BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

UM 1302

In the Matter of an Investigation into the Treatment of CO_2 Risk in the Integrated Resource Planning (IRP) Process.	STAFF'S OPENING COMMENTS

Introduction

The Public Utility Commission of Oregon (Commission), in Order No. 07-002, adopted the following guideline regarding the treatment of environmental costs in utility Integrated Resource Planning (IRP):

> Utilities should include in their base-case analyses the regulatory compliance costs they expect for carbon dioxide (CO_2), nitrogen oxides, sulfur oxides, and mercury emissions. Utilities should analyze the range of potential CO_2 regulatory costs in Order No. 93-695, from zero to $40 (1990$). In addition, utilities should perform sensitivity analysis on a range of reasonably possible cost adders for nitrogen oxides, sulfur oxides, and mercury, if applicable.

(*See* Guideline 8: Environmental Costs, Order No. 07-002 at 17-19.) The Commission also indicated a willingness to consider revision or enhancement of the environmental cost guideline following an investigation into the treatment of CO_2 risk in IRP. The Commission stated:

> The investigation will cover not just the base case value for CO_2, but also the sensitivity analyses that should be conducted. It will address what CO_2 costs should be used for sensitivity analysis, as well as what analysis of trigger point values should be required.

(*See* Order No. 07-002 at 18.)

The Parties have attempted to facilitate the Commission's investigation by creating an Issues List.[1] In these opening comments, Staff first summarizes the treatment of CO_2 risk in recent electric utility IRP filings[2], then addresses each of the issues on the Issues List, and concludes with a recommendation for a new environmental cost guideline for IRP.

---

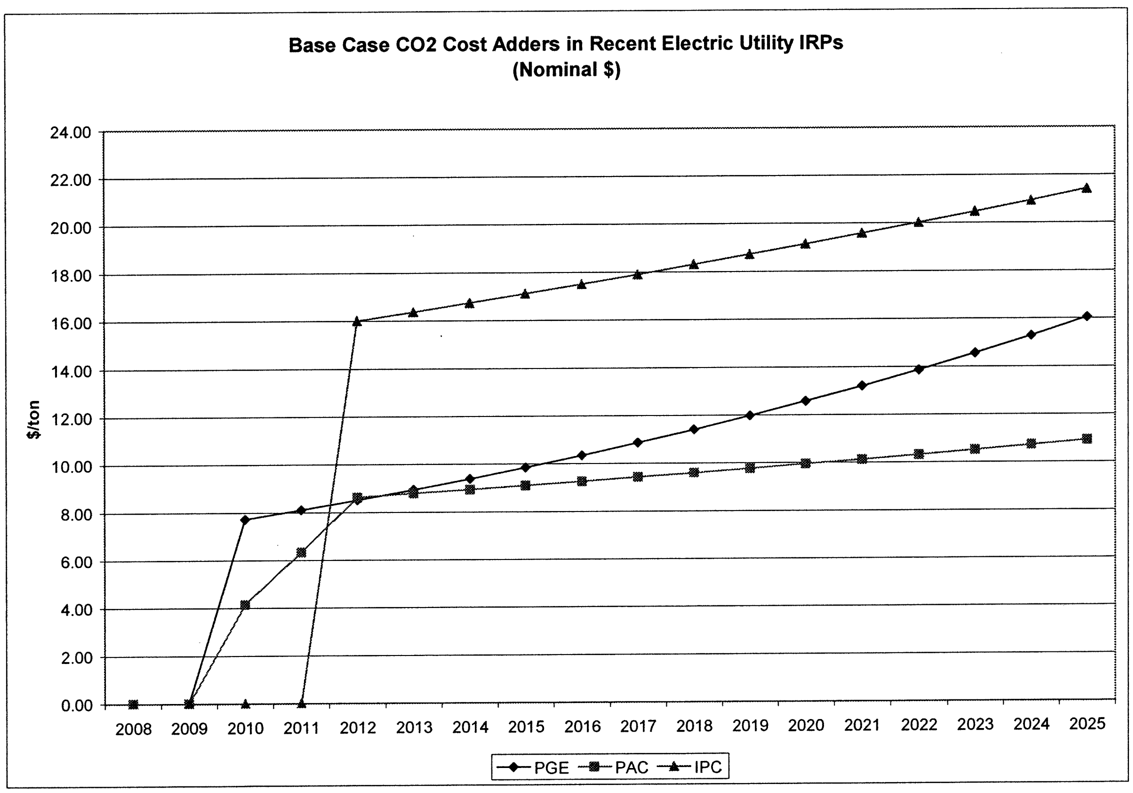
[1] ALJ Power adopted the Issues List on April 20, 2007.

