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Exhibit Number	:	ORA-1
Commissioner	:	Michel Peter Florio
Admin. Law Judge	:	Eric Wildgrube
ORA Project Mgr.	:	Xian Ming Li
ORA Witnesses	:	Various

OFFICE OF RATEPAYER ADVOCATES
CALIFORNIA PUBLIC UTILITIES COMMISSION

TESTIMONY ON SAN DIEGO GAS & ELECTRIC COMPANY APPLICATION FOR COMPLIANCE REVIEW OF UTILITY OWNED GENERATION OPERATIONS, ELECTRIC ENERGY RESOURCE RECOVERY ACCOUNT ENTRIES, CONTRACT ADMINISTRATION, ECONOMIC DISPATCH OF ELECTRIC RESOURCES, UTILITY RETAINED GENERATION FUEL PROCUREMENT, AND OTHER ACTIVITIES FOR THE PERIOD JANUARY 1 THROUGH DECEMBER 31, 2015 (U 39 E)

(PUBLIC VERSION)

San Francisco, California
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CHAPTER 1: EXECUTIVE SUMMARY

(Witness: Xian Ming Li)

I. EXECUTIVE SUMMARY

This testimony presents the Office of Ratepayer Advocates' (ORA) review of San Diego Gas & Electric Company's (SDG&E) Energy Resource Recovery Account (ERRA) Compliance Application (A.) 16-06-002 for the period from January 1, 2015 through December 31, 2015 (Record Period). Pursuant to Decision (D.) 02-10-062, D.02-12-074 and California Public Utilities Code (PU Code) § 454.5(d)(3), the purpose of the ERRA is to record and recover power costs and ensure timely recovery of procurement costs incurred related to an investor-owned utilities' (IOUs) approved procurement plan.[1] PU Code § 454.5(d)(3) allows the Commission to establish balancing accounts to track the differences between recorded revenues and costs incurred related to the approved procurement plan.[2]

SDG&E filed its ERRA compliance application on June 1, 2016 requesting that the Commission find that during the 2015 Record Period it:

- Prudently administered its generation resources and portfolio of contracts and dispatched energy in a least-cost manner, in compliance with SDG&E's Commission-approved procurement plan;
- Reasonably and accurately recorded 2015 entries in its Energy Resource Recovery Account (ERRA), Transition Cost Balancing Account (TCBA), Local Generation Balancing Account (LGBA), New Environmental Regulatory Balancing Account (NERBA), Independent Evaluator Memorandum Account (IEMA) and Litigation Cost Memorandum Account (LCMA); and

[1] D.02-10-062, Finding of Fact (FOF) 23 and 26, pp. 71 – 72.

[2] PUC Code §454.5(d)(3) states: "The commission shall establish power procurement balancing accounts to track the differences between recorded revenues and costs incurred pursuant to an approved procurement plan. The commission shall review the power procurement balancing accounts, not less than semiannually, and shall adjust rates or order refunds, as necessary, to promptly amortize a balancing account, according to a schedule determined by the commission."

- Procured greenhouse gas (GHG) compliance instruments consistent with applicable standards.

SDG&E also requests that the Commission allow SDG&E to pursue cost recovery of the under-collection amount in SDG&E's LGBA in its 2018 Forecast proceeding to be filed on April 15, 2017 or its next Annual Electric Regulatory Update filing.

ORA reviewed SDG&E's utility-owned generation (UOG) operations, fuel expenses and procurement, contract administration, least-cost dispatch (LCD), demand response (DR), and greenhouse gas compliance instrument procurement. It also conducted a financial review of balancing account entries. In this testimony ORA presents its analyses and recommendations associated with SDG&E's requests. This testimony focuses on the 2015 Record Period and is based on ORA's analysis of information submitted by SDG&E that includes, but is not limited to: SDG&E's testimony and workpapers submitted with its application, responses to data requests, meet-and-confer notes, and field-visit presentations.

The issues that ORA reviewed in the 2015 Record Period are listed in the table below and summarized in this chapter. For those issues or topic areas for which no testimony is filed, ORA does not have any recommendations or disallowances. The qualifications of ORA's witnesses and their testimony declarations are contained in Appendix A of this testimony.

List of ORA Witnesses and Respective Chapters

Chapter	Description	Witness
1	Executive Summary	Xian Ming Li
2	Least-Cost Dispatch And Economically-Triggered Demand Response (DR)	Patrick Cunningham
3	Utility-Owned Generation - Fossil	Michael Yeo
4	Greenhouse Gas Compliance Instrument Procurement	Ayat Osman
5	Contract Administration	Patrick Cunningham
6	Compliance Review of the Energy Resource Recovery Account (ERRA) and Other Balancing Accounts	Brian Lui Monica Weaver

II. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The following summary provides an overview of each chapter presented and sponsored by the witnesses for the 2015 Record Period. This summary is provided strictly for the reader's convenience.

1. **Executive Summary –** (Xian Ming Li)
2. **Least-Cost Dispatch And Economically-Triggered Demand Response** (Patrick Cunningham)

ORA recommends that the Commission should:

- Order SDG&E to undergo an independent review, by an outside party, of its process and models of forecasting short term system loads, prices in the Day-ahead Market, and the forecast results.
- Order SDG&E to submit load and price forecast data in the format discussed in Chapter 2 for future ERRA applications as an LCD workpaper.
- Order SDG&E to provide an explanation and documentation concerning instances of "zero dispatch" in the same format as

their reporting of "non-economic dispatches" in future ERRA applications.

- Disallow cost recovery of [redacted] from the ERRA balancing account for the 2015 Record Period due to [redacted].
- Order SDG&E to submit an explanation of their method of calculating bids for DR programs partially or fully integrated into the CAISO and information on their progress in integrating each DR program in future ERRA applications.
- Order SDG&E to include the Summer Saver Program, a DR program, in future ERRA applications.

3. Utility-Owned Generation – Fossil (Michael Yeo)

ORA recommends that the Commission:

- Order SDG&E to develop criteria for calculating the replacement power cost for the June 1, 2015 Miramar Unit 1 outage as it does not reflect the actual operation of a peaker facility. Specifically, SDG&E calculated the outage cost [redacted]

4. Greenhouse Gas Compliance Instrument Procurement (Ayat Osman)

ORA recommends that SDG&E continue to procure offsets to meet its remaining allowable limit of offsets to meet its obligation under California Air Resources Board (CARB) Second Compliance Period (2015 – 2017) at lowest cost, as long as offsets trade at a discount to allowances.

5. Contract Administration (Patrick Cunningham)

ORA recommends that the Commission:

- Order SDG&E to include evaluations for terminated contracts based on project delays which qualitatively and quantitatively explains the utility's decision to terminate based on the delay.

6. Compliance Review of the ERRA and Other Balancing Accounts (Brian Lui and Monica Weaver)

ORA has no recommendation or disallowance in this area of the application.

CHAPTER 2: LEAST COST DISPATCH AND DEMAND RESPONSE PROGRAMS

(Witness: Patrick Cunningham)

I. INTRODUCTION AND SUMMARY

This chapter of testimony reviews SDG&E's energy bidding and demand response (DR) activities for the period of January 1, 2015 through December 31, 2015 and assesses whether SDG&E met the California Public Utilities Commission's (CPUC) least-cost dispatch (LCD) standard. OR

A examined SDG&E's Testimony for the Record Period 2015 Energy Resource Recovery Account (ERRA) Compliance application and associated workpapers as filed in Application (A.) 16-06-002. Analysis also included review of data request responses, teleconference meetings, and study of past ERRA testimony and relevant Commission decisions. Both SDG&E's energy bidding and demand response dispatch decisions were reviewed using the LCD standard to determine if operations were in accordance with the Commission's Standard of Conduct 4 (SOC4).

II. RECOMMENDATIONS

A. Load and Price Forecasting

SDG&E's load forecasting [redacted] from 2014 to 2015. Due to the associated costs of both load and price forecast inaccuracy, ORA recommends the following:

- The Commission should require SDG&E to order an independent evaluation to review its process and models of forecasting short term system loads, prices in the Day-Ahead Market, and the forecast results. The evaluation should yield a report which includes the effectiveness and accuracy of SDG&E's forecasting processes and models, the potential costs of load and price forecast inaccuracy, and recommendations to [redacted] in the future. The report should be submitted to SDG&E, ORA and CPUC as an attachment to the 2016 ERRA Compliance application.
- The Commission should require SDG&E to submit load and price forecast data in the same format as the

attachment to Data Response #6 Question 2 for future ERRA applications as an LCD Workpaper.[3] This data was given to ORA by SDG&E on request and proved crucial to the analysis of the ERRA Compliance application.

B. Reporting of Zero-Dispatch of Available Suitable Resources

SDG&E is currently required to explain and document instances when CAISO dispatches energy below what their incremental bid structure would make appropriate. SDG&E has named these dispatches "non-economic dispatches."[4] ORA found similar instances when zero energy was dispatched by CAISO despite the bid prices of a resource being below the Locational Marginal Price (LMP). These "zero-dispatches" require reporting and explanation in order for the Commission to properly analyze least-cost dispatch of SDG&E's portfolio. The Commission should require SDG&E to provide an explanation and documentation of instances of "zero dispatch" in the same format as other "non-economic dispatches" reported pursuant to Decision (D.) 15-05-005.[5]

C. Self-Scheduling Error

Self-scheduling is a method of offering energy to the market using a price-taker bid; the resource is paid whatever the spot price of energy is when CAISO accepts the offer. It is generally uneconomical to offer a dispatchable thermal resource in such a manner, as the resource may be awarded a price below the cost to generate energy.

[redacted][6][redacted]

[3] Attachment 6 of this testimony.

[4] SDG&E Testimony, Attachment C – Incremental Bid Cost Calculations.xlsx "2E".

[5] D.15-05-005 orders the reporting of information described in the "Joint Utilities' Proposal for the Demonstration of least-cost dispatch" as follows in Section Workpapers 2.e: "Monthly and annual tables will include summaries of:[…] Percentage of times incremental energy was not awarded when incremental bid cost at the awarded MW level was lower than the LMP at the applicable node. Explanation and documentation of CIDI tickets submitted and subsequent actions taken by the utility."

[6] Data Request 11 Response CONFIDENTIAL, Q1 & CONFIDENTIAL Attachment E – DR011 3cii update.xlsx, Table 3cii.

[redacted][7] Including this cost in the ERRA balancing account is a violation of Standards of Conduct 4 (SOC4) which requires that utilities administer their generation resources and dispatch energy in a least-cost manner.[8] Since the cost was shifted to ratepayers by being included in the 2015 ERRA Balancing Account, ORA recommends the Commission disallow cost recovery of [redacted] from the ERRA balancing account.

D. Capacity Bidding Program: CAISO Market Bidding Reporting

The data used for CAISO bid analysis of demand response programs for this testimony was almost entirely obtained through data requests by ORA. ORA recommends that the Commission require future ERRA Compliance applications to include an explanation of bid calculations for the DR programs that have partial or full CAISO market integration. The Commission should also require SDG&E to include the most recent Market Integration Progress Report available at the time along with future ERRA application submissions or, pending disuse of the Progress Report, a document including up-to-date data that is currently included in the Report.[9]

E. Summer Saver Program Inclusion

The trigger conditions of the Summer Saver Program (SSP) have a direct link to market costs which means that it should be dispatched in a least-cost manner, making it appropriate to consider in ERRA proceedings. ORA recommends the Commission require the inclusion of the Summer Saver Program (SSP) in future ERRA proceedings.

III. BACKGROUND

A. Evolution of the Current LCD Showing

Due to the changes in the energy markets following the 2009 Market Redesign and Technology Upgrade (MRTU), investor-owned utilities (IOUs or utilities) do not actually

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[7] Data Request 11 Response CONFIDENTIAL, Q1.d.

[8] D.15-05-005, pp. 2-3.

[9] The Market Integration Progress Report is a document submitted by the IOUs to the CPUC as required by Ordering Paragraph 4 of D.14-05-025.

"dispatch" energy into the market. Rather, SDG&E offers available energy to CAISO through an economic or price-taker bid which is then either selected and dispatched by CAISO, or not selected. The term "least-cost dispatch" is defined by the principles set forth in past Commission decisions and the Standard of Conduct 4 to refer to a "situation in which the most cost-effective mix of total resources is used, thereby minimizing the cost of delivering electric services…"[10]

The 2010 ERRA Compliance proceedings recognized deficiencies in the utilities' LCD showings and provided a process for improvement which led to the establishment of metrics and standards for LCD and DR reporting. D.14-07-006, which approved SDG&E's ERRA Compliance Application for 2010 (A.11-06-003), noted that SDG&E's LCD showing was unsatisfactory and concluded that future reporting must demonstrate that procurement costs are minimized for the benefit of the customers and that corrective actions are taken when efforts fall short.[11] That decision provides guidance on how SDG&E should improve its LCD showing: "A complete showing… should include precise numerical calculations that demonstrate that SDG&E achieved LCD during the Record Period, or quantify the amount of overspending by SDG&E."[12]

The Commission's Energy Division held workshops in 2014 to allow the IOUs and other interested parties to develop criteria to determine what constitutes compliance with the LCD standard and the resulting methodology each IOU should follow to assemble a showing that it met its burden and prove such compliance.[13] The utilities submitted a "Joint Utilities' Proposal for the Demonstration of least-cost dispatch" (Joint Proposal) which, along with modifications proposed by ORA, was approved by the

[10] Definitions of LCD and SOC4 set forth in D.02-10-062 and D.02-12-074 have recently been restated in D.15-05-005 pp. pp. 2-3.

[11] D.14-07-006, pp. 22-23.

[12] D.14-07-006, Conclusion of Law 5, p. 33. This showing was required of SCE and PG&E as well.

[13] D.14-07-006, pp. 34; D.13-10-041, pp. 45; D.13-11-005, pp. 81.

Commission in D.15-05-005. It provides a framework for LCD reporting beginning with each utility's 2015 ERRA compliance application.[14]

B. Demand Response Programs As LCD Resources

In D.15-05-005, the Commission required the utilities to include DR resources in their LCD demonstration.[15] The Commission recognized that:

> ... The effect of dispatching DR resources has a direct net financial impact on overall dispatch of resources to meet load;
>
> ... The LCD compliance review is the most appropriate place to investigate the cost of any dispatchable resources;
>
> ... The net financial impact of DR is not fully considered in any other forum;
>
> ... The utilities are making discretionary decisions on when and how much energy to call in DR dispatch events and there is no consideration of the financial impact of these decisions in any other proceeding.

LCD review now includes DR resources dispatched based on economic triggers, such as heat rates or energy prices, in which the customer is obligated to provide a certain response. It does not include programs that are only called based on CAISO emergency conditions or programs where customers are not obligated to perform. In addition, SDG&E has integrated one DR program into the CAISO market in 2014 and through 2015.[16] DR programs typically have functioned at the discretion of and within SDG&E's territory, but bidding them into the market allows the resource to be awarded an energy payment by CAISO like any generating resource. The bid calculation methodology of that program is important to review in the ERRA for the benefits and costs it may place on ratepayers.[17]

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[14] D.15-05-005. Ordering Paragraphs 1-4, p. 16. The Joint Proposal is included as an attachment to the Decision.

[15] *Ibid*., 8.

[16] SDG&E Testimony, JP-35.

[17] *Ibid.*

IV. DISCUSSION AND ANALYSIS

A. Self-Scheduling of Dispatchable Resources

IOUs offer their resources to the CAISO markets by either making economic bids or through self-scheduling. Resources with economic bids will only run if the energy price is above the bid, which is usually set at the cost of operating that resource. Self-schedules are price-taker bids, meaning that the resource is paid whatever the spot price of energy is. Such bids are either scheduled to run for certain times by SDG&E or, for must-take resources like solar power, are offered to the market whenever the energy is available.[18] Dispatchable resources, peaker power plants for example, are not appropriate to be self-scheduled since their production has significant fuel and operation costs that make them inefficient to run at lower energy prices.[19] While there are some instances when self-scheduling may be unavoidable, it is not optimal for LCD. An intentional self-schedule offering for a dispatchable thermal resource is often referred to as a "self-commitment" decision.[20] The following figures do not include Qualifying Facility (QF) resources which may be contractually obligated to be offered as self-schedules.

There were [redacted] hours in which SDG&E self-scheduled eight of its ten dispatchable resources in the record period, making up [redacted][21] of the hours of the year for all eight resources.[22] [redacted] of these events were linked to [redacted], in which the resource had to run regardless of market price.[23]

The remaining [redacted] hours outside of [redacted] were a consecutive period at [redacted] where [redacted]

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[18] There are some contracts that allow SDG&E to curtail production during negative pricing events or offer a renewable resource as an economic bid. See SDG&E Testimony JP-Attachment LCD Wrkpr 5 for award records.

[19] SDG&E Testimony, JP-8:25-28.

[20] SDG&E Testimony, JP-17:5-8.

[21] [redacted]

[22] SDG&E Testimony, Attachment D - 2015 Self Schedules Supporting Data 1 Final "3ab."

[23] [redacted] from data: SDG&E Testimony, JP-Attachment D: Table 3ab.

[redacted].[24] This [redacted] created a cost of production of [redacted] and gained revenue of energy purchased by the market of [redacted] The final deficit of [redacted] would have been avoided if the resource was [redacted].[25] [redacted]

[redacted][26]

[redacted][27]

[redacted] was not a deliberate decision taken by SDG&E but its inclusion in the ERRA Balancing Account is a violation of Standard of Conduct 4 which requires that utilities administer their resources in a least-cost manner.[28] Since the cost was shifted to ratepayers by being included in the ERRA Balancing Account, ORA recommends the Commission disallow cost recovery of [redacted] from the ERRA balancing account.

B. Lake Hodges Pumped Hydro

The Lake Hodges Pumped-Storage Unit, the only such facility in SDG&E's portfolio, pumps water from a lower altitude lake up to a higher reservoir at times of low energy prices, and then partially drains the reservoir to generate energy using its two turbines at times of high energy prices.[29] The resource is constrained by water availability and usage restrictions.[30] The resource is owned by the San Diego County Water

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[24] Data Request 11 Response CONFIDENTIAL, Q1 & CONFIDENTIAL Attachment E – DR011 3cii update.xlsx, Table 3cii.

[25] *Ibid.*

[26] Data Request 11 Response CONFIDENTIAL, Q1.f

[27] *Ibid.*, Q1.d

[28] D.15-05-005, pp. 2-3.

[29] SDG&E Testimony JP-18.

[30] SDG&E Testimony JP-18:6-15.

Authority which may elect to divert the water for consumption, but did not do so during the record period.[31]

Pumped hydro storage systems are best used to generate electricity at times when energy prices are at their highest in order to best utilize the opportunity cost of its water-fuel. When used optimally, Lake Hodges allows SDG&E to decrease the use of high cost resources at peak demand, like peaker plants, which run on average between [redacted] [32] and have a much smaller gap between the market price of energy and the cost to operate the resource.

Graph 1 shows when Lake Hodges pumped water and generated electricity on an average hourly basis in 2015. The Table shows a visual correlation between pump and generation periods occurring at low and high LMPs respectively, which is the essential strategy of running the facility within LCD principles as described by SDG&E's testimony.[33] In the record period, Lake Hodges consumed [redacted] to create [redacted] and had a net market profit of [redacted].[34]

[31] SDG&E 2015 ERRA Compliance Testimony of Sally Chen, SC-42:1-8.

[32] 9%-15% of all instances of SDG&E peaker operation fell in this time frame in 2015. SDG&E Testimony JP- 2015 ERRA Compliance MDR - LCD Wrkpr 5.

[33] SDG&E Testimony, JP-18.

[34] Attachment B 2015 Pump Storage Data ORA REVISED CONFIDENTIAL "Overall Summary."

GRAPH 1: AVERAGE DAILY DISPATCH OF LAKE HODGES PUMPED STORAGE[35] (CONFIDENTIAL)

Full optimization of the resource relies upon accurate forecasting which, as described in Table 3 of this testimony's case study below, [redacted] The two turbines at Hodges [redacted].[36] Those periods of non-generation were worth [redacted] The gain from successful activity during the top 100 events was [redacted].[37] The utility's data suggests that many of these [redacted] are due to severe CAISO market price swings. The failure to accurately predict these costs threatens the principles of LCD and harms ratepayers, and can be largely offset in the future by superior forecasting methods.

C. Overall Forecasting Accuracy

1. Load and Price Forecasting Processes

The CAISO market allows utilities to bid in their daily customer energy load (supply) and their own generation resources (demand). The majority of market volume is

[35] Attachment B 2015 Pump Storage Data ORA REVISED CONFIDENTIAL.xlsx.

[36] [redacted] SDG&E Testimony JP-Attachment B, "Top 500 LMPs."

[37] These value figures do not include the cost to pump the initial amount of water. SDG&E Testimony, Attachment B, "Top 500 LMPs".

scheduled in the Day-Ahead Market, while the Real-Time Market is often used to make minor adjustments to reconcile actual supply and demand with forecast inaccuracies and unanticipated load or market shifts.[38] SDG&E attempts to bid 100% of its anticipated daily load into the Day-Ahead Market using sophisticated methods to forecast that load and to either adapt to deviations or create mechanisms to maintain LCD principles in the Real-Time Market.[39] SDG&E uses a forecasting software tool called GenTrader which considers historical load forecasts, weather, and other variables.[40] Load forecasts are created weekly to consider the next twelve days, and are adjusted the day before the Day-Ahead Market closes to include CAISO forecasts, final variable adjustments, and to reconcile discrepancies in GenTrader.[41]

SDG&E also uses GenTrader to forecast the hourly price of energy in the CAISO market, in concert with in-house developed models using Microsoft Excel.[42] Dispatchable resources are offered on the CAISO market through an economic bid. SDG&E is able to adjust submitted bid prices using the Hour-Ahead Scheduling Process[43] after prices are set in the Day-Ahead Market.[44] The utility's must-take Qualifying Facilities (QF) and some renewable resources are self-scheduled and function as price-takers on the Day-Ahead and Real-Time markets. GenTrader uses fuel prices, commitment costs, and variable operating costs to create incremental bids for dispatchable resources. SDG&E reviews market trading prices and other historical inputs to optimize its market price forecasting model. Forecasts are calculated in-house and

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[38] SDG&E Testimony, JP-20-21.

[39] SDG&E Testimony, JP-15.

[40] SDG&E Testimony, JP-10.

[41] SDG&E Testimony, JP-10.

[42] Data Request 6 Response, Q1.

[43] The HASP market allows incremental or decremental adjustments of scheduling in the Real-Time Market. CAISO only allows prices to be adjusted however, not load. Any difference in load would be settled using real-time prices. JP-19-20.

[44] Data Request 6 Response, Q3.

consider historical forecasts and actual generation awards to modify and improve algorithms.[45]

2. Forecast Accuracy Implications

Accurate forecasting of price and load is crucial for SDG&E to adhere to LCD standards when submitting economic and self-scheduled or self-committed bids. Inaccurate load forecasting leads to a surplus or deficit which then has to be balanced in the volatile Real-Time Market.[46] The price forecast drives SDG&E's determination of opportunity costs which allows the utility to optimally dispatch DR and self-committed resources.[47]

3. SDG&E's Forecast Accuracy for 2015

Load

For the Record Period 2015, SDG&E had an average real-time hourly load of [redacted].[48] Its load forecast had an average corresponding adjustment difference of [redacted] MW.[49] The Mean Absolute Percentage Error (MAPE) is a method of measuring the difference between two figures.[50] The MAPE of the load forecast is calculated by subtracting the actual load from the forecasted load, and dividing the absolute value of the resulting figure by the actual load in order to derive a percentage figure of the difference. A smaller MAPE represents a smaller difference between forecasted and actual load and thus a smaller amount of inaccuracy. The MAPE calculated using 2015 data shows a [redacted] inaccuracy.[51] Table 1 below presents the MAPE along with the

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[45] *Ibid.*

[46] SDG&E Testimony JP-21:22-24.

[47] For DR programs see: SDG&E Testimony – Attachment H – ERRA 2015 Demand Response Metric 1.xlsx. For Self-committed resources see "Lake Hodges": SDG&E Testimony JP-18.

[48] Data Request 6 Response, Q2a and Q2b Attachment.

[49] Data Request 6 Response, Q2a and Q2b Attachment.

[50] The MAPE is a method used by the California ISO to measure load forecast accuracy, and is a useful and straight-forward measure of accuracy in this testimony. CAISO, *Second Revised Straw Proposal – Regional Resource Adequacy.* Accessed 9/13/16. Page 13. https://www.caiso.com/Documents/SecondRevisedStrawProposal-RegionalResourceAdequacy.pdf

[51] Data Request 6 Response, Q2a and Q2b Attachment.

absolute value of the average hourly inaccuracy and the number of hours in 2015 where the MAPE was greater than 10%.

TABLE 1: LOAD FORECAST ACCURACY (CONFIDENTIAL)

Record Period	Average Difference Between Actual and Forecasted Load (Absolute Value)	Absolute Value Difference / Actual Load (MAPE)	Number of Hours with a Difference >=10% of total load[52]
2015[53]	[redacted]	[redacted]	[redacted]
2014[54]	[redacted]	[redacted]	[redacted]
2013[55]	[redacted]	[redacted]	[redacted]
2012[56]	[redacted]	[redacted]	[redacted]

Each of these measures show that SDG&E's load forecast accuracy has [redacted] relative to past years and especially 2014. The right-most column of Table 1 shows how many hours in the year the forecast was significantly incorrect. It is derived by counting the amount of hours when the MAPE was over 10%. Taken along with the average annual MAPE, it is possible to observe severe instances of [redacted] compared to annual accuracy rates.

Price

SDG&E measures its forecast accuracy in terms of the difference between its forecast of the supply Locational Marginal Price (LMP) and Default Load Aggregation Point (DLAP) and the actual values of the South-of-Path 15 (SP15) Day-Ahead price.[57] The supply LMP is the price which the resource is paid by the market to generate, calculated by the region's marginal cost of energy, cost of congestion, and cost of

[52] Each hour the forecast was at least 10% above the Real-time load for that hour.

[53] DR6 Response Q2a+2b ORA REVISED CONFIDENTIAL.xlsx "2b. Load – DA vs. RT"

[54] 2014 Load Summary ORA REVISED CONFIDENTIAL.xlsx, "Annual Summary – DA vs. RT"

[55] ERRA 2013 MDR 1.4.16 ORA REVISED CONFIDENTIAL.xlsx.

[56] ERRA 2012 MDR 1.4.38 ORA REVISED CONFIDENTIAL.xlsx.

[57] Data Request 6 Response, Q1 & Q2.

transmission losses.[58] The DLAP price is what SDG&E had to pay to purchase energy to meet their load, and is the aggregate price of all local demand price nodes in their service territory.[59] The LMP figures in Table 2 are the average figures from across SDG&E's territory, as the prices vary between resource locations.

TABLE 2: 2015 DAY-AHEAD ENERGY PRICE FORECASTING[60] (CONFIDENTIAL)

	Average Energy Price	Average Hourly Forecast Error (Absolute Value of Each Hour)[61]	Average Forecast Error / Average Price
2015 LMP	[redacted]	[redacted]	[redacted]
2014 LMP	[redacted]	[redacted]	[redacted]
2015 DLAP	[redacted]	[redacted][62]	[redacted]
2014 DLAP	[redacted]	[redacted][63]	[redacted]

Table 2 shows [redacted] as measured by "Average Hourly Forecast Error" supplied by SDG&E in 2015 compared to 2014. That figure expressed as a proportion of the average price of energy over the year however, [redacted]. The figures and

[58] CAISO Fifth Replacement Electronic Tariff, Appendix C, pp. pp. 2. http://www.caiso.com/Documents/AppendixC_LocationalMarginalPrice_ER16-1886.pdf

[59] CAISO Fifth Replacement Tariff, Section 11.5.2.2. www.caiso.com/Documents/CombinedPDFDocument-FifthReplacementCAISOTariff.pdf

[60] 2015 Data: DR6 Response Q2a+2b ORA REVISED CONFIDENTIAL.xlsx "2a. Fcst vs Act DA LMP." 2014 Data: DR10 Response Q1a ORA REVISED CONFIDENTIAL.xlsx "1a. Fcst vs Act DA LMP."

