Docket:	**R. 10-05-006**
Exhibit No.:	
Commissioner:	**Michael R. Peevey**
ALJ:	**Peter V. Allen**
Witnesses:	**Rory Cox**

PACIFIC ENVIRONMENT

Prepared Track I Testimony of Pacific Environment

Rulemaking No. 10-05-006
Long-Term Procurement Planning Track III Testimony
San Francisco, CA
August 4, 2011

EXECUTIVE SUMMARY

Pursuant to the *Administrative Law Judge's Ruling Revising System Track I Schedule*, Pacific Environment submits this Testimony in response to the *Track I Testimony of Mark Rothleder on Behalf of the California Independent Systems Operator Corporation*, filed on July 1, 2011. Pacific Environment also responds to the utility modeling results featured in the *Joint IOU Supporting Testimony*, submitted on July 1, 2011. In this Testimony, Pacific Environment addresses issues identified for Track I, in the following order:

I. CAISO'S FINDINGS OF NO INTEGRATION NEED IS SUPPORTED BY A PLETHORA OF EVIDENCE AND SHOULD BE ADOPTED BY THE COMMISSION.

Pacific Environment addresses the result of CAISO's modeling, and agrees with the conclusion that there is no integration need at this time.

II. CAISO'S MODEL RESULTS ARE CONSERVATIVE.

Pacific Environment discusses how CAISO's model results are conservative because it did not consider multiple types of resources such as energy storage and increasing system flexibility that could be used as integration tools.

III. THE COMMISSION SHOULD NOT RELY ON THE HIGH TRAJECTORY SCENARIO.

Pacific Environment discusses how the High Trajectory Scenario was wrongfully constructed and should not be relied on by the Commission.

IV. SCE'S AND SDG&E'S REQUEST FOR LOCAL CAPACITY IS BASED ON FAULTY MODELING ASSUMPTIONS AND SHOULD BE DENIED.

Pacific Environment discusses how SCE's and SDG&E's request for local capacity is based on faulty input assumptions, including a significant underestimate of

renewable build-out and a failure to consider alternative resources to fossil-fuel generation. Pacific Environment urges the Commission to reject these requests for new capacity.

V. CONCLUSION

Pacific Environment urges the Commission to adopt an affirmative statement of no integration need based on CAISO's modeling results finding no need, as well as the fact that these modeling results are conservative and underestimate the ability of the current system to integrate renewable energy.

I. CAISO'S FINDINGS OF NO INTEGRATION NEED IS SUPPORTED BY A PLETHORA OF EVIDENCE AND SHOULD BE ADOPTED BY THE COMMISSION.

Q. What were the results of CAISO's modeling related to integration of renewable resources?

A. In short, CAISO found that there is no need for new conventional resources to integrate a 33 percent renewable portfolio standard for the 2011-2020 timeframe under all four of the Commission mandated scenarios.[1]

Q. Do you believe this assessment is supported by the evidence you reviewed?

A. Yes, the available evidence supports CAISO's finding that California does not need additional conventional resources to meet the 33 percent RPS goal. In fact, CAISO's model is conservative in a number of ways, which further supports the Commission finding that there is no need to authorize new procurement for the purpose of renewable integration at this time. Notably, California's extraordinarily large reserve margin shows that utilities have already over-procured resources, and that existing resources, even with OTC retirements, are more than sufficient to integrate renewable energy. Thus, the available data points show no new need in California, and the results of CAISO's modeling, even with its shortcomings, reflect that.

II. CAISO'S MODEL RESULTS ARE CONSERVATIVE.

Q. Are CAISO's model results conservative?

[1] *See* CAISO Track I Testimony, at p. 43 ("No upward incremental shortfalls were identified for the four priority scenarios, and, thus, no incremental needs of resources beyond capacity already planned were identified in any of these scenarios."); *see also id.* at p. 44 ("qualified capacity in excess of the planning reserve margin in the four priority scenarios provides sufficient unloaded flexible capacity to meet the load following and regulation needs while the renewable resource capacity is meeting the load.").

A. Yes, CAISO's model results are conservative for multiple reasons. For instance, CAISO failed to include all of the currently and likely-available resources for integrating renewables in its input assumptions. For example, by not including input assumptions for resources such as energy storage, CAISO has produced an overly conservative model.

A. CAISO's Modeling Results Are Conservative Because Forecast Errors Will Continue to Improve.

Q. Earlier you stated that CAISO's modeling results are conservative for a number of reasons. Can you explain one of these reasons?

A. Yes, one problem with CAISO's modeling inputs is that CAISO applies the same forecast errors to the entire 2011-2020 timeframe. Using the same forecast errors for the entire period until 2020 is overly conservative. As we move towards 2020, forecasting methodology will greatly improve, making forecasts more accurate.[2] CAISO itself acknowledges this: "[f]orecast error improvements should also be considered in future study work."[3] In fact, CAISO is "undertaking a number of initiatives to improve forecasting and the integration of forecasts into its market and system procedures."[4]

Q. How will forecast errors continue to improve?

A. Forecast errors will continue to improve because the technology used to measure factors such as cloud cover is rapidly developing.[5] Given that the majority of U.S. states

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[2] Climate Policy Initiative, *Balancing and Intraday Market Design: Options for Wind Integration*, at p. 8 (Jan. 2011), http://www.climatepolicyinitiative.org/files/attachments/96.pdf (discussing continuing improvements in wind forecasting).
[3] CAISO Track I Testimony, at p. 5.
[4] CAISO, *Integration of Renewable Resources: Operational Requirements and Generation Fleet Capability at 20% RPS*, at p. 12 (Aug. 31, 2010), http://www.uwig.org/CAISO-20PercentRPS.pdf.
[5] *See* California Renewable Energy Collaborative, *California Renewable Energy Forecasting, Resource Data and Mapping: Current State of the Art in Solar Forecasting*, Appendix A, at pp. 5-18, http://uc-ciee.org/downloads/appendixA.pdf (discussing advances in solar forecasting, including companies working on improving and developing new techniques).

now have renewable portfolio standards,[6] a number of companies and other organizations are investing in improving forecasting technology.[7]

Forecast errors will also continue to improve as more renewable resources are built throughout the state, increasing geographic diversity.[8] With geographically distributed wind and solar resources, forecasts can be aggregated, leading to smoother profiles,[9] a result echoed in numerous studies for both wind and solar resources.[10] Finally, forecast errors will continue to improve when forecasts can be based on a more robust data set.[11]

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[6] Solar Energy Industries Association, *Renewable Electricity Standard (RES): Expanding Markets for Renewable Energy*, at p. 1 (March 1, 2010), http://www.seia.org/galleries/FactSheets/Factsheet_RES.pdf.

[7] *See e.g.,* AWS Truewind Website, Forecasting: eWind® – Proven, Accurate, Valuable, http://awstruewind.overitmedia.com/forecasting.cfm/details/true (for an example of one company that "provides highly reliable forecasts of wind speed, wind direction, and plant output to plant operators, power marketers, utilities, and Independent System Operators."); The Solar Power Forecasting Initiative, http://sol.ucmerced.edu/; Lindsay Morris, *Renewable Energy and the Smart Grid*, Renewable Energy World (Feb. 25, 2011), http://www.renewableenergyworld.com/rea/news/article/2011/02/smart-grid-renewable-energy-and-the-smart-grid (AWS Truepower awarded $2.15 million in federal funding to develop, deploy and manage a targeted observation campaign using advanced forecasting methods covering. "The funding is intended to enable utilities and grid operators to more accurately forecast when and where electricity will be generated from wind power.").

[8] *Comments of the Division of Ratepayer Advocates on the California Independent Systems Operator's and Pacific Gas & Electric Company's Renewable Integration Model Methodologies*, at p. 12 (Sept. 21, 2010) http://docs.cpuc.ca.gov/efile/CM/123702.pdf ("uncertainty around wind generation scheduling is decreasing and the forecast errors are not escalating as more ISOs are integrating wind resources.").

[9] Mills, et. al., *Understanding Variability and Uncertainty of Photovoltaics for Integration with the Electric Power System*, at pp. 2, 5-6, 8 (Dec. 2009), http://eetd.lbl.gov/ea/emp/reports/lbnl-2855e.pdf [Hereinafter Mills]; *see also* Climate Policy Initiative, *Balancing and Intraday Market Design: Options for Wind Integration*, at p. 9 (Jan. 2011), http://www.climatepolicyinitiative.org/files/attachments/96.pdf.

[10] *See e.g.,* International Energy Agency, *Prospects for Large-Scale Energy Storage in Decarbonised Power Grids*, at p. 1 (2009), http://www.iea.org/papers/2009/energy_storage.pdf ("wide geographical dispersal of wind power and PV plants reduces the net variation of many plants as seen by the system as a whole."); Lawrence Berkeley National Laboratory, *Implications of Wide-Area Geographic Diversity for Short-Term Variability of Solar Power*, (Sept. 2010) (same); California Renewable Energy Collaborative, *California Renewable Energy Forecasting, Resource Data and Mapping: Current State of the Art in Solar Forecasting*, at pp. 15-16 http://uc-ciee.org/downloads/appendixA.pdf.

[11] CAISO Track I Testimony, at Slide 64 ("Since forecast errors are based on profiles and not actual production data, recommend calibrating the simulated to the actual forecast errors when more solar data is available.").

Forecast error improvements also provide economic benefits.[12] Xcel Energy, for example, found that every percentage point improvement in accuracy saved it $1.2 million through a reduction in spinning reserves.[13]

Q. Does CAISO consider improvements to forecast errors in its modeling?

A. CAISO believes its forecast errors reflect the benefits of geographic diversity.[14] However, it has admitted that "improvement in forecast errors [is] not directly considered in the Step 2 modeling."[15]

Q. The joint utilities take issue with CAISO's use of hour ahead and five minute ahead forecasting. What do the utilities propose instead?

