SCHLISSEL
TECHNICAL CONSULTING

Comments in Reply to PGE August 10, 2010 Reply Comments Public Utility Commission of Oregon Docket No. LC 48

David A. Schlissel

Thomas Sanzillo, TR Rose Associates

David White, Synapse Energy Economics

September 1, 2010

PUBLIC
PROTECTED MATERIALS REDACTED

45 Horace Road, Belmont MA 02478
david@schlissel-technical.com
(office) 617-489-4840
(cell) 617-947-9507

PUBLIC – PROTECTED MATERIALS REDACTED

Summary of Reply Findings

Finding R1. We have not had an opportunity to review all of the workpapers for the new analyses presented in PGE's Reply Comments.

Finding R2. Despite the flaws and biases identified in Schlissel Technical Consulting's May 19, 2010 *Comments on PGE 2009 Integrated Resource Plan*, (hereinafter the "STC May Comments") and these Reply Comments, the results of PGE's new analyses show that investing $510 million in a scrubber and other environment control equipment for the Boardman plan is not part of a lowest cost, low risk resource plan. In fact, the results of PGE's new analyses show that retirement of Boardman in 2015, 2018 or 2020 would be lower cost options than operating the plant through 2040.

Finding R3. PGE continues to use unreasonably high natural gas prices in its new IRP modeling analyses (both deterministic and stochastic) that bias the analyses in favor of the continued operation of the Boardman plant and against natural gas-fired alternatives.

Finding R4. PGE Continues to overstate its Need for the Capacity and Energy from the Boardman Plant.

Finding R5. Industry experience shows that the actual construction of a new combined cycle gas-fired unit can be completed in two to two-and-a-half years.

Finding R6. PGE's dismissal of a mid-term PPA for some or all of the replacement power if Boardman were retired in 2015 is not persuasive.

Finding R7. The Boardman plant would not be a baseload unit in any of the scenarios with future CO_2 prices even if $510 million were invested in environmental upgrades.

Finding R8 PGE continues to fail to consider the potential for higher coal prices in any of its future scenarios.

Finding R9. PGE must start to aggressively plan to achieve actual reductions in its overall CO_2 emissions not merely the emissions from its individually-owned or jointly-owned generating facilities.

Finding R10. PGE's new IRP analyses do not show that retirement of the Boardman plant in 2015, 2018 or 2020 would adversely affect the reliability of the electric grid in Oregon more than continuing to operate the plant through 2040.

PUBLIC – PROTECTED MATERIALS REDACTED

Finding R11. PGE still fails to demonstrate in its Reply Comments that the HHI differences it shows between portfolios are in any way significant.

Reply Findings

Finding R1. We have not had an opportunity to review all of the workpapers for the new analyses presented in PGE's Reply Comments.

On August 17, 2010, PEAC submitted eight discovery questions to PGE that, among other requests asked for

1. Copies of any workpapers and source documents for PGE's Reply Comments including, but not limited to, all of the figures in those Reply Comments;

2. The output files for the new portfolio analyses described and presented in PGE's Reply Comments; and

3. The notes, minutes, letters and memoranda related to PGE's investigation of the potential for a PPA from uncommitted power plants in the Pacific Northwest.

Although PGE has provided some of the information that PEAC requested in its August 17th discovery, it has not provided any responses to the three specific requests listed above.[1]

Finding R2. Despite the flaws and biases identified in Schlissel Technical Consulting's May 19, 2010 *Comments on PGE 2009 Integrated Resource Plan,* (hereinafter the "STC May Comments") and these Reply Comments, the results of PGE's new analyses show that investing $510 million in a scrubber and other environment control equipment for the Boardman plan is not part of a lowest cost, low risk resource plan. In fact, the results of PGE's new analyses show that retirement of Boardman in 2015, 2018 or 2020 would be lower cost options than operating the plant through 2040.

The STC May Comments identified two significant flaws in PGE's IRP analyses that biased the results in favor of the continued operation of the Boardman plant and against the early retirement scenarios that featured increased reliance on natural gas-fired generation.[2] Despite these flaws, however, Figures 12 and 13 in the STC May Comments showed that in PGE's own IRP modeling analyses retirement of the Boardman plant at

[1] We actually received some additional responses from PGE late on August 31st, as we were completing these Reply Comments. For this reason, we reserve the right to supplement these Reply Comments, as necessary.

[2] See pages 4 through 21 of the STC May Comments.

any time during the period 2014 through 2017 was a lower cost option than operating the plant through 2040.

The results of PGE's new modeling analyses of the DEQ Options and its BART III Proposal confirm this conclusion. Figure R1, below, shows that even assuming PGE's reference case natural gas prices, DEQ Options 2 and 3 (which feature retirement of Boardman in 2018 and 2015) are lower cost alternatives than continuing to operate the plant through 2040. Retiring Boardman at the end of 2020, as in PGE's BART III Proposal, also would be a lower cost option that operating the plant through 2040.

Figure R1: NPVRR of Early Retirement and Boardman through 2040 Portfolios with PGE Reference Case Gas Prices

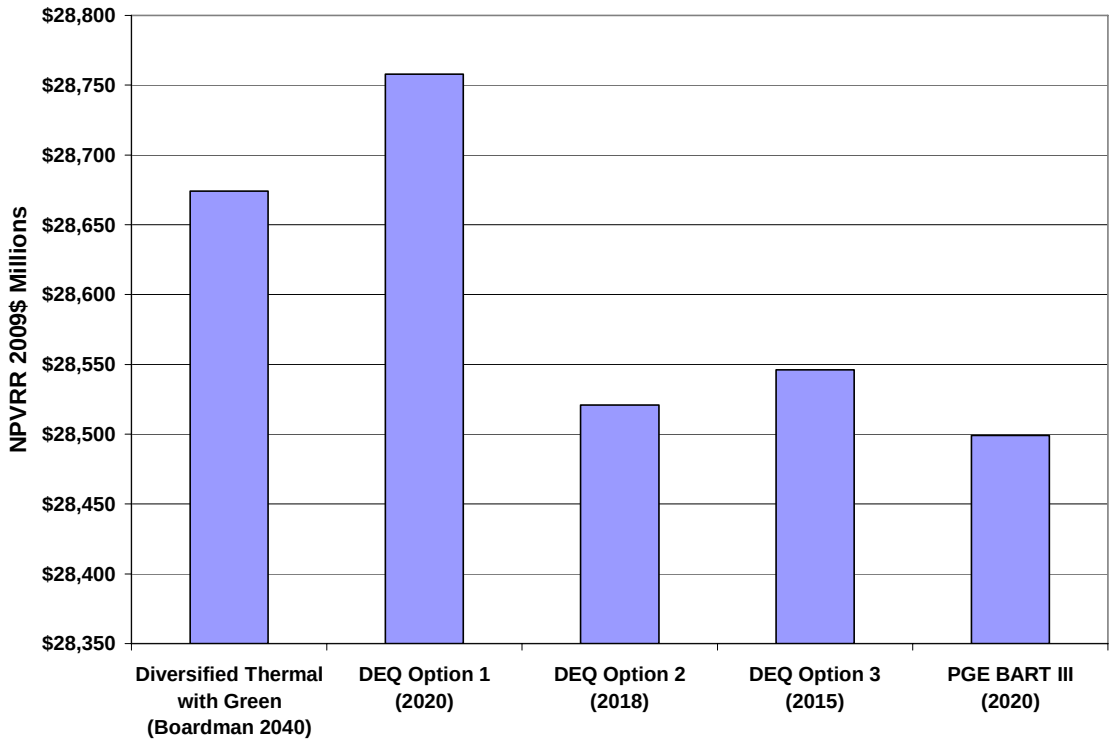
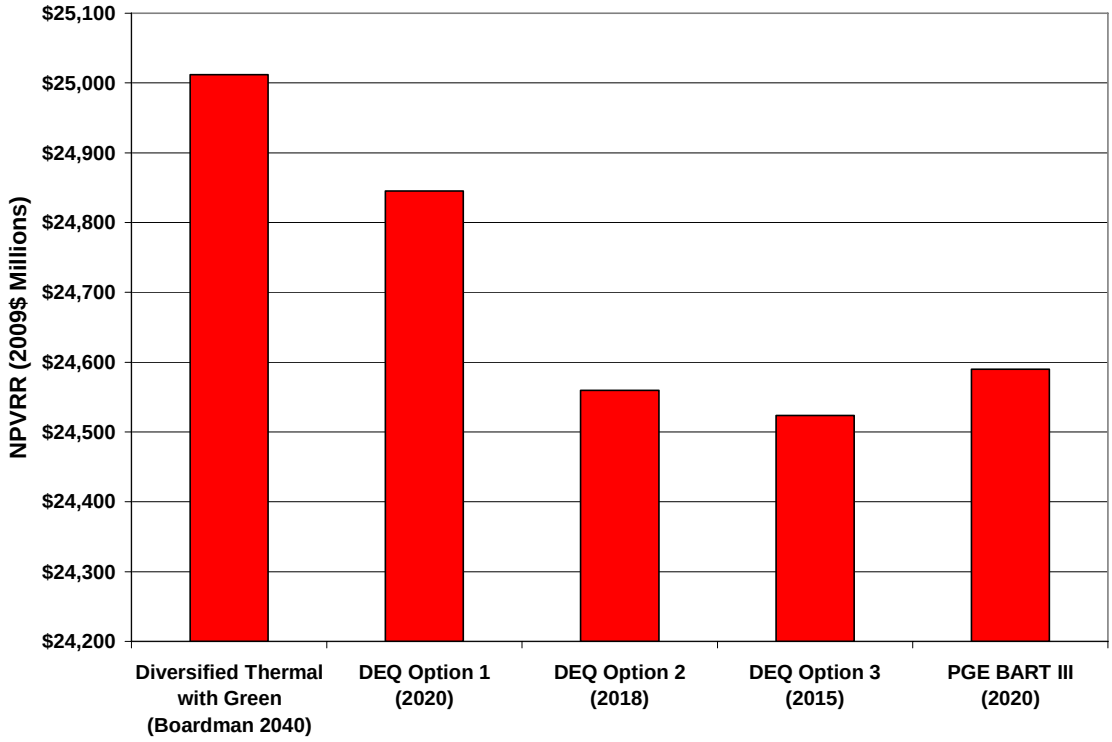