[61] The absolute value of the forecasted price minus the actual price

[62] Original dataset provided by SDG&E provided a calculation which included missing data points which increased the 2015 DLAP Average Hourly Forecast Error to a sum of [redacted] ORA Revised dataset was used which corrected this error to not include missing data points which produced the Average Hourly Forecast Error listed in Table 2. The figure used here is in: DR6 Response Q2a+2b ORA REVISED CONFIDENTIAL.xlsx.

[63] This is not a complete annual figure; DLAP forecasts were not produced prior to 5/3/2014: DR10 Response Q1a ORA REVISED CONFIDENTIAL.xlsx.

supporting data used in ORA's analysis and Table 2 were provided by SDG&E at the request of ORA.[64] The Commission should require SDG&E to submit load and price forecast data in the same format as the attachment provided in SDG&E's response to Data Request Number 6, Question 2.[65] The data provided in that response was crucial to the analysis of forecast accuracy and can be used to develop historical benchmarks.

4. Impact of Forecasting – Case Study: Lake Hodges Pumped Hydro

The Lake Hodges Pumped Hydro Storage facility is particularly affected by forecast inaccuracy because it is self-committed.[66] This means to optimally use the resource, SDG&E schedules the resource to pump at the lowest anticipated price of energy, and generate at the highest price of energy, for a few hours each day.[67] Optimal operation constraints, like pumping or generating for consecutive hours rather than scattered over the day, must also be considered.

Table 3 shows figures derived from SDG&E's testimony.[68] Column A is based on SDG&E's forecasted LMP for when the facility was scheduled to pump and generate, showing the overall expected CAISO market profit of the facility. Corresponding "Actual" figures in Column B are calculated using the actual LMP that occurred in the hours the facility pumped or generated, showing the actual profit realized. The difference between the two in Column C shows the additional cost to pump above forecasted costs and missed revenue from generating below forecasted market returns. Column C would be zero if SDG&E had a forecast accuracy of 100% and scheduled the facility to run at the optimal hours of the day, which is not a realistic expectation but one SDG&E should strive for as closely as possible. The operating constraint of running in consecutive hours to avoid increased operating costs from repetitive start-ups and shut-downs will also

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[64] DR6 Response Q2a+2b ORA REVISED CONFIDENTIAL.xlsx.

[65] Included with this testimony as Attachment 6.

[66] SDG&E Testimony, JP-18-19.

[67] *Ibid.*

[68] Attachment B 2015 Pump Storage Data ORA REVISED CONFIDENTIAL.xlsx

prevent completely optimal scheduling of Lake Hodges;. Using similar data from record period 2014, Table 3, below, presents another example of SDG&E's [redacted], especially Column D which shows [redacted].

TABLE 3: FORECAST INACCURACY AT LAKE HODGES FOR RY2015[69] (CONFIDENTIAL)

Record Period	(A) Expected Revenue – Expected Cost	(B) Actual Revenue – Actual Cost	(C) Additional Costs from Pumping + Missed Revenue from Generating	(D)[70] % Difference between Expected Returns and Actual Returns
2015	[redacted]	[redacted]	[redacted]	[redacted]
2014	[redacted]	[redacted]	[redacted]	[redacted]

5. Forecasting Recommendations

ORA recommends that the Commission do the following to increase forecasting accuracy:

> ... Require SDG&E to order an independent evaluation to review its process and models of forecasting short term system loads, prices in the Day-Ahead Market, and the forecast results. The evaluation should yield a report which includes the effectiveness and accuracy of SDG&E's forecasting processes and models, the potential costs of load and price forecast inaccuracy, and recommendations to improve forecast accuracy in the future. This report would be submitted to SDG&E, ORA, and CPUC. The Commission should also require SDG&E to submit the evaluation results along with the 2016

[69] 2015 figures: Attachment B 2015 Pump Storage Data ORA REVISED CONFIDENTIAL.xlsx "Overall Summary" 2014 figures: 2014 Pump Storage Data ORA REVISED CONFIDENTIAL.xlsx "Overall Summary."

[70] Column D was calculated by taking the additional cost to pump above forecasted cost, adding the difference between forecasted revenue and actual revenue to generate, and dividing it by the total actual pump cost plus the total actual generation revenue. This is the MAPE calculation using several variables. It uses data from both units of Lake Hodges.

ERRA Compliance application. An independent review would provide an outside critique of the processes SDG&E relies upon which may reveal superior approaches to price and load forecasts.

... The Commission should require SDG&E to submit load and price forecast data in the same format as the attachment to Data Response #6 Question 2 for future ERRA applications as an LCD Workpaper.[71] The attachment was supplied by SDG&E when requested by ORA and contains very useful load and price forecast and actual data. It was a key piece of evidence to this testimony and can continue to aid future ERRA testimonies. The Commission could also benefit from the availability of historical forecast data by monitoring accuracy trends which may impact all California utilities and the CAISO markets.

D. Dispatch Reporting

1. Bid Cost Calculations

Economic bids of resources to the CAISO markets are the sum of startup cost, minimum load cost, and incremental energy which typically equals the operating and maintenance (O&M) costs of that resource.[72] As directed by D.15-05-005,[73] SDG&E records in the ERRA testimony every instance when bids submitted to the market incorrectly represented the O&M costs. Incorrect O&M costs create a risk of under or over-payment depending if CAISO dispatches the resource at a price between submitted bids and actual O&M costs. SDG&E instituted a cross validation procedure for bid price generation between two of its market groups beginning in the fourth quarter of 2014 to decrease instances of this variation.[74] This procedure led in part to a [redacted] in the number of incorrectly calculated bids from [redacted] in 2014 to [redacted] in 2015, and a [redacted]

[71] Attachment 6 of this testimony.

[72] SDG&E Testimony JP-17:9.

[73] D.15-05-005, Attachment A, Section 2. (Page 20-21 of the Decision document).

[74] SDG&E Response to ORA Data Request No. 3, Q2.a.

of cost impact from [redacted] to [redacted].[75] Every variance in the record period was due to the [redacted].[76]

2. Non-economic Dispatches

D.15-05-005 requires that SDG&E report times that incremental energy was not awarded when the incremental bid at the awarded MW level was lower than the LMP at the applicable node.[77] Ratepayers suffer a cost impact at these times since the resource was not optimally utilized by the market. SDG&E reported [redacted] instances of such "non-economic dispatches." Most thermal dispatchable resources have multiple bids which increase in price ($/MWh) as the volume of energy awarded by CAISO increases. The price increase is due to increased costs of O&M and heat rates incurred by generating higher amounts of energy.[78] CAISO has the discretion to choose to award an amount of energy lower than what would be dispatched at the LMP for several reasons such as grid reliability and congestion.[79] SDG&E's testimony does not explain the reasons for these dispatches and fails to document relevant Customer Inquiry Dispute and Information (CIDI) tickets in regards to the Non-economic Dispatches as required by D.15-05-005.[80] SDG&E responded to an ORA request for information by stating that all instances were due to CAISO dispatch decisions, and thus outside of SDG&E's capability to maintain LCD principles.[81]

3. Zero-Dispatches

SDG&E's testimony includes hourly bidding and LMP data.[82] Whenever an incremental bid price is below the LMP, the resource should have been dispatched by

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[75] SDG&E Testimony, Attachment C - Incremental Bid Cost Calculations.xlsx "Table 2 - 2B&C."

[76] SDG&E Testimony, Attachment C "Table 2 – 2 Significant Variances."

[77] D.15-05-005, Attachment A, 2.e. (Page 21 of the Decision document).

[78] SDG&E Testimony, JP-25.

[79] Teleconference Meeting Concerning least-cost dispatch Between ORA and SDG&E, 7/5/2016.

[80] D.15-05-005, Attachment A, 2.e.

[81] Teleconference Meeting Concerning least-cost dispatch Between ORA and SDG&E, 7/5/2016.

[82] SDG&E Testimony - Attachment C - Incremental Bid Cost Calculations.xlsx.

CAISO unless the resource was out of operation. SDG&E's data indicates that for many hours for different resources, the LMP reached a price that should have led to dispatch of the resource, but no energy was awarded by CAISO.[83] No reasons for such events of "zero-dispatch" are provided in SDG&E's testimony. For example, Otay Mesa Energy Center (OMEC), the largest generator in SDG&E's portfolio, had [redacted] hours in which it ought to have been awarded an energy dispatch, but none was awarded by CAISO. This compares to [redacted] hours when it was correctly not dispatched because the LMP was below the minimum bid, and [redacted] hours when the resource was dispatched as expected. When an inexpensive and large resource like OMEC does not dispatch, higher cost resources may be utilized in its place. The reasoning for zero-dispatch may be beyond the utility's control or due to outages, but must be documented. Outages for contracted resources are not presently reported in the ERRA. ORA believes that the Commission should require SDG&E to provide explanations along with CIDI documentation for such instances of zero energy awards when the LMP was above minimum bids. Such reporting requirements would mirror the current reporting requirements of "non-economic dispatch" described in the previous section and in D.15-05-005 Attachment A Section 2.e.

4. Bid Upload Failure

On July 5th, 2015, SDG&E failed to offer bids for one of its utility-owned generators. Palomar's 522-565 MW configurations were not bid into the market by the utility for a full day due to a failure for bids to be uploaded.[84] Default Energy Bids allowed Palomar's configuration to be dispatched by CAISO regardless of the upload failure, though at a bid price lower than what SDG&E would have likely bid.[85] No cost impact occurred however, because the default bids were near enough to what SDG&E would have bid if the configurations were uploaded; the price of energy did not fall

[83] SDG&E Testimony - Attachment C - Incremental Bid Cost Calculations.xlsx, "Table 2E."

[84] SDG&E Testimony - Attachment C - Incremental Bid Cost Calculations.xlsx "Table 2D."

[85] ORA observed the bid prices of adjacent days recorded in Attachment C in order to make this assumption. Data Request 8 Response CONFIDENTIAL, Q1.a.

between the two for any hour of that day.[86] The risk of a cost impact is a risk to LCD since it could have allowed the facility to run at a price below operating costs. A similar system error prevented the upload of configurations at the same power plant in January 2014 creating the same risk of costly operations.[87] SDG&E assures ORA that the event is isolated and inadvertent, but ORA recommends that the utility take the necessary steps to prevent the upload failure from continuing to occurring in the future.[88]

E. Demand Response Programs

1. Summer Saver Program

The Summer Saver Program (SSP) is a demand response program that adjusts customer demand by using installed controls on air conditioning units of residential and commercial customers. The program is triggered for dispatch when SDG&E's System Load reaches 3,800 MW or higher for four consecutive hours. The program can be run for a maximum of three days per week and is limited to fifteen events between May and October.[89] SDG&E maintains that the SSP's trigger is not an economic trigger and emphasizes that since the program is not integrated into the CAISO market, it is not relevant to the ERRA Application.[90]

The SSP's trigger is intrinsically economic because system load amounts directly impact energy prices in the market. Dispatching the SSP has a direct impact on energy costs which SDG&E must procure to meet energy demand since it can be utilized in order to decrease load and thus avoid the operation of a high-cost low-value peaker. Sub-optimal use of SSP can thus lead to overspending by SDG&E which must be reported in the ERRA according to D.14-07-006.[91] Efficient dispatch of this program is a part of

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[86] ORA expects that the bid prices for the configurations would be roughly equal to the prices submitted on July 4th and July 6th. The clearing price paid for the resource was above those corresponding prices. SDG&E Testimony, Attachment C "Table 2D."

[87] Data Request 3 Response, Q3.a.

[88] *Ibid.*

[89] Data Request 6 Response, Q6.

[90] Data Request 6 Response, Q6.

[91] D.14-07-006, Conclusion of Law 5, p. 33. This reporting was required of SCE and PG&E as well.

least-cost dispatch which the utility must demonstrate. The program cost [redacted][92] in 2015, an amount [redacted] the Capacity Bidding Program mentioned later, and its inefficient implementation would not extract the maximum value from the program for ratepayers. The LCD value of the program exists regardless of CAISO market integration. The Commission should require SDG&E to submit DR metrics for SSP for review and analysis in future ERRA proceedings to determine compliance with LCD.

2. Evaluation of Capacity Bidding Program

SDG&E reported the use of its Capacity Bidding Program using metrics approved in D.15-05-005.[93] The Capacity Bidding Program (CBP) is a set of two program options in which energy customers or aggregators can participate. The Day-Ahead (DA) option notifies customers of a trigger event by 3pm the day prior (CBP-DA), and the Day-Of (DO) option notifies customers by 9am of the same day of an event (CBP-DO).[94] Participants commit to lower their energy consumption by a certain amount and for a certain duration,[95] and face financial penalties if they fail to do so. The trigger conditions of the two CBPs is the electric system supply portfolio reaching a resource dispatch equivalence of 15,000 Btu/kWh heat rate or at the discretion of SDG&E or request of CAISO.[96]

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[92] R.13-09-001 *SDG&E 2017 Demand Response Program Proposals Pursuant to the Assigned Commissioner and Administrative Law Judge's Ruling Providing Guidance for Submitting Demand Response Programs and Activities Proposal Filings*: Utility Response on 2/1/2016; Confidential. pp. 16, 29.

[93] D.15-05-005, p.16. The Decision adopts a methodology for future ERRA Compliance proceedings for SDG&E to make a showing that quantifies the degree to which it achieved or did not achieve least-cost dispatch of its portfolio.

[94] SDG&E Testimony, JP-34:10-14.

[95] SDG&E offers 1-4 hour, 2-6 hour, and 4-8 hour product options in the CBP tariff. Every dispatch in 2015 was for 4 hours which can apply to each of those options. SDG&E, *Capacity Bidding Program Tariff*. Sheet 3. http://www.sdge.com/documents/capacity-bidding-program-tariff.

[96] SDG&E Testimony, JP-34:15-19.

Assessment of SDG&E's CBP-DA CAISO Bidding Strategy

Traditionally, DR programs are dispatched when their triggering conditions are met and the utility or CAISO approves dispatch. Beginning in October 2014, SDG&E began to integrate its CBP-DA bundled participants into the CAISO market.[97] This partial integration continued from June to October of 2015 and allowed further understanding of the constraints of submitting a DR program into the market.[98] SDG&E continued to dispatch the program itself concurrently with CAISO bidding, using the trigger condition of the program along with its own discretion to determine if dispatch was prudent. Dispatch decisions occurred regardless of whether or not CAISO awarded dispatch; the CBP-DA program could still operate completely off the market.

Program characteristics and integration problems, such as only being able to provide four hours of dispatch, challenged its performance in the record period. SDG&E reports such problems to the Commission along with their progress of adapting the program to fully function on the market.[99] The CBP-DA was bid 75 times between June and October 2015, twelve of which resulted in market awards.[100] The program was only offered into the CAISO Day-Ahead Market Tuesday through Friday because of program limitations.[101] By continuing to dispatch the program even without a market award, SDG&E was able to utilize the benefits of the program for its customers. Successful award from CAISO would complement these usual benefits with a market payment. SDG&E hopes to progressively increase the program's integration into the market, and to integrate other DR programs in the future.[102] It is crucial that the bid price calculation SDG&E employed for the program is reviewed in the ERRA since the program can earn

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[97] Data Request 6 Q.7 Market Integration Progress Report, p. 3.

[98] The CBP-DA would provide about 7.7 MW on average, but the bundled component which was bid into the market was 2.9 MW: Data Request 6 Q.7 Market Integration Progress Report. p. 8.

[99] Data Request 6 Q.7 Market Integration Progress Report, pp. 3, 6.

[100] *Ibid,* pp. 6-7.

[101] *Ibid,* p. 10.

[102] *Ibid,* p. 9.

a payment for market activity which benefits ratepayers and should be bid at a price which dispatches the program at maximum possible value.

SDG&E set bid prices for the CBP based on the heat rate trigger of the program: 15,000 Btu/MWh. A forecast was conducted for each month the program was to run (May through October) to find the eleven highest heat rates. SDG&E set the bid price at the lowest of the eleven heat rates multiplied by the SoCal Citygate price of natural gas[103] to arrive at a dollar per megawatt-hour figure, but SDG&E would set the minimum heat rate figure at the trigger condition of 15,000 Btu/MWh.[104] Each time the program was dispatched, the bid price would be recalculated using the next lowest of 11 forecasted heat rates.[105] An example of the equation, supplied by SDG&E, follows:[106]

HEAT RATE X SoCal Citygate Price = CBP Bid Price
Example: 15 (thousand Btu) X $3 (gas price) =
$45.00/MWh

The amount of energy SDG&E made available to the market was 2.92 MW per hour which was offered for four consecutive hours due to the program's design.[107] Table 4 shows dispatch data for 2015, comparing the average bid price calculated by SDG&E with the DLAP of the CAISO market. No bids were submitted to CAISO in May.[108]

[103] The next-day gas price would be known at the time of forecasting the top eleven heat rates. This would be the price used for calculating the bid price.

[104] SDG&E Response to ORA Data Request No. 6, Question 8.

[105] *Ibid.*

[106] *Ibid.*

[107] SDG&E Testimony, JP-35:6-8. 61.48% of participants were non-bundled customers in 2015: Data Request 6 Q.7 Market Integration Progress Report, p. 8.

[108] Data Request 6 Q.7 Market Integration Progress Report, p. 3.

TABLE 4: CBP-DA BIDDING[109]

	(Column 1) Average Bid Price	(2) # Dispatch Awards	(3) # DLAP > Bid[110]	(4) Total # Bids	(5) # Dispatch Regardless of CAISO[111]
June	$45.50	3	5	15	8
July	$50.46	2	3	19	5
August	$50.21	4	6	16	9
September	$49.66	3	3	7	8
October	$43.43	0	8	18	11

SDG&E's bid cost calculation allows the bid price of the program to vary based on market conditions and takes into account program limitations; CBP-DA cannot run consecutively more than three days and no more than 44 hours a month based on its Tariff.[112] The number of dispatches through the CAISO depends on the accuracy of SDG&E's forecast of heat rates and CAISO market prices.

Since the bid calculation relies on forecasting heat rate prices, this is another area where increased forecast accuracy can benefit ratepayers. SDG&E forecasts heat rates at the start of each month and update its forecasts each time the program is dispatched.[113] The data provided by SDG&E shows that the forecasted Real-Time Market heat rates for each hour between noon and 7pm from May to October were off by an average of [redacted] thousand-Btu/MWh.[114] This [redacted] considering the heat rate trigger is 15 thousand-Btu/MWh. ORA recommends that SDG&E evaluate its heat rate forecasting

[109] Calculated using daily data from the Market Integration Progress Report. Calculations included in attachment: Attachment I Metric 3 ORA REVISED CONFIDENTIAL, "CAISO Dispatch Data."

[110] Typically, DLAP being above the Bid would award a dispatch, but various problems or limitations prevented them. This is noted on the footnotes of attachment: SDG&E Testimony JP-35:6-8. 61. Numbers from: Data Request 6 Q.7 Market Integration Progress Report, p. 7.

[111] CBP-DA Dispatches that occurred in total for the month. Data Request 6 Q.7 Market Integration Progress Report, p. 8.

[112] SDG&E CBP Tariff, p. 1. http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_CBP.pdf.

[113] Data Request 6 Response, Q8.

[114] Attachment K 2015 Metric 6 ORA REVISED CONFIDENTIAL.xlsx "DLAP Heat Rate."

models in order to obtain best-possible accuracy which would improve its the CBP-DA bid prices.

The data used in this testimony's CBP-DA bidding analysis were largely obtained via ORA data requests. ORA recommends that the Commission require future ERRA Compliance applications to include an explanation of bidding calculations for DR programs with partial or full CAISO integration in the LCD testimony. The Commission should also require that SDG&E include the most recent Market Integration Progress Report, or another document including up-to-date data including bid cost calculations, amounts of and reasons for failure of dispatch and bid submissions, a list of market awarded volumes and price by day, and the bid price of each submission.[115] This data is similarly reported for generating resources in SDG&E's portfolio and are similarly important to review LCD principles.

Assessment of Whether SDG&E has Reasonably Dispatched Its Capacity Bidding Programs up to the Amount Available

Table 5 compares the total actual energy dispatched from SDG&E CBP DA and DO program options to the potential energy for dispatch based on trigger conditions. SDG&E has clearly defined trigger conditions for CBP,[116] but may decide not to dispatch.[117] The data in the table shows that for both the DA and DO programs, [redacted] of the energy that was triggered and could have been dispatched was actually dispatched by SDG&E. This is an [redacted] from record period 2014 when only [redacted] of potential energy was dispatched.[118]

[115] The Market Integration Progress Report is a document submitted by the IOUs to the CPUC as required by Order 4 of D.14-05-025.

[116] 15,000 Btu/kWh heat rate or at the decision of SDG&E or CAISO. SDG&E Testimony, JP-34:15-19.

[117] SDG&E takes forecasted system demand, program limitations, and customer fatigue into account before making a final decision about whether or not to dispatch the program. JP-34:21-23.

[118] A1506002 ORA Testimony on Demand Response CONFIDENTIAL, p. 3-8:8.

TABLE 5
TOTAL ANNUAL ENERGY DISPATCHED BY SDG&E'S DR PROGRAMS COMPARED TO TOTAL AVAILABLE ENERGY IN RECORD PERIOD 2015[119]
(CONFIDENTIAL)

	Total Energy Dispatched (MWh)	Total Dispatchable Energy Available when Triggers Met (MWh)*	Under-dispatch (MWh)	% of Total Energy Triggered that was Dispatched	% of Hours Dispatched out of Maximum Hours Dispatchable**
2015 CBP-DA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2014 CBP-DA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2015 CBP-DO	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2014 CBP-DO	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2015 Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2014 Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

* Based on the hours that met the set trigger conditions for the program
** These numbers are subject to trigger design and utility decision to dispatch

Net Cost of Dispatching CBP Below Its Maximum Available Energy Amount

Table 6 shows that SDG&E under-dispatched its CBP resources by [redacted] based on the energy available when the programs were triggered. SDG&E provided a calculation of the net cost impact of that amount of non-dispatched energy of [redacted].[120] This figure is relatively close to the cost impact of 2014 of [redacted] for [redacted] of under-dispatch.[121]

[119] Attachment I Metric 3 ORA REVISED CONFIDENTIAL.xlsx "Summary". Also uses data from Table 3-1: A1506002 ORA Testimony on Demand Response CONFIDENTIAL, pp. 3-9.

[120] The calculation was based on deducting the energy price of calling on the programs from the value of the energy: SDG&E Testimony, Attachment J – ERRA 2015 Demand Response Metric 5.xlsx, "Summary."

[121] A1506002 ORA Testimony on Demand Response CONFIDENTIAL, pp. 3-10.

Evaluation of the Cost Effectiveness of SDG&E's Selection of Dispatch Days

Dispatch exceptions were recorded when SDG&E decided not to call events when trigger conditions were reached. Metric 6 in SDG&E's Testimony provides a net benefit calculation and a comparison between the times DR events were called and all times when trigger conditions were forecasted (whether the program was dispatched or not). The net benefit is determined by deducting the program energy price from the DLAP price. A larger value indicates greater savings from calling the DR program. These figures are presented here in Table 6 which weighs the hourly net benefit by energy available that hour. This is the format of reporting requested by ORA in the 2014 ERRA Compliance application and which SDG&E supplied in its present testimony.

TABLE 6
WEIGHTED AVERAGE HOURLY NET BENEFIT OF ENERGY[122]
(CONFIDENTIAL)

Program	(Column A) Average hourly net benefit from actual dispatch events($/MWh)	(B) Average hourly potential net benefit from all times when trigger conditions were forecast (Dispatched or Not) ($/MWh)	(C) $(A)-(B)	(D) A/B %
CPB-DA 2015	[redacted]	[redacted]	[redacted]	[redacted]
CPB-DA 2014	[redacted]	[redacted]	[redacted]	[redacted]
CPB-DO 2015	[redacted]	[redacted]	[redacted]	[redacted]
CPB-DO 2014	[redacted]	[redacted]	[redacted]	[redacted]

A large positive value in Column C would show that SDG&E correctly selected dispatch events that provided greater savings compared to all times when trigger conditions were forecast. The value for CBP-DA in 2015 [redacted] but positive value, indicating that the utility's selection of dispatch events provided savings compared to randomly selecting instances in which trigger conditions were forecasted. This is not

[122] 2015 Data: Attachment K 2015 Metric 6 ORA REVISED CONFIDENTIAL.xlsx "Summary"
2014 Data: A1506002 ORA Testimony on Demand Response CONFIDENTIAL, "Table 3-4"

true however for CBP-DO, where [redacted] that SDG&E's decisions to dispatch the program did not provide savings compared to randomly selecting instances when trigger conditions were forecasted. In hourly rate terms, both of the programs captured less possible value than in record period 2014, where the programs were utilized less. ORA concludes that although SDG&E dispatched the CBP more in 2015, as we saw in Table 5, dispatch failed to occur on relatively high value energy days.

Dispatch Exceptions

There were [redacted] instances in the record period where trigger conditions were met but CBP was not dispatched.[123] SDG&E's explanation for [redacted] of these instances was that SDG&E did not forecast that the market would reach the trigger conditions.[124] This issue can be addressed by improvements in forecasting which is further explored in Section IV.a above. [redacted] other instances of non-dispatch were due to the difficulty of forecasting prices for Monday on a Friday. Of the thirteen Mondays on which conditions were met, only two were accurately forecasted and the CBP-DA program correctly dispatched. This is a program constraint that cannot easily be mitigated since it would require operation by both SDG&E and its participants on a weekend. The two remaining non-dispatches were due to CAISO error.[125]

CBP Recommendations

SDG&E increased the dispatch of its Capacity Bidding Programs significantly since 2014, mitigating nearly a [redacted] of energy consumption more than 2014. However, SDG&E failed to dispatch CBP some of the times when the programs could capture the best value. ORA does not object to the manner SDG&E dispatched the program, but notes that CBP could benefit from increased forecast accuracy.

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[123] Attachment H Metric 1 ORA REVISED CONFIDENTIAL.xlsx "Triggered and Conditions Met."

[124] *Ibid.*

[125] CAISO prices were posted late once, and the resource ID expired once: Attachment H Metric 1 ORA REVISED CONFIDENTIAL.xlsx "2015 Exception Report"

V. CONCLUSION

SDG&E has significantly reduced its bid variance errors which prevented associated cost impacts in 2015. However, the utility should report and explain "zero-dispatch" of available and suitable resources. This reporting should take a similar form to "non-economic dispatch" reporting.

SDG&E's load forecasting worsened from 2014 to 2015 record periods, and must be improved along with price forecasting. The Commission should order an internal and external evaluation to ensure more effective forecasting and overall lower costs to ratepayers.

SDG&E's DR reporting has undergone changes recently and now represents a substantial improvement over past filings. The metrics established in D.15-05-005 and refined in the 2014 ERRA compliance application now allow for a complete evaluation of DR dispatch. However, the Summer Saver Program was not included and ORA recommends the Commission require that it be part of future Compliance applications.

The recommended disallowance of this chapter of testimony of [redacted] due to an [redacted] should be upheld by the Commission in order to prevent ratepayers from unfairly bearing the cost of SDG&E's error. Least-cost dispatch principles and Standard of Conduct 4 clearly state that it is the responsibility of the utilities to provide energy at the lowest cost, and any decision which results in the dispatch of energy at a higher rate, even in error, must be the responsibility and burden of the utility.

LIST OF ATTACHMENTS FOR CHAPTER 2

#	Attachment	Description
1	A1506002 ORA Testimony on Demand Response CONFIDENTIAL	ORA's Testimony on SDG&E 2014 ERRA Compliance Application; only relevant portions included. Pages 3-8 through 3-12 are cited in this testimony, dealing with the evaluation of CBP.
2	2014 Load Summary ORA REVISED CONFIDENTIAL (Available Via E-Mail)	2014 Load Summary. Also includes figures generated by ORA for use in this testimony. Revised portion highlighted on Tab "Annual Summary."
3	2014 Pump Storage Data ORA REVISED CONFIDENTIAL (Available Via E-Mail)	2014 Pump Storage Data, submitted by SDG&E as "Attachment B" with the 2014 ERRA Compliance testimony. Also includes figures generated by ORA for use in this testimony. Revised portions highlighted on Tabs "Overall Summary" "LH1 Data" "LH2 Data."
4	Attachment B 2015 Pump Storage Data ORA REVISED CONFIDENTIAL (Available Via E-Mail)	2015 Pump Storage Data, submitted by SDG&E as "Attachment B". Also includes figures generated by ORA for use in this testimony. Revised portions highlighted on Tabs "Overall Summary" "LH1 Data" "LH2 Data" "Data for Graph" "Testimony Graph."

