State of Utah

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Public Service Commission

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Commissioner

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Commissioner

To: PURPA Work Group List, Docket File

From: Carol Revelt

Date: January 5, 2007

Re: Minutes of the December 18, 2006, Technical Conference on 2005 EPAct Amendments to PURPA – Interconnection - Docket 06-999-03

Attendees:

Rocky Mountain Power:	Dave Taylor, Les Bahls
Andigen:	Kevin Pack
U.S. EPA:	Katrina Pielli
ETC Group:	Patti Case
In Hot Water:	Rod Hyatt
Needham Hybrid Energy Homes:	Aaron Needham
Provo City Power:	Tad Smallcomb
Regulatory Assistance Project:	Wayne Shirley
Salt Lake Community Action	Betsy Wolf
Smigel, Anderson & Sacks:	Scott DeBroff
UAE:	Kelly Francone
Utah Clean Air Coalition:	Kathy VanDame
Utah Clean Energy:	Sara Wright
UIEC:	Vicki Baldwin
Utah Solar Energy Association:	Greg Libecci
Utah State Energy Program:	Jason Berry
Westminster College:	Kerry Case
Division of Public Utilities:	Judith Johnson, Sam Liu, Artie Powell
Committee of Consumer Services:	Cheryl Murray
Public Service Commission:	Becky Wilson, Carol Revelt

On December 18, 2006, a technical conference was held in room 401 of the Heber Wells building with the purpose of discussing the Interconnection Standard included in the 2005 Energy Policy Act ("EPAct") amendments to the Public Utility Regulatory Policies Act ("PURPA"). During this conference an agenda and a draft recommendation for the Interconnection Standard were distributed, which are attached to this document. The following summarizes the items discussed during this technical conference.

I. Update on Status of Recommendations for Standards addressed in Prior Technical Conferences

The Division provided a brief update on the status of the recommendations addressed in prior technical conferences. Based upon the comments received on the Division's draft recommendations on the Fuel Diversity, Fossil Fuel Generation Efficiency, and Time-Based Metering and Communications Standards, consensus has not been reached on any of the standards. After a brief discussion, it was agreed that the Division would submit separate recommendations for each of the standards to the Commission. The Commission would then issue a Notice requesting comments on the Division's draft recommendation. From the comments received, the Commission will issue a decision regarding each standard. While there is some disagreement as to whether the Time-Based Metering and Communication Standard requires action by February 8, 2007, the group decided that this would be the first standard to address in this fashion and would let the Commission address the date issue in their Order, if they so desire.

The Division brought up the issue of the commitments regarding winter on-peak period and on-peak/off-peak price differential in the Stipulation addressing Schedules 6, 6A, and 6B in the Company's recent 2006 General Rate Case. The Division indicated that time-based metering and communication is an issue broader than that contained in the Schedule 6 stipulation commitments. The Company agreed but thought that it would be more efficient to incorporate the broader time-based metering and communication issue in with the work required to address Schedule 6 stipulation commitments as nothing precludes them from doing so. The Division was concerned about how to approach this and when as there may be benefits that have yet been identified by this standard. The Company indicated that the stipulation must be addressed prior to the next rate case.

Follow-up

- The Division will try to issue a recommendation to the Commission on the Smart Metering standard by Monday, January 8, 2007. Parties will then have an opportunity to respond to the Division's recommendation.

II. Review of Purposes of PURPA and Language in EPAct specific to the Interconnection Standard.

The Division provided a review of the Standard and quotes from different publications indicating that the standard was developed to promote distributed resources by removing barriers to distributed generation ("DG") installations while addressing reliability and safety concerns.

