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January 7, 2008

*Via Electronic Filing and U.S. Mail*

Oregon Public Utility Commission  
Attention: Filing Center  
550 Capitol Street NE, #215  
PO Box 2148  
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**Re: UE 189 – In the Matter of Portland General Electric Request to Add Schedule 111,  
Advanced Metering Infrastructure (AMI)**

Attention Filing Center:

Enclosed for filing in UE 189 are an original and five copies of:

- **JOINT REBUTTAL TESTIMONY OF PORTLAND GENERAL ELECTRIC COMPANY AND OREGON PUBLIC UTILITY COMMISSION (UE 189 / JOINT / 200 SCHWARTZ – OWINGS – TOOMAN)**

These documents are being filed electronically. Hard copies will be sent via postal mail.

An extra copy of this cover letter is enclosed. Please date stamp the extra copy and return it to me in the envelope provided.

Thank you in advance for your assistance.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Tingey", written in a cursive style.

DOUGLAS C. TINGEY

DCT: saa  
Enclosures  
cc: Service List-UE 189

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF THE STATE OF OREGON**

**UE 189**  
Advance Metering Infrastructure  
For Prices Effective June 1, 2008

**PORTLAND GENERAL ELECTRIC COMPANY**

**&**

**OREGON PUBLIC UTILITY COMMISSION**

**Joint Rebuttal Testimony**

**In support of Stipulation**

**January 7, 2008**

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF THE STATE OF OREGON**

**Testimony in Support of  
the AMI Stipulation**

**PORTLAND GENERAL ELECTRIC COMPANY  
&  
OREGON PUBLIC UTILITY COMMISSION**

Joint Rebuttal Testimony of

*Lisa Schwartz – Carla Owings – Alex Tooman*

January 7, 2008

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**I. Introduction**

1 **Q. Please state your names and positions.**

2 A. My name is Lisa Schwartz. I am a Senior Analyst in the Electric and Natural Gas Division  
3 of the Oregon Public Utility Commission (OPUC) Staff. My qualifications appear in  
4 Section VIII of Joint Party Exhibit 100.

5 My name is Carla Owings. I am a Senior Revenue Requirement Analyst in the Rates  
6 and Tariffs section of the Electric and Natural Gas Division of the OPUC Staff. My  
7 qualifications appear in Section VIII of Joint Party Exhibit 100.

8 My name is Alex Tooman. I am a Project Manager in Regulatory Affairs for Portland  
9 General Electric (PGE). My qualifications appear in Section V of PGE Exhibit 100.

10 **Q. What is the purpose of your testimony?**

11 A. The purpose of our testimony is to address the issues identified by the Citizens' Utility  
12 Board (CUB) in relation to PGE's advanced metering infrastructure (AMI) project. These  
13 issues specifically relate to:

- 14 • The timing of PGE's AMI project
- 15 • Accelerated depreciation of PGE's remaining UE 115 network meter reading  
16 (NMR) costs
- 17 • AMI in relation to other capital projects and cost control
- 18 • Mandatory time-of-use and critical-peak pricing
- 19 • Direct load control

**II. CUB Issues**

**A. Project Timing**

1 **Q. What is CUB’s primary critique of the proposed AMI project timing?**

2 A. CUB is concerned that AMI technology is not sufficiently mature to justify the pursuit of  
3 PGE’s AMI proposal. In support of this, CUB cites PGE’s UE 115, NMR project and  
4 progress toward AMI in California.

5 **Q. What is your response to CUB’s admonitions regarding PGE’s NMR costs?**

6 A. CUB raises several issues regarding PGE’s NMR system. We address all of them together  
7 in Section II, part B, below.

8 **Q. What is CUB’s primary concern regarding AMI experience in California?**

9 A. CUB observes that PGE cites California as an example of AMI moving forward, but notes  
10 that it (CUB) sees just the opposite and consequently, reaches the conclusion that AMI is not  
11 a mature technology. For example, CUB states that “California has not yet produced a full-  
12 scale time-tested AMI project” (CUB/100, Jenks/5) and that “94% of US customers do not  
13 have advanced meters” (CUB/100, Jenks/4).

14 **Q. How do you respond to CUB’s concerns?**

15 A. We note that California utilities, after extensive research and testing, have already made  
16 numerous decisions regarding the deployment of AMI systems, and we are confused about  
17 CUB’s suggestions that they have not. Pacific Gas and Electric made the decision to install  
18 an AMI system and began deployment approximately two years ago. Southern California  
19 Edison has announced moving forward with Itron's AMI system for deployment in 2009  
20 through 2012. San Diego Gas and Electric (SDG&E) has been publicly working on its  
21 business case longer than PGE and SDG&E’s AMI decision is expected soon.