#	Attachment	Description
5	Attachment I Metric 3 ORA REVISED CONFIDENTIAL (Available Via E-Mail)	Submitted by SDG&E as "Attachment I". Shows Energy Actually Dispatched by CBP. Also includes figures generated by ORA for use in this testimony. Revised portions highlighted on Tabs "Summary" "CAISO Dispatch Data."
6	DR6 Response Q2a+2b ORA REVISED CONFIDENTIAL (Available Via E-Mail)	Submitted by SDG&E with Data Response 6. 2015 Price and Load Forecast Data. Also includes figures generated by ORA for use in this testimony. Revised portion highlighted on Tabs "2b." "Top 100 LMP" "Top 100 DLAP."
7	DR10 Response Q1a ORA REVISED CONFIDENTIAL (Available Via E-Mail)	Submitted by SDG&E with Data Response 10. 2014 Price and Load Forecast Data. Also includes figures generated by ORA for use in this testimony. Revised portions highlighted on tabs "1a." "Top 100 LMP" "Top 100 DLAP."
8	ERRA 2013 MDR 1.4.16 ORA REVISED CONFIDENTIAL (Available Via E-Mail)	Submitted by SDG&E in the Master Data Request 1.4.16 for the 2013 ERRA Compliance testimony. 2013 Load Forecast Data. Also includes figures generated by ORA for use in this testimony. Revised portions highlighted on tab "Sheet1."

#	Attachment	Description
9	ERRA 2012 MDR 1.4.38 ORA REVISED CONFIDENTIAL (Available Via E-Mail)	Submitted by SDG&E in the Master Data Request 1.4.38 for the 2012 ERRA Compliance testimony. 2012 Load Forecast Data. Also includes figures generated by ORA for use in this testimony. Revised portions highlighted on tab "Sheet1."
10	Attachment H Metric 1 ORA REVISED CONFIDENTIAL (Available Via E-Mail)	Demand Response Programs Metric 1: 2015 Exception Report. Includes a revision by SDG&E from Data Request 3 Response. Also includes figures generated by ORA for use in this testimony. Revised portions highlighted on tab "2015 Exception Report" "Triggered and Conditions Met."
11	2014 Metric 6 ORA REVISED CONFIDENTIAL (Available Via E-Mail)	Submitted by SDG&E in the 2014 ERRA Compliance application, revised by ORA in that applications testimony. Confidential ORA Workpaper for SDGE ERRA 2014's ORA Testimony Chapter 3. Contains 2014 Average Net Cost calculations of the CBP authored by SDG&E and ORA.
12	Attachment K Metric 6 ORA REVISED CONFIDENTIAL (Available Via E-Mail)	Contains data used to calculate heat rate forecast accuracy for the CBP-DA. Tab "DLAP Heat Rate" contains average accuracy figures computed by ORA.
13	Data Request 3 Response	Expansion of "Program Limitations" entry in Attachment H; changes are incorporated in the ORA REVISION of that document attached to this testimony. Also includes Bid Variance information.

#	Attachment	Description
14	Data Request 8 Response CONFIDENTIAL	Includes Palomar and other outage and reporting information.
15	Data Request 6 Response CONFIDENTIAL	Response provides forecast process information, cost impacts of bidding, and non-economic dispatch explanations.
16	Data Request 11 Response CONFIDENTIAL	Information regarding self-scheduling error resulting in a recommendation of disallowance.
17	Attachment E DR011 3cii update CONFIDENTIAL (Available Via E-Mail)	Updated workpaper which accompanied Data Request 11 Question 3cii, relevant to self-scheduling error. SDG&E Data Request 6 Response Q7 Attachment Market Integration Progress Report.
18	Data Request 6 Q.7 Market Integration Progress Report	Submitted by SDG&E as a response to Data Request 6 Question 7. Document is a report of Demand Response integration into the CAISO market which SDG&E submits quarterly to the CPUC in compliance with D.14-05-025 Ordering Paragraph 4.

ATTACHMENT 1

A1506002

ORA TESTIMONY
ON DEMAND RESPONSE

CONFIDENTIAL

Docket	:	A.15-06-002
Exhibit Number	:	
Commissioner	:	Michel Peter Florio
Admin. Law Judge	:	Stephen C. Roscow
ORA Project Mgr.	:	Nika Rogers
ORA Witnesses	:	Various

OFFICE OF RATEPAYER ADVOCATES
CALIFORNIA PUBLIC UTILITIES COMMISSION

Testimony on Application of San Diego Gas & Electric Company (U 902-E) for Approval of: (i) Contract Administration, Least-Cost Dispatch and Power Procurement Activities in 2014, (ii) Costs Related to those Activities Recorded to the Energy Resource Recovery Account and Transition Cost Balancing Account in 2014 and (iii) Costs Recorded in Related Regulatory Accounts in 2014

PUBLIC VERSION

(A.15-06-002)

San Francisco, California
November 12, 2015

Chapter 3 - LEAST-COST DISPATCH DEMAND RESPONSE

(Witness: Xian Ming Li)

A. INTRODUCTION & SUMMARY

This chapter of testimony presents the Office of Ratepayer Advocate's (ORA's) assessment of whether San Diego Gas & Electric Company (SDG&E) has met the Commission's Least-Cost Dispatch (LCD) standard in relation to its dispatch of Demand Response (DR) programs for the period from January 1, 2014 to December 31, 2014 (the Record Year). To conduct this assessment, ORA examined SDG&E's Energy Resource Recovery Account (ERRA) compliance testimony, the Prepared Direct Testimony of Andrew Scates, and associated workpapers for the Record Year, as filed in Application (A.) 15-06-002. ORA also reviewed data request responses from SDG&E. ORA's analysis was conducted to identify whether SDG&E's DR resources have been dispatched appropriately and in accordance with the Commission's Standard of Conduct (SOC) 4.

B. RECOMMENDATIONS

ORA's review concludes that the DR metrics required by the Commission in Decision (D.)15-05-005[22] allow for a more transparent and quantitative evaluation of DR dispatch. These metrics should be compared between years to allow the Commission to assess whether SDG&E is improving its LCD – DR processes and performance between years. Additionally, Metric 6 should be modified to report the weighted average hourly net cost of energy rather than the average to show more precise estimates of the net cost of available energy.

C. BACKGROUND

1. DR and California's Loading Order

In 2003, the State's three energy agencies, the California Public Utilities Commission (CPUC or Commission), California Energy Commission (CEC) and

California Power Authority (CPA), adopted the Energy Action Plan which sets forth an energy resource loading order (Loading Order) for the State's electricity demand.[23] The Commission determined that as part of the Loading Order, DR resources help reduce peak demand by allowing end-use electric customers to reduce their electricity usage in a given time period and to reduce costs: "Demand response also enables utilities to avoid purchasing high-priced wholesale energy by reducing the demand for that energy at particular times of the day and this lowers the price of wholesale energy, and in turn, retail rates."[24]

2. Derivation of the Current LCD Showing in the 2010 Record Year

The 2010 ERRA compliance proceedings recognized deficiencies with the IOUs' LCD showings and provided a process for improvements which led to the establishment of DR metrics. Recent guidance from the Commission regarding SDG&E's demonstration of compliance with the LCD standard was provided in July 2014 in D.14-07-006. That decision, which approves SDG&E's ERRA Compliance Application for the 2010 Record Year (A.11-06-003), notes that SDG&E's LCD showing was unsatisfactory:

> In conclusion, while we find in this decision that—in the absence of a showing the contrary—SDG&E's LCD activities complied with its Conformed 2006 Long-Term Procurement Plan, we caution SDG&E to take seriously our concerns regarding the shortcomings of its showing on LCD. Our concern is that SDG&E not only plan to "get it right" and minimize procurement costs for the benefit of its customers, but that it verify that its plans and intentions have succeeded, and that it take corrective actions when its efforts fall short.[25]

(continued from previous page)

[22] D.15-05-005, p.16. The metrics are explained further in Section C.c and are included as an attachment.

[23] *2008 Energy Action Plan Update*, p.1, posted on California Public Utilities Commission website, retrieved from: http://www.cpuc.ca.gov/PUC/energy/Resources/Energy+Action+Plan/, on 9/23/2015.

[24] *Id.*

[25] D.14-07-006, p.22-23.

The same statement is included in D.13-10-041[26] in relation to Pacific Gas and Electric Company's (PG&E's) ERRA Compliance Application for the Record Year 2010 (A.11-02-011) and D.13-11-005 which relates to Southern California Edison Company's (SCE's) ERRA Compliance Application for the Record Year 2010 (A.11-04-001).[27] D.14-07-006 also provides guidance on how SDG&E should improve its LCD showing: "A complete showing of LCD by SDG&E should include precise numerical calculations that demonstrate that SDG&E achieved LCD during the Record Year, or quantify the amount of overspending by SDG&E."[28]

These three decisions on the IOUs' 2010 ERRA Compliance Applications also mandated that workshops be held in order for the IOUs and other interested parties to develop criteria to determine what constitutes compliance with the LCD standard and the resulting methodology each IOU should follow to assemble a showing that it met its burden and prove such compliance.[29] Subsequently, the Commission held LCD workshops in relation to A.11-02-011 (on January 22, 2014), A.11-04-001 (on February 25, 2014), and A.11-06-003 (on October 15, 2014).

3. Consolidated Joint Utilities Proposal on LCD Compliance and ORA's Response to the Proposal

Following the three LCD workshops, the utilities submitted a joint *Consolidated Proposal for the Demonstration of LCD* (Joint Utilities Proposal) on October 21, 2014.[30] On November 5, 2014, ORA filed a response indicating that it was broadly in agreement with multiple areas of the proposal but did recommend one major change and four minor ones. The major change requested was the inclusion of Demand Response Metrics into

[26] D.13-10-041, p.26.

[27] D.13-11-005, p.26.

[28] D.14-07-006, Conclusion of Law 5, p.33. This showing was required of SCE and PG&E as well.

[29] D.14-07-006, p.34; D.13-10-041, p.45; D.13-11-005, p.81.

[30] Pacific Gas And Electric Company's (U39E), Southern California Edison Company's (U338E), and San Diego Gas & Electric Company's (U902E), Motion for Approval of Joint Proposal for the Demonstration Of Least-Cost Dispatch (A.11-02-011/A.11-04-001/ A.11-06-003 – Not Consolidated). (Joint Utilities Proposal).

the LCD showing.[31] As stated by ORA, metrics are needed because "i) the effect of dispatching DR resources has a direct net financial impact on overall dispatch of resources to meet load; ii) the LCD compliance review has now been explicitly set up to provide a clear quantitative cost demonstration that utilities are dispatching their resources at the lowest possible cost, so this is the most logical choice of medium to investigate the cost of any dispatchable resources; iii) this net financial impact is not considered in any other forum."[32]

4. SDG&E's 2010 ERRA Compliance Application: Interim Ruling and Final Decision

On December 2, 2014, Commissioner Florio and Judge Roscow issued a joint Interim Ruling on the Joint Utilities Proposal with the intention of providing guidance for the ERRA Compliance Proceedings for the Record Year 2014. In the joint Interim Ruling, the Commission determined that the DR metrics proposed by ORA should be included as part of the IOU's LCD filings.[33]

On May 14, 2015, the Commission issued a final Decision (D.15-05-005), on SDG&E's 2010 ERRA Compliance Application (A.11-06-003). D.15-05-005 approved the Interim Ruling's content and in particular ordered that going forward DR metrics should be included as part of the LCD showing.[34] The metrics adopted by the Commission are included as an attachment.

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[31] November 5, 2014 Response of the Office of Ratepayer Advocates on Pacific Gas and Electric Company's (U39E), Southern California Edison Company's (U338E), and San Diego Gas and Electric Company's (U902E) Motion for Approval of Joint Proposal for the Demonstration of Least-Cost Dispatch, p.6-8.

[32] *Id.*, p.6-7.

[33] Interim Ruling Providing Guidance For 2014 ERRA Compliance Proceedings (A.11-02-011/A.11-04-001/ A.11-06-003 – Not Consolidated), p.12.

[34] D.15-05-005, p.16.

D. DISCUSSION & ANALYSIS

This section begins with a description of DR programs that fall under the scope of this proceeding and then describes the analysis of several metrics that are being used to illustrate whether these programs have been dispatched in a way that achieves LCD.

1. SDG&E's DR Programs that Fall Under the Scope of This Chapter and Their Trigger Conditions

As noted in Section C.d. above, the Interim Ruling and D.15-05-005 adopted ORA's proposal to require inclusion of DR resources in the LCD demonstration. ORA's proposal specifically refers to dispatchable DR resources that respond to predefined economic triggers with some certainty regarding the load that can be reduced by the resource. Understanding dispatchability in the context of DR programs requires some further explanation. Participation in some programs is completely voluntary (e.g., the Critical Peak Pricing or Reduce Your Use[35] programs) and this limits the certainty in the level of response from events in these programs. LCD review does not include programs such as these but does include programs where the customer is obligated to provide a specific response when called upon by the utility. Programs are dispatched according to tariffs or contracts that set certain trigger levels and these can include economic triggers such as heat rates and energy prices which occur when there is relatively high demand across the grid. Thus, LCD review includes dispatchable DR resources with economic triggers and with a level of certainty in the load drop of the resource due to obligations for customers to respond.

The following DR programs administered by SDG&E fall under the dispatchable DR category and are included in ORA's LCD – DR analysis:

i. Summer Saver Program (SSP) – Residential and Commercial (Trigger condition: System load greater or equal to 3800 megawatts (MWs).[36]

[35] Also known as Peak Time Rebate.

[36] SDG&E Testimony, p.AS-36.

ii. Capacity Bidding Program (CBP) – Day of and Day Ahead (Trigger condition: 15,000 Btu/kWh heat rate).[37]

2. Evaluation of Summer Saver Program

The SSP utilizes controls on the air conditioning units of residential and small business customers.[38] SDG&E states in its testimony that the SSP uses a system load operational trigger of 3800 MW, does not have an economic trigger and accordingly, "is not subject to the Commission's LCD requirements."[39] Thus, SDG&E did not provide any DR metrics for the SSP since it does not actually utilize an economic trigger that reflects responsiveness to prices and SDG&E cannot demonstrate least cost dispatch of the program. However, both SDG&E and the Commission present the SSP as a price responsive program.[40] This discrepancy needs to be addressed to require reporting of SSP DR metrics and evaluate the program under least cost dispatch. ORA recommends that the Commission review this trigger in the Demand Response proceeding Rulemaking (R.)13-09-011 and determine whether and how it should be changed to more accurately reflect the Commission's goals in using SSP as a price responsive program.

[37] SDG&E CBP Tariff, Sheet 5. http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_CBP.pdf.

[38] *Id.*

[39] *Id.*

[40] In SDG&E's Monthly Reports, Summer Saver is listed under the Price Response programs. D.12-04-045, p.114.

3. Evaluation of Capacity Bidding Program (as Measured by Metrics Approved in the Interim Ruling and D.15-05-005[41])

a. SDG&E's Accuracy in Forecasting Economic Trigger Conditions[42]

In response to the requirement for Metric 2,[43] SDG&E does not provide a calculation of the number of hours when it forecasted the trigger criteria since it used actual prices rather than forecasts to call on its CBP. For CBP Day Ahead (DA), customers are notified by 3pm on the day prior to the actual event[44] so SDG&E had time to view the DA market clearing prices and use them as the trigger criteria for the program.[45] For CBP Day Of (DO), customers are notified by 9am the day of the event[46] and SDG&E "used the published Day-Ahead market clearing prices and other real-time market conditions" to decide whether or not to dispatch the program rather than forecasting price triggers.[47] Since SDG&E uses actual conditions instead of forecasts to dispatch its programs, it did not provide any data on forecasts.

[41] D.15-05-005, p.16. The Decision adopts a methodology for future ERRA Compliance proceedings for SDG&E to make a showing that quantifies the degree to which it achieved or did not achieve least-cost dispatch of its portfolio.

[42] This corresponds to metric 2 in Exhibit A of D.15-05-005. (See Also Exhibit A in ORA's Response to the Joint Utilities Proposal).

[43] Metric 2 reports the number of hours when the utility forecasts that trigger criteria will be reached, as a percentage of hours in which trigger conditions were actually reached in the same time period (monthly and annual basis).

[44] SDG&E Testimony, p. AS-35.

[45] SDG&E Testimony, p. AS-39.

[46] SDG&E Testimony, p. AS-35.

[47] SDG&E Testimony, p. AS-39.

b. Assessment of Whether SDG&E has Reasonably Dispatched its Capacity Bidding Programs up to the Amount Available[48]

Table 3-1 compares the total actual energy dispatched from SDG&E's Capacity Bidding Programs (DO and DA) to the potential energy for dispatch based on trigger conditions (Column 3). The data shows that across CBP, 25% of the energy that was triggered and could have been dispatched was actually dispatched. This low dispatch percentage is concerning since it means that 75% of the energy that could have been dispatched and used to benefit ratepayers was left unused. Section D.c.iii will provide further discussion of the value of that energy. Table 3-1 also shows that across CBP, 15% of the energy that was potentially available based on the tariff conditions was actually dispatched.

Comparing the total triggered energy with the total energy that could be called based on tariffs (Column 6) shows that total triggered energy reached as high as 63% of tariff limits.[49] This indicates that the total energy that could be called based on tariff limits is high compared to triggered energy and higher still compared to energy actually dispatched.

[48] This corresponds to metrics 3 And 4 in Exhibit A of D.15-05-005. These metrics are derived from ORA's Response to the Joint Utilities Proposal. Metric 3 shows the energy available and dispatched for the DR programs and metric 4 requires an explanation when energy was not dispatched to the maximum availability.

[49] ORA Workpapers- SDG&E Data Request Response ORA-SDG&E-DR-07 See *Confidential Li Chapter 3, Attachment I-Revised-ORA.*

Table 3-1

Total Annual Energy Dispatched by SDG&E's DR Programs Compared to Total Available Energy in Record Year[50]

	(1)	(2)	(3)	(4)	(5)	(6)
Program Name	**Total Energy Dispatched (MWh)**	**Triggered Maximum Total Energy Available (MWh)***	**(1)/(2) : % of Total Energy Dispatched that was Triggered**	**Tariff Maximum Total Energy Available (MWh)** **	**(1)/(4): % of Total Energy Dispatched out of Tariff Max ****	**(2)/(4) % of Triggered Energy out of Tariff Max**
CBP-DA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
CBP-DO	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

* Based on the hours that met the pre-set trigger conditions for the program.

** Based on the maximum number of hours a program can be called under its tariff (44 hours per month for 6 months).[51]

The data in Table 3-1 also shows that SDG&E is [redacted] its DR programs compared to either the potential dispatch based on triggers or the maximum available based on program tariffs. As shown in Table 3-2 below, of the [redacted] megawatt-hours (MWh) available to be dispatched based on triggers for these programs, [redacted] MWh were actually dispatched meaning that the system could benefit from an additional [redacted] MWh of dispatch from these programs. The maximum tariff-based dispatch possible of these programs over the Record Year was [redacted] MWh so based on tariff conditions, the system could be benefitting from a further [redacted] MWh of dispatch from these programs.

[50] ORA Workpapers- SDG&E Data Request Response ORA-SDG&E-DR-07 See *Confidential Li Chapter 3* Attachment I-Revised-ORA.

[51] SDG&E CBP Tariff, Sheet 3. http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_CBP.pdf.

Based on these metrics and the fact that dispatch compared to triggered and tariffed energy was so low ([redacted] respectively), SDG&E has [redacted] for improving its dispatch of these programs and outcomes for ratepayers.

Table 3-2
Total Annual Energy Available but Not Dispatched for SDG&E's DR Programs in Record Year[52]

Program Name	Total energy available but not dispatched (based on triggers) (MWh)*	Total energy available but not dispatched (based on tariff) ** (MWh)
CBP-DA	[redacted]	[redacted]
CBP-DO	[redacted]	[redacted]
Total	[redacted]	[redacted]

* Based on the hours that met the pre-set trigger conditions for the program.
** Based on the maximum number of hours a program can be called under its tariff (44 hours per month for 6 months).[53]

c. Net Cost of Dispatching DR Programs Below Their Maximum Available Energy Amount[54]

The information in Table 3-2 shows that SDG&E under-dispatched its DR resources by approximately [redacted] based on the energy available when the programs were triggered.

SDG&E provided a calculation of the net cost impact of non-dispatched energy based on deducting the energy price of calling on the programs from the value of the energy.[55] The total value of the potential energy of the DR programs that was available based on forecasted triggers but under-dispatched was $[redacted].

[52] ORA Workpapers, SDG&E Data Request Response ORA-SDG&E-DR-07 See *Confidential Li Chapter 3* Attachment I-Revised-ORA.

[53] SDG&E CBP Tariff, Sheet 3. http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_CBP.pdf.

[54] This corresponds to metric 5 in Exhibit A of D.15-05-005. These metrics are derived from ORA's response to the Joint Utilities Proposal. Metric 5 shows an estimate of the net cost impact on not calling DR programs up to the maximum availability.

[55] SDG&E Data Request Response, ORA SDG&E DR-007 See *Confidential Li Chapter 3* Attachment J-Revised.

Table 3-3
Total Value of Energy Available But Not Dispatched[56]

Program Name	Net Cost Impact
CBP-DA	[redacted]
CBP-DO	[redacted]
Total	[redacted]

d. Evaluation Of the Cost Effectiveness of SDG&E's Selection of Dispatch Days[57]

When economic triggers are hit, SDG&E retains discretion of whether or not to dispatch the programs. Dispatch exceptions were recorded when SDG&E decided not to call events when triggers were hit. Metric 6 provides a comparison between the selection of DR events called with all times when trigger conditions were forecasted (dispatched or not) in terms of net costs. The net cost is determined by deducting the Default Load Aggregation Point (DLAP) price from the program energy price[58] so a more negative value means greater savings from calling on the DR program. Additionally, SDG&E achieved a more negative average hourly net cost from actual dispatch events than from all times when trigger conditions were forecast[59] so SDG&E correctly selected dispatch events that provided greater savings compared to a random selection of all times when trigger conditions were forecast.

SDG&E had provided an average hourly net cost value but after reviewing the data, ORA recommends that the metric should be refined to report a weighted average hourly net cost. Weighting the hourly net cost by the energy available would provide a more precise calculation that accounts for the fact that the DR programs do not have the

[56] *Id.*

[57] This corresponds to metric 6 in Exhibit A of D.15-05-005. These metrics are derived from ORA's response to the Joint Utilities Proposal. Metric 6 shows whether the selection of DR events called minimized the utility's overall portfolio costs of dispatching supply resources.

[58] SDG&E Testimony, Attachment K.

same amount of energy available to be called each time the trigger is forecasted. It would better associate the net cost of available energy with the amount of energy in that period of time. Table 3-4 reflects ORA's recommended change while Table 3-5 reflects SDG&E's calculations.

Table 3-4
Weighted Average Hourly Net Cost of Energy[60]

Program	(A) Weighted Average hourly net cost from actual dispatch events($/MWh)	(B) Weighted Average hourly potential net cost from all times when trigger conditions were forecast (Dispatched or Not) ($/MWh)	$(A)-(B)	(A)/B (%)
CPB-DA	[redacted]	[redacted]	[redacted]	[redacted]
CPB-DO	[redacted]	[redacted]	[redacted]	[redacted]

Table 3-5
Average Hourly Net Cost of Energy[61]

Program	(A) Average hourly net cost from actual dispatch events($/MWh)	(B) Average hourly potential net cost from all times when trigger conditions were forecast (Dispatched or Not) ($/MWh)	$(A)-(B)	(A)/B (%)
CPB-DA	[redacted]	[redacted]	[redacted]	[redacted]
CPB-DO	[redacted]	[redacted]	[redacted]	[redacted]

(continued from previous page)
[59] *Id.*

[60] ORA Workpapers, SDG&E Data Request Response ORA-SDG&E-DR-07 See *Confidential Li Chapter 3* Attachment K-Revised-ORA.

[61] SDG&E Testimony, Attachment K.

E. CONCLUSIONS

Overall, SDG&E's LCD – DR filing represents a substantial improvement from previous LCD filings. The DR metrics approved in D.15-05-005 and included in this application allow for a more transparent and quantitative evaluation of DR dispatch. In future showings, the DR metrics should be compared between years to allow the Commission to assess whether SDG&E is improving its LCD – DR processes and performance between years. Additionally, Metric 6 should be modified to report the weighted average hourly net cost of energy rather than the average to show more precise estimates of the net cost of available energy.

ATTACHMENT 2

2014 LOAD SUMMARY ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 3

2014 PUMP STORAGE DATA
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 4

ATTACHMENT B 2015
PUMP STORAGE DATA
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 5

ATTACHMENT I METRIC 3
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 6

DR6 RESPONSE Q2A+2B
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 7

DR10 RESPONSE Q1A
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 8

ERRA 2013 MDR 1.4.16
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 9

ERRA 2012 MDR 1.4.38
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 10

ATTACHMENT H
METRIC 1
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 11

2014 METRIC 6
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 12

ATTACHMENT K METRIC 6
ORA REVISED

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

ATTACHMENT 13

DATA REQUEST 3 RESPONSE

ORA MASTER DATA REQUEST
ORA-SDG&E DR-003
SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
SDG&E RESPONSE
DATE RECEIVED: JUNE 29, 2016
DATE RESPONDED: JULY 12, 2016

1. This question is in reference to SDG&E workpaper, "Attachment H_ERRA 2015 Demand Response Metric 1.xlsx" specifically the sheet/tab titled "2015 Exception Report."

    a. For each entry of "Program Limitations" in Column-K, replace with or provide an appended comment which has explanations of what particular limitation of the Capacity Bidding Program led to the decision for non-dispatch.

SDG&E Response 1:

a. The response to Question 1a can be found in attachment "SDG&E Response - ORA DR-003 Question 1a - 2015 ERRA Compliance.xlsx".

ORA MASTER DATA REQUEST
ORA-SDG&E DR-003
SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
SDG&E RESPONSE
DATE RECEIVED: JUNE 29, 2016
DATE RESPONDED: JULY 12, 2016

2. This question is in reference to SDG&E workpaper, "Attachment C – Incremental Bid Cost Calculations.xlsx" specifically the sheet/tab titled "Table 2 - 2B&C."

    a. Provide a brief narrative description of what steps, if any, were taken by SDG&E which significantly reduced the amount of variances between calculated and submitted bids between RY2014 and RY2015. If other independent conditions caused the reduction, please explain.

    b. Provide an explanation for why variances had zero cost impact for RY2015.

SDG&E Response 2

a. In Q4 of 2014, SDG&E instituted a cross validation procedure for bids using available personnel in the Market Analysis Group and the Market Operations Group. Adding additional cross validation significantly reduced the amount of variances between calculated and submitted bids in RY2015.

b. The variances reported, were so small ($.19 or less), that the clearing price never cleared between the bid price and actual cost. If the clearing price is greater than both the bid and actual cost, there would be no impact to dispatch volume, because the resource would be dispatched regardless of the variance. Conversely, if the clearing price was less than both the bid price and actual cost, the resource would not be dispatched regardless of the variance. Since the clearing price was not between the bid price and actual cost, there would be no change in the volume of generation dispatched, and no impact to revenue for the resource.

ORA MASTER DATA REQUEST
ORA-SDG&E DR-003
SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
SDG&E RESPONSE
DATE RECEIVED: JUNE 29, 2016
DATE RESPONDED: JULY 12, 2016

3. This question is in reference to SDG&E workpaper, "Attachment C – Incremental Bid Cost Calculations.xlsx" specifically the sheet/tab titled "2D."

    a. Provide a brief explanation on the failure to upload bids for Palomar in July 5th, 2015. In that explanation, note if the reasons are the same as a similar failure which occurred in January 2014 which was reported in the SDG&E ERRA Compliance Application for RY2014's "Attachment C – Incremental Bid Cost Calculations.xlsx" in the sheet/tab titled "2D."

