

Division of Public Utilities

June 27, 2008 email to PacifiCorp

General Comments

1. The report appears to spend a considerable amount of time on existing measures. Also, the report does not appear make any recommendations but identifies what is achievable based upon cost effectiveness. Is it the Company's intent that the amount identified in the report will be pursued?

Company Response: The report provides several figures as to the magnitude of the demand-side resource opportunities available within PacifiCorp's system. It provides technical potential data on specific measures, screens those technical potentials for what may be found cost-effective, and provides an assessment (based on relevant market data) of how much of the economic potential might be realistically achievable through utility programs. It also analyzed these potentials under three different economic scenarios. The magnitude of demand-side resource potential identified in the report should be viewed as preliminary, as the cost-effective screening was based on proxy avoided costs and the achievable screening on vendor assumptions. PacifiCorp is working with Quantec to develop supply-curves based on the technical potentials screened only by PacifiCorp's assumptions around what's likely to be achievable. The supply curves will be used in PacifiCorp's integrated resource planning models to identify their cost effectiveness. The resources found cost effective will be incorporated into PacifiCorp's resource plan. The demand side resources selected through the integrated resource planning process are expected firm and deliverable. As a result, they may be viewed as conservative from the perspective of those stakeholders encouraging greater reliance on demand side resources. Regardless of the amounts selected, PacifiCorp intends to pursue all the cost effective demand side resources available and will reassess resource potentials and achievable assumptions over time as warranted.

2. The Company plans to use the information contained in this report in the 2007 IRP update.

Company Response: Data derived from the completion of the potential study in June 2007 was used in the development of the 2007 IRP update. While more extensive financial modeling of demand side resources is planned for the 2008 IRP, initial use of the data increased the near-term targets for both Class 1 and Class 2 resource additions within the update. Page 10 of the 2007 IRP update provides additional detail on these initial adjustments.

Will the technical, economic, or achievable levels identified be used as an input?

Company Response: For demand-side management resources, PacifiCorp plans to use the technical potential, adjusted for the Company's assumptions around

achievable levels, as the formulated supply curves for IRP capacity expansion modeling.

In short, how will this data be utilized in the IRP process?

Company Response: The Capacity Expansion Module (CEM) will be used to select demand-side management and distributed resources for portfolios based on their relative cost-effectiveness with respect to other resource options, and based on different assumptions for the future. Portfolios with varying amounts of these resources will be subjected to risk analysis using the Company's stochastic production cost model (the Planning and Risk module).

3. In general, there is concern that while the report does gather a significant amount of useful information and data regarding customer participation and feasibility of current DSM programs, it does not adequately resolve a number of issues raised in the analysis. First, the report effectively notes significant differences between DSM measures that are deemed technically feasible, and those that are actually achievable. For example, of all the Rocky Mountain Power Service Territory DSM peak demand resources identified as "technically feasible" in table ES-2 (see p. ES-3), only a small percentage (about 14 percent overall) are deemed achievable. By class, only about 16 percent of Class 1 DSM resources identified as technically feasible are achievable. Similarly, 37 percent of Class 2 resources were deemed achievable and only about 6 percent of Class 3 resources were achievable. Likewise, only about 6 percent of "Supplemental Resources" were achievable (note that because of the difficulties in assessing effectiveness of Class 4 resources, results for this category are not estimated). Assuming the sample results are valid, what do these results indicate about the effectiveness of Class 1, Class 3 and Class 4 DSM measures? Such questions are relevant, as many of the study participants appear to be ambivalent or uniformed about the DSM programs offered. Why are such issues not addressed in the report.

Company Response: As evidenced by the experience of similar demand response programs, particularly those in Class 1, of other utilities and regional transmission organizations (RTOs), rates of participation in voluntary demand response programs have been low. This is mainly attributable to barriers related to operating constraints that do not allow commercial and industrial customers to interrupt their operations and residential customers comfort concerns. Some of these barriers may stem from a lack of information regarding curtailment strategies and enabling technologies such as advanced facility automation systems and programmable thermostats.

These barriers may be lowered to some extent by more extensive education. Higher incentives and more flexible program designs may also help mitigate some of these barriers. Such strategies have enabled PacifiCorp to offer exceptionally successful programs in the residential (Cool Keeper) and irrigation sectors. However, there remain operating constraints and business considerations in the

commercial and industrial sectors that continue to prevent demand response programs from achieving greater penetration in these markets. Class 2 resources, on the other hand, provide customers with improved living or work conditions through new equipment, improved productivity, improved comfort, and lower energy costs. Following installation, Class 2 resources require no further customer attention.

