BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

In the Matter of the Application of	)	Application No. 06-08-010
San Diego Gas & Electric Company	)	(Filed August 4, 2006)
(U-902) for a Certificate of Public	)	
Convenience and Necessity for the	)	
Sunrise Powerlink Transmission Project.	)	

INITIAL TESTIMONY OF THE

CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

PART V

Nancy Saracino
General Counsel
Judith B. Sanders
Counsel
California Independent System
Operator Corporation
151 Blue Ravine Road
Folsom, CA 95630
916-351-4400 - office
916-608-7296 – facsimile
jsanders@caiso.com

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I. INTRODUCTION

Q. Please state your names, titles and employer.

A. Our names are Armando J. Perez, Vice President of Planning and Infrastructure Development for the California Independent System Operator (CAISO), Robert Sparks, Lead Regional Transmission Engineer at the CAISO, and Ren Orans, Managing Partner of Energy and Environmental Economics, Inc. (E3). Our qualifications have been previously provided at Attachment A to our initial testimony, Part I, submitted on January 26, 2007.

Q. On whose behalf are you submitting this Part V of your testimony?

A. We are submitting this testimony on behalf of the CAISO.

Q. What is the purpose of this testimony?

A. The purpose of this Part V of the CAISO initial testimony is to present the results from the CAISO's analysis of the alternative scenarios requested by the Energy Division (ED) of the Commission and Aspen Consulting, pursuant to the Assigned Commissioner and Administrative Law Judge's November 1, 2006 Scoping Memo and Ruling.

Q. Please describe the CAISO's process to analyze the ED-requested scenarios.

A. The process is identical to the one stated in the CAISO's April 20, 2007 submission of Part III of its initial testimony.

Q. Has the CAISO's analysis of the ED-requested scenarios incorporated the assumption changes adopted by the CAISO in its June 15, 2007 Rebuttal Testimony?

A. Yes**.** These changes are:

- Use a new locational capacity requirement (LCR) table that reflects the 2007 CEC forecast of SDG&E's load growth, net of the MW effect of SDG&E's advanced metering infrastructure (AMI) and capacity contracts.[1]
- Use a floor value of $27/kW-yr for the local RMR capacity prices.[2]
- Use an 8.23% discount rate.[3]
- Include only 80.3% of RPS benefits to adjust for benefits that accrue to non-TAC customers.[4]
- Calculate the RA-qualified capacity that would be provided by RPS purchases,[5] assuming linear ramp up of RPS capacity, which is shown in Table 1.A below.

[1] CAISO Rebuttal Testimony, June 15, 2007, 31, Table 5.
[2] *Id*., 16.
[3] *Id*., 50.
[4] *Id*., 27.
[5] *Id.*, 17.

Table 1.A System RA Provided with RPS Purchases (MW)

Year	Base Case	Salton sea development (Sunrise)	System RA Increase (MW)
2010	-	0	-
2011	258	326	68
2012	516	652	136
2013	774	978	204
2014	1,032	1304	272
2015	1,290	1630	340

- Calculate the value of RA provided by local RMR, CT and RPS RA-qualified capacity. RA is priced at $27/kW-yr (2006 dollars) in 2010 and escalates to a price cap of $50/kW-yr (2010 dollars) when new resources must be added.[6]

Q. What additional changes are in the CAISO's analysis of the ED-requested scenarios since the CAISO June 15, 2007 Rebuttal Testimony?

A. They are as follows:

- The CAISO has revised the relationship between RMR surplus levels and RMR capacity prices. The prior analysis focused entirely on the SDG&E local area and varied prices when RMR capacity under contract was between (a) 680MW, which was the CAISO's estimated by amount of RMR required with Sunrise in service in 2010; and (b) 1440MW, which was the total amount of RMR estimated to be available in the area without postponement of South Bay retirement. If the RMR need was below 680MW, the price was set at the floor of $27/kW-yr (in $2006 dollars); and if it was above San Diego's existing RMR generation of 1440MW, the price was set at the ceiling of

[6] *Id.*, 19.

$50/kW-yr (in 2010 dollars). While the new relationship uses the same price floor[7] and ceiling, it uses a 900MW range of 540MW to 1440MW so that the 540MW starting point reflects the lower LCR deficiencies in the CAISO's June 15, 2007 rebuttal testimony LCR table for San Diego.[8]

- Since these scenarios include a separate analysis for the TE/VS line, the CAISO has also included the effect of the TE/VS line on the local capacity requirements (LCR) in the LA Basin area. For cases where LA Basin LCR is increased, the CAISO has modeled the LA Basin local RMR costs, new CT capacity, and new CT-related transmission capacity costs. As with the San Diego area, the CAISO has assumed that (a) RMR prices increase as RMR surpluses decrease; (b) the minimum and maximum RMR prices in the LA are $27/kW-year (in 2006 dollars) and $50/kW-year (in 2010 dollars), respectively; and (c) the applicable price level in a given year is determined by the amount of in-area RMR required in the LA area in that year. The increase in LA Basin LCR will provide associated system RA as well, which is valued at $27/kW-yr (in 2006 dollars).

Q. What do the ED study results convey?

[7] The CAISO rebuttal testimony discusses $27/kW-yr as a 2010 estimate. For the RMR calculations in this analysis we have used the $27/kW-yr estimate as a 2006 dollar year estimate and adjusted it for a 2010 dollar estimate.

[8] Based on the CAISO Rebuttal Testimony (31, Table 5), the 900 MW range is the difference between (a) the 1000 MW increase in San Diego's import capability due to Sunrise, and (b) the 100 MW [with Note that Table 5 shows a 116MW value. The table is in error and will be corrected in an errata] deficit in San Diego *sans* Sunrise.

A. As indicated in Part III of the CAISO's Initial Testimony (p.6), these results convey the cost and benefit estimates related to the costs of energy payments, RPS compliance and reliability compliance.

These estimates do not convey project cost information. Nor do they convey the CAISO's opinion in its June 15, 2007 rebuttal testimony (p.34) that potentially much higher RPS-compliance costs (than those in the CAISO's April 20 Errata to Part II of the initial testimony) could easily occur in the analysis period.

Q. How will the ED results be presented?

A. For easy comparison, the presentation format for the economic results for the ED-requested analysis is identical to the one in the CAISO's April 20, 2007 submission of Part III and its May 14, 2007 submission of Part IV of its initial testimony.

Q. What do the Aspen study results convey?

A. They convey the reliability effects of Aspen's proposed alternatives.

II. ED-REQUESTED RUNS

Q. Please list the Energy Division (ED) requested alternatives?

A. The list of ED requested alternatives were:

- ED1: CAISO Base Case + TE/VS (transmission without the pumped hydro storage facility ["LEAPS"]);
- ED2: CAISO base case + TE/VS + Green Path North;
- ED3: CAISO base case + TE/VS + Sunrise;
- ED4: CAISO base case + TE/VS + Sunrise + Green Path North;
- ED5: CAISO base case + Sunrise + TE/VS + LEAPS ;
- ED6: CAISO base case + Sunrise + TE/VS + LEAPS + Green Path North;
- ED7: CAISO's base case + Sunrise + South Bay;
- ED8: CAISO base case + Sunrise + South Bay + Green Path North; and
- ED9: CAISO base case + Sunrise + Green Path North.

The remainder of this section will describe each run and the results thus obtained.

Q. Please summarize the LCR changes in San Diego and LA, as noted on page 4 of this testimony.

A. The LCR changes are summarized in Table 1.B below.

Table 1.B. LCR changes by ED-requested scenario

Case ID	Description	Reduction in SD LCR (MW)	Increase in LA Basin LCR (MW)	Note
ED1	LEAPS transmission component only	500	500	
ED2	LEAPS transmission component only plus Green Path North	500	500	
ED3	Sunrise Powerlink with TE/VS transmission component only	1500	500	
ED4	Sunrise Powerlink with TE/VS transmission component only Plus Green Path North	1500	500	
ED5	Sunrise Powerlink with TE/VS plus LEAPS	1500	500	Leaps generation can be used to meet increase in LA Basin LCR
ED6	Sunrise Powerlink with TE/VS plus LEAPS plus Green path North	1500	500	Leaps generation can be used to meet increase in LA Basin LCR
ED7	Sunrise Powerlink with South Bay Repower	1000	0	South Bay increases SD generation that can meet LCR by 620 MW
ED8	Sunrise Powerlink with South Bay Repower plus Green Path North	1000	0	South Bay increases SD generation that can meet LCR by 620 MW
ED9	Sunrise Powerlink with Green Path North.	1000	0	

A. ED1: CAISO Base Case + TE/VS

Q. Please briefly describe Scenario ED1.

A. This scenario modifies the CAISO's base case resource plan[9] by including the Talega-Escondido/Valley-Serrano (TE/VS) project, but ***not*** the LEAPS pumped storage project. This alternative reduces the LCR in San Diego by 500MW, but increases the LCR in the LA Basin by 500MW.

Q. How has the CAISO estimated the costs related to the 500 MW increase in the LA LCR in this case?

A. The 500MW increase in the LA LCR has been included in the analysis through three effects: (1) an increase in LA RMR requirements that increases RMR prices in the LA Basin until all local non-IOU generation is utilized, (2) an increase in the quantity of local RMR that must be contracted, subject to the existing amount of non-IOU generation in the LA Basin, and (3) an increase in the need for CT-capacity in the LA Basin after all non-IOU generation is utilized.

Q. How has the CAISO estimated the benefits related to the 500 MW decrease in the San Diego LCR in this case?

A. The 500MW decrease in the San Diego LCR decreases the RMR prices and quantity of RMR needed in San Diego and decreases the need for CT-capacity as

[9] CAISO Second Errata, April 20, 2007, 4.

well. The net effect of the LA increase and San Diego decrease in costs is described below.

Q. Please summarize the results for Scenario ED1.

A. Based on Table 4, the results are set forth below:

- The total levelized benefit is $21M.
- The $10M of levelized energy benefit reflects the TE/VS project's reduction in the CAISO consumers' net energy payments.
- The $10M of levelized reliability benefit reflects the TE/VS project's net effect of benefits provided to San Diego and the LA Basin.
- Since this scenario has the same RPS cost as the CAISO's base case, its RPS benefit is zero.

Table's 2 and 3 show the benefits of TE/VS for 2015 and 2020, respectively. Figure 1 and Tables 5 and 6 show the annual streams of different reliability costs and benefits in both San Diego and LA.