[2] Staff notes that the guideline requiring analysis of CO_2 risk also applies to the natural gas utilities. Analysis of CO_2 adders higher than the utility's base-case values increases the level of cost-effective conservation, and potentially alternative fuels, in the resulting resource portfolio.

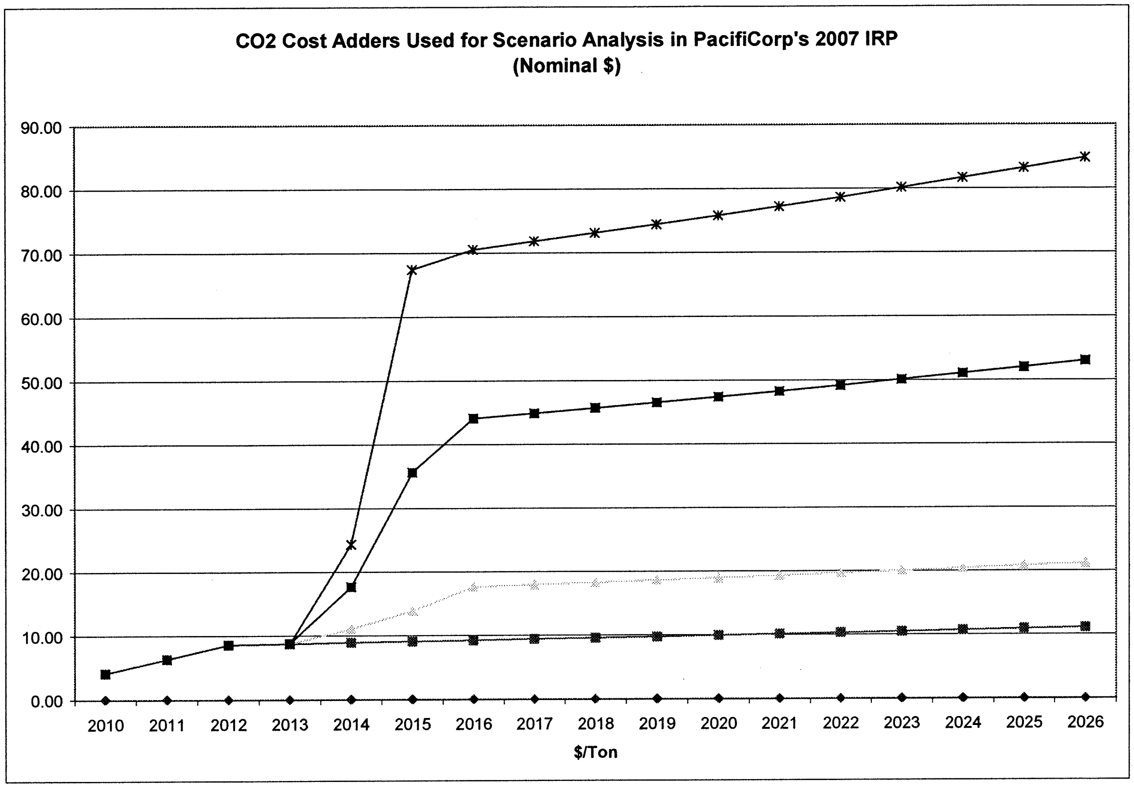
CO_2 Risk Analysis in Recent Electric Utility IRPs

Traditionally, utilities have addressed or included environmental costs in IRP by performing scenario analysis. In such an analysis, a scenario is a distinct time-profile of environmental cost adders (i.e., a stream of cost adders) that represent the potential future impact of regulatory action to internalize environmental costs. The utility typically determines a base case and several alternative cases. Parties have challenged the level and timing of the CO_2 cost adders used in the utility's base case as well as the implicit weighting the utilities assign to each of the cases in the public input phase of IRP.