4. Secondly, while it appears that a good deal of work went into the development and administration of the study's survey, there is little documentation about the specific sampling methodologies used to assess program results. While the appendix includes a discussion about survey administration procedures, sample stratification, and sample selection, there are several technical issues that are not discussed. For example, there is no detail about how results conform to a pre-determined sampling plan that specifies targeted error rates at a given confidence level, required sample sizes and response rates, and administration procedures to minimize sample bias. This is critical, as key factors such as assumed rates of program sign-up/participation appear to be based on the survey results (see p.16). If survey results do not fall within required sampling parameters, the report should make it clear to the reader that outcomes may not necessarily be representative of the targeted population. Sampling shortcomings, e.g., low response rates, ambiguous results, etc., should be pointed out in each section. –

Company Response: Please see the company's response to question #2 in "Specific Comments".

5. Even though solar PV does not appear to meet the TRC criteria we would like this option moved forward to the IRP analysis (updated with then current costs) in order to determine the IRP decrement values and consequent appropriate incentive levels which meet the Utility Cost Test.

Company Response: The use of total resource cost test (TRC) for assessment of cost-effectiveness of renewable resources is justified since the potential assessment was an attempt to evaluate all demand-side resource options on an equal basis with supply-side resources. Moreover, since the cost-effectiveness of PV programs is typically assessed similar to DSM resources by state regulators, it is important that the TRC approach be used in order to avoid any disconnects between the economic justification that occurs through the planning models and that used for program approval and implementation. This approach to valuation of renewable resources is also a common practice in other jurisdictions. Reference the alternative analysis of PV provided as part of this filing, which examines the cost effectiveness of PV from a Utility Cost perspective. This alternative analysis is provided for the purpose of furthering stakeholder discussions on the appropriate way to value PV.

6. Currently, what are the parameters under which residential solar PV would pass the Utility Cost Test?

Company Response: Under current assumptions for avoided costs, the residential solar PV would not pass the utility cost test under any scenario which would involve incentive payments. Reference the alternative analysis of PV provided as part of this filing, which examines the cost effectiveness of PV from a Utility Cost perspective.

7. Are there any reasons why solar PV rental was not addressed as an option?

Company Response: Since the analysis was performed from a TRC perspective, whether the equipment is rented or purchased would not affect the results of the analysis.

Specific Comments

1. On Page 5 of the report, you have indicated that the economic potential for class 2 DSM resources is determined using TRC criterion, which is based on a societal perspective to determine cost-effectiveness of various resource options without consideration for who pays for the efficiency measure or how its costs might be shared between the utility and program participants. The Commission requires DSM cost effectiveness tests be conducted using all four perspectives. Will those class 2 DSM resources that were considered to be economically potential (passes the TRC test) pass the utility cost test, participant cost test, and the rate impact measure test?

Company Response: The cost-effectiveness screening used in the study was for general opportunity assessment purposes only. The Company intends to use the IRP modeling process to determine the amount and value of DSM resources to be pursued. The TRC perspective is the appropriate measure, since it allows DSM resources to be evaluated against supply options on a level playing field. Program filings, whether amendments to existing programs, or the introduction of new programs, would adhere to the specific cost-effectiveness criteria for the particular state in which the filings occur.

On a similar note, the authors use levelized avoided capacity and energy costs as the threshold for screening economic potential of a proposed measure.

While this may be appropriate for an overall study, the real-world “screen” is a resource’s ability to meet the mandated cost-effectiveness tests.

Why is this topic not discussed in the document?

Company Response: As explained in the report (page 79, Economic Potential), the study did not use “levelized” avoided costs to screen energy efficiency measures. Instead, the study relied on measure-specific hourly load shapes and hourly avoided costs to determine the net present value of total avoided cost benefits for each measure. This value was then compared with the net present

value of the measure's incremental costs to determine whether the measure is cost effective from a TRC perspective. This method ensured that the full energy and capacity value of measures were captured properly.

For supplemental resources, the study used the levelized total life cycle cost per kW of each resource to assess the overall cost of the resource. This method makes possible a direct comparison of these resources with supply-side alternatives.

2. On p. 11, "Assessment Methodology" section, it is noted that 15 surveys of program administrators and 215 surveys of PacifiCorp commercial and industrial customers were administered. It is not clear if the 15 program administrators and 215 commercial and industrial customers are sample participants of their respective target populations. If this is the case, there is nothing in the document that details and justifies the sample selection, sample size, etc. Neither is there any information provided about survey administration, response rates, and whether these results are statistically representative of the populations surveyed. As mentioned earlier, this needs to be addressed.