Table 2: Energy Division 1, TE/VS transmission only- 2015

	Summary of 2015 Cost and Benefits	A Costs ($ millions per year, Base Case	B Costs ($ millions per year, ED1	C Net Benefits (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	13,893	13,879	14
2	Less CAISO congestion cost (reduces TAC)	(109)	(106)	(2)
3	Less URG Margin (reduces URG bal acct)	(4,188)	(4,184)	(4)
4	Less IOU excess loss payments	(713)	(713)	(0)
5	**Subtotal Energy Cost and Benefit**	8,883	8,875	**7**
6	RMR Capacity Payments	274	307	(33)
7	RMR Operating Payments	60	52	8
8	CT Capacity Costs	21	18	3
9	Transmission cost for new CTs	10	-	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(226)	(226)	-
12	**Subtotal Reliability Cost and Benefit**	139	151	**(12)**
13	**Total Energy and Reliability Benefits**			**(5)**
	RPS Procurement Cost			
14	Adjusted RPS Cost	3,313	3,313	-
15	**Total Benefits**			**(5)**

Table 3: Energy Division 1, TE/VS transmission only – 2020

	Summary of 2020 Costs and Benefits	A Costs ($ millions per year, Base Case	B Costs ($ millions per year, ED1	C Net Benefits (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,392	15,369	22
2	Less CAISO congestion cost (reduces TAC)	(454)	(450)	(4)
3	Less URG Margin (reduces URG bal acct)	(4,109)	(4,102)	(7)
4	Less IOU excess loss payments	(816)	(815)	(0)
5	**Subtotal Energy Cost and Benefit**	10,013	10,002	**11**
6	RMR Capacity Payments	364	364	-
7	RMR Operating Payments	60	60	-
8	CT Capacity Costs	218	218	-
9	Transmission cost for new CTs	77	77	-
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(334)	(334)	-
12	**Subtotal Reliability Cost and Benefit**	385	385	**-**
13	**Total Energy and Reliability Benefits**			**11**
	RPS Procurement Cost			
14	Adjusted RPS Cost	5,366	5,366	-
15	**Total Benefits**			**11**

Table 4: Energy Division 1, TE/VS transmission only – Levelized

		A	B	C
	Summary of Levelized Costs and Benefits	**Costs** ($ millions per year, nominal)		**Net Benefits** (Base case cost - Alt. case cost)
		Base Case	ED1	
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,771	15,751	20
2	Less CAISO congestion cost (reduces TAC)	(325)	(321)	(4)
3	Less URG Margin (reduces URG bal acct)	(4,433)	(4,427)	(6)
4	Less IOU excess loss payments	(825)	(825)	(0)
5	**Subtotal Energy Cost and Benefit**	10,187	10,177	**10**
6	RMR Capacity Payments - Levelized	323	327	(4)
7	RMR Operating Payments - Levelized	60	55	5
8	CT Capacity Costs - Levelized	396	390	7
9	Transmission cost for new CTs-Levelized	139	137	2
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(375)	(375)	-
12	**Subtotal Reliability Cost and Benefit**	544	534	**10**
13	**Total Energy and Reliability Benefits**			**21**
	RPS Procurement Cost			
14	Adjusted RPS Cost	4,265	4,265	**-**
15	**Total Benefits**			**21**

Figure 1: Energy Division 1, TE/VS transmission only [ED-1] – Reliability benefits (2010 dollars)

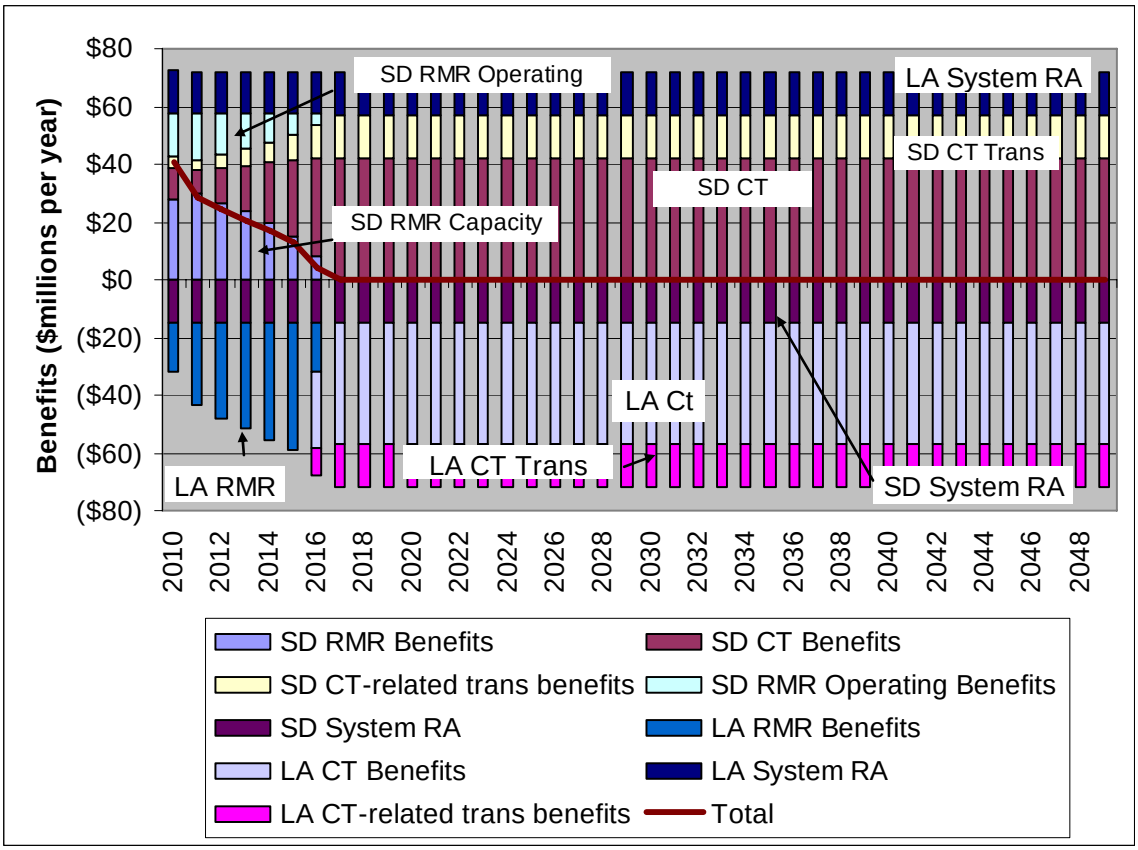

Table 5: Energy Division 1, TE/VS transmission only – Reliability benefits table – San Diego

	Base Case - San Diego Only (Nominal Dollars)								ED1 - San Diego Only							
Year	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)
2010	1,440	133	1,073	50.02	$ 72.0	$ 15.2	$ 60.0	$ (46.0)	1,073	-	1,073	41.54	$ 44.6	-	$ 44.7	$ (31.4)
2011	1,440	100	1,298	51.02	$ 73.5	$ 11.7	$ 60.0	$ (53.6)	1,040	-	1,298	41.60	$ 43.3	-	$ 43.4	$ (38.7)
2012	1,440	146	1,602	52.04	$ 74.9	$ 17.3	$ 60.0	$ (63.9)	1,086	-	1,602	43.52	$ 47.2	-	$ 45.2	$ (48.7)
2013	1,440	187	1,901	53.08	$ 76.4	$ 22.6	$ 60.0	$ (74.5)	1,127	-	1,901	45.40	$ 51.2	-	$ 47.0	$ (59.0)
2014	1,440	244	2,216	54.14	$ 78.0	$ 30.2	$ 60.0	$ (85.9)	1,184	-	2,216	47.74	$ 56.5	-	$ 49.3	$ (70.1)
2015	1,440	313	2,543	55.23	$ 79.5	$ 39.4	$ 60.0	$ (98.2)	1,253	-	2,543	50.45	$ 63.2	-	$ 52.2	$ (82.1)
2016	1,440	403	2,633	56.33	$ 81.1	$ 51.8	$ 60.0	$ (103.1)	1,343	-	2,633	53.81	$ 72.3	-	$ 56.0	$ (86.7)
2017	1,440	495	2,725	57.46	$ 82.7	$ 64.9	$ 60.0	$ (108.3)	1,435	-	2,725	57.32	$ 82.2	-	$ 59.8	$ (91.5)
2018	1,440	588	2,818	58.61	$ 84.4	$ 78.6	$ 60.0	$ (113.6)	1,440	88	2,818	58.61	$ 84.4	11.8	$ 60.0	$ (96.5)
2019	1,440	683	2,913	59.78	$ 86.1	$ 93.1	$ 60.0	$ (119.2)	1,440	183	2,913	59.78	$ 86.1	25.0	$ 60.0	$ (101.7)
2020	1,440	779	3,009	60.97	$ 87.8	$ 108.4	$ 60.0	$ (125.0)	1,440	279	3,009	60.97	$ 87.8	38.9	$ 60.0	$ (107.2)
2021	1,440	872	3,102	62.19	$ 89.6	$ 123.7	$ 60.0	$ (130.9)	1,440	372	3,102	62.19	$ 89.6	52.8	$ 60.0	$ (112.7)
2022	1,440	966	3,196	63.44	$ 91.3	$ 139.8	$ 60.0	$ (137.0)	1,440	466	3,196	63.44	$ 91.3	67.4	$ 60.0	$ (118.5)
2023	1,440	1,060	3,290	64.71	$ 93.2	$ 156.5	$ 60.0	$ (143.3)	1,440	560	3,290	64.71	$ 93.2	82.7	$ 60.0	$ (124.4)
2024	1,440	1,154	3,384	66.00	$ 95.0	$ 173.8	$ 60.0	$ (149.8)	1,440	654	3,384	66.00	$ 95.0	98.5	$ 60.0	$ (130.5)
2025	1,440	1,248	3,478	67.32	$ 96.9	$ 191.7	$ 60.0	$ (156.5)	1,440	748	3,478	67.32	$ 96.9	114.9	$ 60.0	$ (136.8)
2026	1,440	1,342	3,572	68.67	$ 98.9	$ 210.3	$ 60.0	$ (163.4)	1,440	842	3,572	68.67	$ 98.9	132.0	$ 60.0	$ (143.3)
2027	1,440	1,436	3,666	70.04	$ 100.9	$ 229.5	$ 60.0	$ (170.5)	1,440	936	3,666	70.04	$ 100.9	149.6	$ 60.0	$ (150.0)
2028	1,440	1,531	3,761	71.44	$ 102.9	$ 249.4	$ 60.0	$ (177.8)	1,440	1,031	3,761	71.44	$ 102.9	168.0	$ 60.0	$ (157.0)
2029	1,440	1,625	3,855	72.87	$ 104.9	$ 270.1	$ 60.0	$ (185.4)	1,440	1,125	3,855	72.87	$ 104.9	187.0	$ 60.0	$ (164.1)
2030	1,440	1,719	3,949	74.33	$ 107.0	$ 291.4	$ 60.0	$ (193.2)	1,440	1,219	3,949	74.33	$ 107.0	206.6	$ 60.0	$ (171.5)
2031	1,440	1,813	4,043	75.81	$ 109.2	$ 313.5	$ 60.0	$ (201.2)	1,440	1,313	4,043	75.81	$ 109.2	227.1	$ 60.0	$ (179.1)
2032	1,440	1,907	4,137	77.33	$ 111.4	$ 336.4	$ 60.0	$ (209.5)	1,440	1,407	4,137	77.33	$ 111.4	248.2	$ 60.0	$ (186.9)
2033	1,440	2,001	4,231	78.88	$ 113.6	$ 360.1	$ 60.0	$ (218.0)	1,440	1,501	4,231	78.88	$ 113.6	270.1	$ 60.0	$ (195.0)
2034	1,440	2,095	4,325	80.45	$ 115.9	$ 384.5	$ 60.0	$ (226.8)	1,440	1,595	4,325	80.45	$ 115.9	292.8	$ 60.0	$ (203.3)
2035	1,440	2,189	4,419	82.06	$ 118.2	$ 409.8	$ 60.0	$ (235.9)	1,440	1,689	4,419	82.06	$ 118.2	316.2	$ 60.0	$ (211.9)
2036	1,440	2,283	4,513	83.70	$ 120.5	$ 436.0	$ 60.0	$ (245.2)	1,440	1,783	4,513	83.70	$ 120.5	340.5	$ 60.0	$ (220.7)
2037	1,440	2,377	4,607	85.38	$ 122.9	$ 463.0	$ 60.0	$ (254.8)	1,440	1,877	4,607	85.38	$ 122.9	365.6	$ 60.0	$ (229.8)
2038	1,440	2,471	4,701	87.08	$ 125.4	$ 491.0	$ 60.0	$ (264.7)	1,440	1,971	4,701	87.08	$ 125.4	391.7	$ 60.0	$ (239.2)
2039	1,440	2,565	4,795	88.83	$ 127.9	$ 519.9	$ 60.0	$ (274.8)	1,440	2,065	4,795	88.83	$ 127.9	418.6	$ 60.0	$ (248.9)
2040	1,440	2,660	4,890	90.60	$ 130.5	$ 549.7	$ 60.0	$ (285.3)	1,440	2,160	4,890	90.60	$ 130.5	446.4	$ 60.0	$ (258.8)
2041	1,440	2,754	4,984	92.41	$ 133.1	$ 580.5	$ 60.0	$ (296.1)	1,440	2,254	4,984	92.41	$ 133.1	475.1	$ 60.0	$ (269.1)
2042	1,440	2,848	5,078	94.26	$ 135.7	$ 612.4	$ 60.0	$ (307.2)	1,440	2,348	5,078	94.26	$ 135.7	504.9	$ 60.0	$ (279.7)
2043	1,440	2,942	5,172	96.15	$ 138.5	$ 645.3	$ 60.0	$ (318.6)	1,440	2,442	5,172	96.15	$ 138.5	535.6	$ 60.0	$ (290.5)
2044	1,440	3,036	5,266	98.07	$ 141.2	$ 679.2	$ 60.0	$ (330.4)	1,440	2,536	5,266	98.07	$ 141.2	567.4	$ 60.0	$ (301.7)
2045	1,440	3,130	5,360	100.03	$ 144.0	$ 714.3	$ 60.0	$ (342.5)	1,440	2,630	5,360	100.03	$ 144.0	600.2	$ 60.0	$ (313.3)
2046	1,440	3,224	5,454	102.03	$ 146.9	$ 750.5	$ 60.0	$ (355.0)	1,440	2,724	5,454	102.03	$ 146.9	634.1	$ 60.0	$ (325.2)
2047	1,440	3,318	5,548	104.07	$ 149.9	$ 787.8	$ 60.0	$ (367.8)	1,440	2,818	5,548	104.07	$ 149.9	669.1	$ 60.0	$ (337.4)
2048	1,440	3,412	5,642	106.16	$ 152.9	$ 826.4	$ 60.0	$ (381.0)	1,440	2,912	5,642	106.16	$ 152.9	705.3	$ 60.0	$ (350.0)
2049	1,440	3,506	5,736	108.28	$ 155.9	$ 866.1	$ 60.0	$ (394.5)	1,440	3,006	5,736	108.28	$ 155.9	742.6	$ 60.0	$ (362.9)
Levelized Cost ($ million per year)					$ 90.1	$ 147.1	$ 60.0	$ (129.1)					$ 79.6	91.5	$ 54.5	$ (110.9)
Levelized Benefit (Base Case Cost - Alternative Cost)													$ 10.4	$ 55.7	$ 5.5	$ (18.3)

