NW Energy Coalition

for a clean and affordable energy future

Comments of the
NW Energy Coalition
on
LC 47: PacifiCorp's 2008 Integrated Resource Plan
October 8, 2009 – Steven Weiss

The NW Energy Coalition (NWEC or "Coalition") appreciates this opportunity to comment on PacifiCorp's 2008 Integrated Resource Plan ("IRP" or "Plan"). We urge the Commission to maintain a healthy skepticism toward the Company's modeling and not confuse understanding with massive amounts of data. PacifiCorp's huge modeling effort can quickly lead the reader into a labyrinth of details, but we believe there are numerous fundamental flaws in how the utility conducted its analysis and scoring that call the whole exercise into question. Until those flaws are addressed, it is difficult for anyone to know whether the Company's preferred portfolio is reasonable or not.

Significant errors in analysis

1. Some significant assumptions were changed at the last minute and only incorporated piece-meal into the modeling, but other updates were not. A delay in the Lakeside CCCT and additional front office transaction (FOT) liquidity due to new transmission plan were added. However, new load growth forecasts showing large load declines this year, new capital cost estimates that lowered the cost of wind significantly (p. 99), as well as the significantly lower gas costs we are experiencing and the Company's reduction in wind integration costs, were not.

   These last minute changes occurred after the Company had narrowed down its portfolio choices, and the adjustments were only applied to those that had scored well under the previous assumptions—all of which had the Lakeside CCCT hardwired as a "planned resource." Pacific's capital expansion model did not pick this resource, it was forced in. We have no idea whether it would have been picked. The remarkable falling off of load that has occurred could well have delayed or cancelled the plant altogether.

2. Class 2 DSM is significantly underestimated. The Council's recently released 6th Plan estimated potential energy efficiency (calculated on an energy basis) available in the region over the next 20 years to equal about one-third of current loads (about 7,000 aMW of EE compared to 10,000 aMW of load). Pacific's estimate is less than half that (roughly 1,000 aMW of EE compared to over 6,000 aMW of load). There is no reason to think that the non-NW states

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served by PacifiCorp would have much less EE potential than the NW surveyed by the Council.

3. PacifiCorp failed to analyze portfolio #40, the Oregon CO2 cap. After a brief description, and with no explanation, it was simply not included in the group that is subjected to the cost and risk analysis of Chapter 8 that is used to select the preferred portfolio. We believe that failure to fully analyze this portfolio violates PUC requirements.

4. Flexibility needs to be valued. As it is abundantly clear from the huge changes in assumptions in the IRP just since the Company's public process began, uncertainty is a critical issue facing this plan. Unfortunately, this IRP is based on a static model, forcing us all to argue that our guess of future conditions is the best. But this is beside the point. Instead of planning resource decisions based on a guess about what the future will look like, The utility should plan a system that can best adapt to an uncertain future that we all know is impossible to predict.

   Pacific's IRP fails to value flexibility, because of the basic nature of its modeling. Although the Company may argue that its model does incorporate risk, because it tests many sample portfolios against many futures, the model does not reflect the more dynamic way real utilities make decisions.

   The model constructs its test portfolios by "optimizing" them against fixed futures. For example, it constructs a portfolio that performs best under a high load growth future; another in a high gas price future; another in a low carbon-cost future; etc. Each of these portfolios (cases) is chosen to do well over a fixed 20-year-long world where assumptions never change. None must deal with a world where load growth is high for 5 years and then slows for three, accelerates for seven, etc., -- i.e., the real world! Thus, a portfolio that is flexible and retains optionality is never tested, nor is flexibility ever valued.[1]

   In the real world, as opposed to this modeling behavior, if conditions changed, the utility's resource decisions would change. If the future started with a low carbon adder and then a few years out changed to a higher adder, no utility would blindly follow its original plan that had been optimized to the low carbon environment. It would shift its strategy to meet the new conditions. And, most important, having a plan that was flexible in the first place would have a higher value in being able to accomplish that shift than a plan that was unable to change without high costs.[2]

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[1] The model does do a limited stochastic test of each portfolio, but this is no substitute for true dynamic modeling. The stochastic test used by PacifiCorp varies assumptions such as gas prices over time, but the values all regress to the base assumption. More fundamentally, this test still does not allow the *portfolio* to change in response to changed conditions. The stochastic test is of very limited value.