The following chart shows base case CO_2 costs adders from Portland General Electric's (PGE's), PacifiCorp's, and Idaho Power Company's (Idaho Power's) most recently filed IRPs.

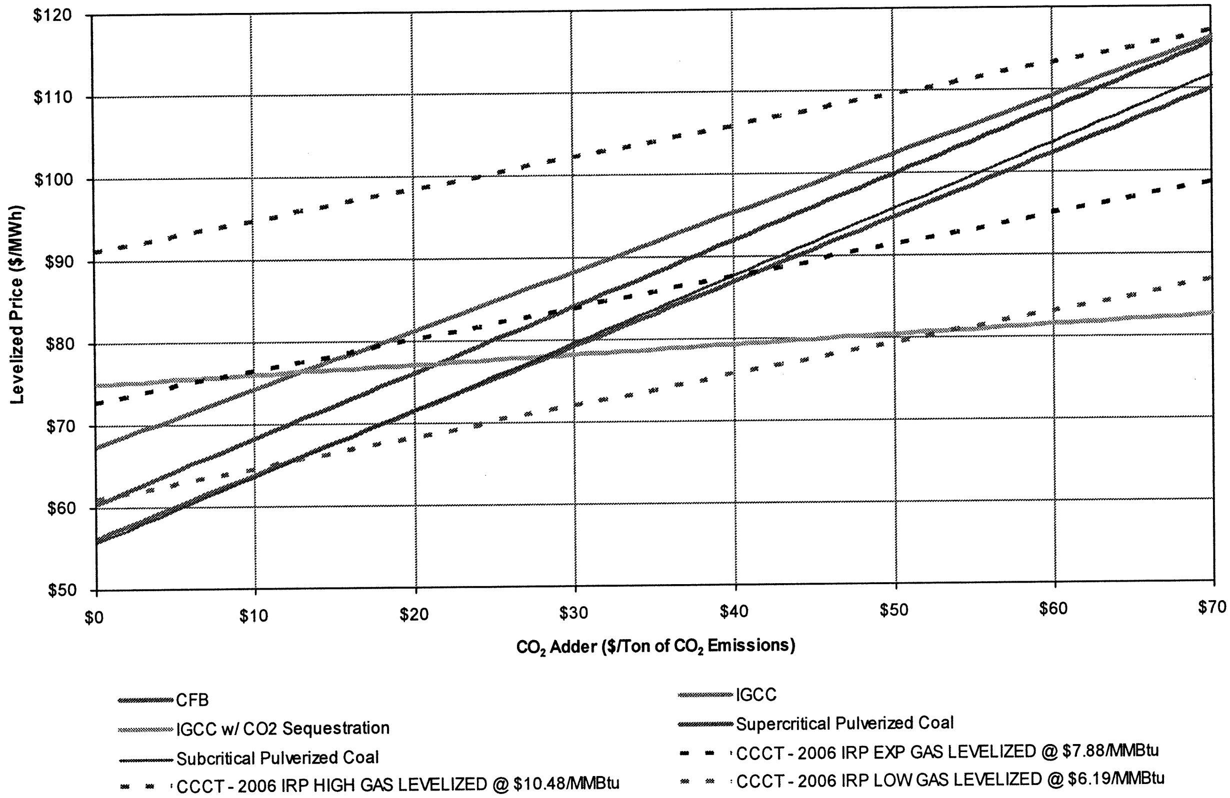


The next chart is an example of alternative CO_2 cost adders used by PacifiCorp in its 2007 IRP.



A recent development in IRP has been the use of trigger point analysis to search for the CO_2 cost adder that causes the least-cost resource (using real-levelized life-cycle cost as the metric) to switch from, for example, a supercritical pulverized coal resource to a natural gas-fired resource. The following chart is an example of trigger point analysis from Idaho Power's 2006 IRP. Note that the switch between then supercritical pulverized coal resource and the natural gas resource occurs at a CO_2 cost adder of approximately $41 per ton.