Table 6: Energy Division 1, TE/VS transmission only – Reliability benefits table – LA Basin

	LA Reference Case								LA Alternative case								Benefits			
Year	Ref Case non-IOU RMR Requirement	Ref Case RMR (MW)	CT Capacity (MW)	Ref Case % of type 2 Cost	Ref Case RMR Cost ($/kW-yr)	Ref Case RMR Cost ($M)	Ref Case CT Cost ($M)	System RA Value ($M)	Alt Case non-IOU RMR Requirement	Alt Case RMR (MW)	CT Capacity (MW)	Alt Case % of type 2 Cost	Alt Case RMR Cost ($/kW-yr)	Alt Case RMR Cost ($M	Alt Case CT Cost ($M)	System RA Value ($M)	LA RMR Capacity ($M)	LA CT Capacity ($M)	LA Ct-Trans ($M)	LA System RA ($M)
2010	2,069	2,069	-	58%	$ 29.2	$ 60.5	$ -	($60)	2,569	2,569	-	61%	$ 30.3	$ 77.9	$ -	($75)	$ (17.4)	$ -	$ -	$ 14.6
2011	2,449	2,449	-	58%	$ 29.8	$ 73.0	$ -	($73)	2,949	2,949	-	68%	$ 34.8	$ 102.7	$ -	($88)	$ (29.7)	$ -	$ -	$ 14.9
2012	2,829	2,829	-	66%	$ 34.3	$ 96.9	$ -	($86)	3,329	3,329	-	76%	$ 39.5	$ 131.4	$ -	($101)	$ (34.5)	$ -	$ -	$ 15.2
2013	3,209	3,209	-	73%	$ 39.0	$ 125.1	$ -	($100)	3,709	3,709	-	84%	$ 44.3	$ 164.4	$ -	($115)	$ (39.3)	$ -	$ -	$ 15.5
2014	3,589	3,589	-	81%	$ 43.9	$ 157.6	$ -	($114)	4,089	4,089	-	91%	$ 49.3	$ 201.8	$ -	($129)	$ (44.2)	$ -	$ -	$ 15.8
2015	3,969	3,969	-	89%	$ 49.0	$ 194.5	$ -	($128)	4,469	4,469	-	99%	$ 54.5	$ 243.8	$ -	($144)	$ (49.3)	$ -	$ -	$ 16.1
2016	4,349	4,349	-	96%	$ 54.3	$ 236.1	$ -	($143)	4,849	4,530	319	100%	$ 56.3	$ 255.2	$ 30	($160)	$ (19.1)	$ (30.3)	$ (10.7)	$ 16.5
2017	4,729	4,530	199	100%	$ 57.5	$ 260.3	$ 19	($159)	5,229	4,530	699	100%	$ 57.5	$ 260.3	$ 68	($176)	$ -	$ (48.5)	$ (17.0)	$ 16.8
2018	5,109	4,530	579	100%	$ 58.6	$ 265.5	$ 57	($175)	5,609	4,530	1,079	100%	$ 58.6	$ 265.5	$ 107	($192)	$ -	$ (49.5)	$ (17.4)	$ 17.1
2019	5,489	4,530	959	100%	$ 59.8	$ 270.8	$ 97	($192)	5,989	4,530	1,459	100%	$ 59.8	$ 270.8	$ 147	($209)	$ -	$ (50.5)	$ (17.7)	$ 17.5
2020	5,869	4,530	1,339	100%	$ 61.0	$ 276.2	$ 138	($209)	6,369	4,530	1,839	100%	$ 61.0	$ 276.2	$ 189	($227)	$ -	$ (51.5)	$ (18.1)	$ 17.8
2021	6,249	4,530	1,719	100%	$ 62.2	$ 281.7	$ 180	($227)	6,749	4,530	2,219	100%	$ 62.2	$ 281.7	$ 233	($245)	$ -	$ (52.5)	$ (18.5)	$ 18.2
2022	6,629	4,530	2,099	100%	$ 63.4	$ 287.4	$ 225	($246)	7,129	4,530	2,599	100%	$ 63.4	$ 287.4	$ 278	($264)	$ -	$ (53.5)	$ (18.8)	$ 18.5
2023	7,009	4,530	2,479	100%	$ 64.7	$ 293.1	$ 271	($265)	7,509	4,530	2,979	100%	$ 64.7	$ 293.1	$ 325	($284)	$ -	$ (54.6)	$ (19.2)	$ 18.9
2024	7,389	4,530	2,859	100%	$ 66.0	$ 299.0	$ 319	($285)	7,889	4,530	3,359	100%	$ 66.0	$ 299.0	$ 374	($304)	$ -	$ (55.7)	$ (19.6)	$ 19.3
2025	7,769	4,530	3,239	100%	$ 67.3	$ 305.0	$ 368	($306)	8,269	4,530	3,739	100%	$ 67.3	$ 305.0	$ 425	($325)	$ -	$ (56.8)	$ (20.0)	$ 19.7
2026	8,149	4,530	3,619	100%	$ 68.7	$ 311.1	$ 419	($327)	8,649	4,530	4,119	100%	$ 68.7	$ 311.1	$ 477	($347)	$ -	$ (58.0)	$ (20.4)	$ 20.1
2027	8,529	4,530	3,999	100%	$ 70.0	$ 317.3	$ 473	($349)	9,029	4,530	4,499	100%	$ 70.0	$ 317.3	$ 532	($369)	$ -	$ (59.1)	$ (20.8)	$ 20.5
2028	8,909	4,530	4,379	100%	$ 71.4	$ 323.6	$ 528	($372)	9,409	4,530	4,879	100%	$ 71.4	$ 323.6	$ 588	($393)	$ -	$ (60.3)	$ (21.2)	$ 20.9
2029	9,289	4,530	4,759	100%	$ 72.9	$ 330.1	$ 585	($395)	9,789	4,530	5,259	100%	$ 72.9	$ 330.1	$ 647	($417)	$ -	$ (61.5)	$ (21.6)	$ 21.3
2030	9,669	4,530	5,139	100%	$ 74.3	$ 336.7	$ 645	($420)	10,169	4,530	5,639	100%	$ 74.3	$ 336.7	$ 707	($442)	$ -	$ (62.7)	$ (22.1)	$ 21.7
2031	10,049	4,530	5,519	100%	$ 75.8	$ 343.4	$ 706	($445)	10,549	4,530	6,019	100%	$ 75.8	$ 343.4	$ 770	($467)	$ -	$ (64.0)	$ (22.5)	$ 22.1
2032	10,429	4,530	5,899	100%	$ 77.3	$ 350.3	$ 770	($471)	10,929	4,530	6,399	100%	$ 77.3	$ 350.3	$ 835	($494)	$ -	$ (65.3)	$ (22.9)	$ 22.6
2033	10,809	4,530	6,279	100%	$ 78.9	$ 357.3	$ 836	($498)	11,309	4,530	6,779	100%	$ 78.9	$ 357.3	$ 903	($521)	$ -	$ (66.6)	$ (23.4)	$ 23.0
2034	11,189	4,530	6,659	100%	$ 80.5	$ 364.5	$ 904	($526)	11,689	4,530	7,159	100%	$ 80.5	$ 364.5	$ 972	($549)	$ -	$ (67.9)	$ (23.9)	$ 23.5
2035	11,569	4,530	7,039	100%	$ 82.1	$ 371.7	$ 975	($555)	12,069	4,530	7,539	100%	$ 82.1	$ 371.7	$ 1,044	($579)	$ -	$ (69.3)	$ (24.3)	$ 24.0
2036	11,949	4,530	7,419	100%	$ 83.7	$ 379.2	$ 1,048	($584)	12,449	4,530	7,919	100%	$ 83.7	$ 379.2	$ 1,119	($609)	$ -	$ (70.6)	$ (24.8)	$ 24.5
2037	12,329	4,530	7,799	100%	$ 85.4	$ 386.8	$ 1,124	($615)	12,829	4,530	8,299	100%	$ 85.4	$ 386.8	$ 1,196	($640)	$ -	$ (72.1)	$ (25.3)	$ 24.9
2038	12,709	4,530	8,179	100%	$ 87.1	$ 394.5	$ 1,202	($647)	13,209	4,530	8,679	100%	$ 87.1	$ 394.5	$ 1,276	($672)	$ -	$ (73.5)	$ (25.8)	$ 25.4
2039	13,089	4,530	8,559	100%	$ 88.8	$ 402.4	$ 1,283	($679)	13,589	4,530	9,059	100%	$ 88.8	$ 402.4	$ 1,358	($705)	$ -	$ (75.0)	$ (26.4)	$ 26.0
2040	13,469	4,530	8,939	100%	$ 90.6	$ 410.4	$ 1,367	($713)	13,969	4,530	9,439	100%	$ 90.6	$ 410.4	$ 1,444	($739)	$ -	$ (76.5)	$ (26.9)	$ 26.5
2041	13,849	4,530	9,319	100%	$ 92.4	$ 418.6	$ 1,454	($748)	14,349	4,530	9,819	100%	$ 92.4	$ 418.6	$ 1,532	($775)	$ -	$ (78.0)	$ (27.4)	$ 27.0
2042	14,229	4,530	9,699	100%	$ 94.3	$ 427.0	$ 1,543	($784)	14,729	4,530	10,199	100%	$ 94.3	$ 427.0	$ 1,623	($811)	$ -	$ (79.6)	$ (28.0)	$ 27.5
2043	14,609	4,530	10,079	100%	$ 96.1	$ 435.6	$ 1,636	($821)	15,109	4,530	10,579	100%	$ 96.1	$ 435.6	$ 1,717	($849)	$ -	$ (81.1)	$ (28.5)	$ 28.1
2044	14,989	4,530	10,459	100%	$ 98.1	$ 444.3	$ 1,731	($859)	15,489	4,530	10,959	100%	$ 98.1	$ 444.3	$ 1,814	($888)	$ -	$ (82.8)	$ (29.1)	$ 28.7
2045	15,369	4,530	10,839	100%	$ 100.0	$ 453.1	$ 1,830	($898)	15,869	4,530	11,339	100%	$ 100.0	$ 453.1	$ 1,915	($928)	$ -	$ (84.4)	$ (29.7)	$ 29.2
2046	15,749	4,530	11,219	100%	$ 102.0	$ 462.2	$ 1,932	($939)	16,249	4,530	11,719	100%	$ 102.0	$ 462.2	$ 2,018	($969)	$ -	$ (86.1)	$ (30.3)	$ 29.8
2047	16,129	4,530	11,599	100%	$ 104.1	$ 471.5	$ 2,038	($981)	16,629	4,530	12,099	100%	$ 104.1	$ 471.5	$ 2,125	($1,011)	$ -	$ (87.8)	$ (30.9)	$ 30.4
2048	16,509	4,530	11,979	100%	$ 106.2	$ 480.9	$ 2,146	($1,024)	17,009	4,530	12,479	100%	$ 106.2	$ 480.9	$ 2,236	($1,055)	$ -	$ (89.6)	$ (31.5)	$ 31.0
2049	16,889	4,530	12,359	100%	$ 108.3	$ 490.5	$ 2,259	($1,069)	17,389	4,530	12,859	100%	$ 108.3	$ 490.5	$ 2,350	($1,100)	$ -	$ (91.4)	$ (32.1)	$ 31.6
Levelized Value ($ million per year)						$232.95	$287.63	($246)						$247.44	$322.14	($264)	($14.49)	($34.51)	($12.13)	$18.27