III. Interconnection Standard

Each electric utility shall make available, upon request, interconnection service to any electric consumer that the electric utility serves. For purposes of this paragraph, "interconnection service" means service to an electric consumer under which an on-site generating facility on the consumer's premises shall be connected to the local distribution facilities. Interconnection services shall be offered based upon the standards developed by the Institute of Electronics Engineer; IEEE Standard 1547 for Interconnecting Distributed Resources with Electric Power Systems, as they may be amended from time to time. In addition, agreements and procedures shall be established whereby the services are offered shall promote current best practices of

interconnection for distributed generation, including but not limited to practices stipulated in model codes adopted by associations of state regulatory agencies. All such agreements and procedures shall be just and reasonable, and not unduly discriminatory or preferential.
After reviewing the standard and the draft proposal, general discussion included the following:

Applicability/Regulatory

- The intent of this regulation is not for FERC-regulated facilities but rather generators that would connect to the distribution system of the electric utility.
- A participant indicated that regardless of the PURPA interconnection standard the effort to address interconnection should ensure that all interconnections (i.e. sizes and jurisdictions) are covered (i.e., there should be no gaps).
- Washington, Oregon, Idaho and Wyoming all have different tariff's:
    - Washington – rigorous rule up to 300 kW and then tariffs above that.
    - Oregon – rigorous procedure up to 10 MW
    - Idaho and Wyoming – up to 10 MW
- A participant proposed that it might make sense if Utah followed what Oregon proposes. While this would make sense from the Company's perspective it depends upon what Oregon mandates as there is a major philosophical difference in how the states approach issues.
- Maybe could propose a variation on FERC's small generator interconnection rules, e.g.
    - Fast Track approval for small inverter-based installations
    - Less than 2 MW would have a different check list but also fast tracked
    - Above 2 MW would require a study however some studies would need to be detailed and some would be expedited.
- Resources: MADRI, Interstate Renewable Energy Council
- Oregon didn't adopt the standard but opened up a rule making to increase clarity.
- OR has a field certification process whereby the first installation is field certified and then can use design for other installations.

DG Potential

- Are there any studies indicating what the DG potential is in Utah? The Primen study only applies to combined heat and power – it didn't look at renewables, etc. The Tellus study indicated that there was about 150 MW of CHP potential in Utah.
- Big projects which are economic are completed however small projects that may be economic may have a more difficult time getting funded.

PURPA Standard/Language in the PURPA Standard

- Who does this standard apply to – it is not clear?
- Regarding the language in the standard regarding best practices the following questions were posed -- what are the best practices, who is the gatekeeper of the best practices, and what do they mean? For example, New Jersey has a "Technical Master" to make these determinations. Best practices change with time. One participant voiced hesitation to the limitations in the standard as technology changes all of the time – proposed more open language so that you can move with the times.
- What does language in the standard mean by "promote" – does it mean "not hinder?" What about uneconomic issues associated with interconnection? Do the words "enable" or "allow" better suit the standard.

- Key to implementing the intent of the standard is to keep it simple – make technology work within the standard.
- One participant recommended that the standard not be adopted but rather modified/clarified as 1547 is not applicable about 10 MW. Clarity is very important.
- Standard is not specific – 1547 does not require an inverter. Process needs to address application fees (if applicable), time lines, etc. while addressing safety, power quality, and reliability. Costs also should not be shifted.
- Why should we adopt a standard and then go to rule-making? Why not go straight to a tariff or rule making?
- Adopting the standard would be the basis for moving rule making along. It would also promote current best practices. Removing barriers would be addressed in the tariff drafting or rule making.
- Sometimes the process is iterative – try for the best solution for the developers/applicants. There should be no incentive to drag things out – need to work together. Should have a concise time-frame and process.
- What are the benefits of rule making vs. simple a tariff since currently the PSC has full jurisdiction over only one electric utility, Rocky Mountain Power, so that a simple tariff would be adequate.
- The EPA representative indicated that many states are not adopting the Interconnection Standard verbatim as it is vague. Rather they are trending toward some type of rulemaking.
- Wording that specifies "local distribution" is another issue that must be resolved before parties are comfortable with the standard.