"Trigger Point" Analysis from Idaho Power Company's 2006 IRP
Levelized Price for Generating Resources vs. Carbon Adder



Issues List

1. What CO_2 regulatory cost stream should utilities use in their IRP base case, and what assumed CO_2 regulatory future, e.g., a fixed carbon adder or a carbon policy modeling constraint, should serve as the basis for the base case cost stream?

Staff continues to recommend the Commission require utilities to include in their IRP base case the CO_2 regulatory costs that the utility expects to prevail over the planning period.[3] Staff opposes the use of a single Commission determined stream of CO_2 cost adders in the IRP process for several reasons.

First, in establishing IRP guidelines, the Commission has the statutory authority to require utilities to consider the likelihood that external CO_2 costs may be internalized in the future. However, the Commission lacks the authority to

[3] *See* Staff's Opening and Reply Comments in UM 1056.

directly, or indirectly, impose costs on a utility that it is not legally required to bear. (*See* Order No. 93-695 at 2-3 and Order No. 07-002 at 17.)

At the same time, in a rate case prudence review, the Commission could allow a utility to recover the costs of a resource that emits less CO_2, but is more expensive, than another resource. Or the Commission could disallow recovery of the resource costs, or any future CO_2 regulatory costs, associated with a resource that is less costly, but emits more CO_2. In making this type of prudence determination the Commission would review whether the utility, at the time it made its resource decision, had prudently considered the likelihood that it would be legally required to bear CO_2 costs in the future. The Commission may also impute the cost of a lower-emitting resource in rates in lieu of a utility-acquired resource with high CO_2 emissions – for example, imputing the cost of a natural gas plant or wind plant, or a combination, in lieu of a coal plant.

In other words, the Commission can require the utilities in IRP to consider the risk that CO_2 costs may be internalized in the future, but it cannot use IRP as a means of imposing resource decisions on the utilities. Further, cost recovery for resources the utility acquires is addressed through rate cases, not IRP.

Second, any future CO_2 regulatory cost stream will ultimately be determined by legislation enacted by Congress. Both the timing and stringency of any CO_2 emission legislation is uncertain. In the near term, the expected costs are likely to vary from year to year according to the composition of Congress and political fashion.

Staff recommends the Commission place more emphasis on developing sensitivity analysis, including trigger point analysis, to inform decision-making than on determining a single base case cost stream to achieve modeling consistency. By emphasizing sensitivity analysis the Commission can retain flexibility in responding to the changing political environment.

Staff is opposed to proposals that reduce this "base case problem" to one of timing by assuming that any enacted legislation will be at least stringent enough to make the selection of conventional coal-fired resources uneconomic. This type of reductionism is not fact-based. The alternative assumption, that any enacted legislation will fail to dramatically curb emissions, is also a plausible scenario. The stringency of any CO_2 legislation is as uncertain as its timing.

Staff is also opposed to proposals that attempt to fix or limit the type of carbon regulation that can serve as the basis for the base case CO_2 cost adders. Even assuming we knew with certainty that cap and trade regulation would be the preferred approach: the variety of cap and trade design options challenges the effectiveness of making this assumption. A cap and trade assumption does little to reduce the complexity and uncertainty of the "base case problem."

2. What alternative CO_2 regulatory cost streams should utilities use in their IRP scenario analyses, and what assumed CO_2 regulatory futures should serve as the bases for these alternative cost streams?

In 1993, the Commission instructed utilities to identify preferred resource strategies for CO_2 cost adders in the range of $0 to $40 per ton (1990 $). In addition to the low and high adder values, the Commission also identified middle values of $10 and $25 per ton. (*See* Order No. 93-695 at 5-8.) The Commission chose to adopt a narrow range for external cost adders in order to convey its belief that external costs are real and that there was a significant likelihood that these costs would be internalized in the future. The Commission stated:

> If information were the only goal, then we would adopt a wide range of external cost estimates (including zero at the low end) and defer to a future least-cost plan or rate case any further consideration of the right figures to use. However, we believe that we should identify a narrower range that reflects our view that environmental impacts create real costs and that those external costs may be internalized in the future.