A. The utilities argue that the model should rely on day ahead forecasting.[16]

Q. Do you agree that day ahead forecasting should be part of the modeling?

A. Balancing authorities are moving towards shorter forecast periods for dispatching resources. Hour and five minute-ahead forecasts are more accurate, and thus help to provide reliable power without over-committing resources.[17] The CAISO model's reliance on hour and five minute-ahead forecasts is consistent with this transition.

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[12] *See Written Statement of Dr. David Mooney, Director of Electricity, Resource and Building Systems Integration Center* , Presented to U.S. House of Representatives (June 16, 2010), http://science.house.gov/sites/republicans.science.house.gov/files/documents/hearings/061610Mooney.pdf.
[13] *See id.,* at p. 4.
[14] CAISO Track I Testimony, at pp. 23-24; *see also* CAISO Data Request Set In Response to PE, July 21, 2011, Question 11. Note that all Data Requests referenced are included in Appendix A.
[15] CAISO Data Request Sent In Response to PE, July 21, 2011, Question 11.
[16] Utility Specific Track I Testimony, at p. 4.
[17] *Comments of the California Wind Energy Association on Renewable Integration Modeling Methodologies per ALJ Allen's Ruling of December 23, 2010*, R.10-05-006, at p. 11 (Jan. 14, 2011), http://www.calwea.org/pdfs/publicFilings2011/CalWEA_LTTP_IntegModel_Comments_011411-final.pdf ("CAISO will effectively replace a significant portion of its Day- Ahead (DA) scheduling process with a number of Day-Of (DO) scheduling procedures that will better address system uncertainty, reduce the procurement of unneeded system resources, and respond to the changing characteristics of both the conventional and renewable resources that are expected to operate in the CAISO footprint in 2020."); *Comments of the Division of Ratepayer Advocates on the CAISO and PG&E's RIM Methodologies*, at p. 12 (Sept. 21, 2010), http://docs.cpuc.ca.gov/efile/CM/123702.pdf ("assumptions for forecast errors are critical to model accurately, as an overestimate of forecast error will lead to a significantly overstated load-following requirement.").

Q. Are there examples of how CAISO is transitioning to shorter forecast periods to integrate renewables?

A. Yes, CAISO is currently in discussions with the Bonneville Power Authority (BPA) to increase scheduling frequency on its ties with BPA, and CAISO expects to begin a pilot project with BPA to increase scheduling frequency this year.[18] CAISO is also continuing discussions with other balancing authorities to develop a dynamic transfer policy.[19]

CAISO also currently has two proposed market redesign initiatives aimed at adapting to the operational requirements of renewable integration.[20] Changes being examined include transitioning to hour by hour planning scheduling as opposed to day ahead scheduling.[21]

B. CAISO's Modeling Results Are Conservative Because Energy Storage Capacity That Is Being Developed and Is Currently Available Should Have Been Included in the Modeling Inputs.

Q. Is considering energy storage capacity that is being developed and is currently available in the model important?

A. Yes, energy storage capacity is currently available, and many projects are being developed. Plus, the coming years will see many advances in storage technology.

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[18] CAISO Data Request Set By DRA No. LTPP2010-CAISO-002, July 15, 2011, Question 4; *see also* CAISO, Discussion Paper for Feb. 1, 2011 Conference Call in Dynamic Transfer Stakeholder Process (Jan. 27, 2011), http://www.caiso.com/2b13/2b13aa17243e0.pdf.

[19] CAISO Data Request Set By DRA No. LTPP2010-CAISO-002, July 15, 2011 Question 4; *see also* CAISO, *Dynamic Transfers Final Proposal* (May 2, 2011), http://www.caiso.com/2b72/2b72e3f642fa0.pdf

[20] CAISO Data Request Set By DRA No. LTPP2010-CAISO-002, July 15, 2011, Response to Additional Request 1; *see also* CAISO, *Discussion & Scoping Paper on Renewable Integration Phase 2* (April 5, 2010), http://www.caiso.com/Documents/DiscussionandScopingPaper-RenewableIntegrationMarketandProductReviewPhase2.pdf.

[21] *See* CAISO, *Discussion & Scoping Paper on Renewable Integration Phase 2*, at pp. 5-6 (April 5, 2010) http://www.caiso.com/Documents/DiscussionandScopingPaper-RenewableIntegrationMarketandProductReviewPhase2.pdf.

Q. Did CAISO consider all the energy storage capacity that is available and currently being developed in its model inputs?

A. No, CAISO only considered the storage capacity of five hydro pump storage facilities, such as the Helms Storage Pump in PG&E's territory.[22] CAISO did not consider the capacity of renewable pump storage facilities including storage facilities that are currently on-line or are planned to come on-line within the 2020 time frame.[23] In fact, CAISO stated that it does not consider the capacity of such storage facilities within the scope of the proceeding.[24] This is despite CAISO's acknowledgment that "[e]nergy storage technology is rapidly advancing,"[25] and "storage or curtailment opportunities should be considered in lieu of additional capacity."[26]

Q. What types of energy storage systems did CAISO not consider?

A. CAISO failed to consider that energy storage MW are currently installed in California.[27] California currently has batteries, compressed air, and molten salt storage in place or being developed.[28] Because CAISO did not consider non-hydro storage as within the scope of the proceeding, it did not consider these resources.[29]

Q. Can you describe some of the energy storage resources that were not considered in the CAISO model?

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[22] *See* CAISO Track I Testimony, at p. 42; *see also* CAISO Data Request Set In Response to PE, July 21, 2011, Question 10 (CAISO considered the operating characteristics for the Helms, Castaic, Eastwood, Lake Hodges, SN LSPP_8, facilities).
[23] CAISO Data Request Set In Response to PE, July 21, 2011, Question 4.
[24] *Id.*
[25] CAISO, *Power Storage R&D: What Do The Next Five Years Look Life?*, at p. 5, http://www.caiso.com/Documents/2749cb114f750.pdf.
[26] CAISO Track I Testimony, at p. 43.
[27] Janice Lin, California Energy Storage Alliance, *Imperative of Energy Storage for Meeting California's Clean Energy Needs*, at p. 37, (May 6, 2010), http://www.storagealliance.org/presentations/StrateGen_CESA_ESA_Presentation_2010-05-06.pdf.
[28] Janice Lin, California Energy Storage Alliance, *Imperative of Energy Storage for Meeting California's Clean Energy Needs*, at p. 37 (May 6, 2010), http://www.storagealliance.org/presentations/StrateGen_CESA_ESA_Presentation_2010-05-06.pdf.
[29] *See* CAISO Data Request Set In Response to PE, July 21, 2011, Question 4.

A. In July of 2010, the Commission approved PG&E's renewable PPA under which PG&E will procure 150 MW of renewable energy,[30] which will include a thermal storage system using molten salt as the energy storage medium.[31] In its Advice Letter seeking project approval, PG&E explained that the storage technology had already been successfully deployed in prior projects.[32]

In January of 2010, the Commission also approved PG&E's request to match U.S. Department of Energy funds for a Compressed Air Energy Storage project in Kern County.[33] The facility "would use off-peak energy from renewable sources such as wind energy to inject compressed air into an underground rock formation, and then use the compressed air to power a generator during peak periods when energy is most needed."[34] The completed project would generate 300 MW of capacity for up to 10 hours.[35]

Other examples I would point to include a 53 MW storage project that SCE and Ice Energy are constructing in the Tehachapi region,[36] which will store wind energy in utility-scale battery systems.[37] SCE's request for matching funds awarded by the DOE was approved by the Commission.[38] Beacon Power has also constructed a flywheel

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[30] Commission Resolution E-4340 (July 29, 2010).
[31] *Id.* at p. 3.
[32] *Id.*
[33] Press Release, *CPUC Approves PG&E Request to Match U.S. Department of Energy Award for Compressed Air Energy Storage Project* (Jan. 21, 2010), http://docs.cpuc.ca.gov/word_pdf/NEWS_RELEASE/112654.pdf
[34] *Id.*
[35] *Id.*
[36] *Southern California Edison Finalizes Stimulus Grant to Large-Scale energy Storage Demonstration*, GREEN ENERGY NEWS (Oct. 21, 2010), http://www.green-energy-news.com/nwslnks/clips1010/oct10021.html.
[37] SCE Website, Energy Storage is Key to a More Efficient Grid, http://www.sce.com/PowerandEnvironment/smartgrid/energy-storage.htm.
[38] Commission Resolution E-4355 (Aug. 12, 2010), http://docs.cpuc.ca.gov/word_pdf/FINAL_RESOLUTION/122098.pdf; *see also* SCE, Tehachapi Wind Storage Project, http://asset.sce.com/Documents/Environment%20-%20Smart%20Grid/0910_TSP.pdf.

storage system connected to a California wind farm.[39] There are also expanding customer-side storage projects, for instance a 12KW thermal storage unit at Napa Community College and a 5 MW thermal storage facility at Los Angeles Community College.[40]

Q. Have there been other demonstrations showing the benefits of energy storage?

A. There have been many demonstrations throughout the country studying different applications of energy storage technology. For example, in 2009 Sandia National Laboratories analyzed a flywheel energy storage demonstration for area regulation in PG&E's service area.[41] Other demonstration projects include a 2 MW storage pilot project in Huntington Beach,[42] a flywheel demonstration project near Fremont,[43] and a Soluble Lead Flow Battery project in San Diego.[44] SMUD is also studying the storage potential for use near its Solano Wind Facility.[45]

Q. Has the Commission been involved in any demonstration projects?

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[39] *See* Renewable Energy World, *Beacon Connects Flywheel System to California Wind Farm*, (March 17, 2010), http://www.renewableenergyworld.com/rea/news/article/2010/03/beacon-connects-flywheel-system-to-california-wind-farm.