B. ED2: CAISO base case + TE/VS + Green Path North

Q. Please briefly describe Scenario ED2.

A. This scenario modifies the CAISO base case by including both TE/VS and Green Path North.

Q. Please summarize the results for Scenario ED2.

A. Based on Table 9, the results are set forth below:

- The total levelized benefit is $76M.
- The $10M of levelized energy benefits reflect the two projects' joint effect on CAISO consumers' energy payment.
- The $21M of levelized reliability benefits reflect the two projects' effect on San Diego's LCR and the non-local RA costs. This includes $10M in system RA benefit from the increased amount of RA-qualified capacity provided by the Imperial Valley renewables development in ED2.
- Since the Green Path North project enables renewable energy development, similar to Sunrise, the scenario's levelized RPS benefit of $45M is the same as the one for the CAISO's Sunrise case.

Again, Tables 7 and 8 show the benefits of this case in 2015 and 2020, respectively. Figure 2 and Tables 10 and 11 show the assumed annual streams of reliability costs and benefits of this scenario.

Table 7: Energy Division 2, TE/VS transmission and Green Path North- 2015

		A	B	C
	Summary of 2015 Cost and Benefits	**Costs** ($ millions per year, Base Case	ED2	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	13,893	13,848	45
2	Less CAISO congestion cost (reduces TAC)	(109)	(85)	(24)
3	Less URG Margin (reduces URG bal acct)	(4,188)	(4,178)	(10)
4	Less IOU excess loss payments	(713)	(705)	(9)
5	**Subtotal Energy Cost and Benefit**	8,883	8,880	**2**
6	RMR Capacity Payments	274	307	(33)
7	RMR Operating Payments	60	52	8
8	CT Capacity Costs	21	18	3
9	Transmission cost for new CTs	10	-	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(226)	(237)	11
12	**Subtotal Reliability Cost and Benefit**	139	140	**(1)**
13	**Total Energy and Reliability Benefits**			**1**
	RPS Procurement Cost			
14	Adjusted RPS Cost	3,313	3,335	(22)
15	**Total Benefits**			**(21)**

Table 8: Energy Division 2, TE/VS transmission and Green Path North- 2020

		A	B	C
	Summary of 2020 Costs and Benefits	**Costs** ($ millions per year, Base Case	ED2	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,392	15,352	40
2	Less CAISO congestion cost (reduces TAC)	(454)	(443)	(10)
3	Less URG Margin (reduces URG bal acct)	(4,109)	(4,097)	(11)
4	Less IOU excess loss payments	(816)	(813)	(2)
5	**Subtotal Energy Cost and Benefit**	10,013	9,998	**15**
6	RMR Capacity Payments	364	364	-
7	RMR Operating Payments	60	60	-
8	CT Capacity Costs	218	218	-
9	Transmission cost for new CTs	77	77	-
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(334)	(346)	12
12	**Subtotal Reliability Cost and Benefit**	385	372	**12**
13	**Total Energy and Reliability Benefits**			**27**
	RPS Procurement Cost			
14	Adjusted RPS Cost	5,366	5,361	6
15	**Total Benefits**			**33**

Table 9: Energy Division 2, TE/VS transmission and Green Path North- Levelized

		A	B	C
	Summary of Levelized Costs and Benefits	**Costs** ($ millions per year, nominal)		**Net Benefits** (Base case cost - Alt. case cost)
		Base Case	ED2	
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,771	15,726	45
2	Less CAISO congestion cost (reduces TAC)	(325)	(308)	(18)
3	Less URG Margin (reduces URG bal acct)	(4,433)	(4,421)	(12)
4	Less IOU excess loss payments	(825)	(820)	(6)
5	**Subtotal Energy Cost and Benefit**	10,187	10,177	**10**
6	RMR Capacity Payments - Levelized	323	327	(4)
7	RMR Operating Payments - Levelized	60	55	5
8	CT Capacity Costs - Levelized	396	390	7
9	Transmission cost for new CTs-Levelized	139	137	2
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(375)	(385)	10
12	**Subtotal Reliability Cost and Benefit**	544	523	**21**
13	**Total Energy and Reliability Benefits**			**31**
	RPS Procurement Cost			
14	Adjusted RPS Cost	4,265	4,220	**45**
15	**Total Benefits**			**76**

Figure 2: Energy Division 2, TE/VS transmission and Green Path North– Reliability benefits (2010 dollars)

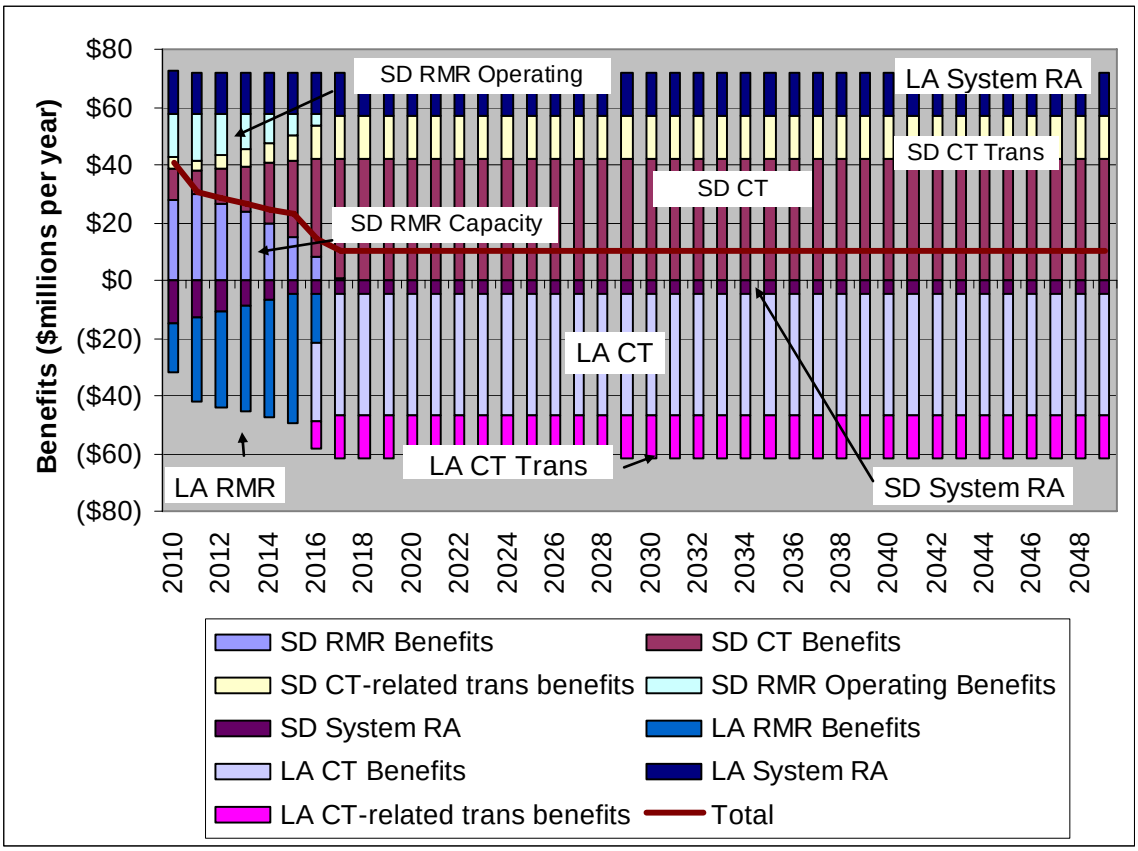

Table 10: Energy Division 2, TE/VS transmission and Green Path North – Reliability benefits table – San Diego