Figure R2, below, then presents the same comparison but reflects PGE's low IRP gas prices. These low gas prices are more comparable to the base or reference gas price forecasted by the NWPCC, the Oregon PUC Staff and others than PGE's reference of high gas prices.

PUBLIC – PROTECTED MATERIALS REDACTED

Figure R2: NPVRR of Early Retirement and Boardman through 2040 Portfolios with PGE Low Case Gas Prices



Consequently, the results of PGE's own modeling analyses show that retirement of the Boardman plant in 2015 or 2018 would be a lower cost option even with the biased assumptions discussed in the STC May Comments and in these Reply Comments. Indeed, when less biased, and more reasonable, natural gas prices are used, continuing to operate the Boardman plant through 2040 (that is, the Diversified Thermal with Green portfolio) is seen to be significantly more expensive than the early retirement options.

As will be explained below, we believe that PGE's Low IRP gas prices are more reasonable for use in the reference or base case than PGE's Reference Case IRP gas prices. In fact, on a levelized basis, PGE's Low IRP gas prices are only seven percent lower than PIRA's current 2010 base or reference case gas prices and only about nine percent lower than the OPUC Staff gas price forecasts.

Figures R3a, R3b, and R3c, below, show the NPVRR differences between the Company's Diversified Thermal with Green portfolio (Boardman through 2040) and the new DEQ Option 2 (2018), DEQ Option 3 (2015) and BART III (2020) early retirement portfolios. As can be seen, in each figure, operating Boardman through 2040 is the more expensive option in at least 16 of 21 scenarios modeled by PGE. An upward facing bar in these Figures means that operating Boardman through 2040 would be the more expensive alternative.

PUBLIC – PROTECTED MATERIALS REDACTED

Figure R3a: NPVRR Difference between PGE Diversified Thermal with Green (2040) and DEQ Option 2 (2018) Portfolio (2009$ Millions)

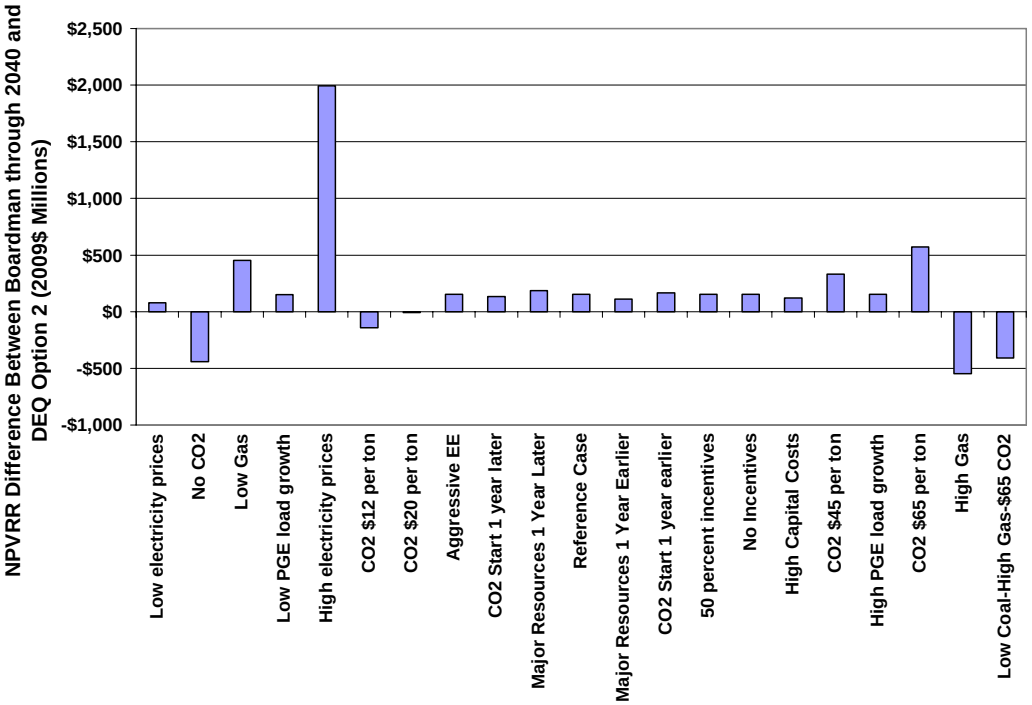
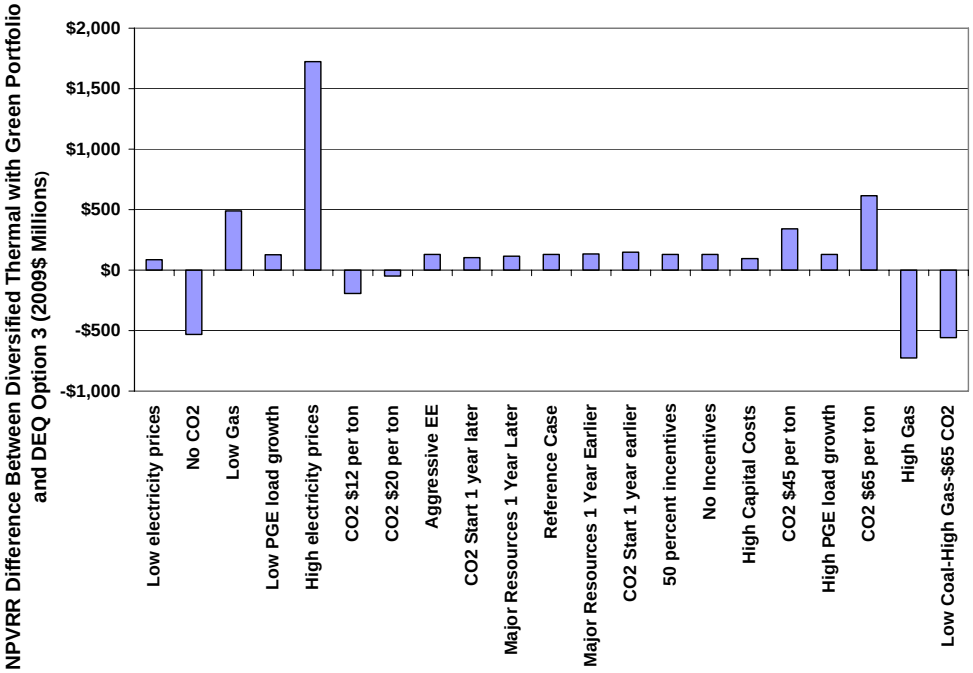
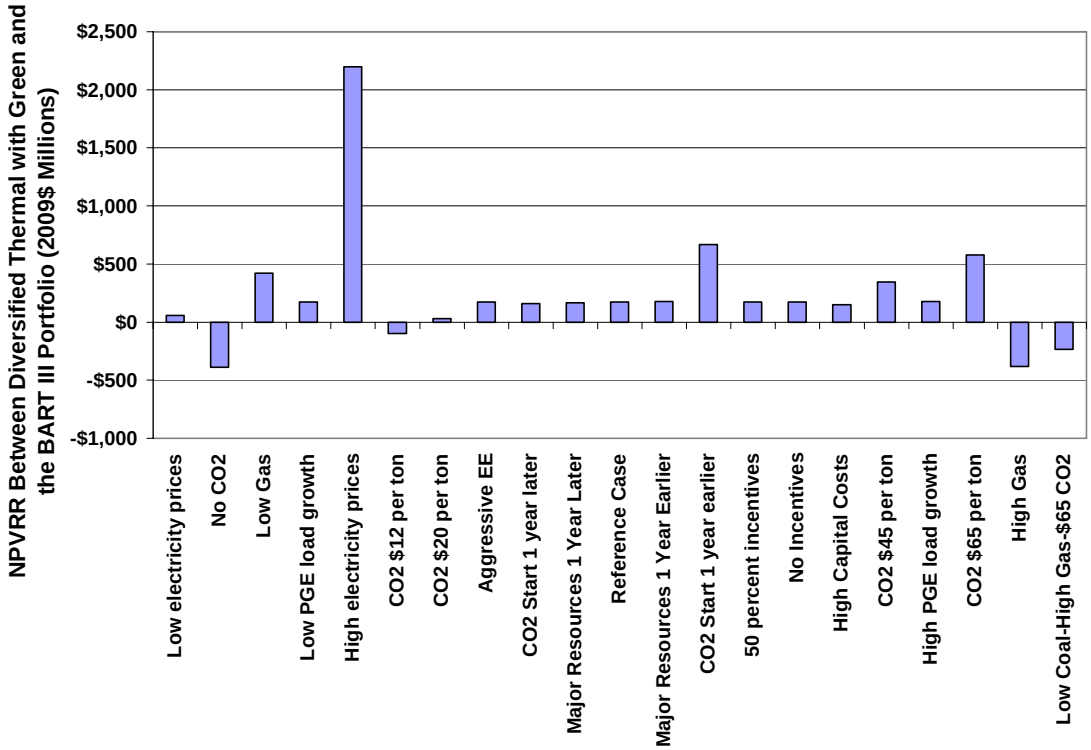