(*See* Order No. 93-695 at 5.) In 2007, it seems well established that CO_2 emissions create real costs. The more central issue for IRP continues to be the expected future level and timing of internalization.

From an analytic perspective, the practical effect of the Commission requiring low, middle, and high CO_2 cost adders is to narrow the search for the CO_2 regulatory future that would signal a switch in the preferred resource strategy. For example, does the preferred strategy switch at a trigger point between CO_2 cost adders of $10 and $25 per ton, between $25 and $40 per ton, or above $40 per ton? Analyzing a range of CO_2 cost adder is essentially an exercise in locating the point, or threshold, at which the preferred resource strategy would change.

Staff recommends the Commission require utilities to perform sensitivity analysis, including trigger point analysis, in IRP. However, Staff does not recommend the Commission require the use of pre-determined streams of CO_2 cost adders for low, middle, and high cases in the IRP process.

3. How should the existing, and potential future, carbon or other greenhouse gas emission goals of the State of Oregon be included in utility IRPs?

House Bill 3543 establishes a state policy to stop the growth of Oregon greenhouse gas emissions by 2010; cut them 10 percent below 1990 levels by 2020; and reduce them at least 75 percent below 1990 levels by 2050. The legislation did not establish specific mechanisms for achieving these goals. A bill was proposed in the 2007 Session to establish an emissions performance standard, similar to the recently enacted California SB 1368 and Washington SB 6001, but was not adopted. A bill to establish a cap and trade system similar to California AB 32 also proposed.

Oregon recently joined the Western Climate Initiative, which plans to establish by August 2008 a regional cap and trade system or other market mechanism to meet a regional emissions reductions goal to be set by member states and provinces. Legislation to adopt the proposed mechanism in Oregon is expected to be considered in the 2009 Session.

In adopting the Western Commissions' Joint Action Framework on Climate Change last year, the Oregon Public Utility Commission committed to "Explore the development and implementation of greenhouse gas emissions standards for new long-term power supplies."[4]

From the IRP perspective, the important considerations are the likelihood that the State of Oregon will implement one or more of these mechanisms and the level of cost that may be imposed on the utilities.

4. What probability weighting, if any, should utilities assign to the CO_2 base case and scenario analyses?

The desire to assign probability weights to the various regulatory futures is ultimately a desire to reduce the ranking of resource strategies to a single metric by using an expected value calculation. The underlying presumption is that one ranking of candidate portfolios based a single metric is less subjective, and therefore better, than multiple rankings based on multiple metrics.

In IRP, the standard cost metric is net present value revenue requirements (NPVRR). CO_2 risk is often measured as the change in NPVRR from the base case. For example, in Idaho Power's 2006 IRP, the NPVRR of the company's preferred portfolio is $5.051 billion given base case assumptions. A low CO_2 adder reduces the preferred portfolio's cost by $0.949 billion. A high CO_2 adder increases the preferred portfolio's cost by $2.256 billion. Idaho Power assigns a 30% probability to its low case, a 50% probability to its base case, and a 20% probability to its high case and calculates an expected CO_2 risk of $0.166 billion.[5] (*See* Idaho Power's 2006 IRP, Table 6-3, at page 80.) Idaho Power assigns probability weights to the low, base, and high cases of four other types of risk, calculates expected risk values, and combines the five measures of risk into a single metric, called the "Risk Adjusted Total Portfolio Cost." Finally, the

---

[4] See Agenda Item 5, November 21, 2006, public meeting.

[5] $0.166 billion = (.30*-$0.949 billion) + (.50*$0.000 billion) + (.20*$2.256 billion).

company ranks its candidate portfolios based on this single metric. (*See* Idaho Power Company's 2006 IRP, Table 6-9, at page 90.)