SDG&E Response 3:

a. Bids were not uploaded for two configurations of Palomar (2x1 and 2x1DF) on Friday, July 3, 2015 for operating day Sunday, July 5, 2015. It was a similar type of event that occurred in January 2014. The event is considered to be isolated and inadvertent.

ATTACHMENT 14

DATA REQUEST 8 RESPONSE

CONFIDENTIAL

ORA MASTER DATA REQUEST
ORA-SDG&E DR-008
SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
SDG&E RESPONSE
DATE RECEIVED: JULY 26, 2016
DATE RESPONDED: AUGUST 8, 2016

Least Cost Dispatch – Joseph Pasquito

Patrick Cunningham (415-703-1933, Patrick.Cunningham@cpuc.ca.gov)

1. This request refers to "Attachment C - Incremental Bid Cost Calculations.xlsx" and "2015 ERRA Compliance MDR - LCD Wrkpr 5 Final.xlsx". Henceforth, the latter file will be expressed as simply, "Workpaper 5."

    a. Attachment C Tab "2E – Raw Data" supports data used in Tab "2D" by showing that two configurations of Palomar were not submitted to market and that no energy was dispatched on July 5, 2015 as a result. However, Workpaper 5 shows that Palomar was awarded dispatch and earned revenue from the market for most of the hours of that day. Please clarify whether Palomar was awarded dispatch on July 5, 2015 in the hours identified in Workpaper 5. Please explain the discrepancy between Workpaper 5 and Attachment C.

SDG&E Response 1:

a. Attachment C Tab "2E – Raw Data" supports data used in Tab "2D" by showing that two configurations of Palomar were not submitted to market. However, it is not stated in the Attachment that no energy was dispatched on July 5, 2015 as a result. In this case, default energy bids (DEB), which do represent variable costs, were used in the Integrated Forward Market (IFM) by the CAISO in the absence of bids to determine Palomar's market award. This is why Workpaper 5 shows that Palomar was, in fact, awarded dispatch and earned revenue from the market and that there is no discrepancy.

ORA MASTER DATA REQUEST
ORA-SDG&E DR-008
SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
SDG&E RESPONSE
DATE RECEIVED: JULY 26, 2016
DATE RESPONDED: AUGUST 8, 2016

2. This question refers to "Attachment C - Incremental Bid Cost Calculations.xlsx" and Master Data Request response 1.1.11.

a. According to MDR Response 1.1.11, Desert Star Energy Center had an actual outage from 5/11 00:01 to 5/22 23:59. According to Attachment C Tab "2E – Raw Data," no energy was dispatched from Desert Star during that period. From 5/23 0:01 to 5/29 07:00 Desert Star was available but no energy was dispatched despite the LMP clearing above most bids. This scenario occurs again from 5/30 00:01 to 6/7 08:00. For what reason(s) did CAISO choose not to utilize available energy from Desert Star?

i. Explain the process of how SDG&E notifies CAISO when a resource is once again available following a scheduled outage. Include the date and time SDG&E notified CAISO that Desert Star was available for dispatch following the scheduled outage ending on 5/22 23:59.

ii. Explain if Desert Star was unable to provide energy to the CAISO market following the outage.

1. If Desert Star was unable to provide energy, please explain why.

SDG&E Response 2:

a. The CAISO chooses to utilize energy based on finding the least-cost energy to serve demand. If the CAISO chose not to use Desert Star, then the cost of utilizing Desert Star was higher than the cost of using other resources to meet demand. Identifying specific reasons that a unit is or is not dispatched is complex. Ultimately, the CAISO must consider all unit costs (start up, minimum load, etc.) along with unit limitations and transmission constraints to reach a least-cost market solution.

SDG&E Response 2 Continued:

i. All resources on an outage have to submit a CAISO Outage Management System (OMS) card. The CAISO OMS card is designed to notify the CAISO Market of the resource's current availability and capacity. Each OMS card has a "planned end time". The "planned end time" is the forecasted end time of when an outage will be concluded. The "planned end time" reflects the resources' best knowledge of when it will be released. As new information becomes available the resource will notify the Scheduling Coordinator (SC) and the SC will modify then OMS cards' "planned end time" to reflect the latest scope and time of the outage. When a resource has concluded an outage, the resource will notify the SC. The SC will then relay that information to the CAISO by ending the OMS card with a "actual end time".

CAISO was notified on 5/22/15 @ 23:38 that Desert Star was available for dispatch following the scheduled outage ending on 5/22 23:59.

ii. Desert Star was able to provide energy to the CAISO following the outage but did not receive a market award based on least-cost dispatch (LCD).

1. Desert Star was able to provide energy, if called upon, for the time period following the outage.

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DATE RESPONDED: AUGUST 8, 2016

3. Are the dispatch and revenue of ancillary services recorded in any way in the workpapers of the testimony?

a. If so, please indicate where in each workbook.

b. If so, please indicate any figures that are sums of dispatched energy or revenue which include amounts derived from ancillary services.

SDG&E Response 3:

Dispatch and revenue of ancillary services were not recorded in the workpapers of the testimony because Appendix A of Decision 15-05-005 does not require ancillary services to be recorded.

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SDG&E RESPONSE
DATE RECEIVED: JULY 26, 2016
DATE RESPONDED: AUGUST 8, 2016

4. Describe SDG&E's current plan to investigate the consideration of least cost dispatch principles in regards to energy storage resources.

a. When does SDG&E plan to schedule energy storage resources for dispatch on the CAISO market?

SDG&E Response 4:

a. On July 29, 2016, counsel for SDG&E spoke with counsel for ORA as well as other ORA staff members, and based on concerns expressed by SDG&E, ORA agreed to withdraw this question.

ORA MASTER DATA REQUEST
ORA-SDG&E DR-008
SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
SDG&E RESPONSE
DATE RECEIVED: JULY 26, 2016
DATE RESPONDED: AUGUST 8, 2016

5. This request refers to "Workpaper 5" Tabs "ERRA Q5 Summaries" and "ERRA Q5 Details"

a. A number of contracted resources which make up a portion of SDG&E's energy portfolio are not present in Workpaper 5. These resources are listed in the Contract Administration testimony of Sally Chen, in particular Table 1 Attachment and Section V.A of Ms. Chen's testimony. Since Workpaper 5 provides a summary of SDG&E's portfolio, it seems these resources should be included. Please explain why these resources are not included in Workpaper 5. If the resources have been omitted in error, please provide an amended Workpaper including each resource's data entries in Tabs "ERRA Q5 Summaries" and "ERRA Q5 Details" The contracted resources concerned are as follows:

i. FPL Energy Green Power Wind

ii. Iberdrola Renewables (Mountain Wind, Phoenix Wind, Manzana Wind).

iii. Oasis Power Partners

iv. Kumeyaay Wind, Olivenhain Municipal Water District (a .45MW generator separate from the pumped hydro resource)

v. Covanta Delano

vi. Point Loma Hydro

vii. SG2 Imperial Valley.

b. Energía Sierra Juarez is listed as a solar resource on Workpaper 5, but is listed as a wind resource in the Contract Administration testimony. Please explain this discrepancy.

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SDG&E RESPONSE
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DATE RESPONDED: AUGUST 8, 2016

SDG&E Response 5:

a. SDG&E is not the scheduling coordinator (SC) for the resources listed below (except for Olivenhain Municipal Water District). They are scheduled (not bid) into the CAISO as a trade using an Inter-SC Trade (IST). Because they are considered trades, SDG&E did not include them as resources in Workpaper 5. Olivenhain Municipal Water District is included in the "Other QF" total in Workpaper 5.

   i. FPL Energy Green Power Wind

   ii. Iberdrola Renewables (Mountain Wind, Phoenix Wind, Manzana Wind).

   iii. Oasis Power Partners

   iv. Kumeyaay Wind, Olivenhain Municipal Water District (a .45MW generator separate from the pumped hydro resource)

   v. Covanta Delano

   vi. Point Loma Hydro

   vii. SG2 Imperial Valley.

Energía Sierra Juarez should have been listed as a wind resource on Workpaper 5, but was listed as a solar resource due to a transcription error.

ORA MASTER DATA REQUEST
ORA-SDG&E DR-008
SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
SDG&E RESPONSE
DATE RECEIVED: JULY 26, 2016
DATE RESPONDED: AUGUST 8, 2016

Contract Administration – Sally Chen

Patrick Cunningham (415-703-1933, Patrick.Cunningham@cpuc.ca.gov)

6. Were there any under or over payments concerning active or in-development contracts during the record year?

a. If such under or over payments occurred, please explain the consequences leading to the payment(s) and the current status of resolution.

SDG&E Response 6:

The information in the section below contains confidential/privileged pursuant to applicable provisions of D.06-06-066, G.O. 66-C and PUC Code Sec. 583 and Sec. 454.5(g).

In the normal course of business there are payment adjustments made to account for, among other things (1) corrections to CAISO or other settlements subsequent to payment of the initial invoice, (2) differences with WREGIS over the quantity of renewable energy credits ("REC") issued for renewable facilities and (3) differences of contract interpretation with our counterparties. These are normally non-material, and are resolved expeditiously with payments trued up accordingly. For the record period, there are three potential overpayments or underpayments that remain unresolved and are under active discussion with the counterparties:

[redacted]

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DATE RESPONDED: AUGUST 8, 2016

Outage – June 1, 2015 at 12:45 a.m. to July 15, 2015 at 8:00 a.m.

7. For the Miramar Energy Facility Unit 1 outage (MEF1 outage), which started on June 1, 2015 at 12:45 a.m. and ended on July 15, 2015 at 8:00 a.m., please provide the following:

a. Is the beginning and the end date and time of the outage as shown above correct? Reference: Response to MDR #1.1.4.9.
b. Is the duration of outage not 44 days, 7 hours and 15 minutes (44:3021 days)? If so, please explain why SDG&E testimony shows the total outage period as 43.8 days (page CLP-A-3).
c. Please enumerate all the parts that were replaced.
    i. Provide pictures of the replaced parts.
    ii. Show where the parts are located in relation to the turbine.
    iii. Please describe how each part failed.
    iv. Please describe the functions of each of the replaced parts.
    v. Were any of the above listed replaced parts directly related to the outage?
d. Why does it take SDG&E that amount of time to repair the above damages? Please provide the schedule/timeline of the various milestone activities. Could something have been done better in the future to reduce the down time – please explain?

SDG&E Response 7-34:

For responses to questions seven through 24, please refer to SDG&E's response to ORA data request 007.

ATTACHMENT 15

DATA REQUEST 6 RESPONSE

CONFIDENTIAL

ORA MASTER DATA REQUEST
ORA-SDG&E DR-006
SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
SDG&E RESPONSE
DATE RECEIVED: JULY 14, 2016
DATE RESPONDED: JULY 28, 2016

Least Cost Dispatch – Joseph Pasquito
Patrick Cunningham (415-703-1933, Patrick.Cunningham@cpuc.ca.gov)

1. Explain what tools and strategies SDG&E employs to optimize and improve the accuracy of load and resource (price) forecasting for the Day-Ahead and Real-Time markets. Please discuss all strategies used to review SDG&E's forecast procedures on an after-the-fact basis.

SDG&E Response 1:

1. SDG&E uses a forecasting tool it developed using Microsoft Excel to forecast load and resource prices for the Day-Ahead Market (DAM). DA Price forecasts are generated by applying historical price spreads and hourly shapes to the SP15 prices traded in the DA market to create a 24-hour price forecast. SDG&E does not forecast Real-Time (RT) prices, but does monitor the relationship between DA and RT prices.

   Due to the constant changing conditions in the market, SDG&E continuously reviews inputs such as historical spreads and market trading prices used in the forecasting model to build price forecasts. Also, SDG&E evaluates price forecasting accuracy by comparing forecasted generation awards to actual generation awards and use that feedback to modify algorithm and inputs for the model accordingly.

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SDG&E RESPONSE
DATE RECEIVED: JULY 14, 2016
DATE RESPONDED: JULY 28, 2016

2. This request concerns the record of SDG&E's resource forecast accuracy, as was ordered to be recorded in this ERRA Compliance review according to CPUC Decision 15-05-005 (Page 16, Order 3.iv):

a. Provide a Mean Average Percentage Error (MAPE) to gauge SDG&E's LMP forecast accuracy against CAISO actual LMP prices. If SDG&E does not typically use the MAPE figure, please use another measurement to express LMP forecast accuracy.

i. Explain how the figure was calculated and why it is the best way to measure accuracy.

ii. Provide an historical benchmark against which to compare the measurement used to determine forecast accuracy in 2015 with forecast accuracy in the previous three years.

b. Provide a MAPE to gauge SDG&E's load forecast accuracy against actual load of SDG&E's bundled customers. If SDG&E does not typically use the MAPE figure, please use another measurement to express load forecast accuracy.

i. Explain how the figure was calculated and why it is the best way to measure accuracy.

ii. Provide an historical benchmark against which to compare the measurement used to determine forecast accuracy in 2015 with forecast accuracy in the previous three years.

SDG&E Response 2:

The following and certain attachments are confidential/privileged pursuant to applicable provisions of D.06-06-066, G.O. 66-C and PUC Code Sec. 583 and Sec. 454.5 (g).

[redacted]

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SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
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[redacted]

[redacted]

[redacted]

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SDG&E RESPONSE
DATE RECEIVED: JULY 14, 2016
DATE RESPONDED: JULY 28, 2016

3. This request is in reference to SDG&E workpaper, "Attachment A - 2015 Summary Load Data.xlsx" and the LCD Testimony Section IV.D.

a. SDG&E attempts to meet 100% of its forecasted load by submitting bids in the Day-Ahead Market. As described in JP-19 & JP-20 of the testimony, if SDG&E under or over forecasts, it will submit self-schedules and cost-based bids for dispatchable resources to the Hour-ahead Scheduling Process (HASP) market in order for CAISO to issue incremental or decremental dispatches. Please provide an estimate of the net profit or loss due to HASP trading compared to a theoretical but ideal scenario where SDG&E had 100% accurate forecasts and met that forecasted load in the DA market. Please explain how SDG&E made its estimate.

i. If SDG&E does not believe such a figure is useful to track forecast accuracy effectiveness, please state why.

SDG&E Response 3:

3.

a. As described in Section IV.D of the 2015 ERRA Testimony of Mr. Pasquito, "SDG&E generally self-scheduled 100% of its forecasted load in the day-ahead market (DAM)." The testimony also states, "the HASP market enabled SDG&E to submit updated self-schedules and cost-based bids for its dispatchable resources so the CAISO could issue incremental or decremental dispatches in the real-time market based on this updated data." There is no profit or loss figure that can be calculated with respect to HASP trading because this refers to scheduling, not trading. SDG&E simply updated the bids (which represent generation costs) and/or self-schedules in order for CAISO to increase or decrease generation based on real-time market conditions. Therefore, SDG&E believes that no comparison can be made with respect to HASP trading related to accuracy effectiveness.

i. Since SDG&E does not engage in HASP trading, no tracking would be considered useful.

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DATE RECEIVED: JULY 14, 2016
DATE RESPONDED: JULY 28, 2016

4. This request is in reference to SDG&E workpaper, "Attachment C - Incremental Bid Cost Calculations.xlsx, Tab 2C- Cost Impacts.xlsx"

a. Provide a definition for "Cost Impact" and explain the process of its calculation.

i. Explain whether Cost Impact is disregarded when CAISO actions are responsible for a non-economical dispatch.

ii. Explain why Cost Impact is disregarded when CAISO actions are responsible for a non-economical dispatch.

b. It appears instances of Cost Impacts for the record year listed in Tab 2C – Cost Impacts only occurred between January and March for the entire record year. Is this correct?

SDG&E Response 4:

4.

a. Cost impact is defined as the cost associated with bidding in generation above or below their true costs. Costs are expressed in the form of bid prices which are calculated using heat rates at various outputs, gas price, gas transport costs, variable operation and maintenance (VOM) costs and GHG adders as inputs. Cost impacts are then calculated by comparing bid prices and LMP clearing prices to determine if generation awards would vary and if so, the lost profitability associated with the variance.

i. Cost impacts are disregarded when CAISO actions are responsible for a non-economical dispatch.

ii. Cost Impact is disregarded when CAISO actions are responsible for a non-economical dispatch because these types of actions are typically reliability driven. In Section V of the Mr. Pasquito's 2015 ERRA Testimony, SDG&E describes several possible justifications for non-economic dispatch from the CAISO.

b. That is correct. SDG&E improved the accuracy of submitted bids, resulting in fewer instances in which incorrect bids were submitted to the CAISO, and none of the incorrect bids resulted in cost impacts after March of 2015.

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SDG&E RESPONSE
DATE RECEIVED: JULY 14, 2016
DATE RESPONDED: JULY 28, 2016

5. This request is in reference to SDG&E workpaper, "Attachment C – Incremental Bid Cost Calculations.xlsx, Tab 2E"

a. In regards to the term, "Non-Economic Dispatch" in Tab 2E defined as "No incremental MWs awarded even though LMP > minimum bid." Please provide a deeper explanation of such a dispatch than is provided in the workpaper.

b. Provide examples for the causes of the Non-Economic Dispatches indicated on Tab 2E that occurred throughout 2015.

SDG&E Response 5:

5.

a. In Tab 2E, "Non-Economic Dispatch" refers to any occurrence when these three criteria are met: (1) the unit received an award for the given hour, (2) the incremental bid cost (minimum bid) was lower than the LMP at the applicable node, and (3) no incremental energy (MWs above the minimum load) was awarded.
b. "LMP > minimum bid" could occur for a variety of reasons, as stated in Section VI. of Mr. Pasquito's 2015 ERRA Testimony, "Potential reasons for LMP clearing higher than incremental bid costs include but are not limited to the consideration of start-up and minimum load costs, MIP (Mixed Integer Processing) gap, inter-temporal constraints, transmission constraints, conditions used as initial conditions for next day and the effect of adjacent balancing authorities' areas

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DATE RECEIVED: JULY 14, 2016
DATE RESPONDED: JULY 28, 2016

6. Please state the triggering conditions of the Summer Saver Program.

SDG&E Response 6:

6. The Summer Saver Program (SSP) is not relevant to SDG&E's 2015 ERRA Compliance as the SSP was not integrated into the CAISO market during the 2015 record period. The trigger conditions in 2015 for SSP are System Load of 3800MW or higher four consecutive hours, maximum of three days per week and limited to 15 events in the program year (May-October).

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SDG&E RESPONSE
DATE RECEIVED: JULY 14, 2016
DATE RESPONDED: JULY 28, 2016

7. Please provide SDG&E's latest wholesale market integration progress report describing SDG&E's progress in integrating its Demand Response programs into the wholesale market.

SDG&E Response 7:

7. Please refer to the attached document labeled "ORA-DR006 Market Integration Progress Report.docx" which is currently provided to the CPUC in compliance with ordering paragraph 4 of D.14-05-025.

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SDG&E RESPONSE
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DATE RESPONDED: JULY 28, 2016

8. Please explain SDG&E's bidding strategy for its Demand Response programs integrated into the wholesale market. How does SDG&E determine the prices of their bids for each program?

a. If there is a calculation, please provide the formula with an explanation of each input. Please also provide a sample calculation of one of SDG&E's bids for a DR program.

SDG&E Response 8:

8. The CBP tariff can be found here: http://regarchive.sdge.com/tm2/pdf/ELEC_ELEC-SCHEDS_CBP.pdf. There is a Day Of component and a Day Ahead component. The tariff describes the maximum and minimum number of hours the event can be called, the Maximum Cumulative Event Duration Per Operational Month, and the Maximum Number of Events per Day that can be called. The inherent use limitations of the PDR bidding process are managed using the following parameters: PDR could be called on a maximum of eleven times in a month for four consecutive hours per dispatch per day, and were never to be triggered with a market heat rate of less than 15.

   At the start of each month, SDG&E forecasted the **eleventh highest market heat rate** (for a consecutive four-hour period) for the balance of each month. If the eleventh highest forecasted heat rate was above 15, SDG&E used that value to formulate a bid price. If the eleventh highest forecasted heat rate was below 15, SDG&E used a 15 heat rate to formulate a bid price. The bid price was calculated by taking the higher of a15 heat rate and the eleventh highest forecasted heat rate and multiplying that value times the SoCal Citygate price for the next day. After the PDR is dispatched, the first time, SDG&E then would take the tenth highest forecasted heat rate and so on until the eleventh dispatch. Bid prices may have gone up or down depending on forecasted heat rates and/or the number of times PDR was dispatched. The following is the formula for calculating the CBP bid price.

   a. HEAT RATE X SoCal Citygate Price = CBP Bid price
   15 X $3.00 = $45.00/Mwhr

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DATE RECEIVED: JULY 14, 2016
DATE RESPONDED: JULY 28, 2016

9. This request is in reference to SDG&E workpaper, "Attachment I - ERRA 2015 Demand Response Metric 3.xlsx, Tab CPB DO Available Capacity and Tab CPB DA Available Capacity"

a. Regarding the values shown in "CBP DA Dispatched" and "Total Available for Dispatch when Triggers Met" and the corresponding columns for the tabs mentioned above. Please explain why SDG&E may dispatch the Capacity Bidding Program below or above what is estimated to be available.

i. How are the amounts of actual capacity bid into the CAISO market with such variance?

SDG&E Response 9.

9.

a. The column CBP DA/DO Dispatched includes an estimate of the actual load reduction that was dispatched as measured after the fact using mathematical analysis. The column Total available for dispatch when triggers are met includes the forecast of the number of MW available at the time the event was called. SDG&E dispatched the total load available for each event.

i. Bids are based on a forecast of how much load reduction is available, not on actual results measured after the fact.

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DATE RECEIVED: JULY 14, 2016
DATE RESPONDED: JULY 28, 2016

10. This request is in reference to SDG&E workpaper, "Attachment J - ERRA 2015 Demand Response Metric 5.xslx"

a. Provide a monthly summary of incentive payments, categorized by energy and capacity payments, made by SDG&E to participants in the CBP.

SDG&E Response 10:

10. Please refer to attachment labeled: "ORA DR 006 Response for Questions 10 Inventive Payments.xlsx" which includes the incentives payments made by SDG&E to CBP participants. The 2015 report includes penalties for non-performance for both capacity and energy payments**.**

ATTACHMENT 16

DATA REQUEST 11 RESPONSE

CONFIDENTIAL

ORA MASTER DATA REQUEST
ORA-SDG&E DR-011
SDG&E 2015 ERRA COMPLIANCE – A.16-06-002
SDG&E RESPONSE
DATE RECEIVED: AUGUST 5, 2016
DATE RESPONDED: AUGUST 19, 2016

1. This request is in reference to "Attachment D – 2015 Self Schedules Supporting Data 1 Final.xlsx" and "Attachment E - 2015 ERRA Compliance - LCD Wrkpr 3c ii and iii SS vs Bid Analysis Final.xlsx"

[redacted]

iv. Please show in which hours in the record year this occurred, and with which resource(s).

[redacted]

c. Please define "Net Self Schedule Value" listed in Attachment E Tab 3cii.

d. Please clarify if the "Net Self Schedule Value" listed in Attachment E Tab 3cii is included in the ERRA balancing account.

i. If yes, in which document is the figure located?

e. Three months are missing from the "Monthly and Annual Table" located on Attachment E Tab 3cii. Please provide an updated table that includes the months of March, May, and July and their associated values.

f. Explain how "Incremental Bid Costs" in Attachment E Tab "Dispatchables SS Only" is calculated.

[redacted]

ii. Please also provide a description of "Incremental Bid Costs" in the context of this workbook.

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SDG&E RESPONSE
DATE RECEIVED: AUGUST 5, 2016
DATE RESPONDED: AUGUST 19, 2016

SDG&E Response 1:

[redacted]

c. "Net Self Schedule Value" is the net profit or loss (revenue minus cost) of self-scheduling energy.
d. "Net Self Schedule Value" listed in Attachment E Tab 3cii is included in the ERRA balancing account.
    i. All CAISO costs and revenues are included in the ERRA Balancing Account. These costs are included in ERRA line item "ISO Supply and Load Costs".
e. An updated table on tab "3cii" of Attachment E includes the months of March, May, and July and their associated values has provided with this response.
f. "Incremental Bid Costs" are calculated by taking the MW award volume (column Y) and subtracting out the minimum load MW (specific to each unit) and multiplying by the bid price (column AI).

[redacted]

    ii. Incremental Bid Costs are the generation costs above minimum load cost expressed in the form of bid pairs (MWs and $). These costs combined with minimum load costs represent total cost of generation at a specific output level.

ATTACHMENT 17

CONFIDENTIAL
ATTACHMENT E - DR011
3CII UPDATE

(AVAILABLE VIA E-MAIL)

ATACHMENT 18

DATA REQUEST 6 Q.7
MARKET INTEGRATION
PROGRESS REPORT

Progress Report: Wholesale Market Integration of Utility Demand Response

The goal of this report is to provide the CPUC with concise feedback on the utility's experience bidding utility-administered demand response resources into the CAISO energy markets in bridge years 2015-2016. Submitting reports according to the schedule below will represent compliance with ordering paragraph 4 of D.14-05-025. For each report filed, the utility should complete each section of the Commission-provided template. Annual reports should follow the same template as the pre-market and mid-year reports, but include more detailed and comprehensive data, roadmaps, and descriptions of challenges and takeaways.

Please select the appropriate report:

☐ July10, 2015 (Pre-market Report) ☒ March 20, 2016 (Annual Report) ☐ March 20, 2017 (Annual Report)

☐ October 20, 2015 (Mid-year Report) ☐ October 20, 2016 (Mid-year Report)

1. Overall Challenges and Lessons Learned

Please succinctly describe the key challenges encountered by the utility when attempting to bid DR programs into CAISO markets, as well as any lessons learned from the utility's experience with wholesale market integration to date. Please also describe any discreet actions utilities, the CPUC, CAISO, or other stakeholders can take to improve the utility's ability to bid in DR. Many of these actions may have already been identified in the Supply DR Integration Working Group filings – if so, this report need only mention the actions – a detailed explanation is not needed. This section is intended to summarize and add context to the information supplied in Section 2, and to identify action steps to improve integration efforts.

SDG&E started preparation for market integration in 2014. Many challenges faced by SDG&E are well documented issues such as the manual work required to register participants into the CAISO Demand Response System (DRS). Other challenges and lessons learned include:

Issue	*Action*
Conversion of meter data to xml format required by CAISO	SDG&E created a desktop application for converting meter data to meet CAISO format requirements.
Market awards that are out of sync with resource capability, as defined in the Resource Date Template ("RDT). RDT file parameters and impact on CAISO awards; more specifically the minimum run time.	Issue was raised in the Supply Side Integration Working Group report. SDG&E is working with CAISO in making adjustments to the Pmin value to remedy the issue. SDG&E will have more information on this issue with more market experience.
Partial dispatch of resource. For example, SDG&E resource has a minimum of 4 hour run time. SDG&E has received awards for 3 of the 4 hours. Unlike traditional resources, SDG&E Proxy Demand Response Resource (PDR) is unable to perform in that fashion.	SDG&E is working with CAISO in finding the root cause of the issue. This is still an outstanding issue.
Approval delays for changes to registration.	Length of time required to make changes to registrations can impact mass market participation. This is a known CAISO issue.

2. Bidding Progress to Date

Portfolio Status

For each program in the utility's 2015-2016 DR portfolio, please list the program, select the appropriate level of integration achieved, and describe specific issues or risks encountered when integrating, or attempting to integrate, the program into the CAISO markets. For programs where an attempt to bid in DR was not made, explain why (e.g. non-dispatchable, could not meet 1-minute telemetry requirement). Examples of types of issues or risks encountered in the bidding process include telemetry requirements, dispatch process, resource size requirements, resource aggregation requirements, registration issues, discrete dispatch limitation, new metering responsibilities, transfer of SQMD for settlement, customer discontent, modifications to AMPs, et al. Please be as specific as possible (e.g. "was not able to comply with +/-2% accuracy telemetry requirement due to cost of installing additional metering" is preferred to "telemetry requirements"). Insert additional program lines as needed.

