Decision 08-04-050 April 24, 2008

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Regarding Policies and Protocols for Demand Response Load Impact Estimates, Cost-Effectiveness Methodologies, Megawatt Goals and Alignment with California Independent System Operator Market Design Protocols.	Rulemaking 07-01-041 (Filed January 25, 2007)

DECISION ADOPTING PROTOCOLS FOR ESTIMATING DEMAND RESPONSE LOAD IMPACTS

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DECISION ADOPTING PROTOCOLS FOR ESTIMATING DEMAND RESPONSE LOAD IMPACT

This decision adopts protocols[1] for estimating the impact of demand response (DR) activities on electric load. This is a very technical decision which provides important information for using demand response as a resource, consistent with the Energy Action Plan I, II, and the 2008 update. The protocols set forth in Attachment A shall be used in the preparation and evaluation of the 2009-2011 DR Program and Budget Applications (Applications), due to be filed by Southern California Edison Company (SCE), Pacific Gas and Electric Company (PG&E) and San Diego Gas & Electric Company (SDG&E) on June 1, 2008. This decision completes work related to load impact estimation in Phase 1 of Commission Rulemaking (R.) 07-01-041; this proceeding remains open to address other issues, including Cost-Effectiveness Methodologies in Phase 1 and the development of DR goals in Phase 2.

1. Procedural Background

On January 25, 2007, the Commission opened R.07-01-041 to address several specific issues related to the Commission's efforts to develop effective DR programs for California's investor-owned electric utilities (IOUs). The Scoping Memo issued on April 18, 2007 divided the major work of this proceeding into two phases. Phase 1, which began in spring of 2007, focuses on the development of M&E protocols and methodologies related to existing and possible future DR activities. Phase 2, which was formally launched by a joint assigned

[1] A protocol is a set of guidelines or rules.

Commissioner's and Administrative Law Judge's (ALJ) Ruling on October 1, 2007, focuses on establishing new DR goals.

The Scoping Ruling required the IOUs, and allowed other parties, to develop and submit straw proposals on load impact estimation and cost-effectiveness for consideration in this proceeding. On July 16, 2007, three-straw proposals on Load Impact Estimation and two on calculating cost-effectiveness were filed. The IOUs filed joint straw proposals on both load impact estimation and cost-effectiveness, as required in the scoping memo. Ice Energy also filed straw proposals on both load impact estimation and cost-effectiveness, and the Ancillary Services Coalition, the California Large Energy Consumers Association (CLECA), Comverge, Inc., EnerNOC, Inc., and Energy Connect, together the "Joint Parties," filed a joint straw proposal on load impact estimation.

Energy Division hosted two workshops on the load impact proposals in July and August 2007. The first workshop, on July 19, 2007, allowed parties that had submitted proposals an opportunity to describe their proposals and answer questions from other parties. Parties filed initial post-workshop comments on the straw proposals in late July.[2] At the second workshop, on August 1, 2007, parties discussed areas of agreement and disagreement, and worked to resolve differences. Parties worked together to prepare a report, filed by the Joint IOUs

[2] Comments were filed by the California Independent System Operator (CAISO), CLECA, the Division of Ratepayer Advocates (DRA), Energy Curtailment Specialists, Inc., Integral Analytics, Inc., Ice Energy, Kinder Morgan (KM), PG&E, SCE, and SDG&E. The Utility Reform Network (TURN), Wal-Mart Stores, and, as well as by the Joint Parties on the Load Impact Straw Proposals, and jointly by Ancillary Services Coalition, EnerNOC, Energy Connect, and Comverge on the IOUs' cost-effectiveness Proposal.

on August 22, 2007, describing the areas of agreement and specifying the parties' positions on areas of disagreement. At the request of the IOUs, the ALJ issued a ruling on August 13, 2007, which modified the Phase 1 schedule to allow parties to file revised straw proposals on cost-effectiveness and load impact methodologies, and extended the date to request evidentiary hearings until September 19, 2007. This ruling also extended to October 12, 2007 the date for issuance of the staff reports synthesizing the comments and party positions and making staff recommendations on protocols for estimating DR load impact and cost-effectiveness.

Energy Division staff issued their report with recommendations on load impact issues on October 12, 2007. Parties filed final comments on the load impact report on October 24, 2007.[3] Based on these final comments and the information comprising the record on this issue, Energy Division and the assigned ALJ developed the final protocols attached to this Decision as Attachment A.

On September 19, 2007, the Commission received three filings addressing the possible need for evidentiary hearings on Phase 1 issues from CLECA, PG&E, and SDG&E and SCE (jointly). PG&E and CLECA each requested evidentiary hearings on certain limited issues related to the development of a cost-effectiveness methodology; CLECA did not see the need for hearings on load impact issues, and PG&E suggested two issues related to the Joint Utilities' load impact protocol that might benefit from further process. PG&E, SCE, and

[3] The following parties filed comments on October 24, 2007, on the staff report on Load Impact issues: Comverge, EnerNOC, and Energy Connect (jointly), the IOUs (jointly), CAISO, DRA, KM, TURN, and Wal-Mart.

SDG&E (the Joint Utilities) and the CAISO filed responses to CLECA's request for hearings.

An ALJ Ruling issued on October 15, 2007, denied these hearing requests, but extended the Phase 1 procedural schedule to allow parties to address several cost-effectiveness issues raised in the requests through individual or joint proposals and comments.[4] Most active parties in the proceeding filed a joint framework proposal[5] in response to this ruling. Rather than answering the specific questions posed in the ruling, this "consensus framework" represented agreement by the various parties on approaches to many of the major cost-effectiveness issues previously in dispute. The consensus framework left several issues unresolved, which parties agreed would need to be deferred to the proceeding on the IOUs' forthcoming DR Applications. This decision does not adopt a cost-effectiveness protocol, which will be addressed in a future decision in Phase 1 of this proceeding.