Figure R3b: NPVRR Difference between PGE Diversified Thermal with Green (2040) and DEQ Option 3 (2015) Portfolio (2009$ Millions)



PUBLIC – PROTECTED MATERIALS REDACTED

Figure R3c: NPVRR Difference between PGE Diversified Thermal with Green (2040) and PGE BART III (2020) Portfolio (2009$ Millions)



It is important to recognize that the few scenarios in which operating Boardman through 2040 is the lower cost option include the two scenarios with completely unrealistic high gas prices and the three scenarios with no CO_2 prices or low CO_2 prices. Consequently, in order to accept that operating Boardman through 2040 is a lower cost option than retiring the plant in 2015, 2018 or even 2020, it is necessary to accept either that gas prices will be dramatically higher than anyone (including PGE and PIRA) now projects and/or that there will be no federal regulation of greenhouse gases at any time between 2010 and 2040 or that federal regulation will lead only to low CO_2 prices.

It also is important to emphasize that these results rely on the unreasonable natural gas prices and the stale load forecasts that PGE used in its IRP modeling analyses. If more reasonable gas prices and more current load forecasts were used, the results of the analyses would show more substantial benefits to each of the early retirement portfolios as compared to continued operation of Boardman through 2040.

PUBLIC – PROTECTED MATERIALS REDACTED

Finding R3. PGE continues to use unreasonably high natural gas prices in its new IRP modeling analyses (both deterministic and stochastic) that bias the analyses in favor of the continued operation of the Boardman plant and against natural gas-fired alternatives.

A. All of the economic comparisons in PGE's Reply Comments use the same natural gas prices as PGE's 2009 IRP analyses and, therefore, are biased in favor of continued operation of the Boardman plant.

PGE has said that all of the economic comparisons and analyses in its Reply Comments (that is, the economic comparisons between PGE's BART III proposal and the DEQ Options, the Efficient Frontier Chart presented on page 11) assumed the same reference, high and low natural gas prices as were used in the Company's 2009 IRP analyses. Moreover, each of the four new portfolios examined by PGE in its Reply Comments assumes that Boardman would be replaced by natural gas-fired generation. Consequently, as we explained in our opening comments, the results of these analyses are biased in favor of longer operation of the Boardman coal plant (the Diversified Thermal with Green portfolio that includes Boardman through 2040 and the Company's BART III portfolio that includes Boardman through the end of 2020) and against the early retirement scenarios (such as DEQ Options 2 and 3) that have larger amounts of natural gas generation.[3]

B. PGE misrepresents the information that the Sierra Club provided regarding the figures and tables in the STC May Comments.

At page 32, PGE suggests that the only information provided by the Sierra Club regarding its comments on gas price forecasts was simply a reference back to Figures 1 through 5 in the STC May Comments:

> For example, in looking at the year-to-year shape in Sierra Comments, Exhibit 1, Figure 2, we find that it does not resemble the shape reported in IRP Figure 5-1 on page 77, even when converted to 2009$. This also does not represent the shape provided by PIRA for Henry Hub. PGE submitted a data request to Sierra requesting its gas price forecasts in an attempt to reconcile this discrepancy. *See*, PGE Data Request 21, dated May 17, 2010, attached hereto as Attachment 6. However, in answering that data request, Sierra simply referred back to Figures 1 through 5 above but did not provide the annual gas price forecasts.

As can be seen from Attachment 6 to PGE's Reply Comments, PGE Data Request 21 requested any gas price forecasts prepared since June 1, 2009 by or for or relied upon by any of the intervenors. Our response to that Data Request correctly

[3] STC May Comments, at pages 7 and 8.

and appropriately referred PGE back to the April 2010 Company, OPUC Staff, NWPCC and EIA gas price forecasts on which Schlissel Technical Consulting and Sierra Club relied in this proceeding. Neither Schlissel Technical Consulting nor Sierra Club prepared their own gas price forecasts. Instead, their analyses rely on the gas price forecasts listed above. Therefore, there was no other information to provide to PGE.

However, PGE fails to report that in its response to PGE Data Request 23, Sierra Club provided ***all*** of the workpapers for the figures and tables in the STC May Comments.[4] Therefore, the Company had all of the information it needed to investigate whether, in fact, there were errors or mistakes in any of Schlissel Technical Consulting's analyses. Instead of examining these workpapers, PGE misleadingly relies on innuendo to discredit the conclusions in the STC May Comments by claiming that its figures "appear to be defective" and "do not appear to represent the prices included in our IRP," etc.

C. PGE used unreasonably high natural gas prices in its IRP modeling analyses (both deterministic and stochastic)

Figures R4 Confidential and R5, below, compare the gas prices that PGE uses in its new DEQ Option and BART III portfolio analyses with the same gas price forecasts that were presented in Figures 1 through 5 of the STC May Comments. The gas prices in these new Figures are presented on precisely the same basis as the gas prices are discussed in the April 2010 IRP Addendum, that is, for the years 2010 through 2025.[5] For example, the gas prices in Figures R4 Confidential and R5 represent the same average of the Sumas and AECO Hub prices as PGE presented in Figure 5-1 of its 2009 IRP. The PIRA 2010, Oregon PUC staff, NWPCC and AEO 2010 gas price forecasts also are for the northwest.

[4] A copy of this response and the transmittal letter in which it was sent to PGE are included as Attachment 1 to these Comments.

[5] The gas price comparisons in Figures 1 through 5 of the Schlissel Technical Consulting Comments were based on the years 2010 through 2030. Perhaps the use of gas prices for this longer period confused PGE in its review of those Figures.