Company Response: The 15 surveys of program administrators were informal interviews with program administrators at various utilities to elicit information on their experiences with their capacity-focused (demand response) programs.

The 215 surveys of PacifiCorp's commercial and industrial customers were conducted to obtain information on customers' willingness to participate in energy efficiency and demand response programs. The results of this survey were used to estimate market (or achievable) potentials for the commercial and industrial sectors.

The rationale for this survey and its methodology, including the sampling procedure, and detailed tabulation of the results are provided in Appendix A-1 of Volume II of the report. The size of this sample corresponds with the criteria for a 90 percent level of confidence and a precision of 10 percent (90/10) for responses to questions with a binary distribution, which requires a sample size equal to 68 ($n = 68$). Respondents were asked whether they would adopt specific measures assuming three incentive amounts equivalent to 25%, 50% or 75% of measure costs. Since each of these options represented a binary choice, a sample of 204 ($3 \times 68 = 204$) observations would be required to satisfy the 90/10 criterion for all three questions. The survey results related to customers' willingness to adopt particular energy efficiency measures and the associated standard errors, calculated at a 90% confidence level, are reported in Table 1 below.

Table 1. Calculated Means and Standard Errors for Survey Respondents; Willingness to Participate in Energy Efficiency Programs

Market Acceptance Rates Used in The Assessment								
Incentive Level	Lighting Systems	Air Conditioning	Space Heating	Ventilation	Building Envelope	Refrigeration	All Industrial Mean	
0	30%	16%	19%	13%	14%	8%	22%	
0.5	81%	59%	60%	56%	52%	63%	64%	
0.75	87%	67%	66%	62%	60%	65%	66%	
Standard Errors								
0	3%	3%	3%	2%	2%	2%	6%	
0.5	4%	5%	5%	6%	5%	10%	9%	
0.75	4%	5%	5%	6%	5%	10%	9%	
Summary of Responses to all Energy Efficiency Measures								
Incentive Level	Overall Mean	Overall SE	Number of Overall Responses	Absolute Precision	Relative Precision	Lower Confidence Interval	Upper Confidence Interval	
0	16%	1%	1503	2%	15%	13%	18%	
0.5	66%	3%	527	5%	8%	61%	71%	
0.75	72%	2%	527	5%	7%	67%	77%	

As shown, with few exceptions, particularly in the industrial sector at a zero (0) incentive level, all standard errors are within 10% of the calculated means, reflecting the fact that the results met or exceeded the survey design parameters of 90/10.

With respect to all measures, i.e. customers' willingness to adopt any energy efficiency measures, the results show relatively small standard errors of between $\pm 2\%$ at zero incentive level and $\pm 5\%$ for the 50% and 75% incentive levels.

3. The results from Table 3, "C&I Survey Results: Attitude toward Capacity-Focused Program Options," found on p. 16 do not appear to correspond to the analysis provided. For example, the statement is made that "The results of the survey, summarized in Table 3 indicate relatively positive attitudes toward more voluntary, less firm (Class 3 DSM) resources..." This is somewhat misleading with respect to what is *not* said about the sample participants who responded in the negative. The results in table 3 show that with the exception of Critical Peak Pricing programs, the majority of respondents indicated that they either had a negative opinion, or didn't know about the program. Even for the Critical Peak Pricing program, only a small majority (57 percent) indicated a positive attitude toward the program. Rather, the results show that many sample participants have decidedly negative opinions about Hourly Pricing, Curtailment, and Direct Load Control programs. Moreover, there were a relatively large number of sample participants who appear to be uninformed about the programs, particularly with respect to Demand Buy Back and Hourly Pricing. Again, if these results are valid, what does this imply about potential barriers to broader public uptake of such programs?

Company Response: The survey results show that, in general, customers prefer demand response programs which offer customers the choice to opt in or out of an event. As indicated in the above citation from the report, 57 percent of

respondents indicated what is assumed to be a “*relatively*” positive attitude toward critical peak pricing compared to other options. The survey also found a generally more negative attitude toward mandatory options such as direct load control. This was particularly the case among the respondents in the industrial sector.