Section 2 of this decision describes the protocol adopted in this decision; Section 3 describes the Commission's rationale for choices on protocol elements on which there were significant differences among the parties. Section 4 provides detail on when and how these protocols should be applied, and Section 5 discusses issues raised in comments and workshops that are outside the scope of this proceeding. Section 6 describes the need for development of a future protocol for estimating operational load impacts.

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[4] We affirm this, and all other ALJ rulings made to date in this proceeding.

[5] Joint Comments of CLECA, Comverge, Inc., DRA, EnergyConnect, Inc., EnerNoc, Inc., Ice Energy, Inc., PG&E, SDG&E, SCE, and TURN Recommending a DR cost-effectiveness Evaluation Framework, filed November 19, 2007 in R.07-01-041.

2. Load Impact Protocols

The workshops and subsequent discussions of parties led to substantial agreement among them on the purpose of and approach to the Load Impact Protocols; agreement among parties was then reflected in revised protocols filed on September 10, 2007. The Staff Report focused primarily on the revised straw proposal filed by the Joint Utilities because it was the most comprehensive approach to developing a protocols document for estimating the load impact for DR resources. For the same reason, the protocols adopted in this decision (see Attachment A) are based on that revised Joint Utilities' Straw Proposal and the subsequent October 12, 2007, staff report. In preparing the final protocols, staff considered additional party comments, the revised load impact protocols filed by the Joint Parties, and the original protocol filed by Ice Energy, and also made adjustments consistent with Commission policy and technical considerations.

2.1. Purpose and Approach of the Protocols

Estimates of the impact on electric load of DR programs are necessary for any analysis of the cost-effectiveness of DR programs, and for other Commission activities such as long-term resource planning. A protocol is a set of guidelines or rules; in this case, the adopted load impact estimation protocols are a set of guidelines to be used to estimate the impact on load, generally in Megawatts (MW), from DR activities. In developing and revising their protocols, the utilities focused on providing guidance to facilitate consistent estimates of DR load impacts by specifying:

1) What the load impact studies should produce, and what should be reported in load impact studies; and
2) What issues should be considered when selecting a load impact evaluation method or approach.

The Joint IOUs state that their load impact proposal was not meant to detail "how to do the job" of actually creating the estimates, but addressed the required outputs needed to understand the program's impacts on load and the issues that need to be addressed in applying evaluation methods. The variety of potential DR resource activities to be covered by the protocols requires a broad set of evaluation tools and methods, even if the purpose of the adopted protocols is narrow, in this case focusing on long-term resource planning. Each different type of DR activity will require different input data, produce different output information and need an evaluation approach that takes into account unique elements of that DR resource.

For this reason, the adopted protocols contained in Attachment A to this decision define minimum data outputs needed to understand the MW impact of a program, and statistical measures to assist in determining the accuracy of these impact estimates, while allowing flexibility on the part of the load impact evaluators to choose methodologies that are both feasible for and suitable to the particular type of DR activity. The protocols also allow the evaluators to define any additional purposes and needs of the particular evaluation, beyond the minimum required data. The flexibility to choose appropriate methods and define additional purposes and needs beyond the minimum is appropriate in an area of M&E that is relatively new and does not yet have established best practices. This flexibility, combined with the guidance to use current research to validate the choice of methods, is intended to allow evaluators to take advantage of new knowledge and improve estimates over time. To the extent appropriate, the protocols provide direction and guidance on what methods might be appropriate in particular situations, and raise issues that evaluators should consider in choosing methodologies. These protocols should be used in future

formal program evaluations, and should also be used in the preparation of the IOUs' Applications for 2009-2011 Activities and Budgets, currently due June 1, 2008. Only if the evaluator can demonstrate that it is not possible to use these protocols and that other protocols are more appropriate, will other protocols be allowed.

2.2. Structure and Elements of the Protocols

The Joint Utilities' proposal on load impact contained 25 protocols grouped into seven categories. This decision expands these 25 protocols into a set of

27 protocols grouped into eight categories, as follows:

1) Evaluation Planning – Protocols 1 through 3;
2) Ex Post Evaluation for Event Based DR Resources – Protocols 4 through 10;
3) Ex Post Evaluation for Non-Event Based DR Resource – Protocols 11 through 16;
4) Ex Ante Estimation of DR Resource Load Impacts – Protocols 17 through 23;
5) Impact Estimation of DR Portfolios – Protocol 24;
6) Sampling Methods – Protocol 25;
7) Reporting Requirements – Protocol 26; and
8) Process Review – Protocol 27

Protocols 1 through 3 and 27 describe planning and review activities that must be conducted as a part of all load impact evaluations, to ensure that the methodologies chosen in a particular evaluation are appropriate to the particular DR activity and will provide useful results. Similarly, Protocol 26 contains reporting requirements to be used by all evaluators to ensure that the results of each load impact evaluation are reported in a consistent manner. Protocols 24

and 25 address analytical considerations specific to particular situations. Protocol 24 is used to estimate MW impact of a set or portfolio of DR activities; protocol 25 is used for data sampling when such sampling is required.

The remaining protocols are divided into three categories, each focusing on load impact estimation in a different situation. Protocols 4-10 are applicable to ex post (after-the-fact) estimation of load impacts for event-based activities. Protocols 11-16 are applicable to ex-post estimation of load impacts for non-event-based DR activities, and Protocols 17-23 are applicable to ex ante estimation for all DR activities. The different protocols acknowledge that event-based and non-event based activities involve different considerations, and ex ante estimation requires yet a different set of considerations.