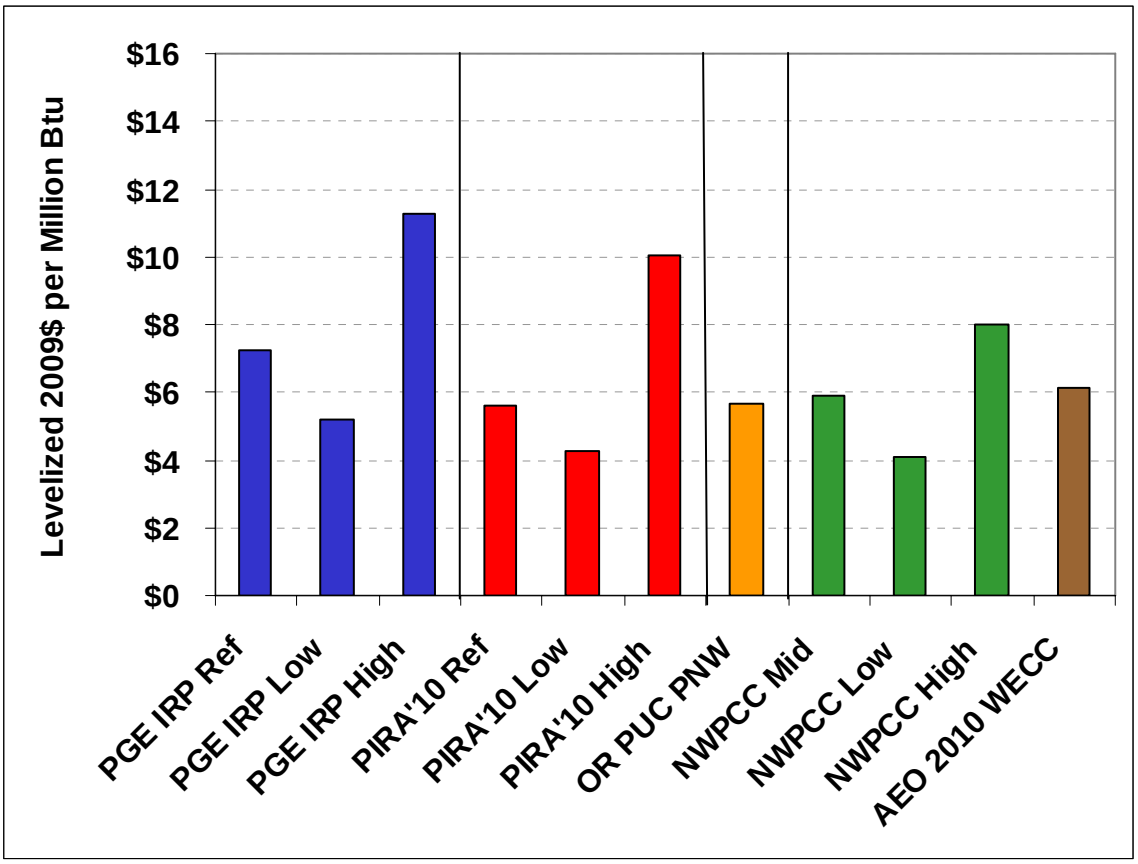
PUBLIC – PROTECTED MATERIALS REDACTED

Figure R4: Annual Natural Gas Prices for the Years 2010 through 2025 Used in PGE Reference Case IRP Modeling vs. NWPCC, Oregon PUC Staff and NYMEX Futures [Confidential]

FIGURE REDACTED

PUBLIC – PROTECTED MATERIALS REDACTED

Figure R5. Natural Gas Prices for the Years 2010 through 2025 Used in PGE IRP Modeling Analyses vs. NWPCC, Oregon PUC Staff, AEO 2010 and NYMEX Futures (Levelized in 2009$)



These Figures show that:

- The reference case natural gas prices that PGE used in its new IRP modeling analyses are significantly higher than the recent reference case gas prices forecasted by the Oregon PUC Staff, the NWPCC and the EIA's AEO 2010.
- The reference case natural gas prices that PGE used in its new IRP modeling analyses are significantly higher than PIRA's 2010 projected reference case gas prices.
- The reference case natural gas prices that PGE used in its new IRP modeling analyses are significantly higher than NYMEX futures prices.
- The year-to-year gas price shape in Figure R4 Confidential appears to be the same as that reported in IRP Figure 5-1 on page 77 of PGE IRP. The levelized costs for the PGE IRP gas prices presented in Figure R5 are precisely the same as PGE reported in its November 2009 IRP.

PUBLIC – PROTECTED MATERIALS REDACTED

- The high gas prices that PGE used in its new IRP risk assessments are significantly higher than the NWPCC high gas prices and higher than the PIRA 2010 high gas prices, as well.

Contrary to what PGE suggests in its Reply Comments, neither Schlissel Technical Consulting nor the Sierra Club relies only on the gas prices forecasted by the U.S. EIA. Instead, as can clearly be seen from Figures 1 through 5 in the STC May Comments and Figures R4 and R5 above, we rely, and we believe that the Company and the Commission should rely on a range of projected gas prices from the NWPCC, the Commission Staff, and the EIA, as well as more recent PIRA forecasts and current NYMEX futures prices. All of these are significantly lower than the gas prices used by PGE in its IRP analyses.

For example, Figure R6 Confidential and R7 Confidential compare the reference case and high year-by-year gas prices used by PGE in its IRP analyses with PIRA's 2010 mid and high year-by-year gas price forecasts.

Figure R6: Reference Case Annual Natural Gas Prices for the Years 2010 through 2025 Used in PGE Reference Case IRP Modeling vs. 2010 PIRA Forecast [Confidential]

FIGURE REDACTED

PUBLIC – PROTECTED MATERIALS REDACTED

Figure R7: High Annual Natural Gas Prices for the Years 2010 through 2025 Used in PGE Reference Case IRP Modeling vs. NWPCC High and 2010 PIRA High Forecasts [Confidential]

FIGURE REDACTED

Thus, the current PIRA 2010 gas prices are significantly lower than the gas prices that PGE continues to use in its IRP analyses. In fact, on a levelized basis, the PIRA 2010 reference case gas prices are 22 percent lower than the reference gas prices that PGE continues to use in its IRP analyses. The PIRA 2010 high gas prices are 11 percent lower, on a levelized basis, than the high gas prices that PGE continues to use in its IRP analyses.

It is critical that planning analyses and decisions be based on current, not stale information. The approximate four month period between the issuance of PIRA's new 2010 gas prices in April 2010 and the August 10, 2010 filing of PGE's Reply Comments with its new modeling analyses of DEQ Options 1 through 3 certainly gave the Company more than adequate time to update its modeling analyses to reflect the new gas prices and other appropriate changed assumptions (such as its new, and lower energy and peak demand forecasts). However, PGE refused to update its modeling analyses to reflect even its own new gas prices. For this reason alone, those modeling analyses should not be accepted by the Commission.

PUBLIC – PROTECTED MATERIALS REDACTED

PGE warns the Commission about being cautious about allowing the current optimism in gas projections to unduly influence the approach to resource decision-making.[6] The Sierra Club is not asking the Commission to abandon a cautious approach to resource planning. It is merely asking the Commission to reflect current information about gas supplies and prices and to require PGE to use natural gas prices in is IRP analyses that are consistent with the Company's *current* forecasts and with the forecasts of such independent and objective parties as NWPCC and the Commission Staff. Indeed, it is clear that continuing to rely on the Boardman plant through 2040 would not be the *cautious* resource planning decision, in the light of likely federal regulation of greenhouse gas emissions and other coming federal air emission requirements.

D. It is appropriate, where possible, to examine a range of projected natural gas prices.

PGE cites at pages 31 and 32 of its Reply Comments a number of points regarding the potential uncertainty of current gas prices. We agree that there is uncertainty regarding what gas prices will actually be in the next few years, let alone what gas prices will be in 2020, 2030 or 2040. For this reason, we believe that, where possible, a range of projected natural gas prices should be considered in resource planning.

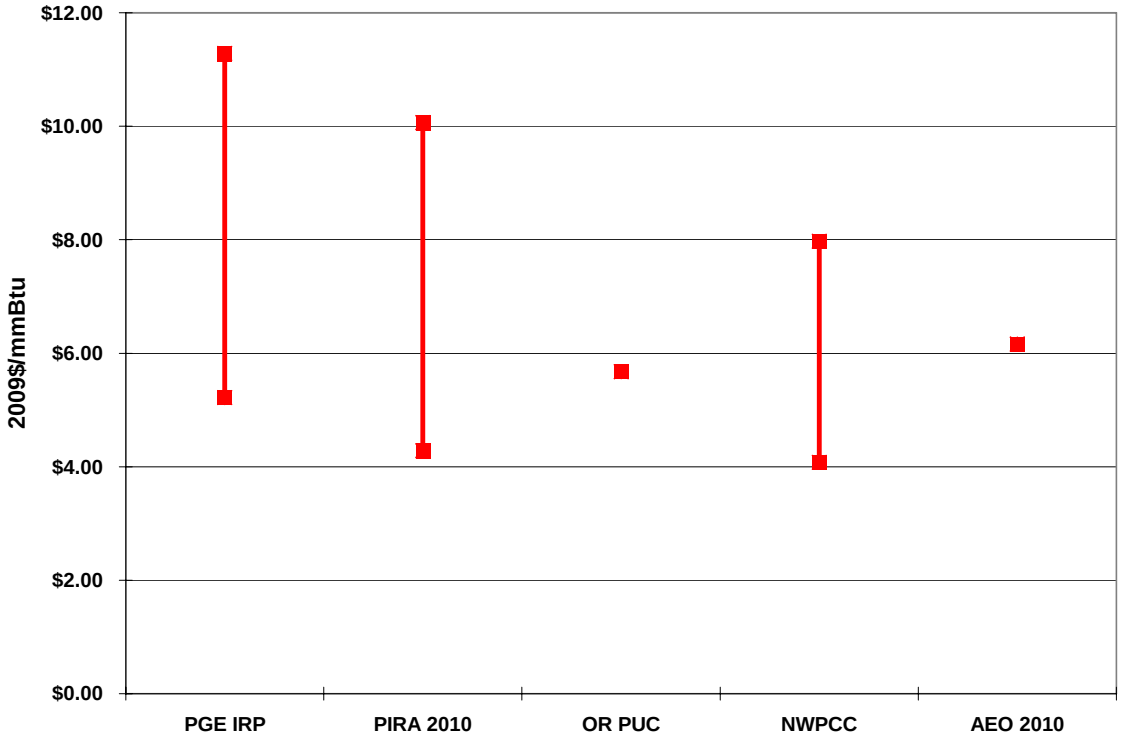
The problem is that the both the reference case forecast and the range of natural gas prices that PGE continues to use in its IRP modeling analyses are far too high. For example, on a levelized basis, the PGE IRP high gas price forecast is 56 percent higher than the PGE reference case forecast where the NWPCC high gas price forecast is only 32 percent higher than the NWPCC mid forecast.