2 Pacific's methodology should be contrasted with that performed by the Council. The Council starts with thousands (according to a conversation with Michael Schilmoeller, after the first two hundred plans are tested, an optimizer is used to narrow develop remaining plans by using the elements of the first 200 that appear frequently in lower cost plans. This reduces calculation time—one plan is tested each second against 750 futures—enabling each overall scenario to contain thousands of plans. In his words, the model starts "sniffing around" toward successful plans.) of random sets of resource *options*, not plans. Each of these sets of options can be thought of as an embryonic plan, and each is then subjected to 750 stochastically varying futures. Each future can change quarterly over 20 years, reflecting Monte Carlo draws of many factors, including load growth, gas prices, carbon prices, hydro years, capital costs, etc. Over the course of each future the model chooses the options based on

5. PacifiCorp's methodology means the tail wags the dog. One outcome of the Company's static modeling described above is that resource decisions made in the later part of the 20-year planning horizon greatly influence the performance of each portfolio—despite the fact that there is little reason to think that the utility would actually blindly acquire those later resources if conditions changed significantly.

   This flaw is carried into the plan scoring. Each static plan, developed for a particular fixed future, is then tested against other futures—futures for which it wasn't designed. It's final score—mostly its cost—is an average of how it performed against these other futures.

   In real life this would not occur. A plan designed to perform well in one future which then experiences a quite different future would be modified. Its real cost over time would not be the cost of the original plan, but the cost of the modified plan. And to the extent it could be modified, it would perform better. This ability of a plan to be flexible is one of its most valuable attributes in real life. Pacific's model never tests for it.

   A much better way to model real utility behavior in the face of uncertainty is the dynamic methodology used by the Power Planning Council ("Council"). The Council model (described more fully in footnote #2) essentially tests initial plans that are modified over time in response to changing futures. The results of this modeling show that actions that increase flexibility, or that have economic benefits regardless of future conditions (such as aggressive conservation), turn out to be more valuable than large capital-intensive and long-lead-time resources that reduce a utility's flexibility.

   Can Pacific change its modeling methodology to more closely mirror the Council's? We do not expect the Company to toss out its model at this late date. However, there is a somewhat acceptable surrogate for this that could be made.

   PacifiCorp should modify its test portfolios (cases) in the following way. All resource decisions beyond the planning horizon—probably 8-10 years or so—should be replaced with one standard resource. This resource could be market purchases (or what Pacific calls Front Office Transactions, or FOTs) or a generic CCCT—being the same for all portfolios means the decision is not important. That is, every portfolio would look the same in its later years. By doing this, we get a much more realistic comparison of the costs of the initial resource decisions, unaffected by later decisions that will most likely change to respond to future conditions anyway.

   This solution would still not correctly value the risk benefits of flexibility—something that the Council's does—but it would at least prevent resource decisions that occur after many

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quarterly conditions—there is no perfect foresight. At the end of this exercise, the model then calculates the costs of that one set of options over the 750 futures, and calculates an expected cost, and uses the costs of the highest 75 of those futures as the measure of risk (TailVar90). This then becomes one point of thousands in a space from which an efficient frontier is developed.

What is especially important to note is that this methodology will find and value initial decisions that don't limit how a different condition further into the future might affect overall costs. That is, big-bet, big-shaft decisions are penalized, while plans that keep their options open score better. Ultimately, for example, the model shows that acquiring conservation and small chunks of renewables and DG at a cost well over its strict avoided cost is a very good strategy to reduce both costs and risks.

years, and that are most likely to be changed, influencing the near-term resource decisions that must be made in the early years.

The Coalition also proposes that the Commission require that future IRPs incorporate an "inflexibility adder" or other mechanism to reflect the added risk that long-lead-time, capital intensive projects impose on the utility if it is impossible for the Company to move to a dynamic methodology such as the Council's.

6. Wind costs—both capital and integration—are too high. On p. 99, the IRP notes that, "…subsequent to completion of its 2008 IRP portfolio analysis in late 2008 and early 2009, the Company has witnessed price declines for wind turbines…. These cost declines were not incorporated in portfolio cost estimates." Since the high cost of turbines used in this IRP is 40% over the last IRP, due to tight turbine supplies that no longer exist, this is a serious error.