Despite the primary focus of the adopted load impact protocols on ex ante estimation for resource planning, it is also appropriate to include ex post estimation protocols here because estimates of future impacts should be informed by actual past performance of similar programs. These ex post protocols may also be useful in evaluating past program performance as part of future program planning, but are not necessarily appropriate for use in determining program settlement methods and terms, which involve different issues important to program participants (such as transparency and timing considerations); these differences are discussed in the protocols themselves.[6]

The frequency for conducting and reporting on load impact evaluations of the various programs is addressed later in this decision.

[6] Appendix A, p. 10.

2.2.1. Evaluation Planning – Protocols 1 through 3

The first three protocols, described in Chapter 3 of Attachment A, address the preparation of an evaluation plan, specifying the methods to be used and the budget and timing involved. These protocols describe the minimum requirements that must be included in the evaluation plan, and in additional issues beyond those minimum requirements that evaluators may wish to address in the plan.[7] Protocol 1 requires development of a formal evaluation plan that addresses the specifics of the minimum requirements elaborated in the remaining protocols, which include (but are not limited to) development and reporting of uncertainty adjusted hourly load impact estimates for certain day types. Protocol 2 states that the evaluation plan should consider whether or not to perform additional analyses beyond the specified minimum requirements; such analyses could relate to potential applications of the impact estimates beyond long-term resource planning, such as ex ante impact estimates for operational dispatch by the CAISO, or ex post impacts for monthly reporting. Protocol 3 contains questions and considerations related to several additional issues, to assist evaluators who need or choose to go beyond the Commission-imposed minimum requirements.

[7] Additional issues that may be addressed in a formal evaluation include (but are not limited to) forecasting DR impacts for resource adequacy or operational dispatch by the CAISO, or periodic reporting of DR performance.

2.2.2. Protocols for Ex Post Estimation of Impact of Event-Based Activities – Protocols 4 through 10

Protocols 4 through 10, described in Chapter 4 of Attachment A, contain direction on conducting ex post evaluations of event-based DR activities.[8] Protocols 4 and 5 instruct evaluators in the basic metrics[9] that must be calculated to measure the load impact of event-based DR activities, and requires calculation of load impact estimates broken down by relevant factors such as event day and participant notification, described in Protocol 8.[10] Protocol 6 requires reporting of the 10th, 30th, 50th, 70th, and 90th percentiles of the calculated impact estimate values. This protocol is intended to address the uncertainty of DR load impact estimates, which are necessarily based on an unobserved "baseline" value of what usage would have been in the absence of DR. Protocols 7 and 8 describe the specific values that must be calculated to provide the minimum data needed to understand a program's impact. Protocol 7 specifies the format for reporting this data, while Protocol 8 describes the information and level of aggregation to be reported in those tables to ensure understanding of the information reported.

Protocols 9 and 10 require certain statistical information to describe the precision and possibility of bias in the impact estimates. Protocol 9 is to be used when an evaluation uses a "day matching"-type methodology[11] for determining

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[8] Event-based DR activities are described on p. 33 of Attachment A.

[9] These metrics include the change in energy use measured in kilowatt hours per hour (kWhr/hr) for relevant hours, the mean change in energy use per year for participants, and the total change in energy use attributable to the particular activity being evaluated.

[10] For example, day type.

[11] The concept of "day matching" is described on page 38 of Attachment A.

the baseline usage and associated load impact. This protocol involves the calculation of different types of error using specific formulas and data.[12] Protocol 10 is to be used when a regression method is used to estimate the load impact.

In general, regression analyses are thought to provide more accurate estimates than day-matching methods. However, if insufficient information is available to perform a regression, day matching may be appropriate. The determination on whether a day matching or regression methodology is most appropriate, and so whether Protocol 9 or 10 should be applied, is made during the creation of the evaluation plan according to Protocols 1 through 3, and is subject to review through the Process Protocol, described in Section 2.2.8, below. Section 3, below, contains a more detailed discussion of appropriate baseline methodologies, which was one of the more controversial issues among parties in the development of the load impact protocols.

2.2.3. Protocols for Ex Post Estimation of Impact of Non-Event-Based Activities – Protocols 11 through 16

Chapter 5 of Attachment A, consisting of Protocols 11 through 16, contains protocols for conducting ex post evaluations of non-event-based DR activities, and is structured to parallel Chapter 4. Protocols 11 and 12 instruct evaluators in the basic metrics[13] that must be calculated to measure the load impact of non-

[12] The example calculations provided in this section are for illustrative purposes only, and approaches appropriate to each specific case should be included in each program's evaluation plan for review as part of the process protocol.

[13] These metrics include the change in energy use measured in kWhr/hr for relevant hours, the mean change in energy use per year for participants, and the total change in energy use attributable to the particular activity being evaluated.

event-based DR activities, and requires calculation of the disaggregated estimates described in Protocol 15.[14] Protocol 13 requires reporting of the 10th, 30th, 50th, 70th, and 90th percentiles of the calculated impact estimate values. This protocol is intended to address the uncertainty of DR load impact estimates, which are necessarily based on an unobserved "baseline" value of what usage would have been in the absence of DR. Protocols 14 and 15 describe the specific values that must be calculated to provide the minimum data to understand a program's impact. Protocol 14 specifies the format for reporting this data, while Protocol 15 describes the information and level of aggregation to be reported in those tables

[14] For example, day type.

to ensure understanding of the information reported. Protocol 16 addresses the statistical information that must be provided to give an indication of the precision and possibility of bias in the impact measures calculated using regression-based methods, which are expected to be appropriate for most types of non-event-based activities.[15] Additional discussion in Chapter 5 provides guidance on specific techniques that could be appropriate for particular types of activities.