Program Name: Capacity Bidding Program

Stage of Integration: ☐ Successfully bid in entire program ☒ Successfully bid in partial program

☐ Attempted to bid in but not successful ☐ No integration attempts were made

Bidding Experience:

2014:

SDG&E was able to bid the SDG1_1_PDRP09 resource 4 days in October. SDG&E only received one market award on October 29th. SDG&E did not dispatch the product because the market award was not for the entire 4 hour period, as specified in the SDG1_1_PDRP09 RDT.

2015:

Starting June 4th, 2015 SDG&E began bidding SDG1_1_PDRP09 into the CAISO Day-ahead Energy market. SDG&E was awarded a total of three days in June; the 9th, 16th, and 17th. These awards were either greater or less than the "max on time" given in the RDT Master File. Time constraints within the CAISO software have not allowed PDR_09 to be awarded accordingly to the Master Files parameters. On June 24th, SDG&E changed the "Pmin" value in the RDT from 0MW to 2.91MW and was not awarded for the rest of the month because the Pmin of 2.91MW did not meet the minimum curtailment requirement of 0.1MW. August 11th thru August 24th SDG&E submitted changes to the Master file RDT which limited our ability to bid the resource in.

2016:

SDG&E plans to continue bidding capacity bidding program into the market in 2016. SDG&E's Capacity Bidding Program is seasonal and does not start until May 1st, 2016.

Program Name: Summer Saver

Stage of Integration: ☐ Successfully bid in entire program ☐ Successfully bid in partial program

☐ Attempted to bid in but not successful ☒ No integration attempts were made

Bidding Experience: Potential registration issues because the large number of participants, especially residential accounts make the program unfit for manual market integration.

Integration of this program is slated for 2017-2018 timeframe. SDG&E is actively pursuing opportunities in making program changes in anticipation of market participation.

Program Name: Critical Peak Pricing – Default (CPP-D)

Stage of Integration: ☐ Successfully bid in entire program ☐ Successfully bid in partial program
☐ Attempted to bid in but not successful ☒ No integration attempts were made

Bidding Experience: Program does not have economic trigger and will likely be categorized as load modifying.

Program Name: Base Interruptible Program (BIP)

Stage of Integration: ☐ Successfully bid in entire program ☐ Successfully bid in partial program
☐ Attempted to bid in but not successful ☒ No integration attempts were made

Bidding Experience:

2016:

SDG&E plans to bid the Base Interruptible program into the CAISO markets in 2016. The bidding will likely coincide with the start of Capacity Bidding Program season.

Program Name: Permanent Load Shifting Program (PLS)

Stage of Integration: ☐ Successfully bid in entire program ☐ Successfully bid in partial program
☐ Attempted to bid in but not successful ☒ No integration attempts were made

Bidding Experience: PLS is a non-dispatcheable program and will not be bid into the CAISO market.

Program Name: Small Commercial Technology Deployment

Stage of Integration: ☐ Successfully bid in entire program ☐ Successfully bid in partial program
☐ Attempted to bid in but not successful ☒ No integration attempts were made

Bidding Experience:

SCTD is not feasible because SCTD is an approved enabling technology deployment program and is not a DR resource program or rate. SCTD supports resource programs by offering technology solutions for deeper savings. Similar to SDG&E's Technology Incentive program, SCTD is

merely a technology gateway program encouraging customers to participate in demand response and to optimize dynamic pricing and time of use rates.

Program Name: Peak Time Rebate (PTR)

Stage of Integration: ☐ Successfully bid in entire program ☐ Successfully bid in partial program

☐ Attempted to bid in but not successful ☒ No integration attempts were made

Bidding Experience: Voluntary performance design of the program, registration and baseline issues are the main barriers to market integration. Additionally SDG&E is seeking commission permission to phase out this program.

Program Name: Demand Bidding Program (DBP)

Stage of Integration: ☐ Successfully bid in entire program ☐ Successfully bid in partial program

☐ Attempted to bid in but not successful ☒ No integration attempts were made

Bidding Experience: DBP is a voluntary program and is not a good fit for market participation.

2016:

SDG&E has filed program changes for the 2017 year. If approved, the current DBP program will undergo significant changes. SDG&E will reexamine market integration after commission decision.

Bidding Experience Data

Please complete the following tables for all resources successfully bid in or attempted to be bid in to CAISO markets beginning January 1, 2015. The table is cumulative from report to report; insert additional rows as needed.

Wholesale Resources

CAISO Resource Name	What retail programs/contracts are part of this resource?	PDR or RDRR	Number of Service Agreements (Accounts)	Resource Pmax registered in CAISO	CAISO Services (Energy, Ancillary Service Non-Spinning)	CAISO Market (Day Ahead, Real Time, or Both)	Average offered MWs per bid, by operational month	Bid Price Parameter (Floor / Ceiling) - Include CAISO Net Benefit Test On and Off Peak	Number of Bids per operational month	Number of Awards per operational month	Number of times dispatched per operational month	If partially dispatched, Average Settled MW, by operational month
SDG1_1_PDRP09	CBP DA/DO	PDR	296	2.92 MW	Energy	DA	October 2014: 2.92 Sept 2015: 2.92	See Appendix A Below	Oct 2014: 4 Jun 2015: 15 July 2015: 19 Aug 2015: 16 Sept 2015: 7 Oct 2015: 18	Oct 2014:1 (29th)[1] Jun 2015: 5 (July 2015: 3 days August 2015: 6 Sept 2015: 3 October 2015:8	Oct 2014:0[2] Jun 2015: 8[3] July:5 Aug:9 Sept:8 October 11	May: 0 Jun: 0

[1] No dispatch because the award did not satisfy minimum on time of 4 hours.
[2] No DA Award but Event triggered due to market HR satisfying SDG&E parameters, issues with master file RDT
[3] DA Awarded and Event triggered, Awarded in DA market but not 4 consecutive hours
[4] Resource ID SDG1_1_PDRP09 registration expired on September 11th
[5] Market Published after notification deadline
[6] DA Awarded event not triggered due to program parameters

Market Awards

DAMarket Awards October 2014: *1 Market Award*								
Date	10/29/2014							
HE	(HE16)[1]							
DAMarket Awards June 2015: *5 Market Awards*								
Date	6/9/2015	6/16/2015	6/17/2015	6/18/2015	6/19/2015			
HE	(16-19)[3]	(16-19)[3]	(16-19)[3]	(18)[1]	(19)[1]			
DAMarket Awards July 2015: *3 Market Awards*								
Date	7/29/2015	7/30/2015	7/31/2015					
HE	(16-19)[5]	16-19	16-19					
DAMarket Awards August 2015: *6 Market Awards*								
Date	8/4/2015	8/5/2015	8/25/2015	8/26/2015	8/27/2015	8/28/2015		
HE	(16-19)[6]	(16-19)[6]	(16-19)	(16-19)	(16-19)	(16-19)		
DAMarket Awards September 2015: *3 Market Awards*								
Date	9/9/2015	9/10/2015	9/11/2015					
HE	(16-19)	(16-19)	(16-19)					
DAMarket Awards October 2015: 8 *Market Awards*								
Date	10/14/2014	10/15/2015	10/16/2015	10/20/2015	10/21/2015	10/22/2015	10/23/2015	10/27/2015
HE	(18)[1 4]	(18-19)[1 4 6]	(19)[1 4 6]	(19)[1 4 6]	(17-18)[1 4]	(18)[1 4]	(18-19)[1 4]	(14-16 & 19)[1 4]

[1] No dispatch because the award did not satisfy minimum on time of 4 hours.
[2] No DA Award but Event triggered due to market HR satisfying SDG&E parameters, issues with master file RDT
[3] DA Awarded and Event triggered, Awarded in DA market but not 4 consecutive hours
[4] Resource ID SDG1_1_PDRP09 registration expired on September 11th
[5] Market Published after notification deadline
[6] DA Awarded event not triggered due to program parameters

Triggered Events

DAMarket Awards June 2015: *8 Triggered Events*										
Date	6/9/2015	6/16/2015	6/17/2015	6/22/2015	6/24/2015	6/25/2015	6/26/2015	6/30/2015		
HE	(16-19)[3]	(16-19)[3]	(16-19)[3]	(16-19)[2]	(16-19)[2]	(16-19)[2]	(16-19)[2]	(16-19)[2]		
DAMarket Awards July 2015: *5 Triggered Events*										
Date	7/1/2015	7/16/2015	7/28/2015	7/30/2015	7/31/2015					
HE	(16-19)[2]	(16-19)[2]	(16-19)[2]	16-19	16-19					
DAMarket Awards August 2015: *9 Triggered Events*										
Date	8/6/2015	8/11/2015	8/12/2015	8/13/2015	8/21/2015	8/25/2015	8/26/2015	8/27/2015	8/28/2015	
HE	(16-19)[2]	(16-19)[2]	(15-18)[2]	(16-19)[2]	(16-19)[2]	16-19	16-19	16-19	16-19	
DAMarket Awards September 2015: *8 Triggered Events*										
Date	9/9/2015	9/10/2015	9/11/2015	9/23/2015	9/24/2015	9/25/2015	9/29/2015	9/30/2015		
HE	16-19	16-19	16-19	(16-19)[2,4]	(16-19)[2,4]	(16-19)[2,4]	(16-19)[2,4]	(16-19)[2,4]		
DAMarket Awards October 2015: *11 Triggered Events*										
Date	10/8/2015	10/12/2015	10/13/2015	10/14/2015	10/21/2015	10/22/2015	10/23/2015	10/27/2015	10/28/2015	10/30/2015
HE	(16-19)[2 4]	(16-19)[2 4]	(16-19)[2 4]	(16-19)[3 4]	(16-19)[3 4]	(16-19)[3 4]	(16-19)[3 4]	(16-19)[3 4]	(16-19)[2 4]	(16-19)[2 4]

Retail Information

Retail Program	Program Options	Number of Service Agreements (Accounts)	Percentage of service accounts that are non-bundled	Average MW enrolled over reporting period	Operational Dispatch (SLAP, or other grouping)	Notification Timeline per tariff/contract
Summer Saver	Day Of	27,036	6.04%	15.6	SLAP	n/a
Base Interruptible Program	Day Of	6	66.67%	1.4	SLAP	30
Capacity Bidding Program	Day Ahead	122	61.48%	7.7	SLAP	3 PM day ahead
	Day Of	219	73.06%	6.0	SLAP	9 AM day of
Demand Bidding Program	Day Ahead	8	100.00%	4.6	SLAP	Day Ahead by 1 PM
CPP-D	Day Ahead	1,241	17.16%	21.8	SLAP	3 PM Day ahead
PTR	Day Ahead	76,521	0.00%	5.5	SLAP	3 PM Day ahead
SCTD Residential	Day Ahead	8,247	0.00%	3.2	SLAP	3 PM Day ahead
SCTD Commercial	Day Ahead	2,518	0.00%	3.3	SLAP	3 PM Day ahead
Reduce Your Use (TOU-A-P & TOU-PA-P)	Day Ahead	1,802	0.00%	0.5	SLAP	3 PM Day ahead
Reduce Your Use (TOU-DR-P)	Day Ahead	612	0.00%	0.1	SLAP	3 PM Day ahead

3. Steps Taken to Date

Describe the steps taken to date by the utility in preparation for the wholesale market integration of DR programs. This list should be cumulative from report to report; insert additional rows if needed.

Step	*Program*	*Timing*	*Comments*
SDG&E is working to create business processes and requirements in building automation for CAISO market integration.	Not program specific	Ongoing – To be completed in accordance with Rule 24/32 cost recovery application timeline.	
SDG&E has worked on creating cost estimates for CAISO integration efforts. SDG&E plans to implement some of these integration points in 2016.	Not program specific	Q4 2016	

4. Proposed Roadmap for Continued Integration

Describe the planned action steps to be taken by the utility in the future to further the wholesale market integration of DR programs.

Item	*Program*	*Timing*	*Comments*
Increase integration of Capacity Bidding Program	Capacity Bidding Program	Demand Response season 2016	SDG&E will increase CBP integration in 2016. The gradual increase is based on SDG&E's experience in market participation in the past season, allowing increased volume for participation.
Integrate Base Interruptible Program	Base Interruptible Program	Demand Response season 2016	

These progress reports should include, at a minimum, the above information, however utilities may provide additional data they believe could assist CPUC staff in better understanding their experiences with wholesale market integration of DR.

Appendix A

SDG&E Bid prices:

DA Bid Price October 2014																			
Date	24-Oct	28-Oct	29-Oct	31-Oct															
Bid Price	$57.60	$68.22	$63.20	$66.00															
DA Bid Price June 2015																			
Date	4-Jun	5-Jun	9-Jun	10-Jun	11-Jun	12-Jun	16-Jun	17-Jun	18-Jun	19-Jun	23-Jun	24-Jun	25-Jun	26-Jun	30-Jun				
Bid Price	$40.50	$40.05	$43.05	$45.20	$45.68	$44.97	$46.20	$46.80	$47.55	$46.51	$46.05	$46.50	$46.83	$47.70	$48.88				
DA Bid Price July 2015																			
Date	1-Jul	2-Jul	3-Jul	7-Jul	8-Jul	9-Jul	10-Jul	14-Jul	15-Jul	16-Jul	17-Jul	21-Jul	22-Jul	23-Jul	24-Jul	28-Jul	29-Jul	30-Jul	31-Jul
Bid Price	$59.96	$66.85	$66.20	$59.20	$54.33	$48.57	$45.85	$47.10	$48.30	$48.15	$48.15	$46.95	$47.70	$48.15	$33.45	$47.25	$47.55	$48.00	$46.95
Bid Price August 2015																			
Date	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	11-Aug	12-Aug	25-Aug	26-Aug	27-Aug	28-Aug								
Bid Price	$52.80	$53.43	$54.54	$51.25	$50.55	$53.76	$55.04	$43.95	$44.70	$44.88	$44.39								
DA Bid Price September 2015																			
Date	1-Sep	2-Sep	3-Sep	4-Sep	9-Sep	10-Sep	11-Sep												
Bid Price	$49.84	$50.79	$49.02	$47.38	$48.10	$50.14	$52.32												
DA Bid Price October 2015																			
Date	1-Oct	2-Oct	6-Oct	7-Oct	8-Oct	9-Oct	13-Oct	14-Oct	15-Oct	16-Oct	20-Oct	21-Oct	22-Oct	23-Oct	27-Oct	28-Oct	29-Oct	30-Oct	
Bid Price	$45.97	$44.27	$43.90	$42.35	$41.45	$42.89	$51.06	$53.85	$57.20	$57.29	$45.06	$39.31	$35.98	$40.47	$36.44	$35.47	$35.87	$32.89	

Net Benefits Test Results October 2014[4]:

Year	Month	Peak Type	Threshold Price	Price Window
2014	10	ON PEAK	$50.16	[25,80]
2014	10	OFF PEAK	$52.00	[25,80]

[4] http://www.caiso.com/Documents/DemandResponseNetBenefitsTestResultsOctober2014.pdf

Net Benefits Test Results June 2015[5]:

Year	Month	Peak Type	Threshold Price	Price Window
2015	06	ON PEAK	$36.95	[30,60]
2015	06	OFF PEAK	$37.59	[30,70]

Net Benefits Test Results July 2015[6]:

Year	Month	Peak Type	Threshold Price	Price Window
2015	07	ON PEAK	$32.02	[25,80]
2015	07	OFF PEAK	$32.40	[25,80]

Net Benefits Test Results August 2015[7]:

Year	Month	Peak Type	Threshold Price	Price Window
2015	08	ON PEAK	$35.29	[25,45]
2015	08	OFF PEAK	$36.04	[25,45]

Net Benefits Test Results September 2015[8]:

[5] http://www.caiso.com/Documents/DemandResponseNetBenefitsTestResultsJune2015.pdf
[6] http://www.caiso.com/Documents/DemandResponseNetBenefitsTestResultsJuly2015.pdf
[7] http://www.caiso.com/Documents/DemandResponseNetBenefitsTestResultsAugust2015.pdf
[8] http://www.caiso.com/Documents/DemandResponseNetBenefitsTestResultsSepember2015.pdf

Year	Month	Peak Type	Threshold Price	Price Window
2015	09	ON PEAK	$38.30	[25,50]
2015	09	OFF PEAK	$39.15	[25,50]

Net Benefits Test Result October 2015[9]:

Year	Month	Peak Type	Threshold Price	Price Window
2015	10	ON PEAK	$36.49	[25,50]
2015	10	OFF PEAK	$37.22	[25,50]

[9] https://www.caiso.com/Documents/DemandResponseNetBenefitsTestResultsOctober2015.pdf

CHAPTER 3: UTILITY OWNED GENERATION (FOSSIL)

(Witness: Michael Yeo)

I. SUMMARY AND RECOMMENDATIONS

In this chapter, ORA reviews San Diego Gas & Electric Company's (SDG&E's) filing on its utility-owned generation (UOG) operations and activities of its fossil fueled facilities, including generation outage information, from January 1, 2015 to December 31, 2015 (Record Period).

After reviewing SDG&E's testimony and responses to data requests, ORA recommends that the Commission order SDG&E to develop criteria for calculating replacement power cost because ORA contends that SDG&E's computation for the June 1, 2015 Miramar Unit 1 outage does not reflect the actual operation of a peaker facility. Specifically, SDG&E calculated the outage cost [redacted]

II. FOSSIL FACILITIES

SDG&E's UOG facilities consist of the 43 megawatt (MW) Cuyamaca Peak Energy Plant (CPEP), the 490 MW Desert Star Energy Center (DSEC), the 98 MW Miramar Energy Facility (MEF), and the 566 MW Palomar Energy Center (PEC).

III. OUTAGE

For the 2015 Record Period, ORA selected the MEF1 outage that started on June 1 for further review and analysis because of the length of the outage.

A. Miramar Energy Facility Unit 1 Forced Outage – June 1, 2015 through July 15, 2015 – 43.8 Days

1. The Facility

The Miramar Energy Facility (MEF) located in the San Diego area is a peaker facility in SDG&E's portfolio. The MEF is comprised of two simple cycle gas turbine generators known as Miramar 1 (MEF1) and Miramar 2 (MEF2). These units began service in 2005 and 2009, respectively. Each unit has a nameplate capacity of approximately 49 MW for a combined total of 98 MW.

These small power units can reach full generating capacity within 10 to 15 minutes to meet immediate demand on the grid. They are typically called on when demand for power is highest, such as a hot summer day, or at times when loads are changing rapidly.

The Commission approved SDG&E's purchase and operation of the MEF1 in Decision (D.) 04-06-011[126] on June 9, 2004. On January 27, 2005, the Commission issued Resolution E-3896[127], and approved the SDG&E/RAMCO Turnkey Acquisition Agreement. The Commercial Operating Date was July 27, 2005.

SDG&E, on June 16, 2008, submitted Application (A.) 08-06-017[128] to the Commission to seek approval of the Miramar II project. On January 29, 2009, the Commission issued D.09-01-008[129] authorizing SDG&E to enter into an Engineering, Procurement and Construction contract with Wellhead Services, Inc. and a contract with General Electric for the supply of a simple cycle gas-fired combustion turbine with a capacity of approximately 46.5 megawatts to provide peaking energy and capacity. In Advice Letter 2099-E[130] filed on July 30, 2009 and approved by the Commission on March 22, 2010, SDG&E notified the Commission of the project's completion in order to seek Commission approval of its updated revenue requirement. The facility's commercial operation date was August 7, 2009.

2. The Outage

(See Table 3.1 for the glossary of terms used.)

The outage started at 12:45 p.m. on June 1, and ended on July 15 at 8:00 a.m. when MEF1 was returned to service.

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[126] Rulemaking (R.) 01-10-024 *Order Instituting Rulemaking to Establish Policies and Cost Recovery Mechanisms for Generation Procurement and Renewable Resource Development.*

[127] Advice Letter 1621-E *Approval of the RAMCO contract and associated cost recovery/ratemaking pursuant to D.04-06-011* as filed on September 8, 2004.

[128] Application of San Diego Gas & Electric Company (U 902 E) for Expedited Approval of the Miramar Energy Facility II Project.

[129] Decision Approving Application by San Diego Gas & Electric Company for the Miramar Energy Facility II Project.

[130] Revenue Requirement Update Associated With The Miramar Energy Facility II.

On May 31, 2015, SDG&E operators received an alarm from the lubricating oil system, indicating that it detected deleterious particles (chips). SDG&E did a test run, and found, in the detector chamber, chips which appeared to be fragments from the metallic bearings. As a result of the finding, SDG&E placed the unit in a forced outage on June 1 because SDG&E believed that continued operation with damaged bearings would result in more severe damage.[131]

The metallurgical laboratory hired by SDG&E, Failure Analysis Service Technology, confirmed that the chips were metal pieces from the bearings.[132] Figures 3.4 and 3.5 show the damage on the ball bearing and bearing balls.

[131] SDG&E Carl LaPeter's direct testimony, page CLP-A-3

[132] SDG&E's response to ORA DR #7.9.

GLOSSARY OF TERMS[133]

#	Term	Explanation
1.	Ball Bearing	A type of rolling-element bearing that uses balls to maintain the separation between the bearing races. The purpose of a ball bearing is to reduce rotational friction and support radial and axial loads. It achieves this by using at least two races to contain the balls and transmit the loads through the balls. In most applications, one race is stationary and the other is attached to the rotating assembly (e.g., a hub o shaft). As one of the bearing races rotates it causes the balls to rotate as well. Because the balls are rolling they have a much lower coefficient of friction than if two flat surfaces were sliding against each other.
2.	Bearing Ball	A special highly spherical and smooth ball, most commonly used in ball bearings, but also used as components in things like freewheel mechanisms
3.	Chip	A small particle found in the oil system, usually of sufficient size to be detected visually. Chips are typically a small fraction of an inch. The chip may be metallic or not metallic. A chip or chips can be a sign of wear, damage or the intrusion of a foreign material into the system. The presence, and type, of the chip, or chips, must be evaluated to determine if there is an issue for concern.
4.	Chip Detector Alarm	An alarm on the turbine generator control computer, received in the control room on the operators control computer, both visually and audibly, to alert the operator that there may be chips in the chip detector.
5.	Inlet Gear Box	An assembly, with gears, that connects the high pressure ("HP") rotor (internal to the turbine); through a radial drive shaft to the transfer gear box ("TGB") (external to the turbine). The IGB purpose is to transfer rotational energy from the turbine high speed shaft (internal to the turbine) to the TGB (external to the turbine) which then transfers the rotational energy to the Accessory Gear Box ("AGB"). The AGB turns various engine accessories, such as the engine lube oil pump, the variable-geometry pump, and shaft speed monitor. The AGB also allows the transfer of rotational energy, in the opposite direction, from the engine starter motor through the AGB, through the TGB to the IGB to rotate the high speed shaft for starting the turbine.

[133] All glossary term descriptions were provided by SDG&E in its DR responses.

#	Term	Explanation
6.	Lubricating oil system	It provides oil to all components that require forced (pumped) oil lubrication.
7.	Test Run	A test run is operating a generator, connected to the Electric Grid, when there are no dispatch orders. The test run can only be performed with authorization from CAISO. The test run is a request, by the owner or operator, to connect a generator to the Electric Grid, to supply electric power, when it has not been dispatched by the CAISO. The test run is a normal maintenance practice. A test run may be performed for various reasons, some of which are: • to determine if equipment operates satisfactorily after maintenance • to investigate or troubleshoot a concern or issue • for turbine tuning • for emissions testing • for required testing or certification • for other reasons During the test run the generator will be operated using normal operating procedures, it will be synchronized and connected to the Electric Grid, and then operated under loaded conditions.

FIGURE 3.1[134]
TYPICAL BALL BEARING – PARTIAL CUTAWAY VIEW

[134] SDG&E's response to ORA DR #7, SDG&E's Attachment 12 (8/16/2016 updated response)

FIGURE 3.2[135]
TYPICAL BALL BEARING – PARTS OF A BALL BEARING

[135] SDG&E's response to ORA DR #7, SDG&E's Attachment 12 (8/16/2016 updated response)

FIGURE 3.3[136]
TYPICAL BALL BEARING – CROSS-SECTIONAL VIEW

The MEF1 turbine is a rebuilt turbine originally manufactured by General Electric (GE), and purchased by SDG&E from TransCanada Turbines (TCT). The rebuilt turbine was installed on September 29, 2014.[137] SDG&E and its vendor Erwin Services Corporation removed the MEF1 turbine and transported it to TCT to repair the damage. The MEF1 turbine was shipped to TCT because SDG&E had an 18-month warranty at that time as part of the purchase contract.[138]

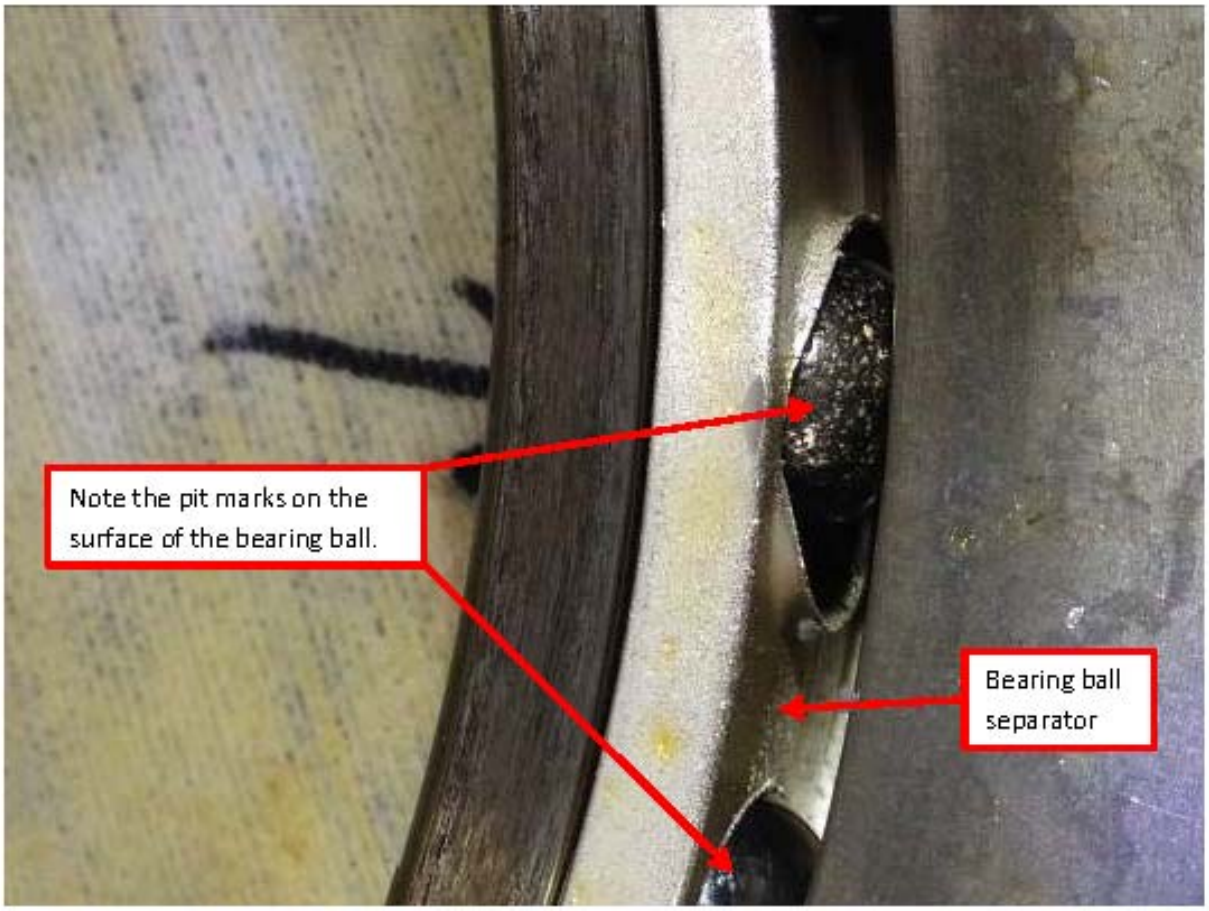
[136] SDG&E's response to ORA DR #7, SDG&E's Attachment 12 (8/16/2016 updated response).