The point of this example is not to single out Idaho Power, but simply to demonstrate the heroic assumptions and calculations that are needed to produce a single metric for ranking candidate portfolios.[6] Note also that Idaho Power had serious concerns regarding the implementation of the top ranked portfolio, and therefore, for qualitative reasons, selected the second ranked portfolio as its preferred portfolio. The point is that IRP risk modeling is no more than a useful technique in the service of good decision making. The outcome of these risk exercises cannot, and should not, be decisive. Ultimately, the utilities must exercise good judgment in resource decision-making.

Staff recommends the Commission not adopt specific probability weights to assign to the CO_2 base case and alternative cases in IRP. Staff believes trigger point analysis provides a better route to informed decision-making.

5. How should utilities vary the CO_2 regulatory cost streams to identify the "trigger point" (or CO_2 regulatory future) that changes the preferred resource portfolio, and should utilities vary other model inputs to achieve logical consistency and to test the sensitivity of the trigger point to the changes in other variables?

In its 1993 external cost order, the Commission directed the utilities to identify *preferred* resource strategies *for specific values within the range* of the various environmental cost adders. (*See* Order 93-695 at 5.) The rationale for this directive seems to be that it is likely the preferred resource strategy for the entire range of possible cost adders will be significantly different from, for example, the preferred strategy given a set of high cost adders. The identification of changes in preferred strategies contemplated by the Commission in its 1993 order is markedly different from the kind of sensitivity analysis and trigger point analysis that is currently conducted in IRP.

In current IRP, the utilities typically analyze how a set of *candidate* resource portfolios performs under a high CO_2 cost scenario. This is not necessarily the same thing as identifying, or designing, a preferred portfolio for a high cost scenario. In addition, the utilities have recently begun to conduct analysis that identifies a CO_2 cost scenario that causes the least-cost resource (using real-levelized life-cycle cost as the metric) to switch from, for example, a conventional coal-fired resource to a natural gas-fired resource. Again, this is not quite the same thing as identifying the point at which the utility would switch from the portfolio it prefers given the entire range of cost adders to the portfolio it prefers given a high cost scenario.

---

[6] PacifiCorp calculates a single risk metric by averaging stochastic risk across five CO_2 adder cases. (*See* PacifiCorp's 2007 IRP, Table 7.39, at page 190.)

Staff recommends the Commission require the utilities to develop a high CO_2 cost scenario that achieves logical consistency between model inputs. This high cost scenario should be developed such that the time-profile of CO_2 cost adders results in a significantly different resource portfolio becoming the preferred portfolio. The CO_2 cost stream should be the lowest set of adders that leads to this result.

Staff recommends the Commission require the utilities to fully develop the preferred portfolio for this high CO_2 cost scenario. The utilities should perform a full set of cost and risk analysis on this portfolio and compare its performance to that of the portfolio that is preferred given the entire range of potential cost adders. The utilities should indicate their judgment of the likelihood that this high CO_2 cost scenario will become legally binding.

The advantage of this approach is that it does not require heroic assumptions about the likelihood that high CO_2 costs may be internalized in the future. The utilities and interested parties can compare two significantly different portfolios, one that is designed to be preferred under a wide range of possible conditions and one that is designed to be preferred under high CO_2 cost conditions, and using their own subjective probabilities and best judgment, argue for the best resource strategy.

Again, the outcome of these risk assessment exercises cannot, and should not, be decisive. Ultimately, the utilities must exercise good judgment in resource decision-making.

6. Are the alternative futures used in the scenario analyses an adequate measure of the cost risk associated with choosing one portfolio over another? Should utilities use a different approach when considering the risk of future CO_2 regulation?

Staff believes its recommended approach to modeling CO_2 risk in IRP is adequate for choosing one portfolio over another. Staff supports the continued use of the best combination of cost and risk standard in IRP (*See* Guideline 1: Substantive Requirements, Order No. 07-002 at 5.) Staff is aware that parties may recommend adoption of a precautionary principle or safety standard for the treatment of CO_2 risk in IRP. Staff will comment on any proposal to change or temporarily suspend the best combination of cost and risk standard in its reply comments.