2.2.4. Protocols for Ex Ante Estimation of Load Impacts

Chapter 6 of Attachment A, consisting of Protocols 17 through 23, contains protocols for conducting ex ante evaluations of future DR activities. These protocols are the most directly relevant to long-term resource planning, and are also useful for evaluation of proposed future activities, whether new or existing. Protocol 17 provides that, to the extent possible, ex ante estimates should be informed by ex post estimates of historical DR performance of similar or comparable activities. Such ex post data may include valid data from other utilities or other states, if those data are more relevant than data on more local programs. The evaluators must explain their choice of data, and if available ex post estimates are not used, the protocol requires the evaluator to explain why not.

In structure, the rest of the ex ante protocols parallel the protocols for ex post estimation contained in previous chapters, with additional analytical steps to address issues specific to ex ante analysis. Protocols 18 and 19 prescribe

[15] Day-matching may be feasible for some non-event-based activities, such as scheduled DR.

the basic metrics[16] that must be calculated to estimate the load impact of future DR activities, and require calculation of the disaggregated estimates described in Protocol 22.[17] Protocol 20 requires reporting of the 10th, 30th, 50th, 70th, and 90th percentiles of the calculated impact estimate values. Like Protocols 6 and 13, this protocol is intended to address the uncertainty of DR load impact estimates, which are necessarily based on an unobserved "baseline" value of what usage would have been in the absence of DR. Protocols 21 and 22 describe the specific values that must be calculated to provide the minimum data to understand a program's impact. Protocol 21 specifies the format for reporting this data, while Protocol 22 describes the information and level of aggregation to be reported in those tables to ensure understanding of the information reported. Information that must be calculated includes estimation of load impacts under different possible weather conditions and other relevant day-type characteristics, and evaluators must explain the many factors and assumptions incorporated into the impact estimates, to facilitate interpretation of the data provided.

Protocol 23 requires certain statistical information to describe the precision and possibility of bias in the impact measures calculated using regression-based

[16] These metrics include the change in energy use measured in kWhr/hr for relevant hours, the mean change in energy use per year for participants, and the total change in energy use attributable to the particular activity being evaluated.

[17] For example, day type.

methods: the same statistics as required in Protocols 10 and 16.[18] Additional discussion in Chapter 6 outlines several different ex ante scenarios, and provides guidance on specific techniques that could be appropriate based on the various factors reflected in these scenarios.

2.2.5. Portfolio Protocols

Chapter 7 of Attachment A consists of Protocol 24, which has been added to the protocols since the IOUs' revised straw proposal. Protocol 24 provides guidance for using the load impact estimates for various activities to estimate the overall MW impact of a set of planned or proposed activities used in conjunction over a particular time period. The overall impact of a DR portfolio will depend not only on specifics such as event-day scenarios, but also on interactions between different types of activities. This protocol is described in greater detail in Section 3.2, below.

2.2.6. Sampling Protocols

Chapter 8 of Attachment A consists of Protocol 25, which outlines considerations for using data sampling in the application of the load impact estimation protocols. Data sampling, as opposed to using a complete data set, can increase the possibility of error and uncertainty in analyses. However, data sampling can be appropriate in some situations and sometimes is necessary. For example, sampling may be necessary when complete interval load data is not available, or as a means to reduce analysis costs when the volume of data available is too large. The decision on whether sampling is appropriate will be

[18] Day-matching may be feasible for some non-event-based activities, such as scheduled DR.

made during the production of the evaluation plan (Protocols 1 through 3) with input through the Process Protocol (Protocol 27). Protocol 25 directs evaluators utilizing sampling to take specific steps to minimize sampling bias and to analyze and account for any suspected bias that may result from the sampling methodology. Additional discussion in this chapter provides guidance on sampling issues such as the circumstances under which different sampling methodologies, designs and sample sizes may be appropriate.

2.2.7. Reporting Protocols

Chapter 9 of Attachment A consists of Protocol 26, which prescribes the format, structure and contents of evaluation reports. In addition to reiterating the output table format for the data analyses described in earlier protocols, Protocol 26 describes the objectives and necessary narrative elements of final load impact estimation reports, in order to ensure that such reports are appropriate for a variety of purposes and intelligible to a variety of audiences.

2.2.8. Process Protocols

Chapter 9 of Attachment A consists of Protocol 27, which guides review of the evaluation process by stakeholders and allows for stakeholder input into the chosen methodologies. Like the Portfolio Protocol (Protocol 24), this protocol was not included in the Joint IOUs' initial straw proposal, but was recommended by staff.

Protocol 27 requires load impact evaluations, which are generally performed by or at the direction of the utility responsible for the DR program, to undergo a review and comment process at several stages to ensure that they benefit from public review. We anticipate that this review process would utilize

the existing Demand Response Measurement and Evaluation Committee.[19] The protocol requires review of the initial evaluation plan, interim and draft reports, and final reports to allow comment on (and, if appropriate, adjustment of) chosen research methods to improve final results. Further discussion in this chapter focuses on procedures for review of the evaluation at different stages of the process, and establishes that Joint Staff can resolve disputes among the evaluators and reviewers over technical choices on appropriate methodologies in a particular situation.

3. Conclusions in Areas of Disagreement

As noted above, the workshop on load impact estimation held on August 1, 2007, resulted in agreement among parties on many fundamental methodological, technical, and content issues for the load impact estimation protocols. The adopted approaches contained in the 2008 Load Impact Protocol, Attachment A to this decision, reflect this substantial agreement among the parties. In several areas of the adopted protocols, staff have changed language to add detail or clarify specific methodological recommendations that were generally agreed upon by parties. Most of these changes, which are reflected in Attachment A, are consistent with the staff recommendations described in the October staff report, and do not require further discussion here.

Some issues were not universally agreed upon by parties, or were agreed upon in principle but not fully reflected in the revised IOU draft filed

[19] The Demand Response Measurement and Evaluation Committee (DRMEC), consisting of representatives of each of the IOUs and staff from the California Energy Commission and this Commission, provides oversight of DR evaluation activities. See D.06-11-049, Conclusion of Law 4.