Benefits

- Must keep in mind the benefits – there could be up to 10% capacity additions. If the barriers are removed so much the better.
- Transmission of power across shorter distances, reliability, back-up power
- Environmental benefits – anaerobic digesters process methane which is a much more potent greenhouse gas. Methane is 18-21 time more destructive than CO2.
- Some distributed generation installations use waste products and remove sulfur and moisture before burning.

Barriers

- Comments regarding Solar Power: Incentives help to bring solar on to the grid. Residential: 2 to 3 KW is a big residential system. Commercial: 10 to 30 KW on a flat roof of a medium sized building is possible. Installation is more appealing if there are ways to finance. Economic viability right now is based upon incentives.
- If barriers are removed, the process is not onerous to the company and ratepayers benefit, why should we not consider this?
- There is evidence that barriers exist.
- According to one participant that had been involved in several interconnection projects, each interconnection agreement is a moving target. The first one was easy to obtain. The second one was much harder and the 3rd one was very difficult and took two years to get through the process for a 150 kW installation. The process is going in the wrong direction. Applicants need to know the time frame and should have a working agreement so they can look down the road. Maybe something similar to Schedule 38. Need to know what needs to be climbed over and how long.

- Need/want to have a workable time frame as it is a very long process and should be shortened if installations are the same.
- 25kW applicability in net metering tariff could be an unnecessary barrier.
- 40 – 70% of problem is education.
- Wyoming pays marginal cost for power.
- Marginal costs/avoided costs should be evaluated and shaped more heavily to address on and off peak issues.
- Small projects may fall outside of net metering but are not addressed in other interconnection standards. Even though standard is applicable to local distribution it is important during this process to ensure that all interconnections, regardless of size or jurisdiction, are addressed in some way or another.

Technical/Process Issues

- Local distribution lines/circuits are designed with a 10 MW maximum capacity although some may be smaller. Usually you can add 3-4 MW to a feeder before affecting reliability and power quality. Another option would be to build a sole-use express feeder with a 10 MW capacity.
- IEEE 1547 standard isn't applicable to installations larger than 10 MW.
- The standard should address two issues: Technical issues and process issues with the process above 10 MW requiring a framework of studies.
- If the standard is adopted it doesn't necessarily mean the process will be onerous.
- When we consider these types of installations are we looking at the true economics?
- If there are questions regarding interconnection the Company encourages potential applicants to call because many people may not know if the would be hooking up to distribution or transmission. Company also has contact info on their website which is accessible from the main web page.
- In the summer 20-50% of installations give more power back to the grid than they use.
- Cannot compromise safety, power quality, and reliability and must not shift costs.
- Historically there has been a one-way flow in the local distribution system – must evaluate.
- IEEE 1547 looks at various competing power from distribution and generation.
- IEEE 1547 is relay based – not PLC-based.
- Certifying equipment is important. UL Laboratories rating provides a lot of comfort.
- If the installation is not inverter-based then more study is required to ensure safety and reliability.
- Screening process will work for small and well-controlled installations. Need to ensure that there are no unpredictable processes.

IV. Future Technical Conferences

The remaining scheduled technical conferences addressing the new PURPA standards is indicated below, for which a Commission notice was issued on November 17, 2006. This conference will be held in room #401 of the Heber M. Wells Building.

Wednesday, January 10, 2007 at 1:30 a.m. -- Net Metering

The Commission's Calendar can be found by clicking on the following link:

http://www.psc.utah.gov/calendar.html

Agenda

PURPA Interconnection Standard Technical Conference

December 18, 2006
1:30 p.m. in Room 401 of Heber M. Wells Building

I. Update on status of recommendations for Standards addressed in prior technical conferences

II. Purpose of PURPA Interconnection Standard

III. PacifiCorp's summary of existing interconnection standards and agreements, and response to the discussion items identified below as applicable to the PURPA Interconnection Standard.

IV. The Division of Public Utilities' response to the discussion items listed below as applicable to the PURPA Interconnection Standard

V. Other parties responses to the PURPA Interconnection discussion items listed below as applicable to the PURPA Interconnection Standard

VI. General Discussion/Barriers

VII. Next Technical Meetings:

a. Net Metering: January 10, 2007 at 1:30 p.m.