Conclusion

Staff recommends the Commission adopt the following environmental cost guideline for the IRP process:

> Utilities should include in their base-case analyses the regulatory compliance costs they expect for carbon dioxide (CO_2), nitrogen oxides, sulfur oxides, and mercury emissions. The utilities should identify the portfolio that is preferred given a broad range of potential regulatory compliance costs. Utilities should also identify a distinct time-profile of high CO_2 compliance costs that results in a significantly different resource portfolio as the preferred portfolio. The utilities should fully develop the preferred portfolio for this high CO_2 cost scenario and compare its performance to that of the portfolio that is preferred given the range of potential cost adders. Finally, the utilities should indicate their judgment of the likelihood that this high CO_2 cost scenario will become legally binding.

Dated at Salem, Oregon this 26th day of July, 2007

Maury Galbraith

Maury Galbraith
Electric and Natural Gas Division

CERTIFICATE OF SERVICE

UM 1302

I certify that I have this day served the foregoing document upon all parties of record in this proceeding by delivering a copy in person or by mailing a copy properly addressed with first class postage prepaid, or by electronic mail pursuant to OAR 860-13-0070, to the following parties or attorneys of parties.

Dated at Salem, Oregon, this 26th day of July, 2007.

Kay Barnes

Kay Barnes
Public Utility Commission
Regulatory Operations
550 Capitol St NE Ste 215
Salem, Oregon 97301-2551
Telephone: (503) 378-5763

UM 1302
Service List (Parties)

CABLE HUSTON BENEDICT HAAGENSEN & LLOYD LLP	
EDWARD A FINKLEA	1001 SW 5TH - STE 2000 PORTLAND OR 97204 efinklea@chbh.com
CHAD M STOKES	1001 SW 5TH - STE 2000 PORTLAND OR 97204 cstokes@chbh.com
CASCADE NATURAL GAS	
JON T STOLTZ SR VICE PRESIDENT--REGULATORY & GAS	PO BOX 24464 SEATTLE WA 98124 jstoltz@cngc.com
CITIZENS' UTILITY BOARD OF OREGON	
LOWREY R BROWN UTILITY ANALYST	610 SW BROADWAY - STE 308 PORTLAND OR 97205 lowrey@oregoncub.org
JASON EISDORFER ENERGY PROGRAM DIRECTOR	610 SW BROADWAY STE 308 PORTLAND OR 97205 jason@oregoncub.org
ROBERT JENKS	610 SW BROADWAY STE 308 PORTLAND OR 97205 bob@oregoncub.org
DAVISON VAN CLEVE	
IRION A SANGER ASSOCIATE ATTORNEY	333 SW TAYLOR - STE 400 PORTLAND OR 97204 ias@dvclaw.com
DAVISON VAN CLEVE PC	
MELINDA J DAVISON	333 SW TAYLOR - STE 400 PORTLAND OR 97204 mail@dvclaw.com
DEPARTMENT OF JUSTICE	
STEPHANIE S ANDRUS ASSISTANT ATTORNEY GENERAL	REGULATED UTILITY & BUSINESS SECTION 1162 COURT ST NE SALEM OR 97301-4096 stephanie.andrus@state.or.us
DAVID HATTON ASSISTANT ATTORNEY GENERAL	REGULATED UTILITY & BUSINESS SECTION 1162 COURT ST NE SALEM OR 97301-4096 david.hatton@state.or.us
JANET L PREWITT ASST AG	1162 COURT ST NE SALEM OR 97301-4096 janet.prewitt@doj.state.or.us
ECUMENICAL MINISTRIES OF OREGON	
JAMES EDELSON	415 NE MIRIMAR PL PORTLAND OR 97232 edelson8@comcast.net