September 10, 2007. These issues and the approach that we adopt for each of them (as reflected in Attachment A) are discussed in more detail below.

3.1. Baseline Issues

One of the most important elements in estimating the ex post or ex ante impact of any DR program is determining what electricity usage would have been in the absence of the DR program. This is generally referred to as the "baseline." The baseline, by definition, cannot be observed or measured directly, and so it is necessary to develop a methodology that estimates usage as accurately as possible. The appropriate baseline for measuring a program's impact was a subject of much debate among parties, from the straw proposals to the workshops to the final comments filed on the staff report. The straw proposals of the Joint Parties and Ice Energy make recommendations on appropriate methodologies for determining an accurate baseline for certain types of customers under particular circumstances, while the Joint IOUs' straw proposal leaves flexibility for a program evaluator to choose an appropriate baseline, depending on various factors specific to a given activity.

There has been much discussion (in this proceeding and elsewhere) and some research on how best to estimate the baseline usage against which to compare actual or forecasted use to calculate DR load impacts. Parties have expressed strong preferences for and against various baselines, and have cited completed and ongoing research[20] on baselines in support of their positions (and in opposition to positions that they do not espouse).

[20] e.g., Quantum, *Evaluation of 2005 Statewide Large Nonresidential Day-ahead and Reliability Demand Response Programs*, April 28, 2006, pp. 7-114.

Some parties used arguments about the accuracy (or inaccuracy of particular methodologies in asking that particular program-level load impact baseline methodologies be either pre-approved or ruled out entirely within the Load Impact Protocols themselves.[21] The Joint Parties and TURN, for example, provide specific examples from recent research in support of their contention that a day-matching methodology using the highest 3 in the previous 10 days to estimate baseline (sometimes called the "highest 3 in 10 methodology) may systematically misstate (some say overstate, others say understate) the load impact of certain weather-sensitive customers.[22]

Because of the variety of different types of programs and the many customer types and characteristics that may affect the accuracy of baseline calculations, however, it is not possible to provide a comprehensive list of methodologies that are appropriate for each possible type of program. In addition, there is a relative absence of research on the accuracy of many baseline methodologies in different circumstances, so it is not yet possible to determine whether there are methodologies that are better or worse in any or all situations.

Given that the state of knowledge on the accuracy of baseline methodologies continues to evolve, it is appropriate to provide evaluators with flexibility to apply methodologies that they deem appropriate given the

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[21] TURN advocates ruling out the current "3 in 10 method" in TURN Comments, October 24, 2007, p.5; Joint Parties advocate the development of a set of "Commission-approved" baseline methodologies in Joint Party Comments, October 24, 2007, at p.8.

[22] "TURN Comments on Staff Report Addressing Load Impact Estimation Protocols," October 24, 2007, p. 3, referencing Quantum, *Evaluation of 2005 Statewide Large Nonresidential Day-ahead and Reliability Demand Response Programs,* April 28, 2006, pp. 7-114.

characteristics of a specific program and its participants, and not to arbitrarily limit the choices to pre-approved methodologies that may be superceded by newer methodologies, or that subsequent research may show are not as accurate as alternatives. Similarly, it does not make sense to completely rule out any methodology in all situations, when even unpromising methodologies later may be found to be accurate and appropriate for use in specific circumstances.

Rather than adopting a set of approved baseline methodologies or ruling out other options entirely, the adopted protocols allow flexibility by evaluators to choose a methodology appropriate to the particular program under consideration. However, the planning and process protocols will require that evaluators provide adequate justification for their choices, and will allow review and require revision of these choices if they are found to be inappropriate in a particular case.

We emphasize that evaluators should in all cases base the choice of a baseline methodology on current research, and should provide a detailed explanation of why they made their choice and why they believe it to be most appropriate. The adopted protocols for ex post and ex ante load impact estimation allow for flexibility to choose appropriate methods, which may change as knowledge in this area changes, but tempers this flexibility by requiring evaluators to offer a clear and research-based rationale for the chosen methodology, and to get input from stakeholders and consider changes to the initially proposed methodology through the process protocol.

Several parties advocated further study of the accuracy of baseline methodologies, to improve future load impact estimates. We encourage such research. If appropriate based on future research, this protocol may be refined

and updated to provide more specific guidance in a future Commission review of these protocols.

3.1.1. Customer Settlement Baselines Differ from Ex Post Program Baselines

Some parties to this proceeding have also argued for changes to the existing customer-specific baselines used for settlement purposes in existing programs, or for the placing of limitations on the settlement methodologies that may be proposed or adopted for future DR activities.[23] These issues are outside the scope of this proceeding. Because settlement baseline issues have been raised repeatedly, however, it may be helpful to explicitly discuss the difference between methodologies for determining baselines for settlement, and methodologies for determining baselines for resource planning.

The Joint Parties' comments on the PD cite discussion in previous rulings in this proceeding of the value of ex post analysis of load impacts, and assert that these references show that determination of appropriate settlement baseline methodologies are within the scope of this proceeding.[24] This incorrectly conflates ex post program-level baseline methodologies focused on resource planning with customer settlement methodologies, and reflects a confusion between the customer- or contract-specific baseline used for determining payments to a customer (often at the individual customer level) enrolled in a particular program, and the broader aggregated baselines described in these protocols for use by program evaluators in ex post analysis for program and

[23] Joint Parties' comments, October 24, 2007, p. 8. KM comments p. 4. Wal-Mart comments p. 3.