[40] California Energy Storage Alliance, *Importance of Energy Storage to California's Renewable Future*, at pp. 3-4 (April 28, 2011), http://www.energy.ca.gov/2011_energypolicy/documents/2010-11 16_workshop/presentations/07_Lin_Importance_of_Energy_Storage.pdf.

[41] Jim Eyer, Sandia National Laboratories, *Benefits from Flywheel Energy Storage for Area Regulation in California – Demonstration Results,* (October 2009), prod.sandia.gov/techlib/access-control.cgi/2009/096457.pdf.

[42] AES Energy Storage Projects, http://www.aesenergystorage.com/projects.html.

[43] ARRA Energy Storage Demonstrations, at p. 3, http://www.sandia.gov/ess/docs/ARRA_StorDemos_10-6-10.pdf.

[44] Electricity Advisory Committee, *Energy Storage Activities in the United States Electricity Grid*, at p. 11 (May 2011), http://www.oe.energy.gov/DocumentsandMedia/FINAL_DOE_Report-Storage_Activities_5-1-11.pdf.

[45] PUC SmartGrid Workshop, Sacramento Municipal Utility District, *Integration of Renewables and Energy Storage*, (June 26, 2009), http://www.cpuc.ca.gov/NR/rdonlyres/734E972D-112F-488E-9FB2-659827ED7190/0/ElaineSisonLebrillaSMUD.pdf.

A. Yes, the Commission awarded a number of grants to companies engaged in storage demonstration projects in September of 2010,[46] including a project from SunPower Corporation demonstrating the integration of advanced energy storage systems in combination with existing PV systems,[47] and a demonstration project on a Zero Net Energy village in Davis California demonstrating storage technology use for small "behind the meter" systems.[48]

Q. Has the Commission acknowledged energy storage as an integration tool?

A. Yes. Energy Division has stated that "storage technologies have progressed through successful pilot and demonstration phases . . . [and] are poised to become commercially available."[49] Energy Division further recommended that the Commission incorporate energy storage systems in the Energy Action Plan loading order and require all resource procurement processes to allow energy storage to participate.[50]

In the Distributed Generation proceeding,[51] the Commission's proposed decision granted eligibility to Advanced Energy Storage (AES) to be included in the Self-Generation Incentive Program, which provides funding for qualifying

[46] Commission Resolution E-4354 (Sept. 2, 2010), http://docs.cpuc.ca.gov/word_pdf/COMMENT_RESOLUTION/121571.pdf
[47] *Id.*
[48] *Id.*
[49] California Public Utilities Commission, *Electric Energy Storage: An Assessment of Potential Barriers and Opportunities*, at p. 2, (July 9, 2010).
[50] *Id.* at p. 9.
[51] R.10-05-004.

facilities.[52] The Commission approved AES as a qualifying facility, citing the ability to "reduce peak demand and GHGs."[53]

Q. Is there any legislation related to energy storage?

A. Yes, AB 2514 requires utilities to meet a percentage of peak loads through use of energy storage, and has been projected to result in at least 3,400 MW of storage capacity by 2020.[54] To comply with AB 2514, the Commission also began a rulemaking in 2010 to determine targets for energy storage systems.[55]

Given the passage of AB 2514, complete consideration of energy storage potential makes particular sense given that energy storage will be a *required* aspect of the California grid. Energy storage has also been found to be a critical aspect of meeting AB 32 and RPS goals.[56]

Q. Did CAISO consider the impacts of AB 2514 in its model?

A. No. CAISO's failure to take into account energy storage systems that are available and are likely to be constructed makes its model results overly conservative.

C. CAISO Did Not Adequately Consider the Flexibility of the Current System, Which Presents a Feasible and Cost-Effective Approach to Integrating Renewables.

Q. Does increasing system flexibility help to integrate renewable energy?

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[52] California Public Utilities Commission, *Proposed Decision Modifying the Self-Generation Incentive Program and Implementing Senate Bill 412*, at p. 17 (May 6, 2010), http://docs.cpuc.ca.gov/efile/PD/139612.pdf.

[53] *Id.*

[54] *See* California Energy Storage Alliance, *The Business Case For Distributed Energy Storage*, at p. 5 (2010), http://www.storagealliance.org/presentations/CESA_Beijing_ES_Forum_Distributed_%20Energy_Storage_2010-03-31.pdf.

[55] *See* Order Instituting Rulemaking, R.10-12-007, at p. 1 (Dec. 16, 2010), http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/128658.pdf.

[56] Berkeley Law Center for Law, Energy & the Environment, *The Power of Energy Storage: How to Increase Deployment in California to Reduce Greenhouse Gas Emissions*, at pp. 8-12 (July 2010), http://www.law.berkeley.edu/files/Power_of_Energy_Storage_July_2010.pdf.

A. Yes, system flexibility includes resources such as fast start technology that helps units quickly ramp up and down in response to changes in the grid. Including a full analysis of current flexibility in the system and ways to increase flexibility would produce a more accurate model.

Q. Did CAISO consider the current system's flexibility in its modeling?

A. CAISO's consideration of system flexibility was conservative and did not examine future increases in flexibility. For instance, CAISO did not analyze the potential for upgrading existing facilities with software technology.[57] CAISO also assumed that most imports would not provide ancillary services.[58] Both of these assumptions could have been modified in the modeling as it is likely that existing facilities will be outfitted with new software technology and imports will increasingly provide ancillary services.

The Lawrence Berkeley National Laboratory comments on the Standardized Assumptions suggested incorporating system flexibility assumptions into the model, recommending that CAISO evaluate options to increase existing flexibility including reducing institutional barriers to accessing flexible units outside of California and providing incentives to operate existing units in more flexible ways.[59]

Q. How would considering system flexibility impact the modeling results?

A. For many currently existing facilities, software upgrades such as OpFlex are currently being used to allow for faster startup and increased ramping capability.[60]

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[57] CAISO Data Request Set In Response to PE, July 21, 2011, Question 13 ("The ISO did not make any assumption regarding upgrading of the existing system software or other technologies to come on more quickly. ISO modeled what capabilities currently exist.").
[58] CAISO Data Request Set In Response to PE, July 21, 2011, Question 7.
[59] Lawrence Berkley National Laboratory, *Review of PG&E Renewable Integration Modeling and CAISO 33% RPS Analysis*, at p. 9 (Dec. 21, 2010), http://docs.cpuc.ca.gov/efile/RULINGS/128790.pdf.
[60] *See* GE Ecomagination: OpFlex Turndown Technology, http://ge.ecomagination.com/products/opflex-turndown.html; *see also* Siemens, Integrated Technologies that Enhance Power Plant Operating Flexibility,

Facilities have seen substantial benefits by employing OpFlex[61] and Fast Cycle technology,[62] and the CEC has recommended fast-start technologies for facilities coming on-line.[63] Further, this technology can be installed through relatively minor modifications, making upgrades more cost-effective than building a new facility.[64]

Q. What else should CAISO have incorporated into its model?

A. The model should have examined other ancillary services. For instance, CAISO is currently "considering a market mechanism including additional products needed to meet increased renewable penetration levels."[65] Calpine Corporation agreed that the Plexos model should have considered additional ways to incorporate flexibility.[66]

Finally, CAISO's model overestimates the need for ancillary services by using seasonal maximum values for determining need,[67] again producing a model that appears more inflexible than it actually is.

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http://www.energy.siemens.com/hq/pool/hq/energy-topics/pdfs/en/combined-cycle-power-plants/PowerGen2007PaperFinal_.pdf.

[61] *See Best Practices Awards*, COMBINED CYCLE JOURNAL, at pp. 14-16 (2008), http://www.combinedcyclejournal.com/1Q2008/1Q2008-1/108Award-p.3-27.pdf.

[62] Siemens, *Integrated Technologies that Enhance Power Plant Operating Flexibility*, at p. 2, http://www.energy.siemens.com/hq/pool/hq/energy-topics/pdfs/en/combined-cycle-power-plants/PowerGen2007PaperFinal_.pdf; Siemens AG, *Improvement of Operational Efficiency Based on Fast Startup Plant Concepts*, at p. 4 (Sept. 12-16, 2010) http://www.worldenergy.org/documents/congresspapers/455.pdf.

[63] *See* Letter from Paul C. Richins, Jr., Environmental Protection Office Manager, California Energy Commission, to Jack P. Broadbent, Bay Area Air Quality Management District, at p. 2 (May 29, 2007), http://www.energy.ca.gov/sitingcases/russellcity_amendment/documents/2007-05-31_LTR_BROADBENT.PDF.

[64] Jeanne Rubner, *Pictures of the Future* (Spring 2009), http://www.siemens.com/innovation/en/highlights/energy/update_01/power-plant-optimization.htm.

[65] *Id.*

[66] *See Calpine Comments on 33% RPS Integration Study Step 2 Production Simulation Input Data*, at p. 1, Attached to CAISO's Responses to DRA Data Request No. LTPP2010-CAISO-001(a); *see also* Jan. 24, 2011, Email from Matthew Barmack, Calpine Corporation, Attached to CAISO's Responses to DRA Data Request No. LTPP2010-CAISO-001(a); *see also* Combined Cycles of the Future – DOCO30211, Attached to CAISO's Responses to DRA Data Response No. LTPP2010-001(a).

[67] CAISO Data Request Set By DRA No. LTPP2010-CAISO-001(a), July 15, 2011, Question 1.

D. It Is Not Clear to What Extent, If Any, CAISO Considered Demand Response Programs Such as Auto-DR.

Q. Did CAISO consider demand response programs in its modeling?

A. Yes. The load pattern was modified to reflect assumptions accounting for demand response.[68] However, it is not clear whether CAISO also examined advances in demand response technology, specifically Automated Demand Response.

