Institute
~ *Cardiopulmonary Mortality and Air Pollution*, 2002. C.A. Pope et al, The Lancet.
~ *Climate Change 2014: Mitigation of Climate Change*, 2014. Fifth Assessment Report of the Intergovernmental Panel on Climate Change
~ *Co-Benefits of Energy Efficiency and Renewable Energy in Utah*, 2010. Synapse Energy Economics.
~ *Full cost accounting for the life cycle of coal*, 2011. Epstein et al in Annals of the New York Academy of Sciences
~ *Green Jobs in Tennessee: Economic Impact of Selected Green Investments,* 2011. Middle Tennessee State University, with Tennessee Department of Labor and Workforce Services. IMPLAN Model
~ *Health & Environmental Costs of Electricity Generation in Minnesota*, 2013. Minnesota Center for Environmental Accuracy
~ *Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use*, 2010. National Academy of Sciences
~ *Omitted Damages: What's Missing From the Social Cost of Carbon*, 2014. Institute for Policy Integrity, New York University School of Law

~ *The Resource Value Framework: Reforming Energy Efficiency Cost-Effectiveness Screening*, 2014. National Home Performance Council: National Efficiency Screening Project
~ *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis*, 2010, Interagency Working Group on Social Cost of Carbon, U.S. Govt.
~ *The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania*, 2012. Clean Power Research.