	Base Case - San Diego Only (Nominal Dollars)								ED2 - San Diego Only							
Year	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)
2010	1,440	133	1,073	50.02	$ 72.0	$ 15.2	$ 60.0	$ (46.0)	1,073	-	1,073	41.54	$ 44.6	-	$ 44.7	$ (31.4)
2011	1,440	100	1,366	51.02	$ 73.5	$ 11.7	$ 60.0	$ (53.6)	1,040	-	1,366	41.60	$ 43.3	-	$ 43.4	$ (40.7)
2012	1,440	146	1,738	52.04	$ 74.9	$ 17.3	$ 60.0	$ (63.9)	1,086	-	1,738	43.52	$ 47.2	-	$ 45.2	$ (52.8)
2013	1,440	187	2,105	53.08	$ 76.4	$ 22.6	$ 60.0	$ (74.5)	1,127	-	2,105	45.40	$ 51.2	-	$ 47.0	$ (65.3)
2014	1,440	244	2,488	54.14	$ 78.0	$ 30.2	$ 60.0	$ (85.9)	1,184	-	2,488	47.74	$ 56.5	-	$ 49.3	$ (78.7)
2015	1,440	313	2,883	55.23	$ 79.5	$ 39.4	$ 60.0	$ (98.2)	1,253	-	2,883	50.45	$ 63.2	-	$ 52.2	$ (93.0)
2016	1,440	403	2,973	56.33	$ 81.1	$ 51.8	$ 60.0	$ (103.1)	1,343	-	2,973	53.81	$ 72.3	-	$ 56.0	$ (97.9)
2017	1,440	495	3,065	57.46	$ 82.7	$ 64.9	$ 60.0	$ (108.3)	1,435	-	3,065	57.32	$ 82.2	-	$ 59.8	$ (102.9)
2018	1,440	588	3,158	58.61	$ 84.4	$ 78.6	$ 60.0	$ (113.6)	1,440	88	3,158	58.61	$ 84.4	11.8	$ 60.0	$ (108.1)
2019	1,440	683	3,253	59.78	$ 86.1	$ 93.1	$ 60.0	$ (119.2)	1,440	183	3,253	59.78	$ 86.1	25.0	$ 60.0	$ (113.6)
2020	1,440	779	3,349	60.97	$ 87.8	$ 108.4	$ 60.0	$ (125.0)	1,440	279	3,349	60.97	$ 87.8	38.9	$ 60.0	$ (119.3)
2021	1,440	872	3,442	62.19	$ 89.6	$ 123.7	$ 60.0	$ (130.9)	1,440	372	3,442	62.19	$ 89.6	52.8	$ 60.0	$ (125.1)
2022	1,440	966	3,536	63.44	$ 91.3	$ 139.8	$ 60.0	$ (137.0)	1,440	466	3,536	63.44	$ 91.3	67.4	$ 60.0	$ (131.1)
2023	1,440	1,060	3,630	64.71	$ 93.2	$ 156.5	$ 60.0	$ (143.3)	1,440	560	3,630	64.71	$ 93.2	82.7	$ 60.0	$ (137.2)
2024	1,440	1,154	3,724	66.00	$ 95.0	$ 173.8	$ 60.0	$ (149.8)	1,440	654	3,724	66.00	$ 95.0	98.5	$ 60.0	$ (143.6)
2025	1,440	1,248	3,818	67.32	$ 96.9	$ 191.7	$ 60.0	$ (156.5)	1,440	748	3,818	67.32	$ 96.9	114.9	$ 60.0	$ (150.2)
2026	1,440	1,342	3,912	68.67	$ 98.9	$ 210.3	$ 60.0	$ (163.4)	1,440	842	3,912	68.67	$ 98.9	132.0	$ 60.0	$ (157.0)
2027	1,440	1,436	4,006	70.04	$ 100.9	$ 229.5	$ 60.0	$ (170.5)	1,440	936	4,006	70.04	$ 100.9	149.6	$ 60.0	$ (164.0)
2028	1,440	1,531	4,101	71.44	$ 102.9	$ 249.4	$ 60.0	$ (177.8)	1,440	1,031	4,101	71.44	$ 102.9	168.0	$ 60.0	$ (171.2)
2029	1,440	1,625	4,195	72.87	$ 104.9	$ 270.1	$ 60.0	$ (185.4)	1,440	1,125	4,195	72.87	$ 104.9	187.0	$ 60.0	$ (178.6)
2030	1,440	1,719	4,289	74.33	$ 107.0	$ 291.4	$ 60.0	$ (193.2)	1,440	1,219	4,289	74.33	$ 107.0	206.6	$ 60.0	$ (186.2)
2031	1,440	1,813	4,383	75.81	$ 109.2	$ 313.5	$ 60.0	$ (201.2)	1,440	1,313	4,383	75.81	$ 109.2	227.1	$ 60.0	$ (194.1)
2032	1,440	1,907	4,477	77.33	$ 111.4	$ 336.4	$ 60.0	$ (209.5)	1,440	1,407	4,477	77.33	$ 111.4	248.2	$ 60.0	$ (202.3)
2033	1,440	2,001	4,571	78.88	$ 113.6	$ 360.1	$ 60.0	$ (218.0)	1,440	1,501	4,571	78.88	$ 113.6	270.1	$ 60.0	$ (210.7)
2034	1,440	2,095	4,665	80.45	$ 115.9	$ 384.5	$ 60.0	$ (226.8)	1,440	1,595	4,665	80.45	$ 115.9	292.8	$ 60.0	$ (219.3)
2035	1,440	2,189	4,759	82.06	$ 118.2	$ 409.8	$ 60.0	$ (235.9)	1,440	1,689	4,759	82.06	$ 118.2	316.2	$ 60.0	$ (228.2)
2036	1,440	2,283	4,853	83.70	$ 120.5	$ 436.0	$ 60.0	$ (245.2)	1,440	1,783	4,853	83.70	$ 120.5	340.5	$ 60.0	$ (237.4)
2037	1,440	2,377	4,947	85.38	$ 122.9	$ 463.0	$ 60.0	$ (254.8)	1,440	1,877	4,947	85.38	$ 122.9	365.6	$ 60.0	$ (246.8)
2038	1,440	2,471	5,041	87.08	$ 125.4	$ 491.0	$ 60.0	$ (264.7)	1,440	1,971	5,041	87.08	$ 125.4	391.7	$ 60.0	$ (256.5)
2039	1,440	2,565	5,135	88.83	$ 127.9	$ 519.9	$ 60.0	$ (274.8)	1,440	2,065	5,135	88.83	$ 127.9	418.6	$ 60.0	$ (266.5)
2040	1,440	2,660	5,230	90.60	$ 130.5	$ 549.7	$ 60.0	$ (285.3)	1,440	2,160	5,230	90.60	$ 130.5	446.4	$ 60.0	$ (276.8)
2041	1,440	2,754	5,324	92.41	$ 133.1	$ 580.5	$ 60.0	$ (296.1)	1,440	2,254	5,324	92.41	$ 133.1	475.1	$ 60.0	$ (287.5)
2042	1,440	2,848	5,418	94.26	$ 135.7	$ 612.4	$ 60.0	$ (307.2)	1,440	2,348	5,418	94.26	$ 135.7	504.9	$ 60.0	$ (298.4)
2043	1,440	2,942	5,512	96.15	$ 138.5	$ 645.3	$ 60.0	$ (318.6)	1,440	2,442	5,512	96.15	$ 138.5	535.6	$ 60.0	$ (309.6)
2044	1,440	3,036	5,606	98.07	$ 141.2	$ 679.2	$ 60.0	$ (330.4)	1,440	2,536	5,606	98.07	$ 141.2	567.4	$ 60.0	$ (321.2)
2045	1,440	3,130	5,700	100.03	$ 144.0	$ 714.3	$ 60.0	$ (342.5)	1,440	2,630	5,700	100.03	$ 144.0	600.2	$ 60.0	$ (333.2)
2046	1,440	3,224	5,794	102.03	$ 146.9	$ 750.5	$ 60.0	$ (355.0)	1,440	2,724	5,794	102.03	$ 146.9	634.1	$ 60.0	$ (345.4)
2047	1,440	3,318	5,888	104.07	$ 149.9	$ 787.8	$ 60.0	$ (367.8)	1,440	2,818	5,888	104.07	$ 149.9	669.1	$ 60.0	$ (358.1)
2048	1,440	3,412	5,982	106.16	$ 152.9	$ 826.4	$ 60.0	$ (381.0)	1,440	2,912	5,982	106.16	$ 152.9	705.3	$ 60.0	$ (371.1)
2049	1,440	3,506	6,076	108.28	$ 155.9	$ 866.1	$ 60.0	$ (394.5)	1,440	3,006	6,076	108.28	$ 155.9	742.6	$ 60.0	$ (384.4)
Levelized Cost ($ million per year)					$ 90.1	$ 147.1	$ 60.0	$ (129.1)					$ 79.6	91.5	$ 54.5	$ (121.1)
Levelized Benefit (Base Case Cost - Alternative Cost)													$ 10.4	$ 55.7	$ 5.5	$ (8.0)

Table 11: Energy Division 2, TE/VS transmission and Green Path North – Reliability benefits table – LA Basin