1 **Q. Is California the only state in which AMI systems have been or are being deployed?**

2 A. No. California is not the only state with utilities making AMI choices. Examples of other  
3 two-way systems include:

- 4 • Wisconsin Public Service – AMI installed for 700,000 meters
- 5 • Pennsylvania Power & Light – AMI installed for 1,400,000 meters
- 6 • Alliant Energy – AMI planned for 1,400,000 meters
- 7 • Southern Company – AMI planned for 4,300,000 meters

8 The Federal Energy Regulatory Commission staff report, “Assessment of Demand  
9 Response & Advanced Metering – 2007,” includes an extensive list of utility AMI projects  
10 implemented, underway or planned  
11 (<http://www.ferc.gov/legal/staff-reports/09-07-demand-response.pdf>).

12 **Q. California aside, what are the real issues regarding timing for AMI?**

13 A. The real issues regarding AMI deployment at this time are the following:

- 14 • Does the system provide full or adequate functionality?
- 15 • Is AMI a mature technology?
- 16 • Are AMI costs stable or will they decline significantly over time?

17 **Q. Does PGE’s proposed system provide full or adequate functionality?**

18 A. Yes. PGE’s proposed AMI system consists of fully two-way, low-cost communication  
19 capability that will connect with every home and business in PGE’s service territory and  
20 provide all the benefits described in previous UE 189 testimony. This system will also be  
21 able to “talk” with devices capable of "hearing" the signal so as to provide additional  
22 benefits related to direct and automated load control. Interval data and two-way  
23 communications are the core capabilities of AMI systems. Given this level of full

1 functionality, we do not see a basis for this system becoming obsolete in the foreseeable  
2 future.

3 **Q. Why do you believe that AMI is a mature industry?**

4 A. We believe this for five reasons:

- 5 1. Solid-state metering has existed for approximately 15 years.
- 6 2. Radio frequency technology to transmit information or to control devices (which  
7 is the basis of PGE's AMI proposal) has existed even longer.
- 8 3. The combination of one and two, above, is not a dramatic technological  
9 innovation, but rather one that requires appropriate software to manage the flow  
10 of large volumes of interval data. Large volumes of data are something that  
11 software in other applications has been processing for decades.
- 12 4. Over the last 15 years, the reliability of fully solid-state meters has improved  
13 dramatically. PGE has now had positive experiences with all five of the major  
14 meter manufacturers, noting that over a number of years, these meters have had  
15 an average failure rate of less than 0.5% per year.
- 16 5. Prices for solid-state meters had declined in the past, but have been steady over  
17 recent years.

18 **Q. What limitations are there to deploying an AMI system?**

19 A. Ultimately, the primary limitations related to AMI are not the AMI technology, but rather  
20 the utility infrastructure and processes needed to run the system, and supplemental programs  
21 needed to provide the system benefits. PGE states that it will take approximately three years  
22 for the Company to design, implement, test, and train customers and employees on the new  
23 utility processes associated with AMI, (e.g., remote disconnect, customer-selected due date,



1 automated move-in/move-out, and new processes for lost revenue protection). PGE also  
2 believes it will require additional years to accomplish the following (for example):

- 3 • Capture and effectively use automated outage reporting;
- 4 • Develop data systems and analysis tools to improve distribution asset utilization  
5 based on interval data;
- 6 • Learn how to use AMI telemetry and command-and-control capability to  
7 automate feeder rerouting during an outage to reduce outage times;
- 8 • Instruct many of PGE’s customers to understand how to access and interpret  
9 interval data to help them reduce their energy use.

10 **Q. Aren’t these reasons to go slow and delay deployment?**

11 A. Just the opposite. All of these multi-year initiatives of learning and implementing new  
12 utility processes can only begin after PGE moves forward with AMI.

**B. Accelerated Depreciation of NMR**

13 **Q. What are CUB’s concerns regarding PGE’s NMR system?**

14 A. CUB has identified several concerns regarding PGE’s NMR system, which consist of the  
15 following:

- 16 • The NMR meters have 15-year remaining lives and PGE is proposing to replace  
17 them within two years.
- 18 • PGE’s NMR system is not cost effective and is an example that the advanced  
19 metering industry is not mature.
- 20 • Because NMR is not cost effective, it is no longer used and useful.