   PacifiCorp's wind integration study has serious errors, but we note that Pacific's estimate of almost 1 cent/kWhr is about twice as high as the wind integration costs used by BPA (and even BPA's methodology, in our opinion, includes extraneous costs.

   The main flaws in the utility's methodology are: (a) it calculates the need for flexibility to serve wind isolated from that needed to serve variations in load; (b) it takes no account of the smoothing benefits that will occur from geographical diversity; and, (c) it assumes that the Company's own resources cannot be used—instead applying a fairly high transaction cost to market supplied flexibility. We endorse and refer the reader to the more detailed comments of RNP regarding flaws in the Company's wind integration cost study.

7. Scoring criteria and weightings are arbitrary and not reflective of ratepayer concerns. PacifiCorp relied upon a complicated scoring and ranking method to choose its preferred portfolio. Table 7.8, p. 175 summarizes the weighting scheme. We see problems in several areas.

   - Customer Rate Impact (20% weight) measures year-to-year variability of utility costs. Year-to-year variability of utility costs is not a valid risk metric for a number of reasons. First, it will correlate highly with expected cost, so in reality is not truly a risk measure. Second, consider a two-year period. Assume that in one portfolio, costs increase 2% each year, and a second portfolio that produces no increase the first year, then a 4% increase the second. A year to year variation metric would score the second scenario 41% worse than the first, since the metric is a sum of squares calculation. But clearly the two scenarios are not all that different from a customer point of view. (In fact, due to compounding, at the end of the day the single 4% increase results in lower rates.)

     In addition, year-to-year cost variations are mostly a management concern. There are many ways to deal with stochastic cost changes besides yearly rate adjustments, including balancing accounts. Resource plans should not be chosen with this type of measure being given such a large weight in the scoring. Customers are much more concerned with high cost outcomes than utility-cost variability year-to-year.

- Production Cost Standard Deviation (5%) is also a measure of volatility, not poor outcomes. It will score as negative a distribution with very low mean but wide distribution around that mean. Standard deviation is a measure of the spread of cost outcomes (and only the production cost part of total costs), not the risk of high outcomes. The fact that standard deviation is a poor risk metric was discussed at length during the last IRP, and the parties agreed that some sort of upper-tail or 90th percentile risk measure was more appropriate. We are troubled to see it reappear in the Company's analysis.

  We recommend that these two measures be dropped from the scoring completely. It is interesting to note that when the Company tested an alternative ranking (p. 228-9) that reduced the weight for Customer Rate Impact and raised the weight for CO2 Cost Exposure, a weighting we believe is justified, the ranking of the top two portfolios reversed. Therefore it is important that the Commission address this issue further to see the results of other weightings on the ranking.

- $0, $45 and $100/ton CO2 tax levels are weighted equivalently. While we favor including a $0 level to better understand the influence of carbon adders, we oppose weighting the $0 level equally with $45. There is simply no way that carbon will be ignored over the next 20 years, and assuming that there is a one-third possibility that that will be the case is irresponsible.

  While some might argue that the same reasoning applies to the $100 ton level, we could not disagree more. The science is leading us rapidly to the conclusion that the urgency and magnitude of the climate crisis is worsening. It well may result in policies such as early forced shutdown or severe dispatch limits to the Company's many coal plants that are essentially equivalent to carbon adders above $100.

- The result of weighting each of the CO2 prices equally is to, in affect, give *no weight* to carbon risk. The "Cost Exposure under Alternative Carbon Dioxide Tax Levels" metric that is assigned a 15% weighting (p. 201) for choosing portfolios is a measure of the cost of not guessing right about the CO2 price. It does not score portfolios with high CO2 emissions any worse than those with low emissions.

  While PacifiCorp spends much time analyzing the effect of various carbon prices on its candidate portfolio, the Company is missing the public policy context of the whole exercise. *The policy goal of carbon pricing or regulation is to reduce emissions.* If the Company's modeling fails to mirror this concern, than it must be suspect. The idea of the modeling shouldn't be to design a portfolio that performs just as well under no carbon policy as under a high cost carbon policy—for why would we be discussing this policy in the first place? The goal should be to design a prudent, low cost and low-risk strategy to best reduce dangerous global warming pollution—especially given the extremely different cost impacts of the various alternatives, and the very high risk of much stronger regulatory requirements on CO2.