Q. What is Automated Demand Response?

A. Automated Demand Response (Auto-DR) is pre-programmed DR technology where customer response is fully automated.[69] As a result, Auto-DR is more reliable because it does not rely on the actions of the end-user,[70] and has been shown to result in a higher amount of load shed than manual DR.[71]

Q. What is the significance of Auto-DR to the CAISO model?

A. CAISO only considered DR as a subtraction from the load,[72] but because Auto-DR can automatically work to back up sudden losses in generation, it can be fully integrated into the system as an ancillary service. Thus, Auto-DR can act not just as a demand side reduction but as a backup for integration needs.

Q. What other DR tools should CAISO have considered in its modeling?

A. CAISO should have also incorporated the benefits associated with Open ADR.

Q. Can you explain what Open ADR is?

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[68] CAISO Track I Testimony, at p. 35.
[69] Lawrence Berkeley National Laboratory, *OpenADR and AutoDR Program History and Implementation*, at Slide 13 (Sept. 16, 2010), http://www.energy.ca.gov/electricity_analysis/notices/2010-09-16_drmec_workshop/presentations/Kiliccote-Piette-OpenADR-EvalPresentation_Version2-091510.pdf.
[70] Global Energy Partners Project Manager, *Auto-DR: Smart Integration of Supply and Demand for Rapid Grid Response*, at p. 8 (March 2010), http://www.gepllc.com/AutoDR_GridResponse.pdf.
[71] *Id.* at p. 9.
[72] CAISO Data Request Set In Response to PE, July 21, 2011, Question 2.

A. Open ADR is a grid interoperability standard currently used to automate DR programs.[73] Open ADR provides a "DR interface that allows electricity providers to communicate DR signals directly to existing customers using . . . existing communications such as the Internet."[74] The CEC has recognized the benefits of Open ADR, including "increasing the number of facilities that participate in demand response, and reducing the cost to . . . participat[e] in demand response."[75]

Q. Are there any Auto-DR or Open ADR programs in place in California?

A. Yes. In California and the Northwest, roughly 200 facilities have implemented DR strategies via the Open ADR infrastructure, and in 2008, these 200 facilities averaged a 29% peak load reduction.[76] PG&E is currently looking to Open ADR and Auto-DR to address certain challenges posed by renewable integration, including intra-hour variability, ramping, forecast error, and over generation.[77]

E. CAISO's Modeling Results Are Conservative Because It Failed to Adequately Consider the Full Range of Smart Grid Technology and Management.

Q. What is Smart Grid Technology, and why is it important to consider here?

A. Generally, Smart Grid Technology is technology that aids balancing authorities and utilities in sharing resource planning information. Key features include consumer

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[73] Lawrence Berkeley National Laboratory, *OpenADR and AutoDR Program History and Implementation*, Slides 3, 5 (Sept. 16, 2010), http://www.energy.ca.gov/electricity_analysis/notices/2010-09-16_drmec_workshop/presentations/Kiliccote-Piette-OpenADR-EvalPresentation_Version2-091510.pdf.

[74] Demand Response Research Center Website, Open Automated Demand Response, http://drrc.lbl.gov/openadr.

[75] California Energy Commission, *Open Automated Demand Response Communications Specification*, at p. 2 (April 2009), http://drrc.lbl.gov/sites/drrc.lbl.gov/files/cec-500-2009-063.pdf.

[76] Global Energy Partners Project Manager, *White Paper on Auto-DR: Smart Integration of Supply and Demand for Rapid Grid Response*, at p. 7 (March 2010), http://www.gepllc.com/AutoDR_GridResponse.pdf.

[77] *See* PG&E & Lawrence Berkeley National Laboratory, *Technical Training for PG&E's Intermittent Renewable Resources and OpenADR Integration Pilot*, at Slide 52 (Feb. 8, 2011), http://drrc.lbl.gov/sites/drrc.lbl.gov/files/irr-tech-training-2-8-2011.pdf.

participation in demand response and "[a]ccomodating all generation and storage options."[78]

Q. How does smart grid technology help to integrate renewables?

A. To provide one example, smart grid technology can help improve forecast errors by enabling quicker sharing of forecast information. One study found that the most economical approach for improving hourly forecasts, "would be to require or incentivize 3rd party data providers/aggregators to share PV output and radiometer data in real time with the ISO, utilities, and forecast providers," through smart meters, among other technology.[79] The cost of sharing forecast data "is minimal as the infrastructure is in place such as more than 2000 sensors, meters, telemetry, and databases."[80]

Q. Did CAISO consider these advances in its modeling?

A. CAISO did consider some aspects such as demand response, but the modeling inputs do not take into consideration the full panoply of smart grid resources available.[81]

Q. What is the result of CAISO not considering the full range of smart grid resources available?

A. CAISO's failure to consider the full range of smart grid resources available makes CAISO's modeling results conservative.

F. CAISO's Modeling Results Are Conservative Because CAISO Does Not Consider the Full Projection of Distributed Generation Build-Up.

Q. What are distributed generation (DG) resources?

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[78] Department of Energy Website, Smart Grid, http://www.oe.energy.gov/smartgrid.htm.
[79] California Renewable Energy Collaborative, *California Renewable Energy Forecasting, Resource Data and Mapping: Current State of the Art in Solar Forecasting*, at p. 1.
[80] *Id.* at p. 17.
[81] *See* CAISO Data Request Set In Response to PE, July 21, 2011, Question 2.

A. In short, DG resources are projects that are 20 MW or less that are usually located close to load, such as solar photovoltaic on rooftops.

Q. What DG assumption did CAISO use in the model?

A. CAISO assumed a total of 1,749.5 MW of customer-side distributed solar.[82]

Q. Does this comport with other California initiatives?

A. No, this is a conservative estimate that conflicts with California initiatives that will increase customer-side solar. For instance, the Go Solar California campaign is a joint CEC and Commission effort with a goal of installing 3,000 MW of DG by 2016.[83] The Commission's portion of the campaign, the California Solar Initiative (CSI), is a solar rebate program aimed at IOU customers with a goal of installing approximately 1,940 MW of solar generation capacity by 2016.[84]

The Commission recently issued its CSI Annual Program Assessment, showing "that the rate at which Californians are installing rooftop solar energy systems to meet their electric demand is growing at a rapid pace."[85]

Governor Brown also recently held a major conference to begin implementing the goal of reaching 12,000 MW's of localized renewable generation by 2020.[86] In one of the working papers for the conference, Energy Commission staff found that based on "current market trends," California is on its way to meeting this goal, estimating about

[82] CAISO Track I Testimony at p. 27, Table 4.
[83] About Go Solar California, http://www.gosolarcalifornia.org/about/index.php
[84] *Id.*
[85] Commission Press Release, *CPUC Report Shows Record Growth in Rooftop Solar Installs*, (July 5, 2011) http://docs.cpuc.ca.gov/word_pdf/NEWS_RELEASE/138482.pdf.
[86] The Governor's Conference on Local Renewable Energy Resources, Discussion Paper No. 1, *California's Path to 12,00 Megawatts of Local Renewables*, http://gov.ca.gov/docs/ec/ConferencePaper_regional_target.pdf.

5,210 MW of "behind the meter" development, 3,420 MW of wholesale generation, and 11,000 MW of potential capacity to interconnect in the IOUs territories.[87]

Q. Does CAISO consider this goal in its modeling?

A. No, this is another example of how CAISO's model is conservative.

III. THE COMMISSION SHOULD NOT RELY ON THE HIGH TRAJECTORY SCENARIO.

Q. What is the High Trajectory scenario?

A. The 33% Trajectory High Load Scenario is a non-priority scenario included in CAISO's modeling. The scenario has a 10% higher load assumption than the four priority scenarios.[88]

Q. What are the results of the Trajectory High Load scenario?

A. The model shows 4,600 MW of upward load following, because with an increased load, there is an additional need for flexible fleet capacity. "As a result, remaining flexible capacity is insufficient to simultaneously meet the load following requirements."[89]

Q. Should the Commission rely on this scenario in this proceeding?

A. No. This scenario is not constructed properly. First, it relies on improper solar forecasts by using generic forecasts for a sunny area where solar output is expected to be high. Second, it artificially inflates the load to be 10% higher whereas all available data shows lower economic and population growth during the relevant time frame.[90] CAISO does not explain how it arrived at this higher load figure.[91]

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[87] *Id.* at p. 2.
[88] *See* CAISO Track I Testimony, at p. 6.
[89] *Id.* at pp. 43-44.
[90] *See* Track II Testimony of Bill Powers on Behalf of Pacific Environment, at pp. 4-6.
[91] *See* CAISO Data Request Set In Response to PE, July 21, 2011, Question 9.

For these reasons, the Commission should not rely on the High Trajectory scenario and should not base any of its findings of the results from this scenario.

IV. SCE'S AND SDG&E'S REQUEST FOR LOCAL CAPACITY IS BASED ON FAULTY MODELING ASSUMPTIONS AND SHOULD BE DENIED.

Q. Have you read SCE's and SDG&E's Track I testimony?

A. Yes.

Q. Do SCE and SDG&E request new procurement authority?

A. It is unclear if SCE is requesting new procurement authority, but SCE's Track I testimony does describe a scenario whereby 2,000 MW of fossil-fired generating capacity is needed in the SCE service area to serve Local Capacity Requirements.[92] SDG&E, on the other hand, asks the Commission to authorize the procurement of 415 MW of new generation.[93] But, as SDG&E admits, its calculation resulted in a cushion of 393 MW.[94]

Q. Do you agree that SCE or SDG&E need new procurement authority?

A. No.

Q. Can you explain why?

A. Both SCE's and SDG&E's models are faulty. In addition to the cushion in SDG&E's calculation, the type of model both calculations rely on, as even SCE admits, "cannot be used to conduct full, or robust, LCR studies, which require flow and other detailed transmission modeling analysis."[95] In addition, both utilities ignore several key factors in their calculus, which if examined, would have shown no new additional fossil capacity requirements.