	LA Reference Case								LA Alternative case								Benefits			
Year	Ref Case non-IOU RMR Requirement	Ref Case RMR (MW)	CT Capacity (MW)	Ref Case % of type 2 Cost	Ref Case RMR Cost ($/kW-yr)	Ref Case RMR Cost ($M)	Ref Case CT Cost ($M)	System RA Value ($M)	Alt Case non-IOU RMR Requirement	Alt Case RMR (MW)	CT Capacity (MW)	Alt Case % of type 2 Cost	Alt Case RMR Cost ($/kW-yr)	Alt Case RMR Cost ($M	Alt Case CT Cost ($M)	System RA Value ($M)	LA RMR Capacity ($M)	LA CT Capacity ($M)	LA Ct-Trans ($M)	LA System RA ($M)
2010	2,069	2,069	-	58%	$ 29.2	$ 60.5	$ -	($60)	2,569	2,569	-	61%	$ 30.3	$ 77.9	$ -	($75)	$ (17.4)	$ -	$ -	$ 14.6
2011	2,449	2,449	-	58%	$ 29.8	$ 73.0	$ -	($73)	2,949	2,949	-	68%	$ 34.8	$ 102.7	$ -	($88)	$ (29.7)	$ -	$ -	$ 14.9
2012	2,829	2,829	-	66%	$ 34.3	$ 96.9	$ -	($86)	3,329	3,329	-	76%	$ 39.5	$ 131.4	$ -	($101)	$ (34.5)	$ -	$ -	$ 15.2
2013	3,209	3,209	-	73%	$ 39.0	$ 125.1	$ -	($100)	3,709	3,709	-	84%	$ 44.3	$ 164.4	$ -	($115)	$ (39.3)	$ -	$ -	$ 15.5
2014	3,589	3,589	-	81%	$ 43.9	$ 157.6	$ -	($114)	4,089	4,089	-	91%	$ 49.3	$ 201.8	$ -	($129)	$ (44.2)	$ -	$ -	$ 15.8
2015	3,969	3,969	-	89%	$ 49.0	$ 194.5	$ -	($128)	4,469	4,469	-	99%	$ 54.5	$ 243.8	$ -	($144)	$ (49.3)	$ -	$ -	$ 16.1
2016	4,349	4,349	-	96%	$ 54.3	$ 236.1	$ -	($143)	4,849	4,530	319	100%	$ 56.3	$ 255.2	$ 30	($160)	$ (19.1)	$ (30.3)	$ (10.7)	$ 16.5
2017	4,729	4,530	199	100%	$ 57.5	$ 260.3	$ 19	($159)	5,229	4,530	699	100%	$ 57.5	$ 260.3	$ 68	($176)	$ -	$ (48.5)	$ (17.0)	$ 16.8
2018	5,109	4,530	579	100%	$ 58.6	$ 265.5	$ 57	($175)	5,609	4,530	1,079	100%	$ 58.6	$ 265.5	$ 107	($192)	$ -	$ (49.5)	$ (17.4)	$ 17.1
2019	5,489	4,530	959	100%	$ 59.8	$ 270.8	$ 97	($192)	5,989	4,530	1,459	100%	$ 59.8	$ 270.8	$ 147	($209)	$ -	$ (50.5)	$ (17.7)	$ 17.5
2020	5,869	4,530	1,339	100%	$ 61.0	$ 276.2	$ 138	($209)	6,369	4,530	1,839	100%	$ 61.0	$ 276.2	$ 189	($227)	$ -	$ (51.5)	$ (18.1)	$ 17.8
2021	6,249	4,530	1,719	100%	$ 62.2	$ 281.7	$ 180	($227)	6,749	4,530	2,219	100%	$ 62.2	$ 281.7	$ 233	($245)	$ -	$ (52.5)	$ (18.5)	$ 18.2
2022	6,629	4,530	2,099	100%	$ 63.4	$ 287.4	$ 225	($246)	7,129	4,530	2,599	100%	$ 63.4	$ 287.4	$ 278	($264)	$ -	$ (53.5)	$ (18.8)	$ 18.5
2023	7,009	4,530	2,479	100%	$ 64.7	$ 293.1	$ 271	($265)	7,509	4,530	2,979	100%	$ 64.7	$ 293.1	$ 325	($284)	$ -	$ (54.6)	$ (19.2)	$ 18.9
2024	7,389	4,530	2,859	100%	$ 66.0	$ 299.0	$ 319	($285)	7,889	4,530	3,359	100%	$ 66.0	$ 299.0	$ 374	($304)	$ -	$ (55.7)	$ (19.6)	$ 19.3
2025	7,769	4,530	3,239	100%	$ 67.3	$ 305.0	$ 368	($306)	8,269	4,530	3,739	100%	$ 67.3	$ 305.0	$ 425	($325)	$ -	$ (56.8)	$ (20.0)	$ 19.7
2026	8,149	4,530	3,619	100%	$ 68.7	$ 311.1	$ 419	($327)	8,649	4,530	4,119	100%	$ 68.7	$ 311.1	$ 477	($347)	$ -	$ (58.0)	$ (20.4)	$ 20.1
2027	8,529	4,530	3,999	100%	$ 70.0	$ 317.3	$ 473	($349)	9,029	4,530	4,499	100%	$ 70.0	$ 317.3	$ 532	($369)	$ -	$ (59.1)	$ (20.8)	$ 20.5
2028	8,909	4,530	4,379	100%	$ 71.4	$ 323.6	$ 528	($372)	9,409	4,530	4,879	100%	$ 71.4	$ 323.6	$ 588	($393)	$ -	$ (60.3)	$ (21.2)	$ 20.9
2029	9,289	4,530	4,759	100%	$ 72.9	$ 330.1	$ 585	($395)	9,789	4,530	5,259	100%	$ 72.9	$ 330.1	$ 647	($417)	$ -	$ (61.5)	$ (21.6)	$ 21.3
2030	9,669	4,530	5,139	100%	$ 74.3	$ 336.7	$ 645	($420)	10,169	4,530	5,639	100%	$ 74.3	$ 336.7	$ 707	($442)	$ -	$ (62.7)	$ (22.1)	$ 21.7
2031	10,049	4,530	5,519	100%	$ 75.8	$ 343.4	$ 706	($445)	10,549	4,530	6,019	100%	$ 75.8	$ 343.4	$ 770	($467)	$ -	$ (64.0)	$ (22.5)	$ 22.1
2032	10,429	4,530	5,899	100%	$ 77.3	$ 350.3	$ 770	($471)	10,929	4,530	6,399	100%	$ 77.3	$ 350.3	$ 835	($494)	$ -	$ (65.3)	$ (22.9)	$ 22.6
2033	10,809	4,530	6,279	100%	$ 78.9	$ 357.3	$ 836	($498)	11,309	4,530	6,779	100%	$ 78.9	$ 357.3	$ 903	($521)	$ -	$ (66.6)	$ (23.4)	$ 23.0
2034	11,189	4,530	6,659	100%	$ 80.5	$ 364.5	$ 904	($526)	11,689	4,530	7,159	100%	$ 80.5	$ 364.5	$ 972	($549)	$ -	$ (67.9)	$ (23.9)	$ 23.5
2035	11,569	4,530	7,039	100%	$ 82.1	$ 371.7	$ 975	($555)	12,069	4,530	7,539	100%	$ 82.1	$ 371.7	$ 1,044	($579)	$ -	$ (69.3)	$ (24.3)	$ 24.0
2036	11,949	4,530	7,419	100%	$ 83.7	$ 379.2	$ 1,048	($584)	12,449	4,530	7,919	100%	$ 83.7	$ 379.2	$ 1,119	($609)	$ -	$ (70.6)	$ (24.8)	$ 24.5
2037	12,329	4,530	7,799	100%	$ 85.4	$ 386.8	$ 1,124	($615)	12,829	4,530	8,299	100%	$ 85.4	$ 386.8	$ 1,196	($640)	$ -	$ (72.1)	$ (25.3)	$ 24.9
2038	12,709	4,530	8,179	100%	$ 87.1	$ 394.5	$ 1,202	($647)	13,209	4,530	8,679	100%	$ 87.1	$ 394.5	$ 1,276	($672)	$ -	$ (73.5)	$ (25.8)	$ 25.4
2039	13,089	4,530	8,559	100%	$ 88.8	$ 402.4	$ 1,283	($679)	13,589	4,530	9,059	100%	$ 88.8	$ 402.4	$ 1,358	($705)	$ -	$ (75.0)	$ (26.4)	$ 26.0
2040	13,469	4,530	8,939	100%	$ 90.6	$ 410.4	$ 1,367	($713)	13,969	4,530	9,439	100%	$ 90.6	$ 410.4	$ 1,444	($739)	$ -	$ (76.5)	$ (26.9)	$ 26.5
2041	13,849	4,530	9,319	100%	$ 92.4	$ 418.6	$ 1,454	($748)	14,349	4,530	9,819	100%	$ 92.4	$ 418.6	$ 1,532	($775)	$ -	$ (78.0)	$ (27.4)	$ 27.0
2042	14,229	4,530	9,699	100%	$ 94.3	$ 427.0	$ 1,543	($784)	14,729	4,530	10,199	100%	$ 94.3	$ 427.0	$ 1,623	($811)	$ -	$ (79.6)	$ (28.0)	$ 27.5
2043	14,609	4,530	10,079	100%	$ 96.1	$ 435.6	$ 1,636	($821)	15,109	4,530	10,579	100%	$ 96.1	$ 435.6	$ 1,717	($849)	$ -	$ (81.1)	$ (28.5)	$ 28.1
2044	14,989	4,530	10,459	100%	$ 98.1	$ 444.3	$ 1,731	($859)	15,489	4,530	10,959	100%	$ 98.1	$ 444.3	$ 1,814	($888)	$ -	$ (82.8)	$ (29.1)	$ 28.7
2045	15,369	4,530	10,839	100%	$ 100.0	$ 453.1	$ 1,830	($898)	15,869	4,530	11,339	100%	$ 100.0	$ 453.1	$ 1,915	($928)	$ -	$ (84.4)	$ (29.7)	$ 29.2
2046	15,749	4,530	11,219	100%	$ 102.0	$ 462.2	$ 1,932	($939)	16,249	4,530	11,719	100%	$ 102.0	$ 462.2	$ 2,018	($969)	$ -	$ (86.1)	$ (30.3)	$ 29.8
2047	16,129	4,530	11,599	100%	$ 104.1	$ 471.5	$ 2,038	($981)	16,629	4,530	12,099	100%	$ 104.1	$ 471.5	$ 2,125	($1,011)	$ -	$ (87.8)	$ (30.9)	$ 30.4
2048	16,509	4,530	11,979	100%	$ 106.2	$ 480.9	$ 2,146	($1,024)	17,009	4,530	12,479	100%	$ 106.2	$ 480.9	$ 2,236	($1,055)	$ -	$ (89.6)	$ (31.5)	$ 31.0
2049	16,889	4,530	12,359	100%	$ 108.3	$ 490.5	$ 2,259	($1,069)	17,389	4,530	12,859	100%	$ 108.3	$ 490.5	$ 2,350	($1,100)	$ -	$ (91.4)	$ (32.1)	$ 31.6
Levelized Value ($ million per year)						$232.95	$287.63	($246)						$247.44	$322.14	($264)	($14.49)	($34.51)	($12.13)	$18.27

C. ED3: CAISO base case + TE/VS + Sunrise

Q. Please briefly describe Scenario ED3.

A. This scenario modifies the CAISO base case plan by adding TE/VS and Sunrise. This combination of resources reduces the San Diego LCR by 1500MW (TE/VS + Sunrise), and increases the LA Basin LCR by 500MW (TE/VS).

Q. Please summarize the results for Scenario ED3.

A. Based on Table 14, the results are set forth below:

- The total levelized benefit is $188M.
- The $33M of levelized energy benefits reflects the two projects' joint effect on CAISO consumers' energy payment.
- The $110M of levelized reliability benefit reflects the benefits provided by both projects to the San Diego area and well as the costs imposed in the LA area and associated non-local RA costs.
- Since the scenario assumes that the Sunrise project is in place, the scenario's levelized RPS benefit of $45M is the same as the CAISO's Sunrise case.