Discussion Items Identified during the October 6, 2006 Work Group Meeting

a. The purpose of the standard.
b. Address whether any current standards in place in Utah are equivalent/comparable
c. Prior state actions (already have much of this information) and their effectiveness
d. Recommendation regarding adoption of the standard
e. Criteria and measurements to determine utility adherence to the standard
f. Identify issues to be addressed in the Energy Efficiency Docket.
g. Other considerations specific to the standard

PURPA Interconnection Standard: Each electric utility shall make available, upon request, interconnection service to any electric consumer that the electric utility serves. For purposes of this paragraph, "interconnection service" means service to an electric consumer under which an on-site generating facility on the consumer's premises shall be connected to the local distribution facilities. Interconnection services shall be offered based upon the standards developed by the Institute of Electronics Engineer; IEEE Standard 1547 for Interconnecting Distributed Resources with Electric Power Systems, as they may be amended from time to time. In addition, agreements and procedures shall be established whereby the services are offered shall promote current best practices of interconnection for distributed generation, including but not limited to practices stipulated in model codes adopted by associations of state regulatory agencies. All such agreements and procedures shall be just and reasonable, and not unduly discriminatory or preferential.

INTERCONNECTION STANDARD RECOMMENDATONS
Working Document
December 18, 2006

PURPA Interconnection Standard:

Each electric utility shall make available, upon request, interconnection service to any electric consumer that the electric utility serves. For purposes of this paragraph, "interconnection service" means service to an electric consumer under which an on-site generating facility on the consumer's premises shall be connected to the local distribution facilities. Interconnection services shall be offered based upon the standards developed by the Institute of Electronics Engineer; IEEE Standard 1547 for Interconnecting Distributed Resources with Electric Power Systems, as they may be amended from time to time.

In addition, agreements and procedures shall be established whereby the services are offered shall promote current best practices of interconnection for distributed generation, including but not limited to practices stipulated in model codes adopted by associations of state regulatory agencies. All such agreements and procedures shall be just and reasonable, and not unduly discriminatory or preferential.

Q. PURPOSE OF THE STANDARD?

A. The purpose of the standard apparently is to facilitate distributed generation by removing barriers to DR installations. Some experts expect DR to be able to contribute greatly to the energy supply in the future with as much as 10% of new capacity additions over the next 20 years while providing multiple benefits to the system. Thus the purpose of the standard would support all three of PURPA's goals: 1) conservation of energy supplied by an electric utility; 2) optimization of the efficient use of facilities and resources by electric utilities; and 3) equitable rates to consumers. These experts, however, recognize that there are reliability and safety concerns.

The following is from Basso, T.; Friedman, N. R. (2003). "IEEE 1547 National Standard for Interconnecting Distributed Generation: How Could It Help My Facility?" Preprint.

"Distributed generation (DG) not only provides local benefits to its owner, but it also offers **new options for utilities**. These options range from a physical hedge against purchased power to alternatives to transmission and distribution system upgrades or construction."

"Projections for new distributed resources (DR) electricity generation capacity range up to 30 GW over the next 20 years, accounting for about **10% of new capacity additions** during this period. Attaining the high end of this range depends on improvements in DR unit cost and performance, favorable energy prices, and fewer barriers to DR installations."

"When properly integrated with the grid, DG has potential benefits such as **reduced electric line loss; grid/EPS investment deferment and improved grid/EPS asset utilization; improved reliability; ancillary services such as voltage support or stability, VARs, contingency reserves, and black start capability; clean energy; lower-cost electricity; reduced price volatility; greater reliability and power quality; energy and load management**; and combined heat and power (CHP) synergies."

"Further, DG, especially in CHP mode, has the potential to dramatically **reduce industrial and commercial sectors' carbon and air pollutant emissions and increase source energy efficiency**. In CHP mode, overall energy effectiveness is enhanced because CHP produces electricity and usable byproduct thermal energy onsite, converting 80% or more of the fuel into useable energy."