  Therefore it is incumbent upon PacifiCorp to reflect the public policy of the state and include total emissions as a factor in scoring and choosing portfolios.

- No scoring weight is given for optionality. As discussed earlier, NWEC believes that dealing with uncertainty is one of the principal challenges in planning.

- The final selected portfolio, 5B_CCCT_Wet, was chosen over 5B and 8B, similar portfolios without the added gas plant, based on very small Present Value of Revenue Requirement (PVRR) differences amounting to roughly $100 million or about $8 million per year. Given the Company's overall revenue requirement, this amount is lost in the statistical noise. However, by choosing to build the plant, the decision limits PacifiCorp's options. Had the scoring valued optionality in even a small way, it is obvious that 5B or 8B would have been chosen instead.

Conclusion and Recommendations.

The NW Energy Coalition is concerned that this IRP's flaws make it impossible to objectively evaluate the Company's resource options. That said, we would be somewhat less concerned with these modeling problems, except for PacifiCorp's determination in Action Item 3 to acquire a 570 MW CCCT by the summer of 2014, despite the utility's recent declines in load due to the recession and its low forecast of available energy efficiency compared to the Council's estimate. Except for these items, the Action Plan makes no long-term bets on large-scale fossil fuel plants and steadily acquires new wind.

We are also troubled by the 2014 CCCT decision when looking at Table 8.3 (p. 189) that gives the usage factors of each resource by portfolio. We note that of the final two top-ranked portfolios, #5, which includes the Lake Side CCCT, results in a gas plant utilitization of only 40% over the 2013-20 period. And the other top portfolio, #8, uses its gas plants only 28% during this time. Most of the other scenarios show similarly low usage. Is it prudent to build more gas plants when the Company's existing ones run so little and the Council is predicting a large surplus in the region caused by a combination of low load growth, aggressive conservation and RPS renewables?

Given the uncertainty the Company faces in the next few years, we urge the Commission to make these findings:

1. Acknowledge the Action Plan, except for item #3, the acquisition of a large CCCT in 2014. This plant could be safely delayed further through a small increased reliance on market purchases (FOTs) and increased conservation. Delay is valuable, since it keeps options open to changes in technology, regulation, load growth and other factors.

2. Require PacifiCorp to re-examine its energy efficiency potential in light of the Council's detailed analysis, including available measures and ramp rates.

3. Require PacifiCorp to conduct a complete analysis of Portfolio #40, the Oregon CO2 cap.

4. Require PacifiCorp to adopt a modeling methodology for future IRPs that includes the following elements. It should:

    a. Value flexibility and reduce the impact of later resource decisions (that are likely to be changed depending upon conditions in the future) on the selection of its preferred portfolio.

    b. Avoid using measures of volatility, such as standard deviation or year-to-year change, as a substitute for better risk measures such as upper tail risk.

c. Give much less weight to very low carbon adders, given emerging climate science.

d. Include a direct measure of carbon emissions as part of its scoring criteria.

NWEC's fundamental concern with this IRP is that PacifiCorp is not responding to the policy direction of the State of Oregon (and the WCI, the WGA, the international community, the Obama Administration, the scientific consensus, etc., etc., etc.) that we must begin to seriously address the fact of global warming. Must we wait longer, making the problem worse and the solutions more expensive? The underlying assumption that CO2 is just one more of a number of uncertain variables, just as likely to have no cost as high cost, is simply unsupportable. We expect better.

LC 47 CERTIFICATE OF SERVICE

I hereby certify that I served the foregoing **Initial Comments of the NW Energy Coalition on PacifiCorp's IRP (LC 47)** on the following persons on October 8, 2009, by hand-delivering, e-mailing, or mailing (as indicated below) to each a copy thereof, and if mailed, contained in a sealed envelope, with postage paid, addressed to said attorneys at the last known address of each shown below and deposited in the post office on said day at Salem, Oregon:

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