[137] SDG&E's response to ORA DR #7.15.

[138] *Ibid.*

TCT found that the balls in the bearing in the inlet gear box were defective, which led to the chipping of the balls. The bearing was manufactured by the vendor, MRC Bearing.[139]

FIGURE 3.4[140]
FAILED PARTS OF BALL BEARING – CLOSED-UP VIEW

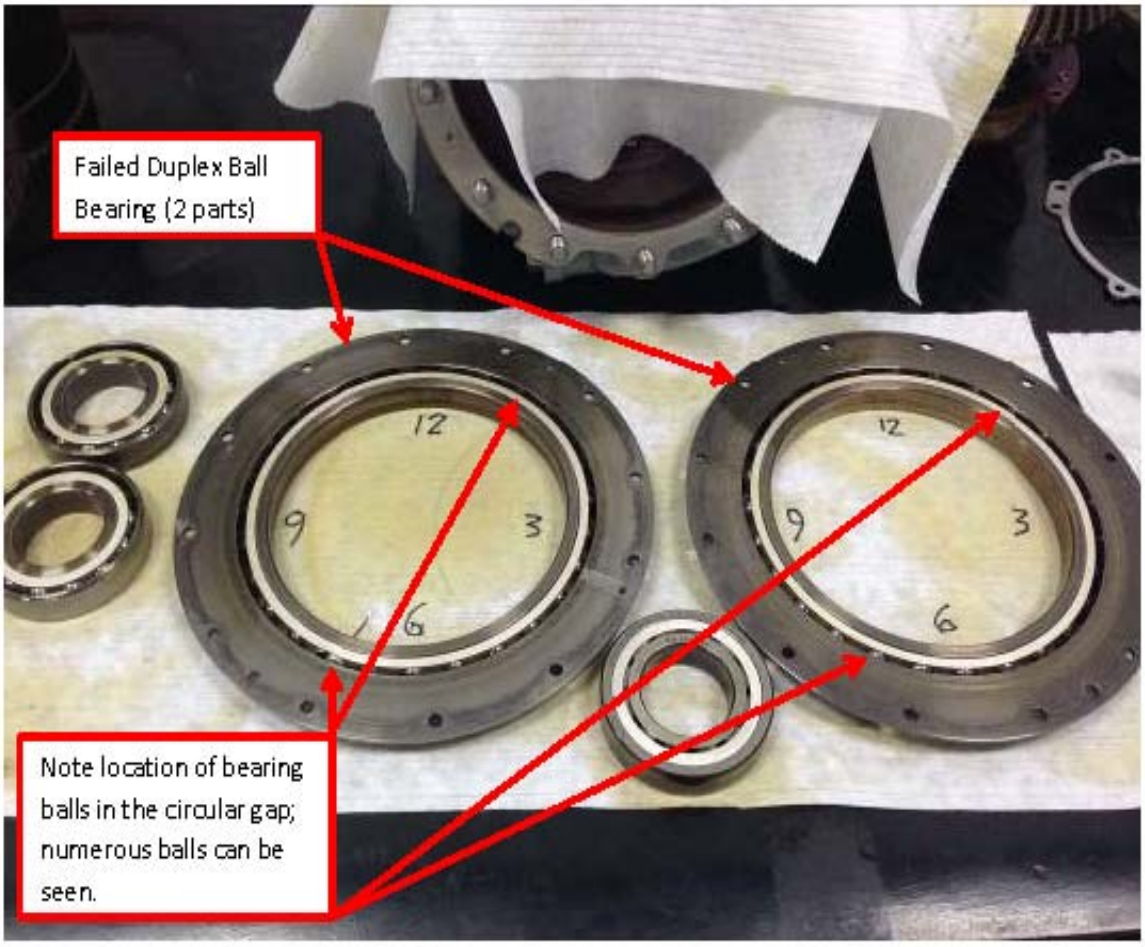


One of the bearing balls, in the failed bearing, is shown in this close up photograph. The spherical bearing ball is partially obscured because of the ball separator. The surface of the bearing ball is pitted and therefore defective; the bearing ball surface should appear smooth and highly polished. Part of another pitted bearing ball can be seen at the bottom of the photograph.

[139] SDG&E's response to ORA DR # 7.11, 7.12 and 7.23.

[140] SDG&E's response to ORA DR #7, SDG&E's Attachment 13 (8/16/2016 updated response).

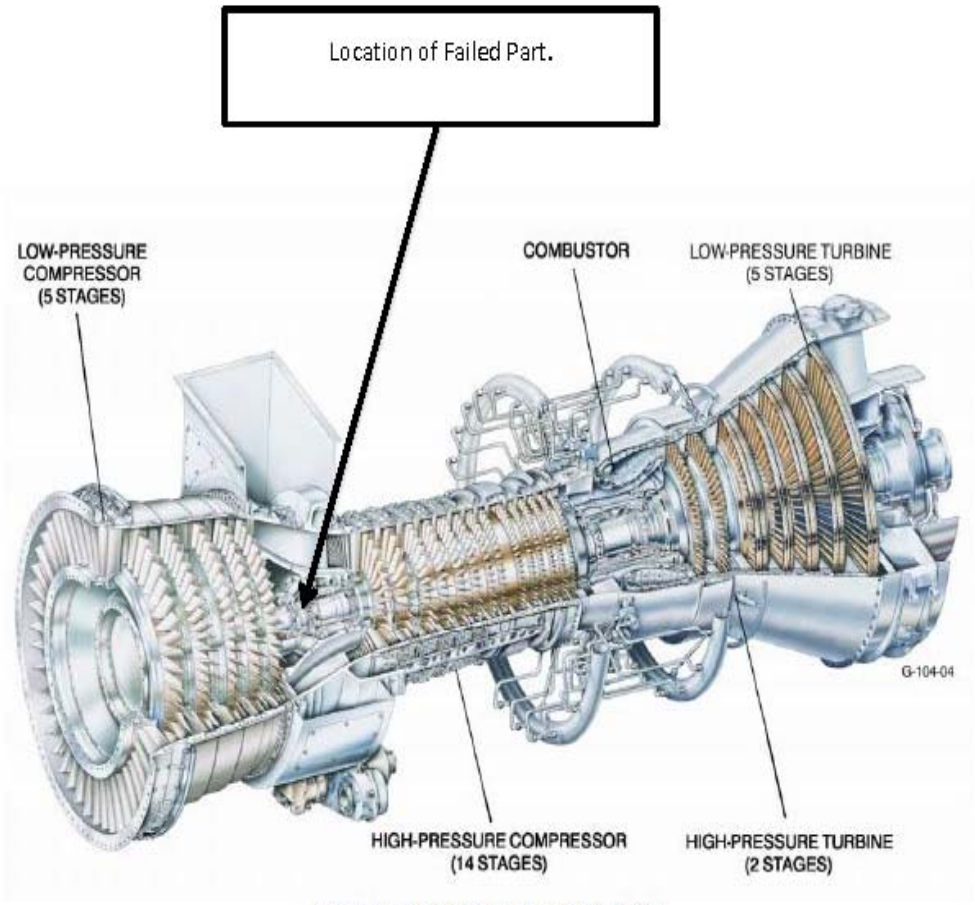
FIGURE 3.5[141]
FAILED PARTS OF BALL BEARING



The large circular objects are the two parts of the failed Duplex Ball Bearing

[141] SDG&E's response to ORA DR #7, Attachment 13 (8/16/2016 updated response).

FIGURE 3.6[142]
LOCATION OF FAILED PART IN TURBINE



TYPICAL LM6000 GAS TURBINE

1

[142] SDG&E's response to ORA DR #7.7.

SDG&E explained the amount of time to do the repair work by providing the following explanation:[143]

> "The repair task was complex, though there were two damaged parts to be replaced. The repair requires partial disassembly and reassembly of the turbine, because the likely damaged parts are inside the turbine. The disassembly also required careful inspection and evaluation, because a failure was involved. This disassembly must be performed at the appropriate repair facility. This requires the turbine to be removed and shipped to the repair facility. At the facility it must be partially disassembled, inspected, repaired, and reassembled. When the repaired turbine was returned, it had to be reinstalled."

SDG&E also provided the timeline of the repair work as follows:[144]

> 5/31 Chip detector Alarm MEF1, TCT informed;
>
> 6/1 Test run of MEF1for investigation, TCT informed;
>
> MEF was operating on 5/31 when the Chip Detector Alarm was received on the control system computer. After the turbine was shutdown, the chip detector sensor was removed and inspected; some metal debris was removed for the chip detector. SDG&E contacted the turbine vendor to discuss the issue. The vendor recommended operating the turbine to see if more metal debris would be produced. On 6/1 SDG&E requested to test run the MEF1 turbine to obtain the information concerning any additional metal debris; CAISO authorized the test run. During the test run, on 6/1, the Chip Detector Alarm was again received on the control system computer. After the turbine was shutdown, the debris was removed from the Chip Detector Sensor and sent to a laboratory for analysis.
>
> 6/2 earing material;
>
> 6/3 Warranty consideration forms submitted to TCT;
>
> 6/5 Turbine removal begins;

---

[143] SDG&E's response to ORA DR #7.7d and 7.7d supplemental (dated 8/16/2016).

[144] SDG&E's response to ORA DR #7.7d and 7.7d supplemental (dated 8/16/2016). While SDG&E's response stated the dates pertained to 2016, ORA recognized the dates should pertain to 2015, the Record Period.

6/8 Turbine removed from MEF1 and shipped to TCT facility;

6/11 MEF1 Turbine arrives at TCT facility;

7/10 MEF1 Turbine repairs complete and shipped from TCT;

7/13 MEF1 Turbine arrived at MEF;

7/15 MEF1 Turbine installation completed.

For a problem and repair of this nature, SDG&E added that the duration of the repair and the downtime was reasonable.

ORA reviewed SDG&E's application, prepared testimony, and responses to ORA's data requests for the 2015 Record Period. Also, ORA met with SDG&E on August 12, 2016 at the Miramar generation site in San Diego to observe the facility and the turbine to have a better understanding of the June 1, 2015 outage.

In addition, ORA also reviewed the following documents provided by SDG&E in its response to DR #7:

(a) TCT's *LM600 GT – Gas Turbine Final Report* dated October 3, 2015;

(b) Failure Analysis Service Technology Report dated June 2, 2015;

(c) TransCanada Turbines Warranty Consideration Form dated 06/03/2015;

(d) Equipment Supply and Installation Agreement between San Diego Gas & Electric Company and TransCanada Turbine Inc, with a signature date of August 5, 2014;

(e) July 10, 2015 email between TCT's Steve Willard and SDG&E's David Mesquita;

(f) Invoices (dated July 15, 2015 and July 16, 2015) from Erwin Services Corp.;

(g) *MEF1 2015 Test Runs* document.[145]

[145] SDG&E's response to ORA DR#8.

Corrective Actions

SDG&E's turbine vendor, TCT, repaired the damage, and the MEF1 unit was restored back to service with the defective parts replaced. SDG&E added that, while ball bearings are widely used in power plant components, a failure due to a manufacturing defect was uncommon; recurrence of this failure would therefore be rare. SDG&E concluded that it was not effective to consider a methodology to preclude this rare event.[146]

SDG&E pointed out that there was no other similar bearing-deficiency issue elsewhere in SDG&E's portfolio of generation facilities.[147]

Cost of Outage

SDG&E stated that the July 1, 2015 outage costs ratepayers [redacted][148] in replacement power; this amount is the net between the actual replacement energy amount and the various cost items (CAISO charges, greenhouse gas costs, and other costs).[149] [redacted].

SDG&E explained [redacted]:

[redacted][150]

Also, SDG&E stated that it did not intend to pursue reimbursement from TCT for the replacement power cost.[151]

In ORA's opinion, SDG&E's computation of the replacement power cost does not reflect the actual operation of a peaker facility. SDG&E's Excel spreadsheet

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[146] SDG&E's response to ORA DR #7.

[147] SDG&E' response to ORA DR # 7.29.

[148] SDG&E's response to ORA DR #7.13, cell #N1067 in Excel spreadsheet.

[149] SDG&E and ORA reached an agreement on the formula for calculating replacement power cost in D.15-06-046/A.14-05-026.

[150] SDG&E's response to ORA DR #7.13 (August 16, 2016 update).

[151] SDG&E's response to ORA DR #33.

(confidential Attachment 3.1) shows that it calculated the power costs for [redacted] for the entire outage period of 43.8 days.[152] Of the [redacted] hourly entries in the Excel spreadsheet, [redacted][154]

Peakers are cost-based bid generation facilities (as opposed to self-scheduled bid generation), and as such, their operators do not dispatch power at a financial loss (see ORA's Least Cost Dispatch chapter). Therefore, SDG&E should not calculate the replacement power cost [redacted]. During the August 12, 2016 site visit, ORA brought this issue to the attention of SDG&E and requested that SDG&E recalculate the cost of replacement power; however, in the August 16, 2016 updated DR response, SDG&E did not make any change to the Excel spreadsheet.

As for SDG&E's direct cost in repairing the turbine, SDG&E stated that it was covered under warranty. SDG&E, however, paid the cost of removing and reinstalling the turbine, as well as a lubricating oil supply system flush (cleaning). The total cost of the two invoices provided to ORA totaled $66,809.34 ($26,639.34 + $40,170.00).[155] SDG&E did not state whether this cost is to be reimbursed by TCT.

IV. CONCLUSION AND RECOMMENDATION

Based on ORA's review of the aforementioned documents and reports, ORA recommends that the Commission order SDG&E to develop criteria for calculating the cost of replacement power because ORA contends that SDG&E's computation for the

[152] SDG&E's response to ORA DR #7.13.

[153] [redacted]

[154] SDG&E's response to ORA DR #7.13.

[155] SDG&E's response to ORA DR #23.

June 1, 2015 Miramar Unit 1 outage does not reflect the actual operation of a peaker facility. Specifically, SDG&E's calculated the outage cost [redacted].

ATTACHMENT FOR CHAPTER 3

#	Attachment	Description
	Data request 007 Question 13 CONFIDENTIAL (Available Via E-mail)	Miramar Cost Impact

DATA REQUEST 007
QUESTION 13
MIRAMAR COST IMPACT

CONFIDENTIAL

(AVAILABLE VIA E-MAIL)

CHAPTER 4: GREENHOUSE GAS COMPLIANCE INSTRUMENT PROCUREMENT AND COSTS

(Witness: Ayat Osman, Ph.D.)

I. INTRODUCTION

On June 01, 2016, San Diego Gas & Electric Company (SDG&E) filed an application requesting the Commission to review and approve its "*Contract Administration, Least-Cost Dispatch and Power Procurement Activities in 2015; Costs Related to those Activities Recorded to the Energy Resource Recovery Account and Transition Cost Balancing Account in 2015; and Costs Recorded in Related Regulatory Accounts in 2015*" (Application (A.) 16-06-002).

On July 28, 2016 the Commission held a prehearing conference to discuss the scope of the proceeding, develop a procedural timetable for management of the proceeding, and establish the service list. On August 16, 2016, the Scoping Memo and Ruling of Assigned Commissioner on the Application (Scoping Memo) was issued.

The objective of the review presented in this testimony is to address the following issues that are identified in the Scoping Memo of this proceeding, as they relate to SDG&E's Greenhouse Gas (GHG) compliance: [156]

- Whether SDG&E's Greenhouse Gas Compliance Instrument procurement is consistent with its Bundled Procurement Plan (BPP) and Commission directives and policies; and,
- Whether the entries in SDG&E's Energy Resource Recovery Account (ERRA) GHG subaccount are accurate.

To conduct its review on the issues stated above, ORA:

- Reviewed SDG&E's application, including testimonies and work-papers, that are relevant to GHG compliance for the 2015 Record Period;

[156] Scoping Memo, page 4. http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M166/K087/166087313.PDF

- Reviewed SDG&E's GHG chapters in its 2012 BPP, the relevant advice letters, resolutions and Commission Decisions;
- Issued data requests and held Meet and Confer meetings to obtain supporting data for SDG&E's claims with regards to the procurement of GHG instruments and their associated costs; and
- Conducted analyses based on SDG&E's responses to ORA's data requests to determine whether SDG&E applied methodologies for calculating the GHG emissions and associated costs correctly (consistently with Commission and state regulations and laws), and recorded its GHG costs accurately.

II. SUMMARY AND RECOMMENDATIONS

In the January 1, 2015 through December 31, 2015 Record Period, SDG&E recorded GHG compliance costs (Direct GHG costs) of [redacted].[157]

SDG&E's total procured compliance instruments in the 2015 Record Period were [redacted]), which is below its direct compliance obligation limit of [redacted][158]

ORA is satisfied with SDG&E's showing that it procured its GHG compliance instruments in accordance with its approved GHG Procurement Plan.

III. BACKGROUND

A. California Arb's Cap-And-Trade Program

The Air Resources Board's (ARB's) Cap-and-Trade program is a market based regulation that is designed to reduce GHG from multiple sources. The program is designed to meet the goal of reducing GHG emissions to 1990 levels by the year 2020. ARB has three main responsibilities under the Cap-and-Trade program: (1) cap GHG emissions by issuing a number of tradeable permits (allowances) equal to the emission cap; (2) reduce the cap over time to reduce emissions to 1990 levels by 2020; and (3)

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[157] SDG&E Confidential response to ORA DR 009, 1.6.1.

[158] SDG&E Application, Ms. Garza-Beutz Testimony, page AGB-5 [Confidential]. [redacted]

enforce the cap by requiring each entity that operates under the cap to turn in one allowance for every metric ton of carbon dioxide gas equivalent ($MTCO_2e$) that an entity emits.

The Cap and Trade program is structured into three compliance periods:

- First compliance period: 2013-2014
- Second Compliance period: 2015-2017
- Third Compliance period: 2018-2020

Compliance with Cap-and-Trade began in 2013 for electricity generators and large industrial facilities emitting 25,000 $MTCO_2e$ or more annually (covered entities).[159] Covered entities must report their emissions to CARB annually, which are verified through an independent third-party verification process.

Under ARB regulations, a covered electric utility is subject to specific compliance requirements and obligations.[160] To meet its compliance obligation a utility can use California GHG emission allowances or offset credits (offsets are limited to 8% of an entity's compliance obligation per compliance period). Compliance instruments must be issued from an allowance budget year within or before the year for which an annual compliance obligation is calculated or the last year of a compliance period for which a triennial compliance obligation is calculated.[161] Thus a utility may bank allowances from previous vintage years, but may not borrow from future vintage years to meet a compliance obligation. Refer to Table 4-1 for a list of which vintage year allowances a utility may use to meet an annual or triennial compliance obligation.

[159] Starting in 2015, ARB expanded the program to cover distributors of transportation, natural gas, and other fuels.

[160] A compliance obligation is the quantity of verified reported emissions or assigned emissions for which an entity must submit compliance instruments to ARB.

[161] CCR Section 95856.

In addition to the compliance obligation associated with a utility-owned facility (for a facility which emits at least 25,000 $MTCO_2e$ per year), an electric utility is also responsible for imported electricity (if the utility is the compliance entity).[162] Under the Cap and Trade Regulations, a utility can apply a Renewable Portfolio Standard (RPS) Adjustment for electric imports from unspecified sources if the electricity is not directly delivered to California.[163]

TABLE 4-1: ELIGIBLE ALLOWANCE VINTAGE FOR CAP AND TRADE SECOND COMPLIANCE PERIOD

Second Compliance Period			
Covered Emissions Year	**Compliance Obligation Due Date**	**Percent of Compliance Obligation Due**	**Eligible Vintages of Allowances**
2015	November 1, 2016	30% of 2015 covered emissions	Vintages 2013-2015, any combination
2016	November 1, 2017	30% of 2016 covered emissions	Vintages 2013-2016, any combination
2017	November 1, 2018	70% of 2015 and 2016, and 100% of 2017 covered emissions	Vintages 2013-2017, any combination

Under ARB reporting requirements, for the 2015 emissions year, facilities and suppliers are required to submit their GHG emissions reports by April 11, 2016 and power entities[164] are required to submit their GHG emissions reports by June 1, 2016. Data verified by independent evaluators are due to ARB on September 1, 2016 and the Cap-and-Trade Compliance deadline is November 1, 2016. Power entities must surrender 30% of their compliance instruments to cover 30% of their qualifying

[162] Also, an electric utility is responsible for GHG compliance costs for GHG emissions associated with contracts, where a utility has assumed the cost of compliance on behalf of a third-party by either agreeing to compensate a third-party for the cost of their compliance obligations, or procuring compliance instruments on the third-party's behalf.

[163] http://www.arb.ca.gov/cc/capandtrade/meetings/20151214/rpssb350.pdf

[164] Electric power entities cover retail providers (electric cooperation, such as SDG&E), electric service providers (such as, Noble Americas Energy Solutions), local public utilities (such as Sacramento Municipal Utility District), community choice aggregators (such as Marin Clean Energy), Western Area Power Administration (WAPA); electricity importers and exporters; California Department of Water (DWR); and the Bonneville Power Administration (BPA). Electric Power Entity is defined in section 95101(d) of Title 17 of the California Code of Regulations (CCR).

emissions by November 1, 2016. For electric utility data reports, the deadline to make corrections to an RPS Adjustment is July 15, 2016.[165]

B. CPUC Decisions

1. Procurement of GHG Compliance Instruments

Decision (D.) 12-04-046 (Decision on System Track I and Rules Track III of the Long-Term Procurement Plan Proceeding and Approving Settlement) Ordering Paragraph 8 authorizes an electric utility to procure GHG allowances, allowance futures and forwards, and offsets and offset forwards within separately calculated Direct Compliance Obligation Purchase Limits and Financial Exposure Purchase Limits. This is also reiterated in Appendix 1 of the Decision.[166]

The Direct Compliance Obligation Purchase Limit sets the maximum amount of compliance instruments an Investor-Owned Utility (IOU) is allowed to purchase in a current year. ORA notes that under this framework, an IOU is not allowed to purchase allowances of a vintage older than three years from the current year. The annual Direct Compliance Obligation Purchase Limit is calculated using the following formula:

LCY = A + 100% * FDCY + 60% * (FDCY + 1) + 40% * (FDCY + 2) + 20% * (FDCY + 3)

Where:

"L" is the maximum number of GHG compliance instruments an IOU can purchase to meet its direct compliance obligation.

"A" is the utility's net remaining compliance obligation to date," calculated as the sum of the actual emissions for which the utility is responsible for retiring allowances (or purchasing on behalf of a third party) up to the Current Year, minus the total allowances or offsets the utility has purchased

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[165] http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep-dates.htm.

[166] "Direct Compliance Obligation" is defined as the tons of emissions for which the utility has an obligation to retire allowances on its own behalf as a regulated entity under the Cap and Trade regime, and/or is otherwise obliged to procure instruments on behalf of a third party that is a regulated entity under the Cap and Trade regime (i.e. contractual arrangements where the IOU is contractually responsible for procuring allowances on a third party's behalf, or could elect to assume that responsibility). Appendix 1, D.12-04-046.

up to the Current Year that could be retired against those obligations.

"FD" is the utility's forecasted compliance obligation," the projected amount of emissions the utility is responsible for retiring allowances, or responsible for purchasing on behalf of a third party, calculated using an implied market heat rate (IMHR) that is two standard deviations above the expected IMHR.

"CY" is the current year, i.e., the year in which the utility is transacting in the market.

2. GHG Emissions

D.14-10-033, as corrected by D.15-01-024, requires an electric utility to calculate and report its GHG emissions and associated costs using specific conventions and methodologies.[167] A utility incurs GHG costs directly (referred to as "Direct GHG Cost") for purchasing compliance instruments for its own Direct GHG emissions under the Cap-and-Trade program and indirectly (referred to as "Indirect GHG Cost") through GHG Cap-and-Trade costs embedded in the price of electricity sold in the wholesale market.

A utility's **Direct GHG emissions**, expressed in metric tons of carbon dioxide equivalents ($MTCO_2e$), could consist of the following sources (refer to Figure 4-1 for a visual depiction of categories of GHG emissions and associated costs methodologies):

(A) Direct GHG Emissions with Physical Compliance Obligations:

(1) Utility Owned Generation (UOG): based on actual plant output, a facility-specific heat rate, and ARB-specific emissions fuel factors; and

(2) Energy Imports: Specified imports-based on actual plant output purchased by a utility and specific emissions factors; and Unspecified imports-based on the ARB emission factor for unspecified imports, the ARB transmission loss factor, and any applicable RPS Adjustment.

[167] D.15-01-024, Attachment D.

(B) Direct GHG Emissions Based on Contractual Obligations:

(3) Qualifying Facility (QF) Contracts: Physical settled emissions based on actual plant output purchased by a utility and the contract-specific settlement terms; and

(4) Tolling Agreements: based on actual plant output purchased by a utility, the contract-specific heat rate, and ARB-specific emissions factors of fuels.

(5) Contracts with Financial Settlements: Emissions from utility contracts in which a utility is responsible for providing the financial settlement specifically for GHG costs (a utility is allowed to record financially settled emissions as Direct or Indirect emissions).

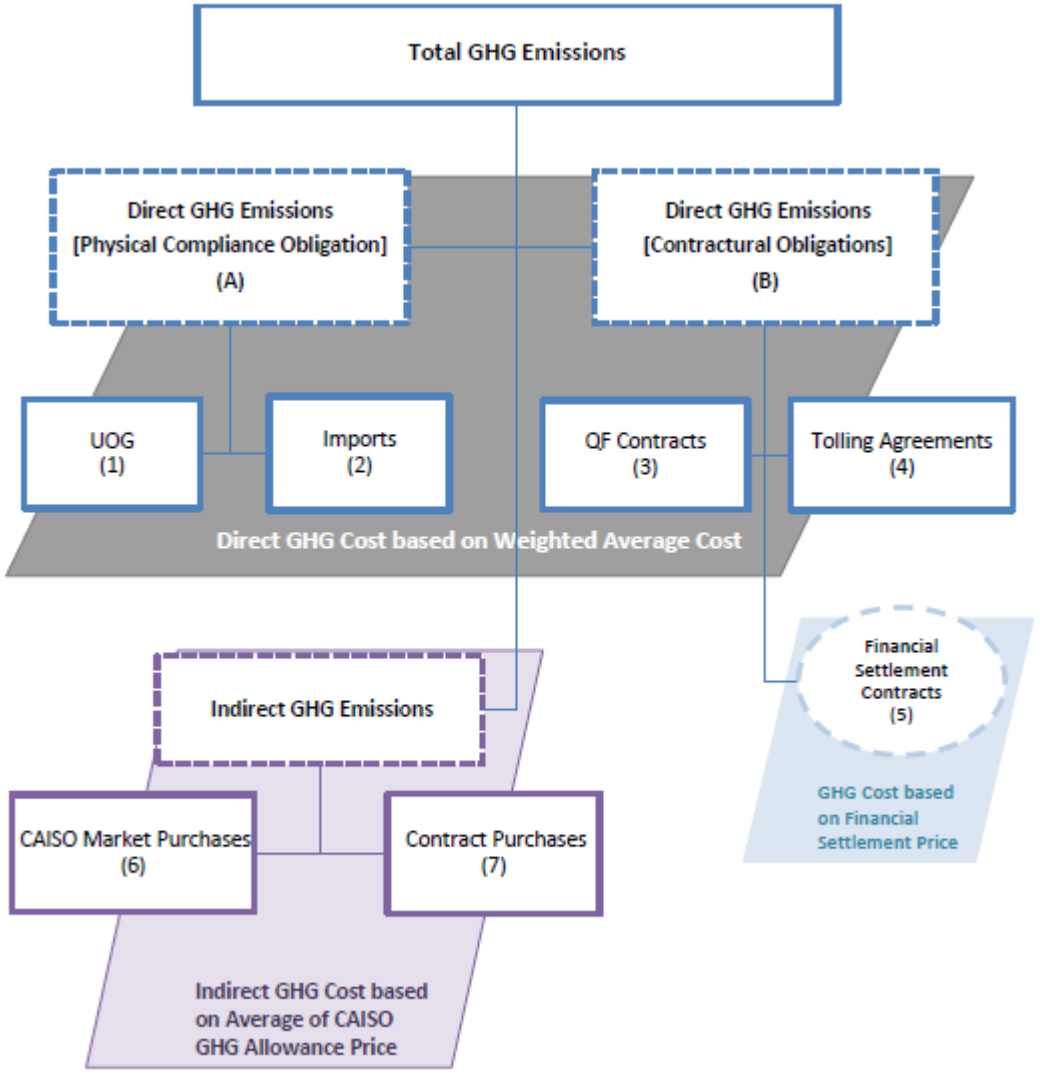
(C) Indirect GHG Emissions:

A utility's **Indirect GHG emissions**, expressed in $MTCO_2e$, could consist of the following sources (See Figure 4-1):

(6) CAISO Market Purchases: Emissions based on net market energy purchases and either ARB's emission factor for a generic system or market heat rate-implied emission factor; and

(7) Contract Purchases: Emissions based on actual plant output purchased by the utility and contract-specific settlement terms.