Figure R8, below, compares, on a levelized basis, the range of gas prices that PGE uses in its IRP analyses with the current NWPCC and PIRA 2010 gas prices. As can be seen, the range of gas prices that PGE uses in its IRP analyses is significantly higher than the PIRA 2010 and NWPCC gas price ranges. Figure R8 also shows that the Oregon PUC Staff gas price forecast is only slightly above the low end of the range of gas prices that PGE continues to use in its new IRP analyses.

[6] PGE Reply Comments, at page 32.

PUBLIC – PROTECTED MATERIALS REDACTED

Figure R8: PGE IRP vs. PIRA and NWPCC Gas Price Forecasts



E. PGE cites but then ignores the fundamental shift in the natural gas markets.

PGE cites in its IRP a number of drivers behind what it acknowledges are recent decreases in natural gas prices:

- Abundant non-conventional gas exerting downward pressure on prices.
- North America not requiring additional LNG imports to meet demand growth.
- The downturn in U.S. economy causing concern about the potential for an extended period of weak economic growth that in turn impacts industrial and power generation growth.[7]

However, PGE then completely ignores the recent decreases in current and projected gas prices and, instead, continues to use the same, extremely high natural gas prices in its new IRP analyses.

We are not proposing, as PGE suggests, that the long-term planning decisions be based on a gas forecast of "cheap and abundant forever." [8]However, it is also imprudent to

[7] IRP, at page 77.

[8] PGE Reply Comments, at page 29.

ignore what has been called a 'structural change' in the natural gas markets caused by the identification of very significant non-conventional gas reserves in the U.S.

For example, a recent study on *The Future of Natural Gas* by the Massachusetts Institute of Technology noted the following:

- Globally, there are abundant supplies of natural gas, much of which can be developed at relatively low cost.
- Unconventional gas, and particularly shale gas, will make an important contribution to future U.S. energy supply and carbon dioxide (CO_2) emission reduction efforts. Assessments of the recoverable volumes of shale gas in the U.S. have increased dramatically over the last five years…. Of the mean projection, approximately 400 Tcf could be developed with a gas price at or below $6/MMBtu at the well-head.[9]

The MIT Study also noted that the environmental impacts of shale gas development are *manageable but challenging*:

> The largest challenges lie in the area of water management, particularly the effective disposal of fracture fluids. Concerns with this issue are particularly acute in those regions that have not previously experienced large-scale oil and gas development. It is essential that both large and small companies follow industry best practices, that water supply and disposal are coordinated on a regional basis, and that improved methods are developed for recycling of returned facture fluids.[10]

F. PGE misrepresents the deviation of EIA forecast gas prices versus subsequent actual prices.

Based on what it said is "an informal PGE review," the Company only discusses instances in which the EIA has under-forecast natural gas prices. The actual history is more complicated and there are also numerous years in which EIA over-forecast gas prices. In fact, given the current prospective for shale gas and current future market indications recent EIA forecasts are likely to have been too high.[11]

G. The Rate Impact comparisons presented in PGE's Reply Comments also are distorted in favor of continued operation by using the same unreasonably high gas prices.

PGE has presented a number of rate impact comparisons on pages 13 and 14 of its Reply Comments and in Slides 22 and 23 of its August 23, 2010 presentation to the

---

9 *The Future of Natural Gas, An Interdisciplinary MIT Study*, June 2010, at page xii.

10 Id.

11 See http://www.eia.doe.gov/oiaf/analysispaper/retrospective/retrospective_review.html.

Commission. These comparisons have no probative value and should be ignored because they are based on the same very high natural gas prices that PGE has used in its new IRP modeling analyses. For this reason, they overstate the rate impacts that would result from the three DEQ Options and from PGE's BART III proposal.

H. There are reasonable alternatives to over-reliance on natural gas other than continued operation of the Boardman plant through 2040.

PGE warns against what it suggests would be an over-reliance on natural gas.[12] However, the only options available to PGE, and the Commission, are not continued operation of the Boardman plant for another 30 years or construction of a MW-for-MW replacement natural gas power plant. Energy efficiency and renewable resources also can be effective both in replacing capacity and energy from Boardman and in reducing PGE's reliance on natural gas. Even if adding some MW of new gas-fired combined cycle capacity were necessary, *in the short term*, to replace Boardman, additional energy efficiency and renewable efforts can be expected to displace generation from such a new gas-fired plant *in the longer term*. In this way, natural gas should be thought of as a bridge to a lower carbon future.

Finding R4. PGE Continues to overstate its Need for the Capacity and Energy from the Boardman Plant.

Slides 4 and 5 in PGE's August 23, 2010 presentation to the Commission purport to show the Company's energy and capacity Loads-Resources Balances for the years 2010-2020. However, as PGE acknowledged in response to a question from one of the Commissioners, these figures ignore the numerous actions that PGE is proposing to take to add gas-fired and renewable resources. Therefore, they overstate the Company's need for capacity and energy including that from the Boardman plant.

Figures 4 and 5 also do not reflect the new load forecasts that PGE adopted back in December 2009. As explained in STC May Comments, these new load forecasts represent significant reductions in the Company's load forecasts.[13] Unfortunately, PGE ignores them in both its new IRP analyses and in Figures 4 and 5 of is August 23rd presentation to the Commission.

PGE also claims that the reductions between the March 2009 load forecasts it used in its IRP analyses and its newer December 2009 forecasts are not material to the Action Plan. This is simply not credible. As we have noted, the Company's December 2009 peak load forecast is 3.6 percent lower in 2015 than its March 2009 forecast, a reduction that increases to 4.6 percent lower by 2030. Similarly, the Company's December 2009 energy forecast is 5.8 percent below its March 2009 forecast in 2015, a reduction that increases to 6.5 percent below in 2030.

---

12 PGE Reply Comments, at page 32.

13 STC May Comments, at pages 18 through 21.

PUBLIC – PROTECTED MATERIALS REDACTED

Table R1, below, shows the annual differences between the Company's March and December 2009 peak load and energy forecasts that were presented in Figures 8.a. and Figure 8.b. on pages 20 and 21 of the STC May Comments. Clearly, these significant reductions are material both to PGE's proposed Action Plan and to the Company's need for the capacity and energy from the Boardman plant.

Table R1: Reductions in PGE Load Forecasts between March and December 2009

	Reduction in Peak Load Forecast Between PGE March and December 2009 Forecasts (MW)	Reduction in Energy Forecast Between PGE March and December 2009 Forecasts (MWa)
2010	67	52
2011	93	80
2012	90	85
2013	102	107
2014	128	129
2015	157	152
2016	183	172
2017	204	189
2018	215	198
2019	218	201
2020	220	203
2021	222	205
2022	224	208
2023	227	210
2024	229	213
2025	232	215
2026	234	218
2027	237	221
2028	239	223
2029	242	226
2030	245	229

PGE accuses intervenors of focusing unduly on the Company's low load growth during the period 1999 through 2008 and on regional load forecasts.[14] Both of these claims are unfair and inaccurate. We agree that it is wrong to focus *only* on the Company's historic load growth or regional forecasts. However, the Company's new load forecasts must be

[14] PGE Reply Comments, at pages 23 and 24.

shown to be consistent with both its recent history and with state and regional forecasts produced by independent and respected organizations like the NWPCC.[15]

PGE claims that its historic energy growth rates, presented in Attachment 5 to its Reply Comments, show that its projected 1.9 percent annual average growth rate is consistent with historic load growth.[16] However, this is clearly not true as the information in Attachment 5 shows that PGE has reached or exceeded 1.9 percent annual growth in energy requirements in only a single year since 2000. That's only one year out of the last eight.