The following is from Thomas S. Basso, and Richard DeBlasio (2003). "IEEE P1547 Series of Standards for Interconnection" Preprint

"The use of distributed generation and, more generally, distributed resources (DR)—which includes distributed generation and energy storage systems—**has the potential to provide more reliable and lower-cost energy for electricity customers as well as benefits for today's electric transmission and distribution** (T&D) systems. This may prove to be particularly true for customer-sited generation. Further, increased interest in the use of DR is evolving as a result of the advent of competition in the electric power industry, the desire for customer choice, potential opportunities envisioned with the modernization of our T&D systems, and the advanced development of improved small, modular generation technologies such as fuel cells, photovoltaics, and microturbines. In addition, the potential environmental benefits of DR (for example, for renewable resources and combined heat and power systems) are substantial."

"Although the application of distributed generation and storage can have many benefits, the **technologies and operational concepts to properly integrate them into the existing power system must be developed to realize these benefits and avoid negative effects on reliability and safety**. The electric distribution system traditionally was not designed to accommodate active generation and storage at the distribution level or, generally, at the sub-transmission level, and, especially, it was not designed to allow distributed generators to supply energy to other distribution customers. The technical issues involved in readily interconnecting and effectively integrating these types of DR applications with grid operations are significant."

Q. CURRENT STANDARDS IN PLACE IN UTAH THAT ARE EQUIVALENT?

The minutes to the August 30, 2006 Technical Conference identified the following previous state actions concerning interconnection.

- Net metering interconnection addressed in 54-15-106 enacted by Law in 2002 and became effective on May 6, 2002, pursuant to Utah Const., Art. VI. Sec. 25, requiring electrical corporations to allow customer generation systems to be interconnected to their facilities.
- Public Utilities Statute:
- 54-15-106 – Customer to provide equipment necessary to meet applicable code requirements – Commission may adopt additional requirements – Testing and inspection of interconnection.

While the Law supports the interconnection standard, we do not believe that it provides an equivalent standard. The part of the standard that states, "… agreements and procedures shall be established whereby the services are offered shall promote current best practices of interconnection for distributed generation, including but not limited to practices stipulated in model codes adopted by associations of state regulatory agencies" provide an opportunity to improve the interconnection process.

Q. RECOMMENDATION REGARDING ADOPTION OF THE STANDARD.

A. We recommend that the Utah Public Service Commission adopt the standard as written. Facilitating distributed generation in the Utah jurisdiction would be particularly beneficial in managing peak growth and meeting the needs of the growing service territory.

Q. RECOMMENDED CRITERIA AND MEASUREMENTS TO DETERMINE UTILITY ADHERENCE TO THE STANDARD?

A. We recommend that a docket be opened to investigate current interconnection procedures. The investigation could lead to rulemaking if it were demonstrated that rules were needed.

Among other topics the investigation could examine:

- Model codes and how they compare to current practices.
- What barriers to interconnection exist for small, medium, and large DR projects?
- What are the market possibilities for small, medium, and large DR projects?
- Why so few customers have signed up for Schedule 135.
- What are the "current best practices of interconnection for distributed generation?"
- ?
- ?
- ?
- ?
- ?
- ?

From the August Technical Conference

Discussion Items/Questions for Electric Utilities on Interconnection
Responses provided by Les Bahls of PacifiCorp

1) Please describe your current interconnection procedures and agreements for distributed generation. As specified in Schedule 135, Net Metering customers must provide at their expense all equipment necessary to meet applicable local and national standards regarding electrical and fire safety, power quality, and interconnection requirements established by the National Electrical Code, the Institute of Electrical and Electronics Engineers, and Underwriters laboratory.

Regarding interconnection requirements in general, the Company provided the following, link http://www.rockymtnpower.net/Article/Article61757.html which specifies:

Customers wishing to connect generators to PacifiCorp (those which do not qualify as net metering) should know that two processes are required for successful interconnection and for the sale of the energy produced.