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[92] Southern California Edison Track I Testimony, at p. 3; Joint Utility Track I Testimony, at p. 4-2.
[93] Prepared Track I Testimony of San Diego Gas & Electric, at pp. 11-12 (July 1, 2011).
[94] *See* SDG&E Data Request Response to DRA, 002-Q1.
[95] Southern California Edison Track I Testimony, at p. 10.

Q. What are these factors?

A. SCE does not consider all of its available resources when making its need determination.[96] SCE fails to adequately quantify the level of renewable build-out and how this will impact its local need. Renewables add local capacity, and current policy trends, prices, and already approved projects promise to substantially increase the potential for renewables to serve local capacity load. Yet in their testimony, SCE bizarrely states that the "renewable portfolio buildout has little impact on LCR . . . ."[97]

Q. Are there renewable projects you can point to that have been ignored by SCE?

A. The Commission recently approved 500 MW of solar PV projects to be distributed on commercial rooftops throughout the SCE service territory. The Commission's press release announcing the authorization states "[t]he energy generated from the project will be used to serve Edison's retail customers and the output from these facilities will be counted towards Edison's RPS goals."[98] Before 2020, these initial 500 MW are likely to be dwarfed by larger programs, as Governor Brown has called for 12,000 MW of capacity built under the state's renewable portfolio standard to be projects sited as distributed generation in urban areas.[99] While the details of this order have yet to be finalized, it's a safe assumption that both the LA Basin and the Ventura/Big Creek LCA are ideal for much of this added capacity, given the solar resources of the region.

Q. Did SDG&E consider renewables?

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[96] SCE Data Request Set DRA/IOU-SCE-002, July 25, 2011, Question 1.
[97] Southern California Edison Track I Testimony, at p. 6.
[98] Commission Press Release, *CPUC Approves 500 MW Distributed Solar Program for SoCal Edison* (June 23, 2009), http://www.bluefish.org/500solar.htm.
[99] The Governor's Conference on Local Renewable Energy Resources, http://gov.ca.gov/s_energyconference.php

A. SDG&E assumes a figure of only 21 MW of local renewable energy for years 2012-2020.[100] This is an assumption that completely ignores the advancement of behind the meter solar PV projects, among other renewable energy projects. For just one program, the California Solar Initiative, the SDG&E territory has had approximately 56 megawatts installed.[101] Other programs, including a recently approved Commission program, are expected to install additional megawatts.[102] This also ignores the tremendous potential that the San Diego region has in efficiency gains, and in additional solar resources. A 2007 study, "San Diego Smart Energy 2020," found that by fully implementing existing programs, following existing laws, and emphasizing distributed solar, SDG&E can cost reduce energy consumption by 4,000 megawatts, while building solar capacity to 5,800 MWs, by 2020. 920 MW's of the solar power would have energy storage capability to smooth out the load.[103] This is far above what SDG&E is considering in this LTPP.

Q. Is this cost-effective?

A. According to the report, this buildout would cost $700 million.[104] However, since the report was published, the cost of solar photovoltaics has fallen further. We believe this is cost-effective, and will contribute to the Governor's order of 12,000 MWs of distributed renewable generation statewide.

Q. Why should these solar resources be considered when determining local reliability needs?

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[100] SDG&E Track I Testimony, at Table 1.
[101] *See* https://energycenter.org/index.php?option=com_docman&task=cat_view&gid=244&Itemid=666.
[102] *See* D.10-09-016 (authorizing a five-year solar PV program to develop up to 100 MW of 1 to 5 MW solar PV projects in SDG&E service area); SDG&E Advice Letters 2210-E, 2211-E (establishing the implementation of the program).
[103] Powers, Bill. *San Diego Smart Energy* 2020. 2007. http://sdsmartenergy.org/smart.shtml.
[104] *Id.* at p. 5.

A. Distributed solar resources help meet peak LCR demand in 1 in 10 scenarios. Hot summer days in Southern California are sunny or nearly-cloud free, and recent studies have shown that distributed solar resources can absorb variable conditions. A 2010 Lawrence Berkeley Lab study demonstrated that the relative aggregate variability of PV plants sited over a 20 km-wide region is six times less than the variability of a single site for variability on time scales less than 15-minutes.[105] The report concludes that the costs of managing solar PV are dramatically reduced by geographic diversity.[106]

The 500 MW in SCE's territory will presumably be spread throughout its large territory. Moreover, recent data from the CSI program has demonstrated that solar PV has a high on-peak availability.[107] Thus, the solar PV resources should be considered as a viable way to meet LCR requirements.

Q. Have California permitting agencies recognized the effectiveness of distributed solar as a viable alternative to peaking natural gas power plants?

A. Yes, in June 2009, the California Energy Commission rejected an application for an upgrade of the Chula Vista Energy Project (CVEP).[108] The CEC took issue with the "too-narrow project objective [which] artificially limit[ed] the range of potential alternatives."[109] Specifically, the applicant eliminated PV generation from its alternatives analysis when it found that PV did "not meet the project objective of utilizing

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[105] Mills, et. al, Lawrence Berkeley National Laboratory, *Implications of Wide-Area Geographic Diversity for Short-Term Variability of Solar Power*, http://eetd.lbl.gov/ea/emp/reports/lbnl-3884e.pdf.
[106] *Id.*
[107] *See* Track II Testimony of Bill Powers on Behalf of Pacific Environment, at pp. 9-12 (describing the results of the CSI program).
[108] Final California Energy Commission Decision on Chula Vista Energy Upgrade Project, Application for Certification (June 2009), http://www.energy.ca.gov/2009publications/CEC-800-2009-001/CEC-800-2009-001-CMF.PDF.
[109] *Id.* at p. 29.

natural gas available from the existing transmission system."[110] The CEC relied on testimony of Bill Powers, who found that it was feasible to install PV "on rooftops and over parking lots in a quantity sufficient to meet or exceed the project's incremental increase in output."[111]

The CEC went on to find that solar PV was a viable option, and that rooftop PV "mounted on existing flat warehouse roofs or on top of vehicle shelters in parking lots do not consume any acreage. The warehouses and parking lots continue to perform those functions with the PV in place . . . [and] there was little or no difference between the cost of energy provided by a project such as the CVEUP compared with the cost of energy provided by PV."[112] The CEC also quoted Bill Powers' finding that "PV does provide power at a time when demand is likely to be high—on hot, sunny days," and "that storage technologies exist which could be used to manage" solar PV.[113]

Q. Are there other resources that SCE and SDG&E do not consider?

A. Yes, both SCE and SDG&E fail to consider energy storage as an eligible resource to meet LCR. There is growing body of evidence and case studies that demonstrate that storage is a viable and affordable energy source to smooth peak load. For instance, Glendale Water and Power recently announced deployment of 2 megawatts of "Ice Bear" storage units from Ice Energy that store energy that is generated at night for daytime peak use, especially in HVAC systems. Each unit installed thus far reduces energy use by more than 386,000 Kwh, largely from peak demand, according to the company.[114]

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[110] *Id.*
[111] *Id.*
[112] *Id.* at pp. 29-30.
[113] *Id.* at p. 30.
[114] Ice Energy Website, Case Study Summary from Glendale Water and Power, http://www.ice-energy.com/stuff/contentmgr/files/1/0fbddf59bb319b2fd3e5f3d1f0f32be5/download/ie_case_study_gwp.pd

Q. Are there other problems with SCE's and SDG&E's analysis?

A. Yes, SCE and SDG&E rely on a 1-in-10 load scenario from the 2009 IEPR that has already been shown to be too high in recent CEC projections. In fact, the revised forecast finds a difference of 771 Megawatts for 2011 in the 1-in-10 forecast for SCE.

SDG&E also applies a 1-in-10 load from the 2009 IEPR. The CEC's more recent revised forecast reduces SDG&E's demand in 2011 for the 1-in-10 forecast by 235 megawatts.[115]

Similarly, SCE did not produce modeling results for the number of violations that occurred using its assumptions, instead "the magnitude of violations was determined only for the hour of highest need," and turbines were "added iteratively in 100 MW increments until all constraints violations in the up direction [were] eliminated."[116]

Q. Will the retirement of once-through cooling ("OTC") units in SCE's and SDG&E's service territory create a need for additional fossil-fuel units?

A. No, OTC units located in SCE's and SDG&E's service territory can and should be decommissioned per the State Water Resources Control Board's (Water Board) compliance schedule[117] without the need for new fossil resources. Much of the available capacity provided by the existing OTC power plants is rarely used. The overall capacity of the OTC units under contract to SCE is nearly 4,000 MW; however, the average run times of these units aggregated was less than 7 percent in 2006. For instance, Unit 1 of the Ormond Beach facility was operating as low as 0.6 percent in 2006, while Units 5 and

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f; see also infra at pp. 7-8 (discussing other storage projects that have been developed and are being constructed in SCE's and SDG&E's territory).

[115] *See* CEC, Revised Short-Term Peak Demand Forecast (2011-2012).

[116] SCE Data Request Set DRA/IOU-SCE-002, July 25, 2011 Question 3.

[117] *See California's Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling*, at Table 1, pp. 12-14 (October 2010).

6 of the Redondo Beach facility have run at less than 2 percent.[118] Similarly, two of the three OTC facilities in SDG&E's local resource area plan to convert units to dry cooling and continue running.[119]

Even in a scenario where all of the OTC units are phased out before 2020, in-place programs for demand response, energy efficiency, and the RPS, as detailed above, are more than adequate to meet this capacity. Replacing this capacity with renewable energy and energy efficiency, such as the programs discussed above, also would cost significantly less than replacing the units with fossil fuel facilities.[120] Thus, SCE's base scenario indicating a need for 2,000 MW's, and SDG&E's request for 425 MW, is excessive.