- 1           • The remaining net investment in PGE’s NMR should not be subject to accelerated  
2           depreciation for recovery in the AMI tariff.

3   **Q. Were NMR meters expected to last another 15 years?**

4   A. No. In the depreciation study (see Docket UM 982, Commission Order No. 01-123)  
5   associated with UE 115, PGE’s 2002 general rate case, depreciation for all meters was set at  
6   a 10-year, remaining-life rate. This was an accelerated rate in anticipation of eventual full  
7   deployment of an AMI system and in recognition that PGE’s meters were expected to have  
8   much shorter lives. This accelerated rate was retained in the subsequent depreciation study  
9   (see Docket UM 1233, Commission Order No. 06-581) as reflected in the UE 180 rate case.  
10   Consequently, if the NMR meters were deployed in 2002 and 2003, and are not replaced  
11   until 2009 or 2010, they have lasted a much longer percent of their expected lives than  
12   assumed by CUB.

13   **Q. Is NMR an example that the advanced metering industry is not mature?**

14   A. No. PGE’s NMR technology choices were to support the limited-deployment, direct-access  
15   requirements of SB 1149, which was cost effective relative to \$40-a-month telephone lines.  
16   In fact, the NMR technology is still cost effective relative to that standard and is 100%  
17   useful in meeting PGE’s direct access requirements. It is also cost effective at reducing  
18   meter-reading costs in remote, rural areas where we have deployed it for that purpose. The  
19   reason PGE is proposing to replace NMR is not because it is obsolete, but because it is not  
20   cost effective relative to our UE 189 business case, which calls for 100% AMI meter  
21   deployment. The AMI system is cost effective because it can provide significant system-  
22   wide benefits, and as described above, it has full functionality so that obsolescence should  
23   not be an issue for the life of the project.

1 **Q. So you disagree with CUB’s assertion that PGE’s NMR system is not cost effective?**

2 A. Yes. CUB takes PGE’s observation that NMR is not cost effective compared to AMI (hence  
3 PGE’s proposal to replace it) and translates this to mean that NMR is simply not cost  
4 effective. This characterization is incorrect.

5 **Q. Why does CUB say that NMR is obsolete and ultimately not used and useful?**

6 A. These are extensions of CUB’s characterization that NMR is not cost effective. In fact,  
7 NMR is no more a bad investment or obsolete than any other component of PGE’s existing  
8 metering system. PGE’s manual-read meters and NMR system are both prudent,  
9 cost-effective investments that are in service and meeting PGE’s operational and regulatory  
10 requirements in the manner in which they were designed.

11 **Q. What are CUB’s views regarding accelerated depreciation of old meters versus NMR  
12 meters?**

13 A. CUB observes that the manual-read meter system has been used and useful for many  
14 decades and that CUB “does not oppose accelerated depreciation of it.” (CUB/100, Jenks/9)  
15 CUB opposes accelerated depreciation of the NMR system, however, because of its claim  
16 that the system is not used and useful. As noted above, however, the NMR meters are no  
17 less used and useful than the manual-read meters. This is also true if we consider the age of  
18 the meters. Although NMR was installed between 2000 and 2003, many manual-read  
19 meters have been installed even more recently. Again, CUB does not object to replacing the  
20 new manual-read meters, but opposes replacement of older NMR meters. Ultimately, if the  
21 AMI benefits justify its deployment, then there is no difference in replacing PGE’s  
22 mechanical meters with AMI for economic reasons than there is in replacing NMR for the  
23 same reasons. If so, then accelerated depreciation of each system should apply equally.

1 **Q. What is your response to CUB's objections to PGE recovering additional O&M costs**  
2 **for the NMR system if AMI does not replace it?**

3 A. As noted above, PGE's NMR and other metering systems are in service and meeting PGE's  
4 operational and regulatory requirements. If they are not replaced by the proposed AMI  
5 system, then O&M costs will be required to keep the systems functioning and these will be  
6 included in any subsequent rate case that PGE will file. Ultimately, though, if you put all of  
7 CUB's argument together, it becomes a regulatory quagmire:

- 8 • AMI should not be approved because something better could come along later;
- 9 • Even if AMI is not approved, it is more cost effective than NMR;
- 10 • If NMR is not cost effective, it is obsolete and no longer used and useful;
- 11 • If NMR is no longer used and useful, it should not be recovered through  
12 accelerated depreciation in the AMI tariff.