Interconnect requests are governed by different federal or state regulations depending on the size of the generator, the voltage of the distribution or transmission line the generator is requesting to connect to, and whether the interconnect customer intends to be a Qualified Facility or not.

To begin the physical interconnection process to PacifiCorp transmission or distribution lines, please contact the Account Manager Transmission at 503-813-6102.

To begin the Power Purchase Agreement or other sale of energy produced, contact the Manager of QF Contracts at 503-813-5957.

Net metering rules vary by state. Generally states restrict net metering to 25-kW or smaller customer-owned generation that uses renewable energy to offset electricity purchases from PacifiCorp. PacifiCorp's contact for net metering questions is the Segment Manager at 503-813-5150

For a definition of a Qualified Facility please visit the Federal Energy Regulatory Commission (FERC) Web site at www.ferc.gov .

The large generator (i.e. larger than 20 MW) transmission system interconnection process and agreement (LGIP and LGIA), covered under the Company's Open Access Transmission Tariff (OATT) under the jurisdiction of the FERC, can be viewed at:
http://www.oasis.pacificorp.com/oasis/ppw/FIFTHREVISEDVOLUME11.PDF

In addition, the small generator (no larger than 20 MW) transmission system interconnections interconnection process and agreement (SGIP and SGIA), also under the jurisdiction of the FERC, can be found at:
http://www.oasis.pacificorp.com/oasis/ppw/ORDER2006_SGIP.PDF and
http://www.oasis.pacificorp.com/oasis/ppw/ORDER2006_SGIA.PDF, respectively.

Purchase power agreements and interconnection agreements follow two separate paths. In general for interconnection, once an application is submitted a scoping meeting is held, and various interconnection studies are completed (feasibility study, system impact study, facilities study, optional interconnection study). The facilities study contains specifications and an estimate of the costs, equipment, engineering, and procurement work needed to implement the conclusions of the system impact study, in accordance

with good utility practice, to physically and electrically connect the interconnection facility with the transmission system.

2. What is the average cost of interconnection for the various customer classes and are there any additional insurance requirements specified in the interconnection agreements?

For non-net metering schedules, there is no difference in cost between customer classes. The cost of interconnection studies ranges from $5,000 to $15,000 (some more some less) – depending upon the circuit and location. Factors which increase the cost of the studies include: initially supplied generation data is incorrect and the interconnection will result in two-way traffic when previously the traffic was one way. The Company must analyze many things to ensure the safety and reliability of a given circuit. In addition, many new interconnections will require telemetry on their systems. The Company's methodologies for completing system impact and facilities studies are included as Attachments E and F, respectively, of the Company's OATT. Section 18 of the LGIA addresses insurance requirements for the interconnection agreement for large generators including requirements for $1 million commercial general liability, workers compensation where applicable, automobile, excess public liability insurance, waiver of subrogation, etc. Many of these provisions are not applicable to the SGIA.

2. Are applicable IEEE standards specifically spelled out in your interconnection agreement(s) or procedures?

Schedule 135 and the SGIA do not spell out specific standards – but generally refers to IEEE standards as indicated in Schedule 135, Special Condition #4 and the SGIA, Section 1.5.4, respectively. For the LGIA, the procedures used to complete the studies are included in Exhibit G of the contract.

3. For any studies required by the various interconnection agreements who must pay the cost of studies?

No cost for Schedule 135 Customers, otherwise Customer pays for the studies.

5. Do your company's interconnection agreements comply with the model code adopted by NARUC?

They are somewhat the same. Some differences include the length of time for studies, deposits, and requirements for construction. The company operates in six states and the NARUC model is the third model suggested. There can be super-expedited process for large KW sizes. NARUC agreement is more structured – the Company works back and forth in an iterative process and the NARUC agreement doesn't address this. Also NARUC doesn't contain insurance and indemnification provisions.