According to a report by Jones & Stokes on the impacts of OTC retirements, transmission upgrades can cost-effectively compensate for much of the power lost from OTC retirements from natural gas power plants.[121] According to the report, "modeling showed that OTC plant requirements could be compensated for solely through transmission upgrades . . . . In other words, under all but the most extreme scenarios, more than enough power plants are expected to be operating in 2015 to more than compensate for any or all OTC plant retirements, with a projected 28 percent reserve margin of supply over demand in the Western half of North America. The key will be

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[118] ICF Jones and Stokes, *Electric Grid Reliability Impacts from Regulation of Once-Through Cooling in California*, at Table 3-1 (April 2008), http://www.swrcb.ca.gov/water_issues/programs/ocean/cwa316/docs/reliability_study.pdf.
[119] *Id.* at Table 1-1.
[120] *See* Pacific Environment, *Green Opportunity: How California Can Reduce Power Plant Emissions, Protect Marine Environment, and Save Money* (Nov. 2009), *available at* http://www.pacificenvironment.org/downloads/PacEnv_GreenOpportunity_final.pdf.
[121] ICF Jones and Stokes, *Electric Grid Reliability Impacts from Regulation of Once-Through Cooling in California*, at pp. 2-3, 4.

ensuring the transmission system is capable of delivering power from those plants to the loads presently served by OTC plants."[122]

Further, SCE and SDG&E rely on an accelerated OTC retirement schedule instead of the actual compliance schedule set forth in the Water Board's OTC Policy to support their analysis.[123] A separate scenario that used the actual compliance schedule found no need for additional LCR resources.[124] Accelerated OTC retirements coupled with the lack of consideration of alternative resources that could be used to replace MW from OTC facilities produces an inaccurate forecast that greatly overestimates need.

V. CONCLUSION

A. Can you summarize your overall response to CAISO's modeling?

Q. CAISO's modeling found that there is no integration need in California. However, by failing to consider numerous resources such as energy storage, Auto-DR, and the ability to increase system flexibility, as well as the continued improvement of forecast errors, CAISO's model is overly conservative.

Because CAISO has provided the Commission with a model that is conservative in many respects, the Commission should hold that the available evidence supports a finding of no need.

A. Can you summarize your response to SCE's and SDG&E's claim of local capacity need?

Q. Both SCE and SDG&E base their requests for new local capacity on faulty modeling assumptions, and greatly inflate the resource needs presented from OTC retirements.

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[122] *Id.* at pp. 2-3.
[123] SCE Data Request Set DRA/IOU-SCE-002, July 25, 2011, Question 9.
[124] SCE Data Request Set DRA/IOU-SCE-002, July 25, 2011, Question 9.

As such, the Commission should deny SCE's and SDG&E's requests for local capacity.

QUALIFICATIONS AND PREPARED TESTIMONY OF RORY COX

Q. Please introduce yourself.

A. My name is Rory Cox.

Q. Who are you testifying on behalf of?

A. I am submitting testimony of behalf of Pacific Environment.

Q. Which sections of Pacific Environment's testimony are you sponsoring?

A. I am sponsoring the entirety of Pacific Environment's Track I Testimony, which includes Testimony on CAISO's modeling results and SCE and SDG&E's local need.

Q. Please briefly describe your background and qualifications.

A. I am a Senior Energy Consultant for Pacific Environment. I have led a West Coast-wide effort to stop the development of Liquefied Natural Gas ("LNG") import terminals proposed for Mexico, California, and Oregon. I have written extensive comments regarding the need for LNG regulation and current trends in California's natural gas market to several California agencies, including the Public Utilities Commission, the State Lands Commission, and the California Air Resources Board. My comments played a direct role in the rejection of an application for the Cabrillo Port LNG terminal, to be located near Oxnard. I have authored a report on LNG entitled *Collision Course: How Imported Liquefied Natural Gas Will Undermine Clean Energy in California*, and edited a report entitled *Green Opportunity: How California Can Reduce Power Plant Emissions, Protect the Marine Environment, and Save Money*.

Q. Please briefly describe the data, information, and reports on which you base your testimony.

A. My testimony is based on my review of publicly available sources and responses to data requests in this proceeding. These sources largely consist of prior Commission decisions, rulings, and policy manuals, as well as reports produced by CAISO and state environmental and energy agencies, such as the California Energy Commission.

APPENDIX A

attached data file for information about minimum capacity and ramp rates of existing generators and planned additions.

ISO RESPONSE TO No. 1 d.:

See ISO RESPONSE TO No. 1 b. and attached documents "GE LMS100.pdf" and "Siemens FP30 2x1 Startup.pdf."

Request No. 2:

CAISO has stated that it is undertaking a further evaluation of incorporating additional studies in its RPS analysis.1 Please provide a description of any of the following information and any inputs that CAISO has incorporated into its modeling runs at the LTPP (including the timeframe of any planned modeling runs), and any data, information, and documentation related to:

a. Balancing area cooperation (including CAISO's Market Redesign and Technology Upgrade);
b. Improved forecasting;
c. Intra hourly scheduling;
d. Advanced metering structure compatible with other balancing area authorities; and
e. Automated demand response.

ISO RESPONSE TO No. 2 a.:

In the running of CPUC – LTPP scenarios, the ISO updated its load forecasting based on 2010 hour ahead and real time (5 minute) load forecasting results compared to actual load. With implementation of Market Redesign and Technology Upgrade, the load forecasting tools were upgraded from those in 2006 which was the basis of data used for the vintage scenarios.

With regards to balancing area cooperation, the assumed that 15% of renewable imports will be dynamic transferred based on the status and expectation of the dynamic transfer policy developed which was approved by ISO Board of Governors on May 19, 2011 meeting. Refer to the following link for final proposal:
http://www.caiso.com/2b72/2b72e3f642fa0.pdf

ISO RESPONSE TO No. 2 b.:

The ISO modified its wind and solar forecast error methodology. As described in its July 1, 2011 testimony, the ISO used a T 1 hour analysis for estimating the wind and solar forecast errors. For wind this resulted in improved forecast error when compared to existing forecast errors for the Participating Intermittent Renewable Resource Program. For solar we also analyzed the forecast error by technology.

ISO RESPONSE TO No. 2 c.:

The ISO had several discussions and is continuing to have discussions with Bonneville Power Authority (BPA) to increase the scheduling frequency on the ties between BPA and the ISO as a pilot project. Currently, both parties are working on agreements and fine tuning the technical details and expect to begin this pilot later on this year (most likely, sometime in the fourth quarter). In addition, in the process of develop the ISO dynamic transfer policy, the ISO had discussions with neighboring balancing authority areas regarding the dynamic transfer policy. Additional documentation on the intra hour scheduling pilot can be found in attached 2 of the following weblink http://www.caiso.com/2b13/2b13aa17243e0.pdf.

ISO RESPONSE TO No. 2 d.:

The ISO did not directly incorporate any advanced metering structure into its model. However, some of the demand response assumed in the CPUC scoping memo are based anticipated use of advanced metering. To the extent advanced metering were included in the CPUC planning assumptions, the ISO incorporated such assumptions into the load assumptions in for the CPUC scenarios.

ISO RESPONSE TO No. 2 e.:

Demand response was modeled as a supply side resource.

Request No. 3:

Early last year, CAISO received permission from the Federal Energy Regulatory Commission (FERC) to move forward in an agreement between CAISO and AES Energy Storage to demonstrate the ability of AES's Sano energy storage system to provide regulation service to CAISO.[1] CAISO stated in its Letter Agreement to FERC that the Agreement will cover an initial test period to evaluate Sano's ability to provide regulation services and an interim certification period.

a. Please provide all information, data, and results from the regulation service provided by AES's Sano energy storage system during the initial test period and certification period.

b. Please provide all information, data, and results from implementation of the Agreement between CAISO and AES.

c. Please provide the criteria or standards that CAISO used, or is using, to measure and analyze the Sano energy storage system's ability to provide regulation service.

[1] Letter from Nathaniel Davis, Deputy Secretary, Federal Energy Regulatory Commission, 130 FERC ¶ 61,242, Docket No. ER10 660 000 (March 26, 2010), available at http://www.ferc.gov/eventcalendar/Files/20100326175021 ER10 660 000.pdf.

ISO RESPONSE TO No. 3:

Objection. Information about the AES Sano storage system is not relevant to this proceeding and is outside the scope of the ISO's renewable integration study and the ISO's testimony. Furthermore, the information requested is commercially sensitive information and the ISO is prohibited by its tariff from providing it, even subject to a non disclosure agreement.

Request No. 4:

Please list all energy storage systems currently providing generation, transmission, and or distribution services to California's wholesale power grid, and all energy storage systems currently under construction and or approved by FERC, the Public Utilities Commission, or CEC, including those storage systems that are operating as demonstration projects. In addition, please provide the following information for each energy storage system listed:

a. Type of energy storage system (i.e., flywheel, CAES, NaS, etc.)
b. Rated power capacity (given in kW or MW)
c. Total discharge time
d. Efficiency rate
e. Response time
f. Please provide the criteria or standards used to measure or analyze an energy storage system's ability to provide generation, transmission, or distribution services.

ISO RESPONSE TO No. 4:

Objection. The ISO has made all of its modeling input assumptions publicly available; therefore any relevant information about energy storage systems, which currently comprises pump/storage hydro (refer to response to question 10 below), that were modeled in the ISO's renewable integration studies has been provided to Pacific Environment. To the extent this data request seeks information about energy storage systems that were not modeled in the ISO's studies, such information is not relevant and is beyond the scope of the ISO's studies and testimony in this proceeding. Furthermore, much of the information requested is commercially sensitive and the ISO is prohibited by its tariff from providing it, even subject to a non disclosure agreement.