4. The survey results regarding Class 1 and Class 3 DSM program preferences for C&I participants as contained in Table 4 on p. 17 appear to be significant. It is telling that every C&I entity selected “no program” as the most preferred response for Class 1 and Class 3 programs. If results are statistically valid, this would appear to suggest that there is serious concern about future participation in such programs (by C&I customers). Why is this issue not addressed in the report? It is also noted that some values used to assess program preferences do not yield statistically valid results about participant preferences (refer to paragraph at the top of p.17). The actions stated to rectify this problem are unclear and should be explained better in a referenced footnote.

Company Response: As indicated in response to question #3 above, customers in general do not seem to have a favorable attitude toward mandatory programs. The report focused on assessing overall opportunities for and market acceptance of various Class 1 and Class 3 options. Actions required to address this issue relate to program planning and design and were not within the scope of the assessment.

As evidenced by the experience of similar demand response programs, particularly those in Class 1, of other utilities and regional transmission organizations (RTOs), rates of participation in non-voluntary demand response programs have been low. This is mainly attributable to barriers related to operating constraints that do not allow commercial and industrial customers to interrupt their operations. Some of these barriers may stem from a lack of information in the commercial and industrial markets regarding curtailment strategies and enabling technologies such as advanced facility automation systems.

These barriers may be lowered to some extent by more extensive education. Higher incentives and more flexible program designs may also help mitigate some of these barriers. Such strategies have enabled PacifiCorp to offer exceptionally successful programs in the residential (Cool Keeper) and irrigation sectors. However, there remain operating constraints and business considerations in the commercial and industrial sector that continue to prevent demand response programs from achieving greater penetration in these markets.

5. On Page 9 of the report, it is been stated that for Class 1, three general options are analyzed in this study:
 1. *Direct Load control:* This option was analyzed for small commercial, residential, and large commercial customers.
 2. *Irrigations load Curtailment:* This option is considered for Irrigation customers.

3. *Thermal Energy Storage*: This was considered for large commercial customers with rooftop cooling units.

This indicates that no class 1 resource was considered for the Industrial Customers. Why?

Company Response: Based on the survey results, industrial customers in general did not have a positive attitude toward utility-controlled options such as direct load control. The study did analyze the potential opportunity for Class 3 curtailment tariffs (pre-negotiated terms), as well as dispatchable standby generation opportunities (little to no impact on customer operations) for this customer sector.

6. On Page 18, it was stated:
“**7. *Estimating Achievable Potential.*** Achievable potential is calculated as that portion of market resources with levelized life cycle costs less than PacifiCorp’s avoided cost of capacity.”

This definition is just the same as that of the economic potential. Is this just a typographical error, or you are saying that achievable potential is just the same as the economic potential? Please confirm.

Company Response: The definition provided in the report is correct. In the case of demand response (Class 1 and Class 3 resources), *market* potential was estimated first, before applying a cost-effectiveness screen. In this context, *achievable* potential is defined as the cost-effective portion of *market* potential.

7. On Page 19, Table 5. The technical and economic potential are the same for class 1 DSM in Rocky Mountain Power. Does this mean that the avoided cost (\$98) for the east is too high to screen any program out, or the levelized life cycle costs are too low?

Company Response: At the assumed avoided capacity costs and program costs used in the study’s analysis, the entire technical potentials identified for the both the residential and irrigation sectors were cost-effective and, therefore, economic. The avoided capacity costs used in the study were estimates used for the completion of the study; the IRP modeling process will ultimately determine resource economic potential and provide direction to the Company as to which resource options to pursue.

8. On Page 19, Table 6, the technical potential for the residential and commercials is 227 MW and 178 MW, respectively. The economic potential for both classes is zero. Does this mean that the avoided cost for the West is too low or the levelized life cycle costs for the West are too high?

Company Response: This is primarily attributable to the significantly lower avoided capacity costs used in the analysis of these resources in the Pacific Power service area. For most of the Class 1 and Class 3 resources that were analyzed, acquisition cost assumptions between the Pacific Power and Rocky Mountain were very similar. The avoided capacity costs used in the study were estimates used for the completion of the study; the IRP modeling process will ultimately determine resource economic potential and provide direction to the Company as to which resource options to pursue.

9. In the discussions of Thermal Energy Storage on p.39, the study lists estimated retrofitting costs that range from \$600 to \$1,500 per ton. The study bases the analysis of this issue on a \$600 cost estimate. Why was the low end selected when the range has significant spread and potential program participation appears to be low?

Company Response: The indicated range in costs was based on research conducted by Cadmus. As explained in the report (paragraph 1, page 39), the choice of the lower estimate of \$600 per ton was based on proprietary information available to PacifiCorp. The authors of the study assumed that the lower figure represented a more market-based price and therefore was more appropriate.