Contrary to what PGE may claim, we are simply arguing that resource planning should be based on the Company's current load forecasts (assuming those forecasts are shown reasonable). We are not asking PGE to use its historic growth rates or to adopt in their entirely the NWPCC's forecasts. Relying on stale load forecasts that every party, including PGE, knows are no longer reasonable, will not produce a reasonable Action Plan.

Finding R5. **Industry experience shows that the actual construction of a new combined cycle gas-fired unit can be completed in two to two-and-a-half years.**

Suppliers of combined cycle technology like Siemens and General Electric are citing durations of approximately two to two-and-a-half years for the actual construction of a new CCCT. The actual construction experience of new CCCTs in the west supports these claims.

For example, publicly available information reports that construction of the 630 MW Hermiston Power Project in Oregon began in the 1st quarter of 2000 and the plant began operations in the summer of 2002 – a construction duration of approximately two-and-a-half years. Similarly, construction on the 280 MW Coyote Springs CCCT is reported to have started in early 2001, with the plant beginning operations in July 2003 – also a construction duration of two-and-a-half years. Construction is reported to have started at the 520 MW Chelhalis Generating Facility in Washington State in May 2001 with an in-service date of August 2003 – a construction duration of less than two-and-a-half years.

Given these actual construction times, it is not unreasonable to expect that a replacement combined cycle unit could be ready for operations by 2016 even if another three to three-and-a-half years were included for planning and licensing activities.

---

15 At page 25 of its Reply Comments, PGE repeats its discredited claim that its March 2009 forecasts are largely consistent with the NWPCC forecast for Oregon. This is only correct if by largely consistent, PGE means much higher than.

16 PGE Reply Comments, at page 26.

PUBLIC – PROTECTED MATERIALS REDACTED

Finding R6. PGE's dismissal of a mid-term PPA for some or all of the replacement power if Boardman were retired in 2015 is not persuasive.

PGE claims that the proposal that the Company rely on mid-term PPAs for some or all of the replacement power from Boardman suffers from several problems. However, upon closer review, the Company's claims are not persuasive.

First, PGE emphasizes the uncertainty surrounding the future availability and prices of power under a PPA.[17] But a major factor for this uncertainty is PGE's refusal to agree to pursue a request for indicative bids from potential suppliers. Had PGE asked merchant plant owners for such indicative bids the Company, and the Commission, would have much more information as to the availability and prices of replacement power under PPAs.

Second, without any evidence, PGE summarily dismisses the potential for entering into a PPA with another utility. Instead of simply dismissing, without offering any analysis or evidence, the potential for a PPA for power from one of the twelve combined cycle units in the northwest that are owned by other utilities, or one of the other three units whose power is subscribed to other utilities, PGE should be seriously exploring the alternative.

Third, PGE makes a number of assumptions about the potential to import power from four merchant-owned combined cycle units without offering any evidence that it has actually studied whether the power from these plants could be transmitted into its service territory. Instead, PGE merely makes such unsupported statements as "the remaining two plants …. *may be unable* to deliver power to PGE on a firm basis …."[18] [Emphasis added]

Contrary to what PGE claims, we are not assuming that its future baseload energy needs can be cost-effectively supplied from market PPAs for a near-term Boardman replacement. We have merely noted, correctly, that PGE has completed failed to evaluate the economics of such a mid-term PPA in its evaluation of replacing Boardman at some time in the years 2014 through 2018. PGE does not cure that deficiency in its new IRP analyses. It instead compounds it by dismissing the potential for a mid-term PPA without looking at the economic costs and benefits of such a PPA for some or all of the Boardman replacement power under DEQ Options 2 and 3.

However, and most significantly, the few workpapers that the Company has provided to PEAC reveal that PGE does include a four-year PPA for the years 2017 to 2020, in its analysis of the costs of DEQ Option 1 and its own BART II and BART III proposals. Thus, when it wants, PGE is quite capable of estimating the future availability and cost of power under future PPAs.

---

17 PGE Reply Comments, at pages 35 and 36.

18 PGE Reply Comments, at page 37.

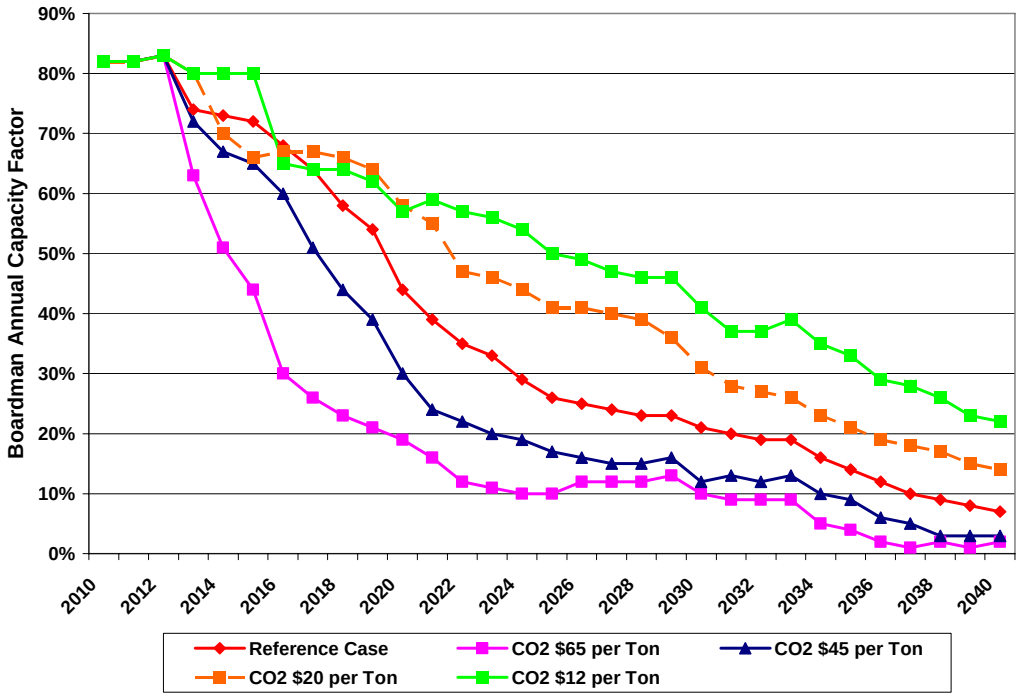
PUBLIC – PROTECTED MATERIALS REDACTED

Finding R7. **The Boardman plant would not be a baseload unit in any of the scenarios with future CO_2 prices even if $510 million were invested in environmental upgrades.**

PGE acknowledges Sierra Club's observation that in its reference case scenario, the Boardman plant will be operating at only a 44 percent capacity factor.[19] However, the Company further claims that if carbon compliance costs are less than anticipated, Boardman "will continue to provide valuable baseload generation, running at close to 60% in 2020 in both the $12 and $20 CO_2 cases." While this claim is technically accurate, it also is very misleading.

In fact, as shown in Figure R9, below, in the $20 CO_2 scenario, Boardman would be operating at only a 47 percent capacity factor as early as 2022, with its capacity factor declining from that point. In the $12 CO_2 scenario, the plant would operate at only a 50 percent capacity factor as early as 2025, declining from that point. The $0 CO_2 scenario is not shown in Figure R9 because we do not believe it is credible to argue that there will be no regulation of greenhouse gases at any time between 2010 and 2040.

Figure R9: **Boardman Capacity Factors 2010-2040 in Diversified Thermal with Green Portfolio – all CO_2 Price Scenarios**



The best argument that PGE can offer is that while running less, Boardman would "continue to provide valuable seasonable supply during the highest load months of the

[19] PGE Reply Comments, at page 18.

year."[20] However, that would mean that, in all credible CO_2 scenarios, by 2025, at the latest, Boardman will be an intermediate, not a base load facility. Moreover, PGE's claim ignores that fact that the Boardman plant was offline during the peak summer months of 2009. Thus, the plant cannot be counted on to "provide valuable seasonable supply during the highest load months" as PGE claims.

The projected steady decline in performance in all credible CO_2 price scenarios raises serious questions about the prudence of investing $510 million for environmental upgrades on a coal-fired unit that would no longer be operating as a baseload unit.