EMO ENVIRONMENTAL MINISTRIES DIRECTOR JENNY HOLMES	 inec@emoregon.org
ESLER STEPHENS & BUCKLEY JOHN W STEPHENS	 888 SW FIFTH AVE STE 700 PORTLAND OR 97204-2021 stephens@eslerstephens.com
IDAHO POWER COMPANY RIC GALE VP - REGULATORY AFFAIRS	 PO BOX 70 BOISE ID 83707 rgale@idahopower.com
BARTON L KLINE SENIOR ATTORNEY	PO BOX 70 BOISE ID 83707-0070 bkline@idahopower.com
MONICA B MOEN ATTORNEY	PO BOX 70 BOISE ID 83703 mmoen@idahopower.com
LISA D NORDSTROM ATTORNEY	PO BOX 70 BOISE ID 83703 lnordstrom@idahopower.com
MICHAEL YOUNGBLOOD SENIOR PRICING ANALYST	PO BOX 70 BOISE ID 83707 myoungblood@idahopower.com
MCDOWELL & RACKNER PC KIMBERLY PERRY	 520 SW SIXTH AVENUE, SUITE 830 PORTLAND OR 97204 kim@mcd-law.com
LISA F RACKNER ATTORNEY	520 SW SIXTH AVENUE STE 830 PORTLAND OR 97204 lisa@mcd-law.com
NORTHWEST ENERGY COALITION STEVEN WEISS SR POLICY ASSOCIATE	 4422 OREGON TRAIL CT NE SALEM OR 97305 steve@nwenergy.org
NORTHWEST INDUSTRIAL GAS USERS PAULA E PYRON EXECUTIVE DIRECTOR	 4113 WOLF BERRY CT LAKE OSWEGO OR 97035-1827 ppyron@nwigu.org
NORTHWEST NATURAL ELISA M LARSON ASSOCIATE COUNSEL	 220 NW 2ND AVE PORTLAND OR 97209 eml@nwnatural.com
INARA K SCOTT REGULATORY AFFAIRS MANAGER	220 NW 2ND AVE PORTLAND OR 97209 inara.scott@nwnatural.com

OREGON DEPARTMENT OF ENERGY	
PHILIP H CARVER SENIOR POLICY ANALYST	625 MARION ST NE STE 1 SALEM OR 97301-3742 philip.h.carver@state.or.us
OREGON PUBLIC UTILITY COMMISSION	
MAURY GALBRAITH NAT GAS/R & P	PO BOX 2148 SALEM OR 97308-2148 maury.galbraith@state.or.us
PACIFIC POWER & LIGHT	
MICHELLE R MISHOE LEGAL COUNSEL	825 NE MULTNOMAH STE 1800 PORTLAND OR 97232 michelle.mishoe@pacificorp.com
PAUL M WRIGLEY MANAGER - REGULATION	825 NE MULTNOMAH ST, STE 2000 PORTLAND OR 97232 paul.wrigley@pacificorp.com
PACIFICORP	
OREGON DOCKETS	825 NE MULTNOMAH ST STE 2000 PORTLAND OR 97232 oregondockets@pacificorp.com
KYLE L DAVIS	825 NE MULTNOMAH PORTLAND OR 97232 kyle.l.davis@pacificorp.com
GREG N DUVALL	825 NE MULTNOMAH - STE 600 PORTLAND OR 97232 greg.duvall@pacificorp.com
NATALIE HOCKEN	825 NE MULTNOMAH SUITE 2000 PORTLAND OR 97232 natalie.hocken@pacificorp.com
PERKINS COIE LLP	
JAMES M VAN NOSTRAND	1120 NW COUCH STREET, 10TH FLOOR PORTLAND OR 97209-4128 jvannostrand@perkinscoie.com
PORTLAND GENERAL ELECTRIC	
RATES & REGULATORY AFFAIRS	RATES & REGULATORY AFFAIRS 121 SW SALMON ST 1WTC0702 PORTLAND OR 97204 pge.opuc.filings@pgn.com
PORTLAND GENERAL ELECTRIC COMPANY	
J RICHARD GEORGE	121 SW SALMON ST 1WTC1301 PORTLAND OR 97204 richard.george@pgn.com
RENEWABLE NORTHWEST PROJECT	
ANN ENGLISH GRAVATT	917 SW OAK - STE 303 PORTLAND OR 97205 ann@rnp.org
JESSE JENKINS	917 SW OAK ST STE 303 PORTLAND OR 97205 jesse@rnp.org