10. Some of the estimated program participation rates appear to be arbitrarily determined and therefore may not be statistically representative of the targeted population. For example, in the analysis of achievable potential for the Curtailable Tariff program on p. 42, it is assumed that all customers who felt “very positive” about the program and half of those who felt “somewhat positive” about the program would participate. The assumption to include half of the “somewhat positive” appears to be arbitrary. Referring to the survey results in Table 3 on p.16 from which these estimates are established, only 5 percent of the survey respondents indicated that they felt “very positive” about this program. Moreover, 55 percent indicated at least a somewhat negative attitude about the program, and 7 percent did not know about it. In light of these survey results, it would be more prudent to justify the assumption about why 50 percent of those who felt “somewhat positive” should be identified as participants. Similar seemingly arbitrary assumptions are made throughout report (see p.44, p.52, p.53, p. 56, p.80 for examples). While it is understandable that there are limitations with available data and sample results, such assumptions should better validated and should be shown how they effect the interpretation of the outcomes with regard to inferences about the targeted populations.

Company Response: Questions regarding the customers’ willingness to participate in demand response products (Class 1 and Class 3 resources) were based on the customers’ reported attitudes toward such programs. Responses to survey questions were elicited in five categories (“very positive,” “somewhat positive,” “somewhat negative,” “very negative” and “don’t know/refused”). The rationale for this approach was that customers’ willingness to participate in

demand response programs can be determined by their attitudes toward different program structures. Responses to questions were used to calculate a “weighted” probability of participation by assigning a 100% probability if respondents felt “very” positive and 50% if they felt “somewhat” positive about the program.

The assignment of probabilities to these responses is reasonable in light of the manner in which these questions were structured. It is, however, important to note that the determination of customers’ willingness to participate in such “hypothetical” offerings is difficult and remains subject to uncertainty. This is particularly the case in light of the survey results indicating relatively low levels of awareness among the customers. As discussed in the report (Effects of Structural Changes, p 129), customers’ willingness to participate in demand-side management programs (achievable potentials) is subject to the influence of many factors and is subject to change over time depending on technological and economic variables.

11. In Figure 8 on Page 25 of the report it appears that real-time pricing and critical peak pricing are cost effective. Do the costs for these programs include smart metering infrastructure with two-way communication – i.e., what is included in the cost? If this infrastructure (i.e. smart meters with two-way communication) is not included in the cost how is the program implemented? How does this information compare with that information used to support the company’s decision regarding AMR and used in preparation of the report dated June 29, 2007, submitted to the Commission on Automated Meter Reading in docket 06-999-03?

Company Response: Yes, the costs include smart metering costs with two-way communication capability, however only for those customers participating. This was estimated at \$1,400 for each participating customer. No assumptions were made regarding the installation and operation of a system-wide Automated Meter Reading (AMR) infrastructure. The Company’s decision to implement mobile AMR was based on operational savings. The mobile AMR system does support simple residential time-of-use schedules (on-peak, off-peak kWh) and can be migrated to a one-way fixed network that will support more advanced time-of-use schedules for both residential and commercial customers.

Appendices: Assessment of Long-Term, System-Wide Potential for Demand-Side and Other Supplemental Resources