Finding R8 **PGE continues to fail to consider the potential for higher coal prices in any of its future scenarios.**

PGE claims that its coal price forecast model is sufficiently robust to incorporate current and future market changes. It contends the model, as currently constructed, provides appropriate estimates of the coal prices it will experience during the years 2010 to 2025. The Company believes these coal prices are manageable from an operational standpoint, and will pose no risk to the ratepayers.

The Company further claims that its modeling has already incorporated a long term 41% increase into the price of coal between 2008-2014, including a significant 83% increase between 2013 and 2014. It concludes its comments with the following statement: "Finally, PGE did consider including a coal scenario with higher costs than those in our reference case. We did not include one because we could not imagine a plausible scenario, in light of potential future carbon legislation, state RPS's, and curtailments of less efficient and older coal plants, in which a commodity in declining demand and continued abundant supply would experience a sustained price increase."[21]

However, Peabody Energy, the nation's leading coal producer, and the owner of the largest reserves in the Powder River Basin, has offered a different and significantly higher coal price forecast that PGE should consider as a sensitivity in its IRP modeling.

On June 17, 2010, Peabody issued a new forecast of PRB coal prices. The forecast projected prices reaching upper limits in the range of $27.00 to $34.00 per ton by 2015.[22] On August 10, 2010, Peabody Energy updated its June forecast. The new PRB price forecast reflected even higher upper limits on coal prices in the range of $29.00-$36.00 per ton.[23]

---

20 Id.

21 PGE Reply Comments, at page 33.

22 Rick Navarre, President and Chief Commercial Officer, *Expanding Markets and Peabody Growth Opportunities,* 2010 Analyst and Investor Forum, June 17, 2010, at page 41.

23 Christina A. Morrow, Vice President, Investor Relations, *Jefferies 6th Annual Global Industrial and A&D Conference*, August 10, 2010, p.23.

PUBLIC – PROTECTED MATERIALS REDACTED

Table R2, below, shows that Peabody Energy anticipates coal price increases far in excess of the PIRA/PGE model. In fact, what PGE estimates is the ***cumulative*** rate of increase for the six year period 2008-2014, that is a 41 percent increase, the Peabody scenario suggests will be the average upper limit ***annual*** increase for the next five years.

Table R2. Actual and Project PRB 8800 Prices 2007 through 2015

	July 2007 Actual [24]	**July 2008 Actual**	**July 2009 Actual**	**July 2010 Actual**	**Peabody**[25] **2015 Estimate. June 2010 (Range)**	**Peabody**[26] **2015 Estimate June 2010 (Range)**
$Price/ton	$9.15	$14.00	$9.00	$14.90	$27.00-$34.00	$29.00-$36.00
Annual %	0	53%	(35%)	65%	N/A	N/A
Cumulative	0	53%	(2.0%)	62%	195%-271%	216%-293%
Annualized	0	53%	(0.8%)	21%	28%-39%	31%-42%

Both of Peabody's new coal price forecasts emphasized that: 1) declining production of Central Appalachian coal will place increased pressure on PRB production; 2) PRB coal has proven more competitive than more expensive eastern coal in an increasingly competitive environment brought on by declining natural gas prices; and 3) Peabody is also selling PRB coal to China and South America.[27]

Both Peabody Energy[28] and the U.S. Energy Information Administration[29] expect intensified production and demand out of the Powder River Basin whatever may be happening to coal production generally in the country as a function of coal plant retirements, lost coal sales from natural gas displacement, failure to add new plants and actual or impending new regulations. The PRB is a dominant submarket. A large segment of the U.S. domestic market is now gravitating toward the PRB (in part because of depletion of reserves in Central Appalachia). Coal producers controlling PRB mines are also actively attracting portions of the world market toward it. As demand for the coal from the PRB increases, its price will rise.

PGE is competing for coal. This should not be seen as a simple procurement exercise for PGE against an abstract, limitless, abundant US domestic coal supply. Individual U.S.

---

24 Each of the July prices are taken from Energy Information Administration, Coal News and Markets, *Average Weekly Spot Prices*, July 6, 2007 and July 3, 2008.

25 Navarre, *Op Cit,* p. 41

26 Christina Morrow, Vice President, Investor Relations, *Jeffries Sixth Annual Global Industrial and A & D Conference,* August 10, 2010.

27 Morrow, *Op Cit,* at page 21.

28 Morrow, *Op Cit,* at page 44. "Significant PRB growth as CAPP declines"

29 Energy Information Administration, *Annual Energy Outlook, 2010, Coal Supply and Prices, Coal Production by Region and Types* projects a 100 million per ton annual increase in Powder River Basin production by 2035, the largest increase of any region in the country.

investor owned utilities are increasingly competing against consumers from around the world for a large, but not inexhaustible, supply of coal.[30] Peabody and others[31] offer a view of what is changing in U.S. domestic and global markets and how they, as industry leaders, will respond. They are managing supply and prices during challenging times. They do not plan to repeat the past (the PIRA model does this) nor simply address current challenges with strategies to reduce prices and with it share value.

Finding R9. **PGE must start to aggressively plan to achieve actual reductions in its overall CO_2 emissions not merely the emissions from its individually-owned or jointly-owned generating facilities.**

PGE is correct that the statement it cites at page 41 from STC's April 26, 2010 presentation to the Commission was incorrect. We apologize to the Commission, to the Company and to the other parties for this incorrect statement.

However, the conclusion presented in our May Comments, that PGE's modeling analyses show that PGE's overall annual CO_2 emissions will be significantly higher in 2030 than in 2010, remains valid and is, in fact, confirmed by Slide 45 in PGE's August 23, 2010 presentation.[32]

PGE would have the Commission focus only on the CO_2 emissions from its individually- or jointly-owned units. This is wrong. The total CO_2 emissions for which the Company is responsible is the important variable, and resource planning should address those total emissions. After all, the Company's ratepayers ultimately will have to pay for all of the CO_2 for which PGE is responsible whether that CO_2 is produced at Company-owned units or through the generation of power that is purchased by the Company.

Focusing only on the CO_2 emissions from Company-owned units also will be misleading as a Company can make it appear that it is reducing its CO_2 emissions from its own units when its total emissions remain the same or increase. The Company, in essence, transfers the production of CO_2 from its own generating units to the units from which it purchases power.

This is, in fact, what is happening with PGE – the Company includes the Figure on page 42 of its Reply Comments and claims that its CO_2 emissions will be decreasing through 2030. However, at the very same time, Slide 45 in PGE's August 23, 2010 presentation to the Commission shows that the Company's total emissions (including those from both its owned units and from purchased power) will be increasing over the same period. This Slide is included as Attachment 2 to these Reply Comments.

---

30 The longer term geological production problems in the Powder River Basin outlined by the United States Geological Survey were included in the initial testimony.

31 See for example: John Eaves, COO, Arch Coal, Inc, *Jeffries 6th Annual Global and Industrial and A&D Conference,* August 12, 2010, at pages 7 and 8.

32 See Figure 9, at page 22, and Confidential Figure 10, at page 23, in the STC May Comments.

PUBLIC – PROTECTED MATERIALS REDACTED

Nothing that PGE has said in its Reply Comments undermines the ultimate conclusion that making large investments in the Boardman plant and continuing to operate the plant through 2040 would be a step in the wrong direction. Instead, PGE should retire the plant early and plan for a replacement portfolio that includes more energy efficiency, more renewable resources and, to the minimal amount necessary, additional natural gas-fired generation.

Finding R10. **PGE's new IRP analyses do not show that retirement of the Boardman plant in 2015, 2018 or 2020 would adversely affect the reliability of the electric grid in Oregon more than continuing to operate the plant through 2040.**

PGE does not include any new evidence in its Reply Comments concerning the reliability of retiring Boardman under DEQ Options 1 (2020), 2 (2018) or 3 (2015) or its BART III proposal (2020). However, the Company did provide some information in its August 23, 2010 presentation to the Commission.

Although we have not had any opportunity to review the workpapers for PGE's new reliability analyses, the Company's August 23rd presentation slides suggest the following:

- The amounts of unserved energy appear to be relatively similar among the DEQ Option 1 (Boardman through 2020), DEQ Option 2 (Boardman through 2018), DEQ Option 3 (Boardman through 2015), PGE BART III (Boardman through 2020), and Diversified Thermal with Green (Boardman through 2040) portfolios.[33] However, it appears that the Diversified Thermal with Green portfolio has a slightly higher amount of unserved energy than the other portfolios. The DEQ Option 3 (retire Boardman in 2015) appears to have the lowest amount of unserved energy.
- The DEQ Option 1 and PGE BART III portfolios appear to have slightly higher LOLP than the DEQ Option 2 and Option 3 portfolios. The DEQ Option 3 portfolio appears to have a slightly lower LOLP than any of the other new portfolios considered by PGE.[34]

[33] Slide 37 in PGE's August 23, 2010 presentation to the Commission.