Tables 12 and 13 show the benefits of this case in 2015 and 2020, respectively. Figure 3 and Tables 15 and 16 show the assumed annual streams of reliability costs and benefits of this scenario.

Table 12: Energy Division 3, Sunrise and TE/VS transmission – 2015

		A	B	C
	Summary of 2015 Cost and Benefits	**Costs** ($ millions per year, Base Case	ED3	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	13,893	13,780	112
2	Less CAISO congestion cost (reduces TAC)	(109)	(76)	(33)
3	Less URG Margin (reduces URG bal acct)	(4,188)	(4,152)	(37)
4	Less IOU excess loss payments	(713)	(699)	(14)
5	**Subtotal Energy Cost and Benefit**	8,883	8,854	**29**
6	RMR Capacity Payments	274	252	22
7	RMR Operating Payments	60	11	49
8	CT Capacity Costs	21	4	17
9	Transmission cost for new CTs	10	-	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(226)	(205)	(21)
12	**Subtotal Reliability Cost and Benefit**	139	61	**78**
13	**Total Energy and Reliability Benefits**			**107**
	RPS Procurement Cost			
14	Adjusted RPS Cost	3,313	3,335	(22)
15	**Total Benefits**			**85**

Table 13: Energy Division 3, Sunrise and TE/VS transmission – 2020

		A	B	C
	Summary of 2020 Costs and Benefits	**Costs** ($ millions per year, Base Case	ED3	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,392	15,303	89
2	Less CAISO congestion cost (reduces TAC)	(454)	(432)	(21)
3	Less URG Margin (reduces URG bal acct)	(4,109)	(4,082)	(26)
4	Less IOU excess loss payments	(816)	(808)	(8)
5	**Subtotal Energy Cost and Benefit**	10,013	9,981	**32**
6	RMR Capacity Payments	364	305	59
7	RMR Operating Payments	60	30	30
8	CT Capacity Costs	218	189	29
9	Transmission cost for new CTs	77	67	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(334)	(311)	(24)
12	**Subtotal Reliability Cost and Benefit**	385	281	**104**
13	**Total Energy and Reliability Benefits**			**136**
	RPS Procurement Cost			
14	Adjusted RPS Cost	5,366	5,361	6
15	**Total Benefits**			**142**

Table 14: Energy Division 3, Sunrise and TE/VS transmission only – Levelized

		A	B	C
	Summary of Levelized Costs and Benefits	**Costs** ($ millions per year, nominal)		**Net Benefits** (Base case cost - Alt. case cost)
		Base Case	ED3	
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,771	15,665	106
2	Less CAISO congestion cost (reduces TAC)	(325)	(297)	(28)
3	Less URG Margin (reduces URG bal acct)	(4,433)	(4,400)	(33)
4	Less IOU excess loss payments	(825)	(813)	(12)
5	**Subtotal Energy Cost and Benefit**	10,187	10,154	**33**
6	RMR Capacity Payments - Levelized	323	289	34
7	RMR Operating Payments - Levelized	60	27	33
8	CT Capacity Costs - Levelized	396	345	51
9	Transmission cost for new CTs-Levelized	139	121	18
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(375)	(349)	(26)
12	**Subtotal Reliability Cost and Benefit**	544	434	**110**
13	**Total Energy and Reliability Benefits**			**143**
	RPS Procurement Cost			
14	Adjusted RPS Cost	4,265	4,220	**45**
15	**Total Benefits**			**188**

Figure 3: Energy Division 3, Sunrise and TE/VS transmission only – Reliability benefits (2010 dollars)

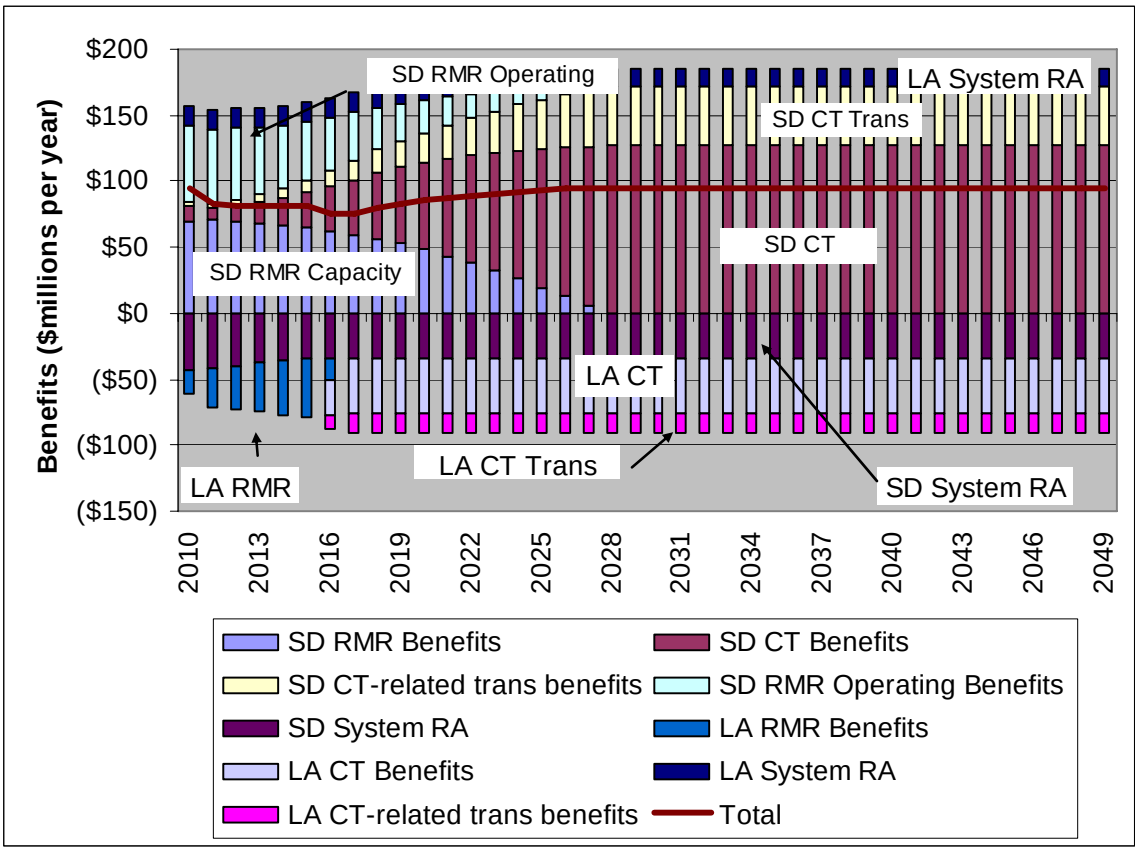

Table 15: Energy Division 3, Sunrise and TE/VS transmission – Reliability benefits table – San Diego