Request No. 5:

Please provide all information or data that supports the changes to the operating characteristics of several generators including LM6000 and LMS100 as described in the IOU's and CAISO's May 18, 2011 Motion in R.10 05 006.

ISO RESPONSE TO No. 5:

Change to LMS100 minimum capacity is based on a GE LMS100 brochure (see attached file "GE LMS100.pdf").

Changes to LM6000 minimum capacity and heat rate are based on input from working group participants. These were the same values used in the vintage cases.

Request No. 6:

On page 4 of the July 1, 2011 Track I Direct Testimony of Mark Rothleder on Behalf of the California Independent System Operator Corporation [hereinafter *Track I CAISO Testimony*], Mr. Rothleder states that the "ISO, along with the CPUC, the CEC and other agencies, is in the process of conducting power flow and stability studies to evaluate local area capacity needs created by once through cooling (OTC) environmental restrictions." Please explain the timeline for this process and what work has been completed to date. Please also provide any reports or studies generated from this process.

ISO RESPONSE TO No. 6:

The timeline and study plan for OTC is contained in 2011/2012 Transmission Planning Process Unified Planning Assumptions and Study Plan http://www.caiso.com/2b84/2b84c4a0ec90.pdf. These studies are still in process and no reports have been generated yet. We expect to present study results at our December 8, 2011 stakeholder meeting shown in the study plan schedule. As a member of the Statewide Advisory Committee on Cooling Water Intake Structures (SACCWIS), the ISO will also review the generator owners/operators' proposed OTC compliance implementation plans and schedules, and will report to the State Water Board with recommendations in October 2011.

Request No. 7:

On pages 10 11 of Track I CAISO Testimony, Mr. Rothleder describes the assumptions used to model imports from renewables. Please explain the basis of the renewable import assumptions described on page 10, lines 14 18. Then, please explain what assumptions were made for non renewable imports, and the basis for the assumptions related to nonrenewable imports. In particular, please explain whether non renewable imports were assumed to provide ancillary service, and if not, why not.

ISO RESPONSE TO No. 7:

The out of state renewable is divided into four categories. 1) 15% assumed to be import into California as a dynamic transfer, 2) 15% assumed to be import into California as a 15 minute intra hour scheduled, 3) 40% assumed to be import into California as an hourly schedule, and 4) 30% assumed to be unbundled renewable energy credit (REC). The percentages were proposed and developed in collaboration with CPUC Energy Division staff and attempt to recognize the scheduling options that will be available by 2020.

All non renewable imports are determined on economic basis, subject to transmission limits. In general imports (including renewable and non renewable) are not assumed to provide ancillary service. The only exception is for the following dynamic resources: HOOVER, APEX_2_MIRDYN, MRCHNT_2_MELDYN, MSQUIT 5 SERDYN, and SUTTER 2 PL1X3.

This is because these resources are dynamically scheduling with the CAISO and are capable of providing ancillary service currently.

Request No. 8:

In Table 4 on page 27 of Track I CAISO Testimony, CAISO provided the location, size and capacity factor planning assumptions for customer side solar resources. Please provide all information and data on which CAISO based these assumptions. Please also describe whether data from the solar units installed pursuant to California's Solar Initiative were considered when making these assumptions.

ISO RESPONSE TO No. 8:

The first 5 columns are from the CPUC Calculator results provided by CPUC. The last two columns were developed and proposed by Nexant as mart of the method to profile these plants.

Request No. 9:

Please describe all assumptions that were changed or modified in the Trajectory High Load case from the Trajectory case. Please explain the basis for each change or modification.

ISO RESPONSE TO No. 9:

The Trajectory High Load case was set up according to the CPUC scoping memo. It has a 10 percent higher load assumption than the Trajectory Case. It also has 1497 MW more renewable resource in order to meet the 33% RPS. The regulation and load following requirements are also higher than the Trajectory Case due to higher load and more renewable resources. Slide 5 in Exhibit 1 contains a list of the load and renewable assumptions for the five CPUC cases. Below is the comparison of regulation and load following requirements of the two cases.

Max Requirement	Regulation up	Regulation down	Load following up	Load following down
Trajectory	1,219	991	3,564	4,122
Trajectory Hi Load	1,230	1,014	3,967	4,424

Request No. 10:

In addition to the Helm Pump Storage assumptions, please explain all other assumptions related to energy storage systems that were made in the inputs to the Plexos Model.

ISO RESPONSE TO No. 10:

Other California pump storage facilities modeled are Castaic, Eastwood, Lake Hodges, SN LS PP_8. There is no specific assumption other than the physical operating characteristics, for these facilities in the model. The pump schedules of these facilities are optimized.

Request No. 11:

Please explain whether, and to what extent, the Plexos model currently takes into account that solar and wind forecasts will continue to improve? If it does take this into account, please explain how. If it does not, please explain why not.

ISO RESPONSE TO No. 11:

The PLEXOS model used for Step 2 production simulation uses hourly profiles of solar and wind. Forecast error and improvement in forecast error are not directly considered in Step 2. Wind and solar forecast error are considered in Step 1 to determine the regulation and load following requirements used as inputs to Step 2. In developing the T-1 hour methodology for estimating solar and wind forecast error, the ISO assumed these values were reflective of improved forecasting.

Request No. 12:

When discussing load profiles used for the four priority scenarios, Mr. Rothleder states on page 41 of the CAISO Testimony that "1,131 MW of upward adjustments were made to account for behind the meter PV that was modeled as supply." Then, on page 5 of Exhibit 3 of its Testimony, CAISO includes Table 12, which calculates peak demand to be used in the load profiles. This table lists 1,131 MW of PV behind the meter as increasing the demand. Please explain the impact and basis of this modification. Please include all information and data that supports this value.

ISO RESPONSE TO No. 12:

The 1131 MWs developed during the development of the modeling for the Vintage cases in 2010 and was accepted by the CPUC Energy Division and CEC for use in the modeling during the review process. Represents a 50% discount from the sum of the PV nameplates of 2262 MWs. The basis of the values was 50% factor is developed by multiplying the capacity credit of 65% for large PV plants by a discount factor. The discount factor is the ratio of the capacity factor of the PV systems on the customer side of the meter (16.2%) to capacity factor of the Large PV plants (21%).

Request No. 13:

Does the CAISO model consider the potential for upgrading existing facilities? For instance, did CAISO consider the capability of existing facilities to upgrade software and other technologies to come on line more quickly? If so, please explain how. If not, please explain why not.

ISO RESPONSE TO No. 13:

The ISO did not make any assumption regarding upgrading of the existing system software or other technologies to come on more quickly. For this phase of studies the ISO modeled what capabilities exist based on currently resource characteristics. If needs are identified, the ISO anticipated studying how such needs could satisfied by further study of options to meet identified needs including potential for upgrading existing equipment to gain additional flexibility.

Request No. 14:

Please provide a copy of all other data requests other parties have served on you and your responses to those data requests.

ISO RESPONSE TO No. 14:

The ISO has attached its response to the first data request of Division of Ratepayer Advocates and its response to the first data request of L. Jan Reid. All other data request responses have been served on the parties.

BEFORE
THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Integrate And Refine Procurement Policies and Consider Long Term Procurement Plans	)))	**R.10 05 006**

RESPONSE OF
THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION
TO DATA REQUEST No. LTPP2010 CAISO 001(a)
BY THE DIVISION OF RATEPAYER ADVOCATES,
CALIFORNIA PUBLIC UTILITIES COMMISSION

Below are responses by the California Independent System Operator Corporation to Data Request No. LTPP 2010 CAISO 001(a), the Division of Ratepayer Advocates, California Public Utilities Commission.

1. With respect to the CAISO's January 26, 2011 reply comments (pp. 5 6 and 14) regarding whether to use individual hourly ancillary service (A/S) requirements or seasonal/monthly maximum A/S requirements for various purposes and modeling steps, DRA requests clarification of when the individual hourly values were used and when the other values (e.g. monthly or seasonal maximum) was used in the final modeling process.

ISO RESPONSE TO DR. 1:

For the CPUC–LTPP defined scenarios that the ISO started in 2011, the ISO used monthly load following and regulation up and down requirements in the production simulation to determine whether there are capacity shortfalls and to determine additional capacity needed to meet the A/S and load following up requirements (this is referred to as the "need run"). The ISO used the hourly load following and regulation up and down requirements for the entire year for the production simulation run conducted to determine cost, fuel utilization, and emissions.

When first running the vintage scenarios and developing the methodology, the ISO used seasonal maximum values of load following and regulation requirements from Step 1 when performing production simulation to determine needs and production costs. Then as the ISO was refining its methodology and considering input, in November 2010, for the vintage scenario, the ISO modified its approach and used seasonal maximum load following requirements for determining need and used hourly load following requirements for determining production costs and emissions.

III. Other

1. Comparison of operational ancillary service (A/S) procurement to A/S requirement modeling

   a. Please describe the CAISO's process during day to day system operations to determine how much ancillary services (A/S) capacity to acquire (i.e., in the Day Ahead Market and any subsequent adjustments). Describe differences between procedures for different A/S products as necessary.

   b. Please compare the method used in current day to day operations with the method used to calculate the A/S requirements in the CAISO's RIM model.

ISO RESPONSE TO DR III.1.a:

In the day ahead timeframe, the ISO attempts to procure 100% of its A/S requirements for each hour of the next operating day. Regulation requirement is based on historical regulation used for similar load demand days. The ISO is in the process of developing a software tool to determine hourly regulation requirement in the day ahead timeframe based on the Step 1 methodology described previously in several CPUC's workshop.