[24] Joint Party Comments on PD, p. 6.

resource planning. Attachment A contains methodologies for ex post estimation of program-level baselines, consistent with the focus of this phase of this proceeding on measurement and evaluation at the program level for resource planning purposes. As discussed in Attachment A, the methodologies appropriate for program-level analyses focused on resource planning may not be applicable to estimation of baselines for settlement purposes.[25]

Because settlement procedures, including settlement baselines, are appropriately determined along with other specific elements of DR activities when those activities are adopted by the Commission, settlement baseline issues are not within the scope of this proceeding, and are not addressed in this decision. The settlement baseline and other terms of existing DR programs adopted in previous Commission decisions[26] remain in effect until or unless they are modified. Avenues exist for parties to request modification of previously adopted program elements, if necessary. Parties interested in participating in the design of settlement baselines and other program characteristics for DR programs in 2009 and beyond are encouraged to participate in the proceeding on the utilities' upcoming DR Applications (in which the terms of most existing DR programs will be reviewed and terms of new programs will be set), and in any additional proceedings in which the Commission considers new DR activities.

3.2. Portfolio Load Impact Estimation (New Protocol 24)

As discussed in the staff report, the expected system impacts from a group of programs may be higher or lower than their simple sum because of potential

[25] Attachment A, p. 33, see especially footnote 22.

[26] See, for example, D.06-03-024 and D.06-11-049.

for positive and negative interactions between the programs. In the future, we expect numerous DR activities to be operational and to operate simultaneously, especially in times of system stress. Parties to this proceeding did not reach agreement on the appropriateness of protocols to recognize the extent and magnitude of these interactions and estimate the overall load impact of a set or portfolio of activities. Before issuance of the staff report, the Joint Utilities stated their belief that it is premature to propose protocols regarding how best to develop impact estimates for DR resource portfolios given the limited research performed to date.[27] Other parties saw a need for a Portfolio Protocol. In the October 12, 2007 Staff Report, Joint Staff recommended a compromise approach, developing a Portfolio Protocol that:

1) Requires the identification of possible synergies across DR resources (i.e., positive relationships across DR resources that could increase impacts over time) and possible overlaps that might reduce the load impacts of the DR resource(s) being addressed in the evaluation; and
2) Once this list of positive synergies and possible DR resource overlaps is compiled, the evaluators would make a judgmental determination regarding whether any of these portfolio effects are "material…"[28]

Several commenting parties were supportive of this compromise approach in principle, some with recommended modifications or suggestions that additional work is needed to improve future methods.[29] No parties objected to

[27] Joint Utilities Revised Straw Proposal filed September 10, 2007, p. 103.

[28] Staff Report, October 12, 2007, p. 30.

[29] Comments of DRA October 24, 2007, p. 3; TURN Comments on Staff Report Addressing Load Impact Estimation Protocols, pp. 6-7; Joint Comments of PG&E,

Footnote continued on next page

this compromise. Staff have developed a Portfolio Protocol consistent with the recommendations in the October 12, 2007, report. Due to the need for further research and experience with portfolio measurement, it is not possible to develop a more detailed Portfolio Protocol in this proceeding, but we see Portfolio 24 as an initial step towards the development of a better portfolio analysis. This Protocol, like others, can be refined in future reviews and updates of the load impact protocols.

3.3. Addition of Reporting on 1-in-10 Weather Year

The Joint Utilities' Protocol 22 called for forecasts of DR impacts to be provided for three-day types:

1) For a typical event day for a 1-in-2 weather year for event-based resource options;
2) For the average weekday for each month in which the resource option is in effect for a 1-in-2 weather year for non-event based resource options; and
3) For the monthly system peak day for each month in which the resource option is in effect, for a 1-in-2 weather year for non-event based resources.

These three-day types are logical, but are not sufficient for forecasting the cost-effectiveness of the DR activities. In addition to these three-day types proposed by the Joint Utilities, the October 12, 2007, staff report recommends the addition of load impact estimates for each of these three-day types for very hot conditions, defined as a 1-in-10 weather year. Most parties did not comment on this suggestion in the staff report, but the Joint IOUs did not object to the

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SDG&E, and SCE on the Joint Staff Recommendation Report on Demand Response Load Impact Estimation, pp. 9-10.

addition of this information and agreed that it would provide valuable information.[30] Providing this information will improve our understanding of the full impact of DR programs under different circumstances, and we have added this requirement to the final protocol, adopted here in Attachment A.

3.4. Inclusion of Reporting on 100 Hours with Highest Loss of Load Equivalent (LOLE)

In an effort to ensure that the load impact protocols provide sufficient information for use with the cost-effectiveness methodology also under development in this proceeding, the staff report recommended that both the ex post and ex ante protocols include estimates of the load reduction that is expected to be available during hours with the highest loss of load equivalent (LOLE) values and highest hourly wholesale prices for the regions and areas where the DR resources would be available. This recommendation was intended to provide a set of estimates of DR MW availability and projected load impact for when the system is under particular stress, which could be useful as an input in future cost-effectiveness analyses.

Most parties did not address this recommendation in their comments on the staff report, but the Joint IOUs expressed strong objections to it. The Joint IOUs noted, among other things, that providing this information would require a great deal of effort and cost, and that estimates of load impacts in 1-in-10 year weather conditions will provide a source of information on response when the system is under stress. Because there are alternative ways to obtain useful information in future cost-effectiveness evaluations, the top 100 hours

[30] Joint IOU comments, October 24, 2007, p. 7.

calculations recommended by staff are not necessary, and are not included in the final load impact protocol.

3.5. Joint Parties' Revised Straw Proposal

The Joint Parties' revised straw proposal focused on a subset of estimation methods related to estimating payments for load drops for selected customer segments. Much of the Joint Parties' revised straw proposal (and later comments) focus on baseline issues, discussed above, including the appropriate baselines to use for settlement purposes. To the extent appropriate, suggestions from the Joint Parties' revised straw proposal and additional factors from the Joint Parties' comments have been integrated into the final Protocols adopted here (Attachment A), which is based on the Utilities' revised proposal. The adopted protocols are sufficiently broad to allow the use of many of the Joint Parties' recommended methods if they are deemed appropriate through the planning and process protocols for evaluation of a particular activity.