[34] Slide 38 in PGE's August 23, 2010 presentation to the Commission.

PUBLIC – PROTECTED MATERIALS REDACTED

Finding R11. PGE still fails to demonstrate in its Reply Comments that the HHI differences it shows between portfolios are in any way significant.

We are very familiar with the traditional use of HHI to measure concentration of market power. In addition, contrary to PGE's claim, we do not in any way confuse PGE's use of HHI with other risk measures such as high construction cost or technological uncertainty.[35]

However, as we explained in the STC May Comments, PGE has failed to demonstrate that the relatively minor HHI differences between portfolios (shown in Slides 39 and 40 of PGE's August 23, 2010 presentation) are in any way significant. Moreover, as we also explained:

> In fact, each of the Boardman retirement portfolios has the high HHIs shown in these Figures precisely because PGE failed to consider any alternative in place of Boardman other than adding a new combined cycle gas-fired unit. All of these portfolios could have had lower HHIs had PGE considered replacement portfolios that included greater investments in energy efficiency and renewable resources plus some new gas or a PPA from a gas-fired unit. Instead, PGE arbitrarily chose to replace Boardman in each portfolio with a comparably sized gas-fired combined cycle unit.[36]

The same is true of the relatively minor Fuel HHI diversity differences that PGE shows for the new DEQ Option 1, DEQ Option 2, DEQ Option 3 and BART III portfolios, as shown in Table R3 below.

Table R3: Fuel and Technological HHIs for New PGE IRP Portfolios

Portfolio	Fuel HHI	Technological HHI
Diversified Thermal with Green (2040)	2073	2532
DEQ Option 1	2101	3075
DEQ Option 2	2106	3075
DEQ Option 3	2135	3075
BART III	2102	3075

We recognize that PGE believes that a higher Fuel HHI means that the Company would have a less diverse fuel supply. But, again, that is the result of PGE's decision to replace Boardman in the early retirement portfolios with only a new natural gas-fired combined cycle unit.

[35] PGE Reply Comments, at pages 45 and 46.

[36] STC May Comments, at page 36.

PUBLIC – PROTECTED MATERIALS REDACTED

Moreover, as shown in Table R3, each of the four new portfolios considered by PGE in its new IRP analyses has exactly the same Technological HHI. So there are no differences among these new portfolios with regard to this factor.

AUBREY BALDWIN
Staff Attorney & Clinical Professor

10015 SW Terwilliger Blvd
Portland, OR 97219
(503) 768-6929
(503) 768-6642
abaldwin@lclark.edu
www.peaclaw.org

June 5, 2010

Randy Dahlgreen
Rates and Regulatory Affairs
Portland General Electric Company
121 SW Salmon St., 1WTC0702
Portland, OR 97204
PGE.OPUC.FILINGS@pgn.com

VIA EMAIL

Re: LC 48 PEAC First Supplemental Response to PGE Data Request

Dear Mr. Dahlgreen:

Enclosed, please find PEAC's Supplemental Response to PGE Data Requests 001, 002, 019, 021, 022, and 023.

Confidential Attachments 023-j and 023-k are being sent on CD via first class mail.

If you have any questions or require further information, please call or email.

Sincerely yours,

Aubrey Baldwin
Aubrey Baldwin
Counsel for Sierra Club, Columbia Riverkeeper,
Friends of the Columbia Gorge, and
Northwest Environmental Defense Center

cc: Gloria Smith
Denise Saunders

enclosure

June 5, 2010

TO: Randy Dahlgreen
Rates and Regulatory Affairs
Portland General Electric Company

LC 48 – Sierra Club, et al., Response to PGE Data Request
Dated May 17, 2010
Question No. 023

Request:

23. Provide all workpapers, analyses, data and other documents supporting the comments that each of the Intervenors intends to file on May 19, 2010.

Response:

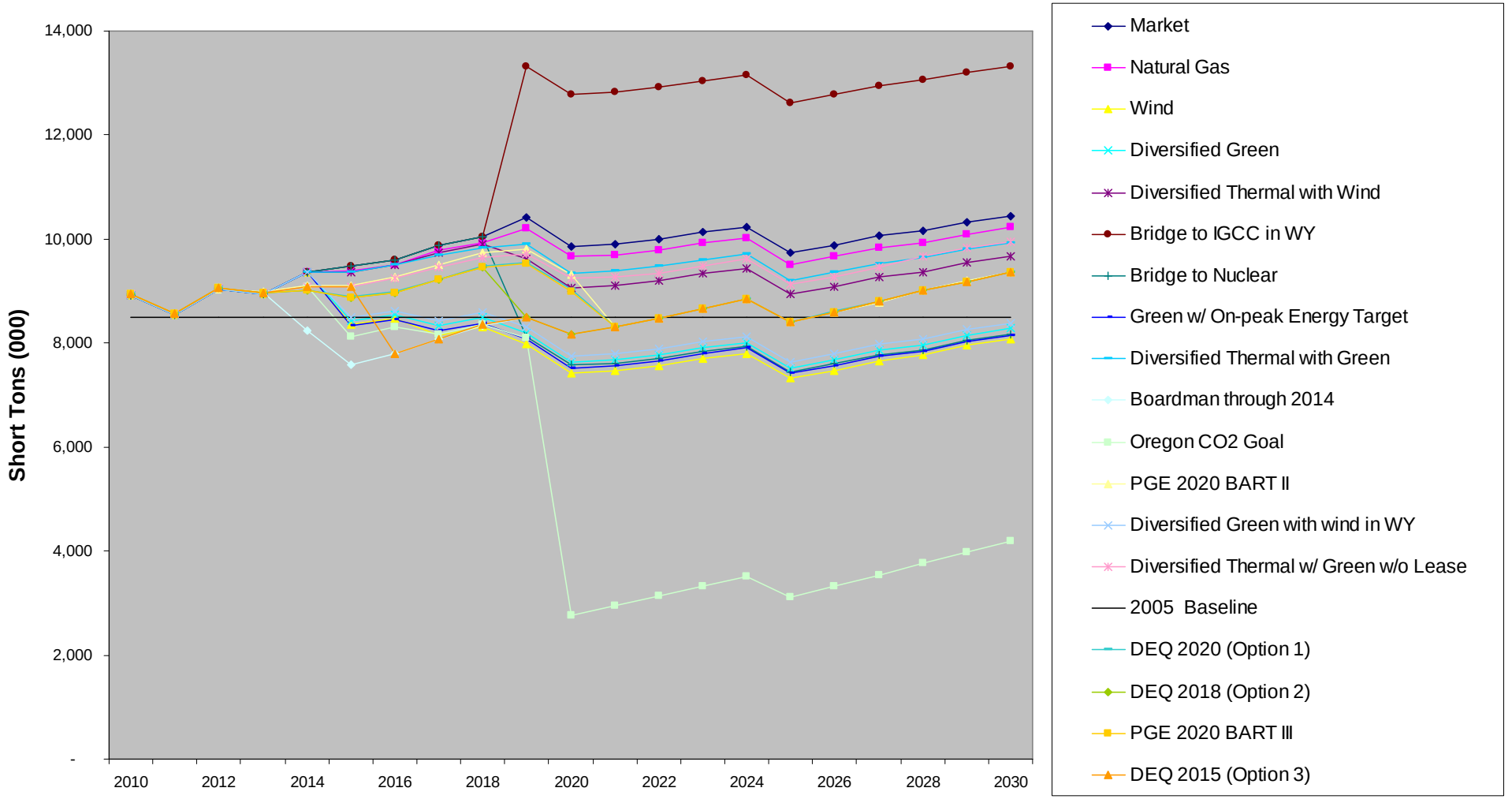
Intervenors state that they will provide a specific response and supporting documents on June 4, 2010.

First Supplemental Response:

Intervenors object that DR 023 seeks documents that are protected by the work product doctrine or attorney-client privilege, are not in Intervenors' possession, custody or control, are available to PGE through less burdensome means, or were provided to Intervenors by PGE.

Notwithstanding the foregoing objections, and without waiving any of them, Intervenors state that Attachments 023-a – 023—i, and Confidential Attachments 023-j and 023-k, support the comments that Intervenors filed on May 19, 2010.

CO_2 Emissions – Reference Case 2010-2030



Portland General Electric