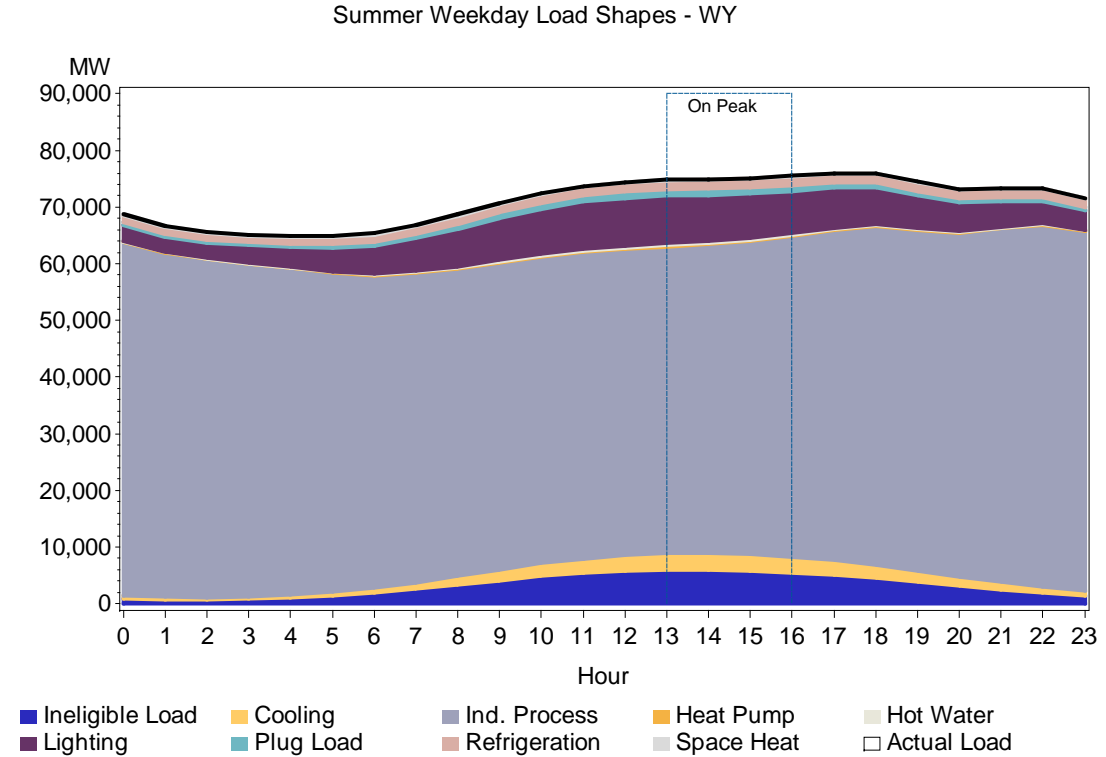
1. Many of the tables and figures in the Appendices are not referenced with the source of the data. It would be helpful if all data source information was readily available in the appendices.

Company Response: Data source citations can be added to the appendices.

2. Figures B.16 (Wyoming Residential Load Shape) and B.17 (Wyoming C&I Load

Shape) are identical. It appears that B.16 is incorrect. -Quantec

Company Response: Figure B.17 is incorrect and the study has been updated with the correct graph below.



3. Table E.5 has the wrong name – it should be Utah Dairy/Swine Number of Farms – not Idaho.

Company Response: It should be Utah Dairy/Swine Number of Farms, not Idaho. The labeling in the study has been corrected.

4. What is the source of Gas Price Data in Tables E.17 – 19? Do the gas price estimates represent the completion of the Rockies Express Project? What is the source of these data?

Company Response: The data used was from the March 2007 Forward Price Curve. The Company’s 72 month gas prices are received from broker quotes and longer term gas prices are retrieved from an outside service. Yes, they include the Rockies Express Project.

5. On Page E-17 there are four charts, E.8 through E.11, with a column entitle CHP eligibility. Do the numbers in these charts referencing CHP eligibility take into account air quality permitting/modeling issues which may preclude a source from

installing heat recovery? i.e., what is the definition of “CHP-eligible”?

Company Response: These eligibility factors do not take into account air quality restrictions as they are only intended to determine the “technical” potential”. The air quality impacts are expected to be minimal because small units burning relatively clean- fuels (natural gas and biomass) were assumed. We recognize that air quality impacts tend to be site-specific; however, an analysis at such level of resolution was deemed beyond the scope of this assessment.

6. The Measure Costs listed in Table C.43 on Page C-77 (and other tables as well) are very confusing – i.e., the measure cost for Existing Evaporative Coolers on a Single Family Residence is \$4 whereas as the measure cost for an Existing Home Central A/C Premium Air Conditioning is \$281,164. What does the term “measure cost” represent? What does incomplete percent installations and technically feasible percent installations represent?

Company Response: Table C.43 presents the year-20 (2027) incremental measure cost for all potential installations. This cost is the product of the per-unit costs of the measure and the number of installations. To avoid the problems associated with negative or zero denominators, in all such cases a minimum cost of \$0.01 was assumed for modeling purposes. Approximately three measures were affected. Quantec has added an explanation regarding the use of \$0.01 in modeling to the text to Appendix C on page C-63.

Other:

On the DSM Potential Study Supplemental Material page of your website the link to the “Detailed 2006 baseline consumption pie chart – Residential” takes you to the “Residential 2007 Achievable Potential and Inputs by Measure Chart” rather than the referenced pie chart.

Company Response: The link was tested and now references the correct pie chart.

The Title on page C-64 of the appendices should be Commercial Measure Details, not Residential Measure details.

Company Response: We acknowledge the error; the report has now been corrected.