3.6. Ice Energy Straw Proposal

Similarly, Ice Energy proposed methods for assessing the load impact for a subset of DR-related activities, in this case some Permanent Load Shifting. The adopted protocols are designed to be useful in estimating the impacts of Permanent Load Shifting, and incorporate or allow for use of Ice Energy proposals to the extent appropriate.

4. Appropriate Uses of the Adopted Protocols

As discussed in the February 27, 2008, ALJ Ruling, the adopted protocols 1 through 26 should be used in calculating the load impact estimates used in the 2009-2011 DR Program and Budget Applications due to be filed on June 1, 2008. Due to time constraints, Protocol 27 (the Process Protocol) need not be followed

in the preparation of the June 1, 2008 Applications, but should be followed for all other required activities.

In addition, IOUs should follow the adopted protocols (including Protocol 27) each year for each DR activity adopted by the Commission, and file an evaluation report on the results in this Rulemaking or a successor proceeding identified by the Commission. The information provided in these evaluations may also be of use in other Commission proceedings, for example those focusing on Resource Adequacy and Procurement. Similarly, the protocols should be used in estimating DR for long-term procurement planning and resource adequacy purposes unless otherwise directed in the relevant proceeding. This decision does not change the IOUs' existing DR monthly reporting requirements. This means that the results of formal evaluations conducted using these protocols may not match the estimates provided in the monthly reports. IOUs should work with staff on ways to improve the accuracy of the monthly reports, keeping in mind that the protocols adopted here are not necessarily appropriate for use in preparing reports that are provided frequently and in close proximity to DR events.

The first full annual evaluation using these protocols will begin within 90 days of this decision, as specified in the protocol itself.[31] That evaluation will focus on ex post evaluation of the 2008 programs and on producing ex ante estimates for at least the next five years, with a final report following the Reporting Protocols in Protocol 26 due on April 1, 2009. Reports on the previous year's programs and utilizing the most recent data to estimate future load

[31] Appendix A, p. 147.

impacts will be due annually on April 1, unless otherwise directed by the Commission.

5. Issues Outside of the Scope of this Proceeding

This proceeding is not the appropriate forum to address a number of the issues raised by the Joint Parties and others that predominately relate to settlement or other program design features. Joint Parties recommend that the IOUs, in the context of current programs and future similar programs, take into account the methods and information provided by the Joint Parties on the appropriateness of different methods to use in estimating customer baselines for settlement that incorporate same day adjustments on event days.[32] Kinder Morgan and Wal-Mart also address settlement baseline issues, and discuss customer notification and timing.[33] As described in Section 3.1, above, these are fundamentally program design issues, and should be considered in the proceedings where the individual programs or tariffs are seeking approval (e.g., advice filing for tariff change, 2009-2011 program application, or contract application). Once the terms of a DR program are adopted, they remain in effect until they are modified, and appropriate procedures exist for parties to request modification if necessary.

6. Load Impact Protocol for Operational Planning Purposes

In their comments on the staff report on load impact issues, CAISO requested a further phase of this proceeding or additional work to complete load

[32] Joint Parties' comments, October 24, 2007.

[33] Kinder Morgan comments on Staff Report, October 24, 2007, and Wal-Mart comments on Staff Report, October 24, 2007.

impact protocols for operational resource planning for their own use in scheduling the wholesale market. The Commission sees the benefit of adapting load impact protocols that would be useful for operational resource planning. Work to develop modifications to load impact protocols for this purpose will be explored in a future phase of this proceeding or a successor proceeding.

7. Comments on Proposed Decision

The proposed decision (PD) of the ALJ in this matter was mailed in accordance with Section 311, and comments were allowed under Rule 14.3 of the Commission's Rules of Practice and Procedure. Comments were filed on April 14, 2008 by CAISO, CLECA, Ice Energy, the Joint Parties, and the Joint Utilities. Reply comments were filed on April 21, 2008 by the Joint Parties, the Joint Utilities, and North American Power Partners LLC.

Comments received from CAISO support the commitment expressed in Section 6 of the PD to develop an operational load impact protocol, and encourage the Commission to aim to have such protocols in place for summer 2009.[34] CLECA expresses general support for the PD,[35] and Ice Energy supports the PD in adopting load impact protocols that address permanent load shifting.[36]

Ice Energy also supports the PD's acknowledgement of the value of geographic specificity in load impact estimation, and recommends that the

[34] Comments of the California Independent System Operator to the Proposed Decision Adopting Protocols for Estimating Demand Response Load Impacts, April 14, 2008. p. 2

[35] Comments of the California Large Energy Consumers Association on the Proposed Decision of ALJ Hecht on Load Impact Protocols, April 14, 2008. p. 3.

[36] Comments of Ice Energy, Inc., April 14, 2008, pp. 1-2.

Commission encourage greater focus on this concept in the future.[37] The protocols have not been changed to require greater granularity in reporting because we lack a sufficient record on which base specific requirements at this point, however this is an area in which the protocols may be refined or expanded in the future.

The Joint Utilities support the PD in general, and suggest several small revisions to the PD and Attachment A (Load Impact Protocols). We have made small corrections and clarifications in the PD and attachment in response to these comments. The Joint Utilities also ask for flexibility to tailor the Load Impact Protocol reporting requirements to waive reporting in specific situations, with the approval of the DRMEC.[38] We decline to provide this flexibility; we require the information described in this decision for DR program planning and evaluation purposes, and it is not appropriate to allow the DRMEC to modify or waive reporting requirements adopted by this Commission.