Hourly operating reserve (spinning plus non spinning reserve) requirements are based on 5% 7% of the forecast hourly load demand for the operating day in the Day Ahead market. 50% of the operating reserve must be spinning reserves. If there are any changes that require additional reserves to be procured, they will be procured through the real time market processes.

The ISO currently does not have an explicit load following product and therefore does not have a methodology description for determining how much load following is procured in day to day system operations. Rather, in the Day Ahead Market, the ISO schedules resources to meet the expected imbalance conditions determined from the balance of load and self schedule supply. The current process does not account for intra hour variability and forecast errors. The ISO is in the process of considering a market mechanism including additional products needed to meet increased renewable penetration levels.

ISO RESPONSE TO DR III.1.b:

If the reference to the ISO's RIM model is referring to the ISO's Step 1 statistical model and Step 2 production simulation methodologies for studying renewable integration, then the following responds to the question: Hourly spinning and non spinning reserve requirements are calculated based on 3% (6% total of spinning non spinning) hourly load demand for each service which is consistent with the ISO's day to day procurement practice. However, due to the variability and uncertainty associated with the expected renewable resources together with forecast errors associated with load demand and wind/solar production, regulation up, regulation down, load following up and load following down requirements were determined through the Step 1 methodology which is described in detail in the Technical Appendix for California ISO Renewable Integration Studies http://www.caiso.com/282d/282d85c9391b0.pdf.

2. Re: CAISO response to data request LTPP2010 CAISO 001 section II, 6a: Please indicate if there were any other hours in the 2020 model year in which any load following down or regulation down shortfalls occurred, even if below the maximum shortfall indicated for December 17, 5PM interval; and provide the dates, hours and quantities if applicable.

ISO RESPONSE TO DR III.2:

The additional days with load following down shortfalls are as follows:

The attached file "DRA_Data Requests_Data Sheets.xlxs" worksheet "LFD Shortage" provides the requested information for the final results as provided on July 1, 2011.

The ISO initially provided preliminary results on April 29th. Following are the hours of load following down shortfalls in December for the Trajectory case associated with Slide 27 of the April 29th results. Note: these results were revised and presented on May 10, 2011. The results were updated and final results were presented on July 1, 2011.

Name	Year	Month	Day	Hour	Property	Value (MW)
LoadFollowingDown	2020	12	31	17	Shortfall	1,158
LoadFollowingDown	2020	12	31	18	Shortfall	23
LoadFollowingDown	2020	12	16	17	Shortfall	5
LoadFollowingDown	2020	1	10	17	Shortfall	23

3. Has CAISO conducted any internal analyses to validate the outcomes of the Step 1 and Step 2 analyses contained in the preliminary results summary presentation of May 10, 2011, or in the final testimony filing of July 1, 2011?

   a. If so, please provide the relevant documents or analyses and explain the methods used in conducting the validation.

   b. Please explain any conclusions the CAISO was able to draw from such analyses with respect to CAISO internal sensitivity analyses, model reconfiguration, or other modeling exercises or analyses (quantitative or qualitative) not currently posted for public viewing on the CAISO website.

ISO RESPONSE TO DR III.3:

The ISO performed quality review of results by comparing results where appropriate with actual production, vintage cases and through review of results with working/review groups. During these quality reviews, the ISO had identified some issues in the May 10, 2011 results. The summary of those issues was contained in slides 75 80 of the Exhibit 1 of the testimony.

4. Since the 33% RPS integration studies began, has CAISO had any discussion with their balancing area counterparts in California (such as municipal balancing area control centers and/or out of state authorities such as Bonneville Power Authority) regarding its long term (2020 timeframe) plans for achieving closer coordination of transactions across CAISO transmission interties (in particular,

increases to scheduling interval frequency)? If so, please describe the current status of such discussions and/or plans to improve coordination, including any documentation available.

ISO RESPONSE TO DR III.4:

The ISO had several discussions and is continuing to have discussions with Bonneville Power Authority (BPA) to increase the scheduling frequency on the ties between BPA and the ISO as a pilot project. Currently, both parties are working on agreements and fine tuning the technical details and expect to begin this pilot later on this year (most likely, sometime in the fourth quarter). In addition, in the process of develop the ISO dynamic transfer policy, the ISO had discussions with neighboring balancing authority areas regarding the dynamic transfer policy.

Documentation on the intra hour scheduling pilot can be found at the following link:
http://www.caiso.com/2b13/2b13aa17243e0.pdf

Documentation of dynamic transfer policy is available at:
http://www.caiso.com/2b72/2b72e3f642fa0.pdf

5. Please explain in detail the modifications that would be needed to the Step 1 and Step 2 processes to incorporate the use of shorter interval forecast error parameters (i.e., shorter than the T-1 parameters currently in use.)

   a. Please provide a rough estimate of the time and costs that would be involved to modify the Step 1 and Step 2 processes to allow for such model changes.

ISO RESPONSE TO DR III.5:

The Step 1 analysis tool is developed by the Pacific Northwest National Lab (PNNL) and the ISO would have to work with PNNL to get an estimate of the modifications needed to incorporate shorter interval errors parameters.

Forecast error parameters are not an input dataset to the Step 2 analysis which is done using the PLEXOS Solutions production simulation software that is commercially available.

ISO RESPONSE TO DR III.5.a:

The rough estimates of time and cost would have to be obtained from the Pacific Northwest National Lab.

6. Please describe any changes or post processing steps taken that would alter the raw output of the model runs used in the July 1 Final Model results.

ISO RESPONSE TO DR III.6:

The ISO did not make any changes to alter the raw output of model runs. The ISO performed post processing by aggregating data in a way that was presented the testimony.

Southern California Edison
2010 LTPP R.10-05-006

DATA REQUEST SET DRA/IOU-SCE-002

To: DRA
Prepared by: Martin Blagaich
Title: Analyst
Dated: 07/08/2011

Question 03:

Page 3-3 of IOU-1 Table 3-1 shows the IOU Scenarios, violation types, max violation and CT Resources added.

a. For Scenarios 1, Scenario 2, and Temperature Peak Scensitivity, please provide each violation that occurred including the date, time, type of violation, and size (MW). Also include the total number of violations for that run and time/date/size of the maximum constraint violation.

b. Please explain how the number of CT resources added is determined.

Response to Question 03:

a. The IOU analysis did not produce results for the frequency of violations. Instead, the hour of highest need was determined using Linear Programming (LP) runs (LP runs have multiple constraints relaxed in order to improve run time and tend to understate the frequency and magnitude of violations). The magnitude of violations was determined only for the hour of highest need.

b. CTs are added iteratively in 100 MW increments until all constraint violations in the up direction are eliminated.

Southern California Edison
2010 LTPP R.10-05-006

DATA REQUEST SET DRA-SCE-002

To: DRA
Prepared by: Marc Pujol
Title: Analyst
Dated: 07/11/2011

Question 01:

Could SCE meet some of its requested LCR capacity for 2020 with alternatives to fossil fuel?

Response to Question 01:

It will take more time and significant analysis for SCE to answer this question. Currently the CAISO uses fossil or thermal generating unit characteristics in its transmission modelling when it determines the amount of LCR need.

Please also refer to the Exhibit SCE-1 entitled 'Testimony of Southern California Edison Company on Track I Issues' page 3 line 18 beginning, "SCE is not at this time…" and continuing through line 20.

Southern California Edison
2010 LTPP R.10-05-006

DATA REQUEST SET DRA-SCE-002

To: DRA
Prepared by: Marc Pujol
Title: Analyst
Dated: 07/11/2011

Question 09:

Did SCE attempt to adjust its requested LCR need to reflect the actual compliance schedule for OTC requirements (IOU Scenario 3), rather than using the accelerated retirement schedules (assuming all units retired by 2020) (IOU Scenario 1) in its LTPP filing?

a. If so, please explain how an adjustment was calculated.
b. If no adjustment was made to account for retirements after January 1, 2020, please explain your rationale for not doing so

Response to Question 09:

No. SCE chose to use the accelerated retirement schedule in IOU Common Scenarios 1, 2 and the sensitivity case to have OTC retirement assumptions that were consistent with the CPUC-Required scenarios that were used in this proceeding. These assumptions resulted in an approximate 2,000 MW deficiency in the amount of LCR generation that would be available to meet the CAISO defined needs in 2020. In IOU Common Scenario 3 SCE used the actual compliance schedule and there was no need for additional LCR resources in 2020. These scenarios therefore give a range in the amount of LCR need that might be expected in 2020 as a value between zero and about 2,000 MW. Since detailed transmission planning studies have not been completed by the CAISO, SCE only used this value in the production simulation modelling done for this proceeding. SCE is not recommending, nor requesting, that this amount of LCR need be approved nor solicited at this time.

For further details, please refer to the Exhibit SCE-1 entitled 'Testimony of Southern California Edison Company on Track I Issues' beginning page 14 line 13 and continuing through line 19 as well as Table III-4 on the same page.

R.10-05-006 SDG&E 08/03/11 Response
LTTP Track 1 Proceeding
DRA-SDGE-002 Dated July 18, 2011
DRA-SDGE-002: Q1-5

Question 1.

On page 4 of the SDG&E testimony, it is stated that SDG&E will have a cushion of approximately 300 MW." Table 1 shows a surplus of 393 Mw in 2020. How did SDG&E derive an approximate value of 300 MW of surplus capacity.

SDG&E Response to Q1:

The approximate 300 MW is based on the value estimated in Table 1. As Table 1 was finalized the final value did increase to closer to 400 MW than 300 MW, however the testimony was not changed. While it might have been more accurate to reflect the specific 393 MW number from Table 1, it should be noted that the 393 MW value is derived from the analysis that was conducted based on the CPUC-Required assumptions, which SDG&E does not support for the reasons set forth in its testimony. Accordingly, in SDG&E's view, the point is moot.