FIGURE 4-1: SCHEMATIC OF DIRECT AND INDIRECT GHG EMISSIONS AND METHODOLOGY TO CALCULATE ASSOCIATED COSTS BY TYPE OF SOURCE



3. GHG Emissions Costs

D.14-10-033, as corrected by D.15-01-024, requires an electric utility to calculate the "recorded" costs associated with GHG emissions covered by compliance obligations under the Cap-and-Trade program using the following methodologies:

(A) Direct GHG Costs:

The recorded Direct GHG costs are the sum of each month's Weighted Average Costs (WAC) of compliance instruments inventory multiplied by that month's actual Direct emissions for which the utility has a physical compliance obligation.[168] Thus, the Direct GHG costs, in a given month's WAC, could be based on GHG emissions from a utility's UOG, imports, tolls, and contracts, where a utility has physical compliance obligations for such emissions under Cap-and-Trade program.

GHG costs associated with financially settled tolling agreements are based on actual contract settlement, not on WAC. Therefore, emissions and costs associated with financially settled tolling agreements are not included when calculating the WAC or the Direct GHG costs, which are based on monthly emissions.[169]

For the purpose of WAC calculations, a utility calculates the WAC based on its inventory of all allowances and offsets which are eligible to meet the compliance obligation for the current compliance period under the Cap-and-Trade program. ARB does not restrict which vintage year of offsets a utility can use to meet a compliance obligation.

[168] D. 15-01-024 Attachment C. pages 1-4.

[169] Direct Cost for Tolling Agreements with financial settlements = Settlement Price * Emissions Quantity; where settlement price is the unit price at which the utility will financially compensate its tolling counterparty for GHG emissions (usually the ARB auction clearing price); and Emissions Quantity is the emissions obligation for the entire month calculated in accordance with the tolling agreement. *Id*. p. 5.

(B) Indirect GHG Costs:

The recorded Indirect GHG costs equal the total of Indirect GHG emissions (CAISO market purchases and contract purchases that do not include explicit provisions for GHG costs) multiplied by the annual average of the CAISO's daily GHG Allowance Price Index. The CAISO GHG Allowance Price Index is computed by averaging the published daily price for the recorded year and dividing by the number of days in that year.

IV. DISCUSSION

A. SDG&E's Procurement of GHG Compliance Instruments in 2015 is within its GHG Purchase Limits

The 2015 Record Period is the first year of the Cap-and-Trade Second Compliance Period that spans 2015, 2016 and 2017. As discussed in Section III.A. of this Chapter, ARB regulations allow a utility to procure compliance instruments to meet its obligation based on specific restrictions. For example, a utility is permitted to use allowances with 2013, 2014 and 2015 Vintages but not borrow from future vintages (such as the 2018 vintage) to meet its obligations for the 2015 emission year. In addition, a utility may only use offsets to meet up to 8% of its compliance obligation. Therefore, SDG&E can use offsets to meet up to 8% of its total 2015, 2016 and 2017 compliance obligations.

The Commission established a Direct Compliance Obligation Limit, to allow utilities reasonable flexibility in procuring compliance instruments, thus avoiding under-procurement or non-compliance, while limiting ratepayer exposure to extra costs, and avoiding over-procurement. Refer to Section III.B.1. of this Chapter for discussion of the Direct Compliance Obligation Limit.

SDG&E's Direct Compliance Obligation Limit applicable to the year 2015 was [redacted] $MMTCO_2e$ based on SDG&E's Commission approved 2012 Long Term Procurement Plan, as shown in Table 4-2.[170]

TABLE 4-2: SDG&E'S FORECASTED 2015-2018 GHG EMISSIONS AND 2015 DIRECT COMPLIANCE OBLIGATION LIMIT[171]
CONFIDENTIAL

	Net Remaining Compliance Obligation	2015	2016	2017	2018	Total
Direct Compliance Purchase Limit for 2015 in MMTCO2e	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

SDG&E's total compliance instrument procurement in the 2015 Record Period was [redacted] which is below its direct compliance obligation limit of [redacted] SDG&E procured a total of [redacted] of allowances, and [redacted] of offsets.[172]

Although SDG&E is allowed to procure future vintage allowances, it cannot use those allowances to meet the compliance obligation for the Second Compliance Period (2015-2017). For 2015, SDG&E is allowed to use any combination of allowances with vintages 2013 through 2015 (there are no restrictions on vintages for offsets). Table 4-3 shows SDG&E's procured Compliance Instruments in 2015.

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[170] SDG&E's Direct Compliance Obligation Limit for 2015 is calculated using a formula established in D.12-04-046. This calculation is based on its forecasted emissions including: 100% of its 2015 forecast, 60% of its 2016 forecast, 40% of its 2017 forecast, and 20% of its 2018 forecast, plus any carryover of compliance instruments from 2013-2014 Compliance period. This limit was two standard deviations higher than the expected Implied Market Heat Rate (IMHR) or base case. SDG&E Advice Letter 2671-E [CONFIDENTIAL], Form Sheets F-15 and F-16.

[171] *Ibid.*

[172] SDG&E Application, Ms. Garza-Beutz Testimony, page AGB-5 [Confidential]. [redacted]

TABLE 4-3: SDG&E'S PROCURED GHG COMPLIANCE INSTRUMENTS IN RECORD PERIOD 2015[173] CONFIDENTIAL

Quarter	Vintage of Allowance Purchased (MTCO2e)		Offset Purchase/(Sale) (MTCO2e)	Total Compliance Instruments Purchased (MTCO2e)
	[redacted]	[redacted]		
Q1 2015	[redacted]	[redacted]		[redacted]
Q2 2015	[redacted]	[redacted]	[redacted]	[redacted]
Q3 2015	[redacted]	[redacted]	[redacted]	[redacted]
Q4 2015	[redacted]	[redacted]		[redacted]
Total in 2015	[redacted]	[redacted]	[redacted]	[redacted]

SDG&E forecasted a compliance obligation of [redacted] for the Second Compliance Period.[174] Based on ARB regulations, SDG&E can meet up to 8% of its compliance obligation for the Second Compliance Period using offsets, which is about [redacted]. SDG&E procured about [redacted] in offsets, which is about [redacted] of its forecasted compliance obligation for the period.

Given that the price of offsets was [redacted] than the price of allowances obtained in CARB auctions in 2015 (average of $12.44/ $MTCO_2eq$), ORA notes that SDG&E could pursue procuring additional offsets up to the maximum 8% of its compliance obligation for the period to reduce the compliance cost that is borne by ratepayers. In a response to ORA data request, SDG&E stated that [redacted]"[175]

ORA is satisfied by SDG&E's showing that its GHG compliance instrument procurement is consistent with its Bundled Procurement Plan and Commission directives and policies. ORA recommends that SDG&E continue to procure offsets to meet its

[173] *Ibid.*

[174] SDG&E Advice Letter 2671-E (2010 Long Term Procurement Plan) [CONFIDENTIAL], Form Sheet F-11.

[175] SDG&E Confidential response to ORA data request number 009, (4.d.).

remaining allowable limit of offsets (which is about [redacted] of SDG&E 2015-2017 forecasted GHG compliance obligation) in order to meet its obligation under CARB Second Compliance period (2015-2017) at lowest cost, as long as offsets trade at a discount to allowances.

B. SDG&E's 2015 Direct GHG Emissions and Costs

ORA conducted thorough discovery and reviewed SDG&E's Application and work-papers to verify if SDG&E correctly applied the methodologies required by ARB regulations and the relevant Commission Decisions,[176] and determine if SDG&E recorded its GHG emissions and costs accurately.

Although SDG&E's procured allowances in the 2015 Record Period includes [redacted], the actual cost that are used to calculate the Direct GHG costs for the 2015 Record Period excludes [redacted] (as required by D.15-01-024). Thus, the GHG cost of [redacted] that is presented in Ms. Garza-Beutz testimony is the GHG procurement cost incurred by SDG&E in the 2015 Record Period, and does not represent the actual Direct GHG cost in the 2015 Record Period for the purpose of cost recovery.[177]

SDG&E stated that "[redacted]."[178]

As discussed in Section III.B.3., the recorded Direct GHG costs are the sum of each month's WAC of compliance instruments (procured allowances and offsets) inventory multiplied by that month's actual Direct emissions for which the utility has a physical compliance obligation.[179] The 2015 WAC should be based on inventory of

[176] For further discussion, refer to Section III. A., III. B. of this Chapter.

[177] SDG&E Application, Ms. Garza-Beutz Testimony, p. AGB-5 [Confidential].

[178] SDG&E Confidential Response to ORA DR 009, 1.6.1.

[179] D. 15-01-024 Attachment C. pp. 1-4.

allowances with vintage years 2015, 2016, and 2017, plus any 2013 and 2014 allowances that were not used to meet the obligation in the first compliance period.[180] ARB does not restrict which vintage year of offsets a utility can use to meet a compliance obligation.

Table 4-4 shows a summary of the compliance instruments and transactions used to calculate SDG&E's WAC for the 2015 Record Period. The compliance instruments procured in 2015 present [redacted] of the total compliance instruments in the inventory used to calculate the Direct GHG costs for the 2015 Record Period; [redacted]

[redacted].

SDG&E's 2015 inventory of [redacted]

[redacted].[181]

TABLE 4-4: SDG&E'S INVENTORY OF COMPLIANCE INSTRUMENTS IN 2015 RECORD PERIOD[182]
CONFIDENTIAL

[redacted]	[redacted] (MTCO2e)	[redacted] (MTCO2e)	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

[180] *Id.*, p. 4.

[181] SDG&E Confidential Response to ORA DR 009 1.6.1a. (Work-paper titled "SDG&E JE 758 GHG Electric 12 2015.xlsx).

[182] *Ibid*.

Based on Ms. Garza-Beutz testimony, SDG&E procured a total of [redacted]. [183] Thus, the compliance instruments purchased in 2015, which are part of the WAC calculation for the purpose of recording the Direct GHG costs, total to [redacted] with the net cost spent of [redacted]. These values exclude the [redacted], which are not part of calculating the WAC for the purpose of Direct GHG cost recovery in the 2015 Record Period. Table 4-5 shows SDG&E's [redacted], and their associated unit and total costs procured in the 2015 Record Period. Table 4-6 shows SDG&E's [redacted] and their associated costs procured in 2015 Record Period.

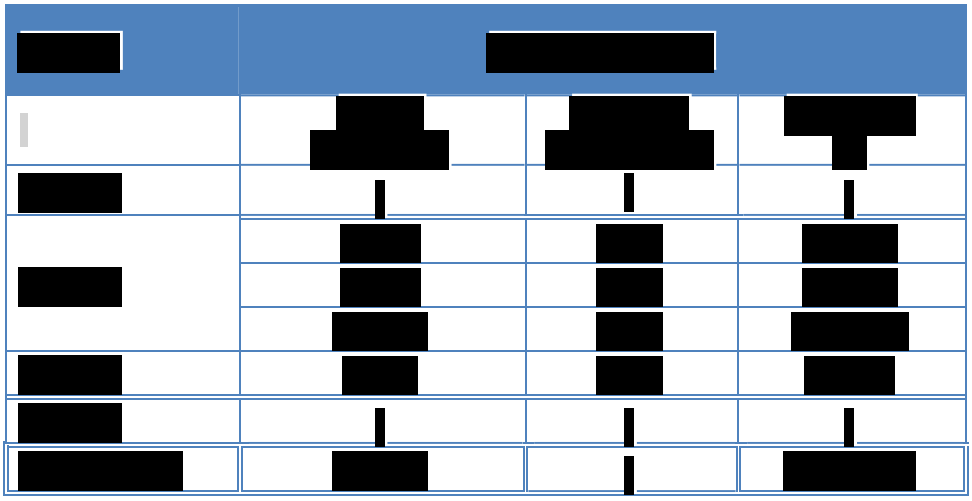
TABLE 4-5: SDG&E GHG [redacted] PROCURED IN 2015 RECORD PERIOD— CONFIDENTIAL

[redacted]

[183] *Ibid*.

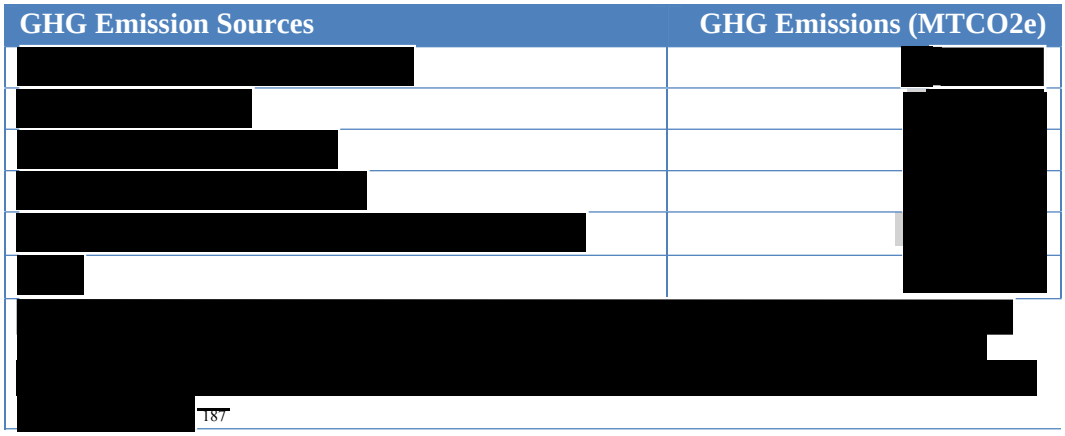
[184] *Ibid*.

TABLE 4-6: SDG&E GHG [redacted] PROCURED IN 2015 RECORD PERIOD[185] CONFIDENTIAL



SDG&E's Direct GHG costs consist of GHG compliance costs associated with emissions from SDG&E's utility-owned generations (UOG), tolling agreements, and imports that occurred in the 2015 Record Period. Table 4-7 provides a summary of SDG&E GHG emissions by source in the 2015 Record Period.

TABLE 4-7: SDG&E GHG EMISSIONS IN 2015 RECORD PERIOD[186] CONFIDENTIAL



[185] *Ibid*.

[186] SDG&E Confidential response to ORA DR 009.1 Q1, Spreadsheet tilted "ORA GHG DR-009.1 Q1 Followup."

[187] SDG&E Confidential response to ORA DR 009.1 Q1, page 4.

SDG&E's annual average WAC for the 2015 Record Period was [redacted], annual GHG emissions were [redacted] $MTCO_2e$ and the total Direct GHG cost was [redacted].

Based on the review of SDG&E's Application, work-papers, and SDG&E's responses to ORA data requests, ORA was able to verify that SDG&E's correctly applied the methodologies required by the relevant regulations and Commission Decisions.[188] ORA has no objection with regard to the accuracy of SDG&E's recorded Direct GHG costs.

II. CONCLUSION

ORA has no objection to SDG&E's request that the Commission find that SDG&E's Greenhouse Gas Compliance Instrument procurement is consistent with its Bundled Procurement Plan and Commission directives and policies.

ORA recommends that SDG&E continue to procure offsets in the future to meet its remaining allowable limit of offsets in order to meet its obligation under the CARB Second Compliance Period (2015-2017), as long as offsets provide the least cost procurement path, to ensure that ratepayers benefit from the potential savings and minimize GHG compliance costs.

[188] For further discussion, refer to Section III. A., III. B. of this Chapter.

CHAPTER 5: CONTRACT ADMINISTRATION

(Witness**:** Patrick Cunningham)

I. INTRODUCTION

This chapter of testimony presents the Office of Ratepayer Advocates' (ORA) review and analysis of San Diego Gas & Electric Company's (SDG&E's) contract administration processes as presented in Sally Chen's Prepared Direct Testimony of SDG&E's Energy Resource Recovery Account (ERRA) Compliance Application (A.) 16-06-002. ORA's review focused on the 2015 Record Period and considered SDG&E's administration of current Qualifying Facility (QF) and non-QF contracts, modification and terminations of existing and expiring contracts, and any over/under-payments of contract transactions and other fiscal errors. Analysis and review of contract administration is conducted by ORA to ensure the utility prudently administered its contracts for the benefit of ratepayers and under guidance set by the Commission's Standard of Conduct 4.

II. RECOMMENDATIONS

ORA makes the following recommendation for SDG&E using the testimony and data provided by the utility along with consideration of historical testimonies, past Commission decisions, and official correspondence with the utility:

A. Termination Evaluation

Many of the contract terminations during the record period are attributed to project delays beyond contract deadlines. Such terminations must be justified as prudent economic decisions that are in the best interest of ratepayers, compared to the alternative of extending a contract by amendment or existing contract language. Currently, SDG&E is required to briefly describe the reason that a contract was terminated in the record period. ORA recommends that for future ERRA cases, the Commission also require SDG&E to include an evaluation for terminated contracts which qualitatively and quantitatively explains the utility's decision to terminate a delayed project. The evaluation should convincingly demonstrate that termination was a better economic value for ratepayers than extension of a contract.

III. BACKGROUND

On June 1, 2016, SDG&E filed its Energy Resource Recovery Account (ERRA) Application seeking Commission approval of its contract administration, least-cost dispatch (LCD), and procurement activities for the 2015 Record Period. ORA gathered additional information about specific contracts in SDG&E's portfolio that underwent modification, termination, and expiration in the record period through its Master Data Request (MDR) and subsequent data requests and discussions.

In the ERRA compliance filing, ORA reviewed contracts in SDG&E's portfolio which were amended or otherwise modified during the Record Period. Public Utilities Code Section 454.5(d)(2) established "a regulatory process to verify and ensure that each contract was administered in accordance with terms of the contract, and contract disputes that may arise are reasonably resolved." ORA's review and analysis of a utility's energy procurement contracts are guided by two major ERRA decisions: Decision (D.) 02-10-062 and D.02-012-074 (the October and December decisions respectively). The October decision set forth the guidelines for California's three investor-owned utilities (IOUs or utilities) to resume procurement responsibilities following the Energy Crisis of 2000-2001.[189] This Decision ordered the utilities to comply with minimum standards of conduct, including Standard of Conduct 4 (SOC 4). SOC 4 states that, "the utilities shall prudently administer all contracts and generation resources and dispatch the energy in a least-cost manner."[190] SOC 4 was modified by the December decision to include specific terms regarding contract administration:

> Prudent contract administration includes administration of all contracts within the terms and conditions of those contracts... In administering contracts, the utilities have the responsibility to dispose of economic long power and to purchase economic short power in a manner that minimizes ratepayer costs… The utility bears the burden of proving compliance with the standard set forth in its plan.[191]

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[189] D.02-12-074, p. 2.

[190] D.02-10-062, p. 52 and Conclusion of Law 11, p. 74.

[191] D.02-12-074, p. 54.

II. DISCUSSION AND ANALYSIS

A. Overview of SDG&E's 2015 Electric Portfolio

As noted in its testimony, SDG&E maintained an electric portfolio of over sixty contracts for 2015.[192] This portfolio was made up of the following resources, energy trade agreements not included:[193]

- Four utility-owned generation (UOG) facilities totaling 1,209 megawatts (MW), all natural gas;
- Nine QFs totaling 140.4 MW (three hydro, six natural gas);
- Ten biogas projects totaling 25.6 MW;
- Two biomass projects supplying 60.5 MW;
- One digester gas + hydro project supplying 4.8 MW;
- Eighteen solar contracts totaling 1,281 MW;
- Fifteen wind contracts supplying 1,235 MW;
- One pumped-hydro facility able to produce 40 MW;
- Two non-QF hydro contracts supplying 4.95 MW; and,
- Two Combined Heat and Power (CHP) facilities totaling 106.4 MW.

B. Analysis of Contracts with Amendments or Modifications

ORA reviewed SDG&E's testimony regarding contract administration practices and activities focusing specifically on the contracts that underwent modification or amendment during 2015. ORA reviewed these modifications to determine if they met the following criteria:

- Did SDG&E adequately justify the rationale for the contract amendment?
- Is the contract amendment necessitated by operational needs?

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[192] SDG&E Testimony, SC-11:12.

[193] SDG&E Testimony, SC-Table 1.

- Is the contract amendment in SDG&E's ratepayers' best interest?
- What is the actual or notional value of the contract amendment?
- How is the actual and/or notional value of the amendment accounted for in SDG&E's expense and/or revenue account?

On May 1, 2014, the CAISO created a dynamic scheduling option called Variable Energy Resource (VER) Forecasting which allows utilities to dispatch renewables at 15-minute intervals.[194] The implementation of VER was mandated by Federal Energy Regulatory Commission (FERC) Order 764 which sought to help integrate renewables into the electric grids, decrease congestion problems, and facilitate the implementation of resource curtailment.[195] Integration of VER requires an alteration of contract language between utility and generator. [redacted] SDG&E states [redacted], with which ORA agrees.[196]

Several amendments to renewable contracts integrated economic curtailment capabilities by allowing SDG&E or CAISO to order a curtailment of product delivery to the transmission grid. The Generator is [redacted][197] SDG&E reports that [redacted]

[194] CAISO, *Business Requirements Specification: FERC Order 764 Compliance 15-Minute Scheduling and Settlement*, pp. 11. & CAISO, *FERC Order No. 764 Market Changes.* https://www.caiso.com/informed/Pages/StakeholderProcesses/FERCOrderNo764MarketChanges.aspx *Accessed8/17/16.*https://www.caiso.com/Documents/External_Business_Requirements_Specification_FERC_Order764.pdf.

[195] *Ibid.*

[196] SDG&E Response to ORA Data Request No. 4, Attachment Q4.c.

[197] SDG&E Response to ORA Data Request No. 4, Attachment Q4.a, p. 25.

[redacted][198] Negative energy market prices occur when there is too much energy supplied on the local or system-wide grid and generating resources must pay CAISO to accept their output, rather than receive a payment for generation. Utilities face costs from both owning renewable resources that have no curtailment capabilities and having dispatchable resources which must run by contract.[199] Negative prices may also occur in a local area due to severe transmission congestion in the immediate region, which is also a threat to reliable delivery.[200] Economic curtailment allows SDG&E to [redacted]. [redacted] curtailed resources were able to avoid an estimated [redacted] in costs in May 2015 alone.[201] Ratepayers benefit from curtailment because costs that would otherwise be passed on to them through the ERRA Balancing Account are avoided. The benefits of curtailment do not affect the notional value of the contract which is amended to implement them. In the case of the described amendments the Generator is [redacted] while the utility finds itself less exposed to market volatility.

Below, ORA provides its analysis and review of the contracts that underwent amendment or modification in 2015:

i. 70SM1 8ME (Calipatria) 3rd Amendment – Renewable

This amendment [redacted] and adds [redacted] to the contract.[202]

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[198] SDG&E Testimony, SC-Table 6.

[199] Many of the later such resources must run at least at 25% of their maximum output due to optimal performance or contract provisions. The ability to curtail other resources would decrease the supply of energy on the grid and push the market price towards positive figures which benefits those resources which must run. CPUC, *Beyond 33 Percent Renewables: Grid Integration Policy White Paper*. Page 11. http://www.cpuc.ca.gov/General.aspx?id=8982. Accessed 9/13/16.

[200] *Ibid.*, p. 13.

[201] SDG&E, *Meeting of SDG&E's Procurement Review Group – CONFIDENTIAL 07.17.15*, p. 21.

[202] SDG&E Testimony, SC-Table 5, 6.

ii. CSolar IV South 2nd Amendment – Renewable

This amendment [redacted] into the contract.[203]

iii. CSolar IV West 3rd Amendment – Renewable

This amendment [redacted] into the contract.[204]

iv. Imperial Valley Solar 1 (Silver Ridge Mt Signal) 1st Amendment – Renewable

This amendment both [redacted] and resolves some issues with [redacted]

[redacted][205]

The changes regarding [redacted] do not create any change in the value of the contract and protects ratepayers from [redacted].

v. SG2 Imperial Valley (SG2) 5th Amendment – Renewable

[redacted][206] [redacted] [redacted] [redacted][207] These amended provisions do not change the notional value of the contract.

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[203] *Ibid.*

[204] *Ibid.*

[205] SDG&E Response to ORA Data Request No. 4, Attachment Q4.a, p. 65.

[206] SDG&E Response to ORA Data Request No. 10 Q4.f.

[207] SDG&E Response to ORA Data Request No. 10 Attachment 2015-04-29 SG2IV – Amendment 5 Added Excess Energy & Guaranty Language.pdf, p. 2.

vi. Tallbear Seville 2nd Amendment – Renewable

This amendment [redacted] and [redacted] to the contract.[208] The amendment also [redacted][209] [redacted][210] The contract undergoes no change in notional value since the [redacted] remain unchanged.

vii. Tallbear Seville 3rd Amendment – Renewable

[redacted].[211] This did not alter the value of the contract nor had any impact on ratepayer interest.[212]

viii. Exelon Generation Company 1st Amendment; Noble Americas Energy Solutions 2nd Amendment; Pilot Power Group 3rd Amendment – Energy Holding Companies

These three amendments [redacted].[213] The update was a [redacted] and did not impact any PPAs or the amount of electricity or capacity SDG&E receives.[214] The amendments thus create no change in value of the contracts.

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[208] SDG&E Testimony, SC-32.

[209] SDG&E Response to ORA Data Request No. 10 Q3.a.

[210] *Ibid.*

[211] SDG&E Testimony, Table 5 & 6.

[212] Teleconference between SDG&E and ORA, 8/23/2015.

[213] SDG&E Response to ORA Data Request No. 4, Attachment Q4a pp. 71, 73. 75.

[214] Teleconference between SDG&E and ORA, 8/23/2015.

ix. Carlsbad Energy Center 1st Amendment – Tolling

[redacted][215]

[redacted][216][redacted][217]

No delivery of energy was made from Carlsbad in 2015; the project was under development.[218]

x. Pio Pico Energy Center 13th Amendment – Tolling

[redacted][219][redacted]

[redacted][220][redacted]

[redacted][221]

xi. City of San Diego "Point Loma" Extension – Biogas

The Seller [redacted]

[215] SDG&E Response to ORA Data Request No. 10, Q4.e

[216] SDG&E Testimony, Table 5.

[217] SDG&E Response to ORA Data Request No. 10, Q4.e Attachment 2015-08-21 NRG CEC Amendment 1.pdf, pp. 1-2.

[218] No deliveries noted: SDG&E Testimony, Table 1.

[219] A "delay in the Project's critical path to achieving commercial operation by September 15, 2015" is mentioned in SDG&E Response to ORA Data Request No. 10, Q4.c Attachment 2015-01-19 PPEC – Amendment 13 Change to CPUC CP.pdf, pp. 2 Section 1.b.

[220] *Ibid.*

[221] SDG&E Response to ORA Data Request No. 10, Q4.c.

[redacted]

[redacted][222]

C. Contract Terminations and Expirations for RY 2015

ORA reviewed SDG&E's testimony regarding its contract administration practices and activities focusing specifically on contracts which expired or were terminated in 2015. ORA reviewed the conduct and decisions of the utility to judge if they met the following criteria:

- Did SDG&E adequately justify the rationale to terminate or allow expiration of the contract?
- Is the contract termination necessitated by operational needs?
- Is the contract termination or expiration in SDG&E's ratepayers' best interest?
- What is the actual or notional value of the contract termination/expiration compared to its continued operation?
- How is the actual and/or notional value of the termination accounted for in SDG&E's expense and/or revenue account?