The Joint Parties assert that the PD errs by not addressing load impact estimation related to customer settlements[39] or (at a minimum) explaining in what proceeding(s) the Commission will address appropriate settlement baseline methodology.[40] We have modified Section 3.1, above, to clarify the difference

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[37] Comments of Ice Energy, Inc., April 14, 2008, pp. 2-3.

[38] Comments of Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company on Administrative Law Judge's Proposed Decision Adopting Protocols for Estimating Demand Response Load Impacts, April 14, 2008, pp. 7-9.

[39] Comments of EnerNOC, Inc., EnergyConnect, Inc, and Comverge, Inc., on Proposed Decision on Demand Response Load Impact Protocols (Joint Party Comments on PD), April 14, 2008. p. 1.

[40] Joint Party Comments on PD, p. 3.

between settlement baselines for individual customers (which are not within the scope of this phase of this proceeding) and baselines for ex post evaluation of program-wide impacts (which are within the scope). In addition, we reiterate that the appropriate methodology for determining the settlement baseline for a given program is determined in the proceeding in which the particular program is adopted. Joint Parties also recommend that the PD be modified to adopt or pre-approve a specific baseline methodology.[41] As discussed in section 3.1, above, it is not possible to adopt a single "best" methodology, or even a comprehensive list of "approved" methodologies, at this time. However, Attachment A does list several methodologies for program evaluators to consider; the methodology supported by the Joint Parties is one of these possibilities.[42]

8. Assignment of Proceeding

Rachelle B. Chong is the assigned Commissioner and Jessica T. Hecht is the ALJ in this proceeding.

Findings of Fact

1. Load impact estimates are necessary for analysis of the cost-effectiveness of DR programs, and for long-term resource planning.

2. Load impact protocols improve consistency and accuracy in the calculation of DR load impact estimates.

3. The variety of potential DR resource activities to be covered by the protocols requires a broad set of evaluation tools and methods.

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[41] Joint Party Comments on PD, p. 3.

[42] See discussion in Attachment A at p. 50.

4. Each different type of DR activity will require different input data, produce different output information and require an evaluation approach that takes into account unique elements of that DR resource.

5. It is not possible to provide a comprehensive list of baseline estimation methodologies that are appropriate for each possible type of DR program.

6. There is a relative absence of research on the accuracy of many baseline methodologies in different circumstances, so it is not yet possible to determine whether there are methodologies that are better or worse in any or all situations.

7. Flexibility in load impact protocols will allow evaluators to take advantage of new knowledge and improve estimates over time.

8. Load impact estimation methodologies appropriate for long-term resource planning are not necessarily appropriate for use in determining program settlement methods and terms.

9. The flexibility to choose appropriate methods and define additional purposes and needs beyond the minimum is appropriate in an area of M&E that is relatively new and does not yet have established best practices.

10. To the extent possible, estimates of the future impacts of DR programs should be informed by actual past performance of similar programs.

11. Settlement terms, including settlement baselines, are appropriately determined along with other specific elements of DR activities when the activities are adopted by the Commission.

12. Choice among possible baseline (and other) methodologies used in load impact estimation according to this protocol should be based on research into the accuracy of the available options.

13. Annual evaluation reports on the load impact of DR activities based on these protocols will provide information that may be of use in several Commission proceedings.

Conclusions of Law

1. The Commission requires load impact information on DR programs for long-term resource planning and other purposes.

2. It is reasonable to allow flexibility on the part of load impact evaluators to choose methodologies feasible for and suitable to a particular type of DR activity.

3. It is reasonable to allow flexibility on the part of load impact evaluators to define additional purposes and needs beyond the minimum required in these protocols.

4. Settlement procedures and other program design issues, including settlement baselines, are outside the scope of this proceeding.

5. It is reasonable to require evaluators to offer a clear and research-based rationale for their chosen methodologies, and get input from stakeholders on possible alternative methodologies.

6. The DR Load Impact Estimation Protocols in Attachment A should be adopted for use by SCE, SDG&E, and PG&E.

7. These protocols should be used in future formal program evaluations, in the preparation of the IOUs' Applications for 2009-2011 Activities and Budgets, currently due June 1, 2008, and in other Commission proceedings, as appropriate.

O R D E R

IT IS ORDERED that:

1. The Demand Response (DR) Load Impact Estimation Protocols in Attachment A (Adopted Protocols) are adopted for use by Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), and Pacific Gas and Electric Company (PG&E).

2. Within 90 days of the date of this decision, SCE, SDG&E, and PG&E shall file initial evaluation plans on all DR activities for the year 2008.

3. SCE, SDG&E, and PG&E shall follow adopted protocols 1 through 26 in preparing load impact estimates to be filed in their 2009-2011 DR Applications on June 1, 2008.

4. SCE, SDG&E, and PG&E shall perform annual studies of their DR activities using the adopted protocols, and shall file reports consistent with Protocol 26 annually on April 1 of each year in this or a successor proceeding. If this and all successor proceedings are closed, the utilities shall file these reports with the Commission's Energy Division and serve them on the most recent service list for this, or a successor proceeding. The information contained in those reports may be used in other Commission proceedings, as appropriate.

5. SCE, SDG&E. and PG&E shall use the adopted protocols to estimate DR load impacts for long-term procurement planning and resource adequacy purposes, unless otherwise directed by the ALJ or Assigned Commissioner in the relevant Commission proceeding.

This order is effective today.

Dated April 24, 2008, at San Francisco, California.

MICHAEL R. PEEVEY
President
DIAN M. GRUENEICH
JOHN A. BOHN
RACHELLE B. CHONG
TIMOTHY ALAN SIMON
Commissioners

D0804050 Adopting Protocols for Estimating Demand Response Load Impacts