13 In short, CUB is saying that AMI should not be approved because it is not good enough,  
14 but because AMI is better than NMR, PGE should not get recovery of NMR in the AMI  
15 tariff. This represents an illogical regulatory approach that should be rejected.

### C. Cost Control

16 **Q. What are CUB's concerns regarding AMI and cost control?**

17 A. CUB compares PGE's capital costs from 2003 through 2011 (actual and projections) and  
18 suggests that AMI will add unnecessary pressure on increasing rates.

19 **Q. How do you respond to CUB's concerns?**

1 A. What CUB fails to include in its discussion is that AMI provides a positive net benefit to  
2 customers and, because of operational savings, will serve to reduce rates below what they  
3 would otherwise be absent AMI.

4 **Q. What again are the AMI benefits?**

5 A. Direct benefits from the system as installed are estimated to be approximately \$18.2 million  
6 in the year following full deployment (i.e., 2011). Based on current estimates of project  
7 costs and these benefits, PGE calculates that over 20 years, the net present value (NPV) of  
8 the project is approximately a \$33 million benefit to customers. PGE has also identified  
9 customer and system benefits for which AMI provides a platform and which are roughly  
10 estimated to increase the NPV to a range of \$37 million to \$80 million over the 20 years.  
11 (See PGE Exhibit 103 – PGE’s Scoping Plan).

12 **Q. What is CUB’s opinion of the \$33 million NPV and how do you respond to it?**

13 A. CUB refers to the \$33 million as “*not* an enormous margin over that amount of time.”  
14 (CUB/100, Jenks/13-14, emphasis in original) We disagree with CUB because we believe  
15 the \$33 million is a significant benefit that serves to reduce rates through operational savings  
16 that cover the costs of both the old system being replaced and the new system to be  
17 deployed.

18 **Q. When do customers actually begin to realize a reduced rate benefit from AMI?**

19 A. As noted above, operational savings are estimated to be approximately \$18.2 million in  
20 2011. By 2012, these ongoing (and escalating) savings are estimated to exceed the revenue  
21 requirement of AMI’s declining rate base resulting in a downward impact on rates. In  
22 recognition of this effect, the Conditions document (Joint Party Exhibit 101, page 8)

1 specifies that the Commission can request PGE to submit a general rate filing after 2010 if  
2 the Company is not already engaged in a general rate proceeding.

3 **Q. Are there any other benefits for customers in addition to rate impacts?**

4 A. Yes. Additional benefits that the system provides include the following:

- 5 • Improved outage detection and restoration
- 6 • Fewer property damage, worker safety, and privacy issues, because PGE will not  
7 have to visit customer meter locations on a monthly basis
- 8 • The potential to allow customers access to daily usage data so they can better  
9 manage their energy usage
- 10 • Customer selected due date for electric bills

**D. Mandatory Time-of-Use and Critical-Peak Pricing**

11 **Q. How would you describe CUB's concerns regarding time-of-use and critical-peak**  
12 **pricing?**

13 A. CUB's primary concern is that if AMI is approved, time-of-use and critical-peak pricing  
14 programs might be made mandatory in order to derive additional benefits from the system or  
15 cover any shortfalls in expected project savings. CUB also notes that such programs have  
16 greater participation and response by some customers and more adverse effects realized by  
17 other customers.

18 **Q. Does PGE plan to introduce such mandatory programs?**

19 A. No, PGE has no current or long-term plan to introduce mandatory, time-varying pricing  
20 programs for small customers. (See Joint/100, Schwartz-Owings-Tooman/20-21) And as

1 we noted previously, any time-of-use or critical-peak pricing proposal will be subject to full  
2 regulatory review by the Commission and with participation by all interested parties.

**E. Direct Load Control**

3 **Q. What is CUB’s argument regarding direct load control?**

4 A. CUB expresses excitement “about the potential for smart thermostats and smart appliances  
5 working together with signals from the utility to manage demand.” (CUB/100, Jenks/13)  
6 CUB, however, is concerned that PGE’s proposed AMI system will lack this important  
7 capability and will need to be replaced by a newer system if we want those benefits. CUB  
8 also believes that absent smart appliances and good load control programs, “PGE’s vision is  
9 based on using punitive price signals to change customer behavior.” (CUB/100, Jenks/2)

10 **Q. How do you respond to CUB’s concerns?**

11 A. PGE intends to implement a direct load control program and recognizes that a standardized  
12 communication protocol will allow direct communications between the utility and  
13 customers’ appliances. Regardless of whether and when such a protocol will be developed,  
14 PGE’s proposed system is positioned to provide direct load control in the following ways:

- 15 • If a standard protocol does not exist or is not utilized:
  - 16 ○ PGE’s AMI meters can communicate with currently available load control
  - 17 switches on appliances and thermostats by using Sensus Metering System’s
  - 18 (PGE’s AMI meter vendor) FlexNet communications system either through
  - 19 the meter or through the system’s tower-based radio transmitters.
- 20 • If a standard protocol does exist and is utilized:

1           ○ PGE’s AMI meters could communicate with smart appliances using some  
2           other communications protocol such as Zigbee or HomePlug. PGE would use  
3           a communication bridge to translate the FlexNet protocol into one of these  
4           protocols should they become the standard and if the economic benefits justify  
5           the expense.

6           ○ Depending on the specific customer needs and cost effectiveness, PGE could  
7           exchange the AMI meter with one that has a specific communication method  
8           built into the meter. Sensus has demonstrated such a meter with Zigbee.

9   **Q. Please elaborate on the difference between these scenarios.**

10 A. Where a standard protocol does not exist or is not utilized, PGE’s proposed AMI system is  
11 completely ready, as installed, to communicate with load control switches on appliances and  
12 thermostats to provide direct load-control benefits. Where a standard protocol does exist  
13 and is utilized, two alternatives are possible. In the first, the AMI meters would use an  
14 easily installed device (the communication bridge) to communicate with smart appliances to  
15 provide direct load-control benefits. This will allow the AMI meter to communicate with  
16 smart appliances that have different communications protocols than that already in the AMI  
17 meter.

18 **Q. What does the second alternative entail?**

19 A. The second alternative entails replacing the customer’s existing AMI meter with one that  
20 can “speak” the language of the new standard. The original meter can then be used at a new  
21 PGE location where direct load control is not chosen.

22 **Q. Can this be practical given the potential level of participation?**



1 A. Yes. We believe so because after the AMI deployment period, PGE expects to install  
2 approximately 245,000 additional meters for new customers during the anticipated lifetime  
3 of the proposed AMI assets. If individual customers require functionality not provided by  
4 the proposed AMI meter, PGE could install a similar AMI meter that provides the additional  
5 functionality and redeploy the one removed to one of the 245,000 new meter locations with  
6 less demanding requirements. This level of activity should accommodate the demands of  
7 any particular program. Again, PGE would choose this option over a communications  
8 bridge based on cost-effectiveness.

9 **Q. Has PGE made any commitments regarding technology for a direct load control**  
10 **program?**

11 A. Yes. In the Conditions document (Joint-Party Exhibit 101, page 4), PGE committed to  
12 explore the use of programmable thermostats or other technology that could be used for both  
13 pricing and direct load control programs.

**III. Conclusions**

1 **Q. What do you conclude about CUB’s concerns regarding PGE’s proposed AMI system?**

2 A. We believe that PGE’s proposed AMI system provides sufficient direct benefits as installed  
3 plus customer and system benefits from additional programs to justify recommending  
4 Commission approval for deployment. We believe that CUB’s arguments regarding the  
5 NMR system are flawed and should be disregarded. We do acknowledge CUB’s concerns  
6 regarding differences among customers in their ability to respond to time-of-use and  
7 critical-peak pricing. As noted above, PGE does not plan to propose mandatory time-of-use  
8 and critical-peak pricing programs for small customers. Regarding voluntary programs,  
9 we look forward to addressing in future proceedings issues associated with varying abilities  
10 of customers to respond to prices.

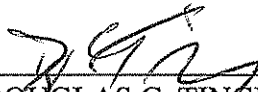
11 **Q. Does this conclude your testimony?**

12 A. Yes.

**CERTIFICATE OF SERVICE**

I hereby certify that I have this day caused the foregoing **JOINT REBUTTAL TESTIMONY OF PORTLAND GENERAL ELECTRIC COMPANY AND OREGON PUBLIC UTILITY COMMISSION (UE 189 / JOINT / 200 SCHWARTZ – OWINGS – TOOMAN)** to be served by electronic mail to those parties whose email addresses appear on the attached service list, and by First Class US Mail, postage prepaid and properly addressed, to those parties on the attached service list who have not waived paper service from OPUC Docket No. UE 189.

Dated at Portland, Oregon, this 7th day of January 2008.

  
\_\_\_\_\_  
DOUGLAS C. TINGEY

SERVICE LIST

OPUC DOCKET # UE 189

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