[redacted] contracted projects from [redacted] different energy companies were terminated and [redacted] expired without renewal in 2015. [redacted] of the terminations were for developing projects that had not yet delivered energy to the utility. SDG&E properly conducted each termination in accordance with the terms of each project's contract, with some resulting in proper termination fees or return of Letters of Credit to the producer. There were four different reasons contracts were terminated in 2015:

[redacted]

[222] SDG&E Testimony, SC-18: 5-10.

[redacted]

When delays or other reasons give SDG&E the option to terminate a contract, a decision must be made concerning the economic value of the contract's extension or termination. This decision must be properly valued in order to ensure it is in the best interests of the ratepayers. The costs to conduct replacement procurement following a termination would be borne by ratepayers, who may also be impacted by a more costly replacement contract. SDG&E provided brief explanations for each termination that occurred in 2015.[223] At the request of ORA, expanded descriptions of the reasons for termination were provided which satisfied this testimony's analysis.[224] However, the explanations for termination could be better supported if they were accompanied by an economic evaluation of the costs to terminate the contract compared to the cost of providing an extension for those contracts which experienced a delay. ORA recommends that the Commission require SDG&E to include a brief economic evaluation in future ERRA Compliance applications to support its decisions regarding whether to grant a contract extension or to terminate it. Such an evaluation (and appropriate supporting workpapers) should be included in all ERRA testimony to accompany all decisions to terminate a contract in which an option to extend the contract due to a delay exists.

A summary and brief analysis of each termination and expiration from 2015 follows:

1. Fresh Air Energy II LLC; Four Projects (Buckman Springs PV 1, PV 2, Viejas Blvd 1, Viejas Blvd 2) - Renewable

[redacted]

[223] SDG&E Testimony, Table 3 Attachment.

[224] SDG&E Response to ORA Data Request No. 4, Q5 & Teleconference between SDG&E and ORA, 8/23/2015.

[redacted][225][redacted][226][redacted][227][redacted][228]

2. ECOS Energy LLC - Renewable

[redacted][229][redacted][230][redacted][231]

3. Victorville Landfill Solar L.P. - Renewable

[redacted][232]

[225] SDG&E Response to ORA Data Request No. 4, Attachment Q5.b.i p. 24.

[226] *Ibid.*, 22. & Teleconference between SDG&E and ORA, 8/23/2015.

[227] SDG&E Testimony, Table 3 & SDG&E Response to ORA Data Request No. 4, Question 5a.

[228] Teleconference between SDG&E and ORA, 8/23/2015.

[229] SDG&E Response to ORA Data Request No. 4, Attachment Q5.b.i pp. 12-14.

[230] Teleconference between SDG&E and ORA, 8/23/2015.

[231] SDG&E Response to ORA Data Request No. 4, Q5.a.ii.

[232] SDG&E Testimony, Table 3.

4. Desmon Power Products LLC (Formerly Con Dios Solar 33) - Renewable

[redacted][233][redacted][234][redacted][235][redacted][236][redacted][237][redacted][238][redacted][239][redacted]

5. Blue Lake Power LLC [redacted] - Bio-Mass

[redacted]

[233] SDG&E Response to ORA Data Request No. 4, Attachment Q5.c.i, p. 1.

[234] SDG&E Response to ORA Data Request No. 4, Attachment Q5.b.i, p. 3.

[235] *Ibid.*, p. 7.

[236] *Ibid.*, pp. 9-10.

[237] *Ibid.*, p. 11.

[238] *Ibid.*, p. 10.

[239] Teleconference between SDG&E and ORA, 8/23/2015.

[redacted][240]

[redacted][241]

[redacted][242]

[redacted][243]

The agreement was approved in Advice Letter 2725-E and made effective 4/1/2015 by Resolution E-4208.[244]

6. Blue Lake Power [redacted]

[redacted][245]

[240] SDG&E Testimony, SC-17.

[241] CPUC. *Advice Letter 2725-E: Notice of Termination of Power Purchase Agreement and New Agreement for Replacement Energy*. pp. 1. http://www.sdge.com/tm2/pdf/2725-E.pdf

[242] SDG&E Response to ORA Data Request No. 4, Q2a.

[243] SDG&E's estimated cost savings was derived from an internal net present value calculation. The precise variables were not provided to ORA. ORA assumes since the value changed but the cost of energy remained the same, that the BLP contract included time-of-use, capacity payments, or other conditions. SDG&E Response to ORA Data Request No. 4, Q2a.

[244] SDG&E Testimony, Table 5. & CPUC Resolution E-4208: http://docs.cpuc.ca.gov/PublishedDocs/PUBLISHED/FINAL_RESOLUTION/94355.htm.

[245] SDG&E Response to ORA Data Request No. 4, Q2.a.i.

[redacted][246]

[redacted]247

7. OCI Solar Lakeside LLC - Renewable

[redacted][248]

8. AES Tehachapi Wind LLC - Renewable

[redacted][249]

9. SunEdison Origination3 LLC - Renewable

[redacted][250]

10. Axio Power Holdings LLC - Renewable

[redacted][251]

11. Covanta Delano, Inc. - Biomass

[redacted]

[246] SDG&E Testimony, Table 3.

[247] CPUC Resolution E-4208: http://docs.cpuc.ca.gov/PublishedDocs/PUBLISHED/FINAL_RESOLUTION/94355.htm.

[248] SDG&E Testimony, Table 3.

[249] SDG&E Testimony, Table 3.

[250] SDG&E Testimony, SC-Exhibit B; *Re: Termination of the RAM Power Purchase Agreement.* 9/14/15.

[251] SDG&E Testimony, SC-Exhibit B; *Re: Termination of Renewable Market Adjusting Tariff Power Purchase Agreement.*

[redacted][252]

D. Over/Under Payments and other Errors/Discrepancies

An overpayment by SDG&E to an energy producer or an unresolved accounting error on the part of SDG&E could result in a disallowance recommendation according to the provisions of Standard of Conduct 4. In 2015, SDG&E encountered routine corrections, discrepancies, and minor contract interpretation events that led to payment adjustments. The majority of them were resolved within the record period, but listed below are outstanding payments and disputes yet to be resolved.

[redacted][253][redacted][254][redacted][255][redacted][256][redacted]

[252] SDG&E Testimony, SC-Exhibit B, p. 28; SC-16.

[253] SDG&E Testimony, SC-30:18-22.

[254] SDG&E Testimony, pp. SC-30: 18-22.

[255] Advice Letter 2848-E, p. 1, and SDG&E Response to Data Request 10 Question 5.a.i.

[256] SDG&E Response to Data Request 10, Question 5.a.i.

[redacted][257]

[redacted][258]

[redacted]

[redacted]

[redacted]259

[redacted]

[redacted]

[redacted][260]

[redacted][261]

[redacted]

[redacted][262]

[redacted]

E. QF Contract Administration for RY 2015

QF facilities are designated as must-take resources by the 1978 Public Utility Regulatory Policies Act. Two of the nine QFs contracted with SDG&E converted from

[257] SDG&E Testimony, SC-31:14-19.

[258] SDG&E Response to ORA Data Request No. 8, Q6.3.

[259] SDG&E Response to ORA Data Request No. 8, Q6.1.

[260] SDG&E Testimony, SC-40.

[261] *Ibid.*

[262] SDG&E Response to ORA Data Request No. 8, Q6.2.

QF to dispatchable CHP facilities during the record period. Goal Line L.P. did so at the start of February 2015, and YCA at the start of December 2015.[263] A third QF, [redacted] is currently undergoing a series of amendments to convert to CHP as well, but will not receive CPUC approval until beyond the record period.

The provisions of delivery do not significantly change after [redacted] but [redacted] [264] The resource is no longer "must-take" and instead uses SDG&E determined bid prices commensurate with the cost of the resource, leading to a [redacted]

No QF contracts were terminated and no unusual payments, claims, or settlements took place.[265] The above mentioned [redacted] dispute with [redacted] is still in progress and did not affect the record period. ORA does not object to SDG&E's administration of its QF contracts.

III. CONCLUSION

Based on ORA's review and analysis of the contracts above and the information SDG&E provided to support its testimony, ORA does not object to SDG&E's administration of its contract amendments and settlements for Record Period 2015. However, future ERRAs could benefit from additional documentation supporting terminated contracts. The Commission should require SDG&E to provide an economic analysis of its contract terminations which compare the costs of termination to the costs of extending and maintaining the contract. This would allow the Commission to decide if contract administration was prudently conducted for the benefit of ratepayers.

[263] SDG&E Testimony, SC-35.

[264] SDG&E Testimony of Joseph Pasquito: Attachment 2015 ERRA Compliance MDR - LCD Wrkpr 5.

[265] SDG&E Testimony, SC-37.

ATTACHMENT FOR CHAPTER 5

#	Attachment	Description
1	Meeting of SDG&E's Procurement Review Group – CONFIDENTIAL 07.17.15	Procurement Group Meeting Presentation containing curtailment data. Confidential.

ATTACHMENT 1:
MEETING OF SDG&E'S PROCUREMENT REVIEW GROUP
07.17.15 SLIDE 21
(CONFIDENTIAL)

CHAPTER 6: COMPLIANCE REVIEW OF THE ENERGY RESOURCE RECOVERY ACCOUNT (ERRA) AND OTHER BALANCING ACCOUNTS

(Witnesses: Brian Lui and Monica Weaver)

I. INTRODUCTION AND SUMMARY

The Office of Ratepayer Advocates (ORA) reviewed San Diego Gas & Electric Company's (SDG&E) Energy Resource Recovery Account (ERRA) and five (5) other balancing and memorandum accounts for the record period January 1, 2015-December 31, 2015. In Application (A.) 16-06-002, SDG&E requests that the Commission find that the transactions recorded to its ERRA and Greenhouse Gas (GHG) Subaccount during the record period, complied with Commission decisions and directives and are recoverable. SDG&E also requests the Commission find the transactions recorded in the Transition Cost Balancing Account (TCBA), Local Generating Balancing Account (LGBA), New Environmental Regulatory Balancing Account (NERBA), Independent Evaluator Memorandum Account (IEMA) and Litigation Cost Memorandum Account (LCMA) during the record period, complied with Commission directives.

II. DISCUSSION

A. Energy Resource Recovery Account (ERRA)

The ERRA's activities for the record period are summarized below. Table 6-1 shows ERRA's December 31, 2015 ending balance with an over collection of $25,271,695.

TABLE 6-1[266] ENERGY RESOURCE RECOVERY ACCOUNT (ERRA) SUMMARY OF 2015 RECORD PERIOD

Description	Under/ (Over) Collection
December 31, 2014 ERRA Balance	$272,848,511
Revenue	($1,401,128,534)
Expenses	$1,225,648,872
Other-net[267]	($122,948,536)
Interest	$307,992
December 31, 2015 Total ERRA Balance	**($25,271,695)**

Pursuant to Decisions (D.) 02-10-062 and D. 02-12-074, the purpose of the ERRA is to provide full recovery of SDG&E's energy procurement costs associated with serving SDG&E's bundled service customers.[268] SDG&E's ERRA costs include:

- California Independent System Operator (CAISO) energy and ancillary services load charges.
- Contract costs.
- Generation fuel costs.
- CAISO-related charges.
- Hedging costs.
- Previously approved equity rebalancing costs related to the financial statement consolidation under Accounting Standards Codification 819 (ASC 810) of the Otay Mesa Energy Center (OMEC) to serve SDG&E's bundled service customers.[269]

ERRA includes revenues from SDG&E's Electric Energy Commodity Cost (EECC) rate schedule, adjusted to exclude California Department of Water Resources (CDWR) revenues for energy provided by CDWR to SDG&E customers, non-fuel generation revenues allocated to the Non-fuel Generating Balancing Account (NGBA),

[266] Table from Prepared Direct Testimony of Norma G. Jasso. p. NGJ-4.

[267] Includes supplier refunds, transfers from other regulatory accounts, carrying costs relates to hedging and SONGS settlement- related entries.

[268] Prepared Direct Testimony of Norma G. Jasso. p. NGJ-2:17-19.

[269] Prepared Direct Testimony of Norma G. Jasso. p. NGJ-2:19-22 and NGJ-3:1-2.

and other Commission approved transfers. ERRA compares the energy procurement costs described above with the revenue from Schedule EECC (excluding CDWR, NGBA revenue and other transfers) on a monthly basis. Any over or under-collection balance collects interest at the three-month Commercial Paper rate.[270]

B. Greenhouse Gas (GHG) Sub-Account

Pursuant to D. 13-12-041,[271] SDG&E was authorized by the Commission to recover deferred GHG costs that were incurred in 2012. By December 2015, the balance in the sub-account was $0 (zero). The 2015 vintage year emission expense was transferred from the ERRA GHG sub- account to the main ERRA schedule.[272] The GHG activities for the Record Period are summarized below in Table 6-2.

TABLE 6-2[273] GREENHOUSE GAS (GHG) SUB-ACCOUNT SUMMARY OF 2015 RECORD PERIOD

Description	Under/(Over) Collection
[redacted]	[redacted]
Ending Balance (12/31/15)	**$0**

C. Transition Cost Balancing Account (TCBA)

The TCBA records eligible above-market power costs and revenues received from SDG&E's Competition Transition Charge (CTC) rate. In 2015 the market benchmark of $55.07/MWh was used to calculate the above-market portion of AB 1890 eligible transition costs.[274] TCBA accounting entries for Record Period are summarized below in Table 6-3.

[270] ERRA preliminary statement, tariff line item 5u.

[271] D.13-12-041 Ordering Paragraph 3.

[272] Prepared Direct Testimony of Norma G. Jasso. p. NGJ-4:8-10.

[273] Prepared Direct Testimony of Norma G. Jasso. Attachment A3.

[274] Prepared Direct Testimony of Norma G. Jasso. p. NGJ-5:17-19.

TABLE 6-3[275] TRANSITION COST BALANCING ACCOUNT (TCBA)
SUMMARY OF 2015 RECORD PERIOD

Description	Under/ (Over) Collection
Beginning Balance (12/31/14)	$7,205,916
Revenue	($18,438,984)
Expenses	$17,557,399
Interest	$9,205
TCBA Ending Balance (12/31/15)	**$6,333,536**

D. Local Generating Balancing Account (LGBA)

The purpose of the LGBA is to record revenues and costs of generation, where the Commission has determined that the resource is subject to a cost allocation mechanism (CAM).[276] In 2015 the only contract included in the LGBA was the Escondido Energy Center.[277] LGBA accounting entries for the Record Period are summarized below in Table 6-4.

TABLE 6-4[278] LOCAL GENERATING BALANCING ACCOUNT (LGBA)
SUMMARY OF 2015 RECORD PERIOD

Description	Under/(Over) Collection
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

E. New Environmental Regulatory Balancing Account (NERBA)

The NERBA records actual costs against revenue requirements for administrative fees charged by the California Air Resources Board (CARB) which are authorized as recoverable under Assembly Bill (AB) 32.[279] Balance of NERBA as of

[275] Table from Prepared Direct Testimony of Norma G. Jasso. p. NGJ-6.

[276] Prepared Direct Testimony of Norma G. Jasso. p. NGJ-6:9-11.

[277] Prepared Direct Testimony of Norma G. Jasso. p. NGJ-6:11-12.

[278] Table from Prepared Direct Testimony of Norma G. Jasso. p. NGJ-7.

[279] Prepared Direct Testimony of Norma G. Jasso. p. NGJ-8:5-7.

December 31, 2015 was a $0.3 million overcollection. NERBA accounting entries for the Record Period are summarized below in Table 6-5.

TABLE 6-5[280] NEW ENVIRONMENTAL REGULATORY BALANCING ACCOUNT (NERBA) SUMMARY OF 2015 RECORD PERIOD

Description	Under/ (Over) Collection
NERBA Beginning Balance 12/31/14	($353,694)
Authorized Revenue	($447,000)
Recorded Expenses	$457,062
Interest	($616)
NERBA Balance 12/31/15	**($344,248)**

F. Independent Evaluator Memorandum Account (IEMA)

The purpose of the IEMA is to record third party costs associated with the use of Independent Evaluators (IE) in the utility's long-term procurement activities and Renewables Portfolio Standard (RPS) programs. Any over or undercollection balance collects interest at the three month Commercial Paper rate. Pursuant to D. 11-10-029, SDG&E transferred the IEMA 2015 undercollection balance of $0.5 million to ERRA.[281] IEMA accounting entries for the Record Period are summarized below in Table 6-6.

TABLE 6-6[282] INDEPENDENT EVALUATOR MEMORANDUM ACCOUNT (IEMA) SUMMARY OF 2015 RECORD PERIOD

Description	Under/ (Over) Collection
IEMA Beginning Balance 12/31/14	$0
Account Balance 12/15	$527,515
Transfer to ERRA 12/15	($527,515)
IEMA Balance 12/31/15	**$0**

G. Litigation Cost Memorandum Account (LCMA)

The LCMA was established in 2004, pursuant to Resolution E-3893, to record litigation costs associated with refunds resulting from the energy price crisis in October 2000 through January 2001. LCMA tracks the difference between incurred litigation

[280] Prepared Direct Testimony of Norma G. Jasso. Summary of Attachment D.

[281] Prepared Direct Testimony of Norma G. Jasso. p. NGJ-9 line 3-5.

[282] Prepared Direct Testimony of Norma G. Jasso. Summary of Attachment E.

costs and settlement proceeds received. SDG&E is presenting transactions recorded during 2015 for review.[283] The balance of LCMA as of December 31, 2015 was an undercollection of $0.1 million. LCMA accounting entries for Record Period are summarized below in Table 6-7.

TABLE 6-7[284] LITIGATION COST MEMORANDUM ACCOUNT (LCMA) SUMMARY OF 2015 RECORD PERIOD

Description	Under/ (Over) Collection
LCMA Beginning Balance 12/31/14	$14,753
Expenses	$80,448
Interest	$79
LCMA Balance 12/31/15	**$95,280**

III. AUDITS OBJECTIVES, SCOPE AND PROCEDURE

ORA reviewed SDG&E's ERRA and five other balancing and memorandum accounts for the Record Period as described in SDG&E's prepared testimony. The objective of the review was to determine whether entries recorded in the ERRA and five other balancing and memorandum accounts were appropriate, correctly stated and in compliance with applicable Commission decisions. Audit procedures of ORA included but were not limited to the following:

- Review of SDG&E's application, testimony, exhibits, workpapers, and data request responses.
- Review of applicable Advice Letter and Commission Decisions.
- Analytical reviews of monthly entries, including review of monthly balances recorded for each of the balancing and memorandum account tariff line items during the year. Evaluation of monthly and annual fluctuations.
- Review of Monthly Interest Rates used and the interest amount calculation.

[283] Prepared Direct Testimony of Norma G. Jasso. p. NGJ-9 line 10-15.

[284] Prepared Direct Testimony of Norma G. Jasso. Summary of Attachment F.

- Review of balancing and memorandum accounts to determine whether revenues and costs recorded were appropriate and correctly stated.
- Review of balancing and memorandum accounts to determine whether SDG&E complied with applicable Commission Decisions and Advice Letter Resolutions.
- Review of copies of internal audit reports issued during the Record Period related to balancing account administration.

ORA selected a sample of balancing and memorandum account monthly and tariff line items to determine whether adequate support exists. We examined invoices, journals, general ledger entries, etc. for amounts recorded in the balancing and memorandum accounts and verified the mathematical accuracy of accounting worksheets and supporting documents. ORA visited SDG&E to review and discuss each of the selected balancing and memorandum monthly and tariff line items in detail with SDG&E staff and to trace those line items to supporting documents.

On a sample test basis, ORA reviewed source documents that supported the revenues, costs, and expenses recorded in the ERRA and the 5 balancing and memorandum accounts. ORA's sample was judgmentally selected and consisted of:

- 35 monthly/ tariff line items recorded in the ERRA.
- 3 monthly/ tariff line items in GHG Sub-account.
- 5 monthly/ tariff line items in TCBA.
- 10 monthly/ tariff line items in LGBA.
- 5 monthly/ tariff line items in NERBA.
- 4 monthly/ tariff line items in IEMA.
- 4 monthly/ tariff line items in LCMA.

A "judgement sample" is a type of nonrandom sample selected by the auditor based on the judgement (opinion) of the auditor. Considered factors when selecting a judgement sample include the auditor's judgments about various elements including but not limited to internal control environment, exposure/ materiality, risk, and results of analytical reviews.

All of ORA's samples selected from the ERRA, GHG Sub-account, TCBA, LGBA, NERBA, IEMA and LGBA were adequately supported with documentation provided by SDG&E.

IV. CONCLUSIONS AND RECOMMENDATIONS

ORA does not take exception to SDG&E's operation of the balancing and memorandum accounts during the Record Period 2015, and that the recorded entries in these accounts were appropriate, correctly stated and in compliance with applicable Commission decisions.

APPENDIX A

QUALIFICATIONS OF WITNESSES

QUALIFICATIONS AND PREPARED TESTIMONY
OF
XIAN MING LI

Q.1 Please state your name and business address.

A.1 My name is Xian Ming (Cindy) Li. My business address is 505 Van Ness Avenue, San Francisco, CA 94102.

Q.2 By whom are you employed and in what capacity?

A.2 I am employed by the California Public Utilities Commission as a Public Utilities Regulatory Analyst in the Electricity Planning and Policy Branch of the Office of Ratepayer Advocates (ORA).

Q.3 Briefly state your educational background and experience.

A.3 I hold a Master of Science degree in Agricultural Resource Economics from the University of California Davis, and a Bachelor of Arts degree in Economics from University of California Berkeley. I joined the Electricity Pricing and Customer Programs Branch in October of 2012 and joined the Electricity Planning and Policy Branch in April 2016.

Q.4 What is the scope of your responsibility in this proceeding?

A.4 I am the project coordinator and was responsible for preparing Chapter 1 (Executive Summary) of ORA's testimony.

Q.5 Does this complete your testimony at this time?

A.5 Yes, it does.

QUALIFICATIONS AND PREPARED TESTIMONY
OF
PATRICK CUNNINGHAM

Q.1 Please state your name and business address.

A.1 My name is Patrick Thomas Cunningham. My business address is 505 Van Ness Avenue, San Francisco, CA 94102.

Q.2 By whom are you employed and in what capacity?

A.2 I am employed by the California Public Utilities Commission as a Public Utilities Regulatory Analyst in the Electricity Planning and Policy Branch of the Office of Ratepayer Advocates (ORA).

Q.3 Briefly state your educational background and experience.

A.3 I hold a Master of Pacific and International Affairs degree from the University of California San Diego, a Master of Arts degree in History from the American Military University, and a Bachelor of Arts degree in History from the University of California Santa Cruz. My most recent degree allowed me to focus in the study of national energy procurement. I joined ORA in May of 2016 and devoted my post-training work to the study of ERRA cases and associated Commission decisions.

Q.4 What is the scope of your responsibility in this proceeding?

A.4 I am responsible for Chapter 2: Least-Cost Dispatch and Economically-Triggered Demand Response and Chapter 5: Contract Administration.

Q.5 Does this complete your testimony at this time?

A.5 Yes, it does.

QUALIFICATIONS AND PREPARED TESTIMONY
OF
MICHAEL YEO

Q.1 Please state your name and business address.

A.1 My name is Michael Yeo. My business address is 505 Van Ness Avenue, San Francisco, California.

Q.2 By whom are you employed and in what capacity?

A.2 I am employed by the California Public Utilities Commission as a Senior Utilities Engineer in the Office of Ratepayer Advocates (ORA).

Q.3 Briefly state your educational background and experience.

A.3 I graduated from the University Of Toronto with a Bachelor of Applied Science in Civil Engineering, and am a registered Professional Engineer. Since joining the Commission in 1992, I have worked in various assignments in ORA, Energy Division and the Consumer Protection and Safety Division. Immediately prior to joining the Commission, I worked for the California Department of Transportation.

Q.4 What is the scope of your responsibility in this proceeding?

A.4 I am responsible for Chapter 3, Utility-Owned Generation (Fossil) of ORA's Intervenor Testimony in San Diego Gas & Electric's Energy Resource Recovery Account Review of Operations, 2016 proceeding (A.16-06-002).

Q.5 Does this complete your testimony at this time?

A.5 Yes, it does.

QUALIFICATIONS AND PREPARED TESTIMONY
OF
AYAT OSMAN, Ph.D.

Q.1 Please state your name and business address.

A.1 My name is Ayat Osman. My business address is 505 Van Ness Avenue, San Francisco, California.

Q.2 By whom are you employed and in what capacity?

A.2 I am employed by the California Public Utilities Commission as a Public Utilities Regulatory Analyst in the Office of Ratepayer Advocates' (ORA) Electricity Planning and Policy Branch.

Q.3 Briefly state your educational background and experience.

A.3 I have a Ph.D. in Civil Engineering from the University of Pittsburgh (2006), Dissertation titled "Life Cycle Optimization Model for Integrated Cogeneration and Energy Systems Applications in Buildings." I also have two Master of Science Degrees: M.Sc.in Environmental Engineering (2002), and M.Sc. in Environmental Science and Management from Duquesne University (2000). I have a Bachelor's of Science in Chemistry from the American University in Cairo (1998). I worked in Energy Division in the Energy Efficiency Section as Public Utilities Regulatory Analyst from 2007 to 2012. I worked as an associate in energy consulting at Cadmus from 2012 to 2014. I joined ORA in 2014 to present.

Q.4 What is the scope of your responsibility in this proceeding?

A.4 I am responsible for Chapter 4: Greenhouse Gas Compliance Instrument Procurement And Costs.

Q.5 Does this complete your testimony at this time?

A.5 Yes, it does.

QUALIFICATIONS AND PREPARED TESTIMONY
OF
BRIAN LUI

Q.1 Please state your name and business address.

A.1 My name is Brian Lui. My business address is 505 Van Ness Ave, San Francisco, California, 94102.

Q.2 By whom are you employed and in what capacity?

A.2 I am employed by the California Public Utilities Commission as a Public Utilities Financial Examiner II in the Office of Ratepayer Advocates (ORA), Electricity Planning & Policy Branch.

Q.3 Please describe your educational and professional experience.

A.3 I received a Bachelors of Science Degree in Biochemistry from the University of California, Riverside. I also possess a Masters Degree in Accounting from Golden Gate University in San Francisco. I joined the Commission on January 7, 2014 in ORA's Electricity Planning and Policy Branch. In ORA, I am involved in the ERRA Forecast and ERRA Compliance proceedings. Immediately prior to joining the Commission, I worked for the California State Board of Equalization as a tax auditor. I have over 4 years of experience working as an auditor in the public sector.

Q.4 What is the scope of your responsibility in this proceeding?

A.4 I am co-sponsoring Chapter 6 of ORA's testimony on Compliance Review of the Energy Resource Recovery Account (ERRA) and Other Balancing Accounts as it relates to the ERRA proceeding in application (A.)16-06-002.

Q.5 Does this complete your testimony at this time?

A.5 Yes, it does.

QUALIFICATIONS AND PREPARED TESTIMONY
OF
MONICA WEAVER

Q.1 Please state your name and business address.

A.1 My name is Monica Weaver. My business address is 505 Van Ness Avenue, San Francisco, California 94102.

Q.2 By whom are you employed and in what capacity?

A.2 I am employed by the California Public Utilities Commission as an Auditor in the Office of Ratepayer Advocates, in the Energy Cost of Service and Natural Gas Branch.

Q.3 Please describe your educational and professional experience.

A.3 I have a Bachelor's of Science in Business Degree with an emphasis in Accounting from the University of Phoenix. I joined the Commission on February 8, 2016 in ORA's Energy Cost of Service and Natural Gas Branch. In ORA, I have worked on ERRA compliance proceedings. I have previously worked on PG&E's ERRA compliance, auditing and evaluating their balancing and memorandum accounts.

Q.4 What is the scope of your responsibility in this proceeding?

A.4 I am co-sponsoring Chapter 6, which addresses the ERRA Balancing Account along with the GHG Sub-Account, and the other balancing and memorandum accounts.

Q.5 Does this complete your testimony at this time?

A.5 Yes, it does.