	Base Case - San Diego Only (Nominal Dollars)								ED3 - San Diego Only							
Year	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)
2010	1,440	133	73	50.02	$ 72.0	$ 15.2	$ 60.0	$ (46.0)	73	-	73	29.23	$ 2.1	-	$ 3.0	$ (2.1)
2011	1,440	100	366	51.02	$ 73.5	$ 11.7	$ 60.0	$ (53.6)	40	-	366	29.81	$ 1.2	-	$ 1.7	$ (10.9)
2012	1,440	146	738	52.04	$ 74.9	$ 17.3	$ 60.0	$ (63.9)	86	-	738	30.41	$ 2.6	-	$ 3.6	$ (22.4)
2013	1,440	187	1,105	53.08	$ 76.4	$ 22.6	$ 60.0	$ (74.5)	127	-	1,105	31.01	$ 3.9	-	$ 5.3	$ (34.3)
2014	1,440	244	1,488	54.14	$ 78.0	$ 30.2	$ 60.0	$ (85.9)	184	-	1,488	31.63	$ 5.8	-	$ 7.7	$ (47.1)
2015	1,440	313	1,883	55.23	$ 79.5	$ 39.4	$ 60.0	$ (98.2)	253	-	1,883	32.27	$ 8.2	-	$ 10.5	$ (60.8)
2016	1,440	403	1,973	56.33	$ 81.1	$ 51.8	$ 60.0	$ (103.1)	343	-	1,973	32.91	$ 11.3	-	$ 14.3	$ (64.9)
2017	1,440	495	2,065	57.46	$ 82.7	$ 64.9	$ 60.0	$ (108.3)	435	-	2,065	33.57	$ 14.6	-	$ 18.1	$ (69.3)
2018	1,440	588	2,158	58.61	$ 84.4	$ 78.6	$ 60.0	$ (113.6)	528	-	2,158	34.24	$ 18.1	-	$ 22.0	$ (73.9)
2019	1,440	683	2,253	59.78	$ 86.1	$ 93.1	$ 60.0	$ (119.2)	623	-	2,253	37.22	$ 23.2	-	$ 26.0	$ (78.7)
2020	1,440	779	2,349	60.97	$ 87.8	$ 108.4	$ 60.0	$ (125.0)	719	-	2,349	40.68	$ 29.3	-	$ 30.0	$ (83.7)
2021	1,440	872	2,442	62.19	$ 89.6	$ 123.7	$ 60.0	$ (130.9)	812	-	2,442	44.15	$ 35.8	-	$ 33.8	$ (88.7)
2022	1,440	966	2,536	63.44	$ 91.3	$ 139.8	$ 60.0	$ (137.0)	906	-	2,536	47.79	$ 43.3	-	$ 37.8	$ (94.0)
2023	1,440	1,060	2,630	64.71	$ 93.2	$ 156.5	$ 60.0	$ (143.3)	1,000	-	2,630	51.56	$ 51.6	-	$ 41.7	$ (99.4)
2024	1,440	1,154	2,724	66.00	$ 95.0	$ 173.8	$ 60.0	$ (149.8)	1,094	-	2,724	55.46	$ 60.7	-	$ 45.6	$ (105.1)
2025	1,440	1,248	2,818	67.32	$ 96.9	$ 191.7	$ 60.0	$ (156.5)	1,188	-	2,818	59.49	$ 70.7	-	$ 49.5	$ (110.9)
2026	1,440	1,342	2,912	68.67	$ 98.9	$ 210.3	$ 60.0	$ (163.4)	1,282	-	2,912	63.67	$ 81.6	-	$ 53.4	$ (116.8)
2027	1,440	1,436	3,006	70.04	$ 100.9	$ 229.5	$ 60.0	$ (170.5)	1,376	-	3,006	67.98	$ 93.6	-	$ 57.4	$ (123.0)
2028	1,440	1,531	3,101	71.44	$ 102.9	$ 249.4	$ 60.0	$ (177.8)	1,440	31	3,101	71.44	$ 102.9	5.0	$ 60.0	$ (129.4)
2029	1,440	1,625	3,195	72.87	$ 104.9	$ 270.1	$ 60.0	$ (185.4)	1,440	125	3,195	72.87	$ 104.9	20.7	$ 60.0	$ (136.0)
2030	1,440	1,719	3,289	74.33	$ 107.0	$ 291.4	$ 60.0	$ (193.2)	1,440	219	3,289	74.33	$ 107.0	37.1	$ 60.0	$ (142.8)
2031	1,440	1,813	3,383	75.81	$ 109.2	$ 313.5	$ 60.0	$ (201.2)	1,440	313	3,383	75.81	$ 109.2	54.1	$ 60.0	$ (149.8)
2032	1,440	1,907	3,477	77.33	$ 111.4	$ 336.4	$ 60.0	$ (209.5)	1,440	407	3,477	77.33	$ 111.4	71.8	$ 60.0	$ (157.1)
2033	1,440	2,001	3,571	78.88	$ 113.6	$ 360.1	$ 60.0	$ (218.0)	1,440	501	3,571	78.88	$ 113.6	90.1	$ 60.0	$ (164.6)
2034	1,440	2,095	3,665	80.45	$ 115.9	$ 384.5	$ 60.0	$ (226.8)	1,440	595	3,665	80.45	$ 115.9	109.2	$ 60.0	$ (172.3)
2035	1,440	2,189	3,759	82.06	$ 118.2	$ 409.8	$ 60.0	$ (235.9)	1,440	689	3,759	82.06	$ 118.2	129.0	$ 60.0	$ (180.2)
2036	1,440	2,283	3,853	83.70	$ 120.5	$ 436.0	$ 60.0	$ (245.2)	1,440	783	3,853	83.70	$ 120.5	149.6	$ 60.0	$ (188.4)
2037	1,440	2,377	3,947	85.38	$ 122.9	$ 463.0	$ 60.0	$ (254.8)	1,440	877	3,947	85.38	$ 122.9	170.9	$ 60.0	$ (196.9)
2038	1,440	2,471	4,041	87.08	$ 125.4	$ 491.0	$ 60.0	$ (264.7)	1,440	971	4,041	87.08	$ 125.4	193.0	$ 60.0	$ (205.6)
2039	1,440	2,565	4,135	88.83	$ 127.9	$ 519.9	$ 60.0	$ (274.8)	1,440	1,065	4,135	88.83	$ 127.9	215.9	$ 60.0	$ (214.6)
2040	1,440	2,660	4,230	90.60	$ 130.5	$ 549.7	$ 60.0	$ (285.3)	1,440	1,160	4,230	90.60	$ 130.5	239.7	$ 60.0	$ (223.9)
2041	1,440	2,754	4,324	92.41	$ 133.1	$ 580.5	$ 60.0	$ (296.1)	1,440	1,254	4,324	92.41	$ 133.1	264.3	$ 60.0	$ (233.5)
2042	1,440	2,848	4,418	94.26	$ 135.7	$ 612.4	$ 60.0	$ (307.2)	1,440	1,348	4,418	94.26	$ 135.7	289.8	$ 60.0	$ (243.3)
2043	1,440	2,942	4,512	96.15	$ 138.5	$ 645.3	$ 60.0	$ (318.6)	1,440	1,442	4,512	96.15	$ 138.5	316.3	$ 60.0	$ (253.5)
2044	1,440	3,036	4,606	98.07	$ 141.2	$ 679.2	$ 60.0	$ (330.4)	1,440	1,536	4,606	98.07	$ 141.2	343.6	$ 60.0	$ (263.9)
2045	1,440	3,130	4,700	100.03	$ 144.0	$ 714.3	$ 60.0	$ (342.5)	1,440	1,630	4,700	100.03	$ 144.0	372.0	$ 60.0	$ (274.7)
2046	1,440	3,224	4,794	102.03	$ 146.9	$ 750.5	$ 60.0	$ (355.0)	1,440	1,724	4,794	102.03	$ 146.9	401.3	$ 60.0	$ (285.8)
2047	1,440	3,318	4,888	104.07	$ 149.9	$ 787.8	$ 60.0	$ (367.8)	1,440	1,818	4,888	104.07	$ 149.9	431.7	$ 60.0	$ (297.2)
2048	1,440	3,412	4,982	106.16	$ 152.9	$ 826.4	$ 60.0	$ (381.0)	1,440	1,912	4,982	106.16	$ 152.9	463.1	$ 60.0	$ (309.0)
2049	1,440	3,506	5,076	108.28	$ 155.9	$ 866.1	$ 60.0	$ (394.5)	1,440	2,006	5,076	108.28	$ 155.9	495.6	$ 60.0	$ (321.2)
Levelized Cost ($ million per year)					$ 90.1	$ 147.1	$ 60.0	$ (129.1)					$ 41.4	31.6	$ 27.2	$ (84.6)
Levelized Benefit (Base Case Cost - Alternative Cost)													$ 48.7	$ 115.6	$ 32.8	$ (44.6)

Table 16: Energy Division 3, Sunrise and TE/VS transmission – Reliability benefits table – LA Basin

	LA Reference Case								LA Alternative case								Benefits			
Year	Ref Case non-IOU RMR Requirement	Ref Case RMR (MW)	CT Capacity (MW)	Ref Case % of type 2 Cost	Ref Case RMR Cost ($/kW-yr)	Ref Case RMR Cost ($M)	Ref Case CT Cost ($M)	System RA Value ($M)	Alt Case non-IOU RMR Requirement	Alt Case RMR (MW)	CT Capacity (MW)	Alt Case % of type 2 Cost	Alt Case RMR Cost ($/kW-yr)	Alt Case RMR Cost ($M	Alt Case CT Cost ($M)	System RA Value ($M)	LA RMR Capacity ($M)	LA CT Capacity ($M)	LA Ct-Trans ($M)	LA System RA ($M)
2010	2,069	2,069	-	58%	$ 29.2	$ 60.5	$ -	($60)	2,569	2,569	-	61%	$ 30.3	$ 77.9	$ -	($75)	$ (17.4)	$ -	$ -	$ 14.6
2011	2,449	2,449	-	58%	$ 29.8	$ 73.0	$ -	($73)	2,949	2,949	-	68%	$ 34.8	$ 102.7	$ -	($88)	$ (29.7)	$ -	$ -	$ 14.9
2012	2,829	2,829	-	66%	$ 34.3	$ 96.9	$ -	($86)	3,329	3,329	-	76%	$ 39.5	$ 131.4	$ -	($101)	$ (34.5)	$ -	$ -	$ 15.2
2013	3,209	3,209	-	73%	$ 39.0	$ 125.1	$ -	($100)	3,709	3,709	-	84%	$ 44.3	$ 164.4	$ -	($115)	$ (39.3)	$ -	$ -	$ 15.5
2014	3,589	3,589	-	81%	$ 43.9	$ 157.6	$ -	($114)	4,089	4,089	-	91%	$ 49.3	$ 201.8	$ -	($129)	$ (44.2)	$ -	$ -	$ 15.8
2015	3,969	3,969	-	89%	$ 49.0	$ 194.5	$ -	($128)	4,469	4,469	-	99%	$ 54.5	$ 243.8	$ -	($144)	$ (49.3)	$ -	$ -	$ 16.1
2016	4,349	4,349	-	96%	$ 54.3	$ 236.1	$ -	($143)	4,849	4,530	319	100%	$ 56.3	$ 255.2	$ 30	($160)	$ (19.1)	$ (30.3)	$ (10.7)	$ 16.5
2017	4,729	4,530	199	100%	$ 57.5	$ 260.3	$ 19	($159)	5,229	4,530	699	100%	$ 57.5	$ 260.3	$ 68	($176)	$ -	$ (48.5)	$ (17.0)	$ 16.8
2018	5,109	4,530	579	100%	$ 58.6	$ 265.5	$ 57	($175)	5,609	4,530	1,079	100%	$ 58.6	$ 265.5	$ 107	($192)	$ -	$ (49.5)	$ (17.4)	$ 17.1
2019	5,489	4,530	959	100%	$ 59.8	$ 270.8	$ 97	($192)	5,989	4,530	1,459	100%	$ 59.8	$ 270.8	$ 147	($209)	$ -	$ (50.5)	$ (17.7)	$ 17.5
2020	5,869	4,530	1,339	100%	$ 61.0	$ 276.2	$ 138	($209)	6,369	4,530	1,839	100%	$ 61.0	$ 276.2	$ 189	($227)	$ -	$ (51.5)	$ (18.1)	$ 17.8
2021	6,249	4,530	1,719	100%	$ 62.2	$ 281.7	$ 180	($227)	6,749	4,530	2,219	100%	$ 62.2	$ 281.7	$ 233	($245)	$ -	$ (52.5)	$ (18.5)	$ 18.2
2022	6,629	4,530	2,099	100%	$ 63.4	$ 287.4	$ 225	($246)	7,129	4,530	2,599	100%	$ 63.4	$ 287.4	$ 278	($264)	$ -	$ (53.5)	$ (18.8)	$ 18.5
2023	7,009	4,530	2,479	100%	$ 64.7	$ 293.1	$ 271	($265)	7,509	4,530	2,979	100%	$ 64.7	$ 293.1	$ 325	($284)	$ -	$ (54.6)	$ (19.2)	$ 18.9
2024	7,389	4,530	2,859	100%	$ 66.0	$ 299.0	$ 319	($285)	7,889	4,530	3,359	100%	$ 66.0	$ 299.0	$ 374	($304)	$ -	$ (55.7)	$ (19.6)	$ 19.3
2025	7,769	4,530	3,239	100%	$ 67.3	$ 305.0	$ 368	($306)	8,269	4,530	3,739	100%	$ 67.3	$ 305.0	$ 425	($325)	$ -	$ (56.8)	$ (20.0)	$ 19.7
2026	8,149	4,530	3,619	100%	$ 68.7	$ 311.1	$ 419	($327)	8,649	4,530	4,119	100%	$ 68.7	$ 311.1	$ 477	($347)	$ -	$ (58.0)	$ (20.4)	$ 20.1
2027	8,529	4,530	3,999	100%	$ 70.0	$ 317.3	$ 473	($349)	9,029	4,530	4,499	100%	$ 70.0	$ 317.3	$ 532	($369)	$ -	$ (59.1)	$ (20.8)	$ 20.5
2028	8,909	4,530	4,379	100%	$ 71.4	$ 323.6	$ 528	($372)	9,409	4,530	4,879	100%	$ 71.4	$ 323.6	$ 588	($393)	$ -	$ (60.3)	$ (21.2)	$ 20.9
2029	9,289	4,530	4,759	100%	$ 72.9	$ 330.1	$ 585	($395)	9,789	4,530	5,259	100%	$ 72.9	$ 330.1	$ 647	($417)	$ -	$ (61.5)	$ (21.6)	$ 21.3
2030	9,669	4,530	5,139	100%	$ 74.3	$ 336.7	$ 645	($420)	10,169	4,530	5,639	100%	$ 74.3	$ 336.7	$ 707	($442)	$ -	$ (62.7)	$ (22.1)	$ 21.7
2031	10,049	4,530	5,519	100%	$ 75.8	$ 343.4	$ 706	($445)	10,549	4,530	6,019	100%	$ 75.8	$ 343.4	$ 770	($467)	$ -	$ (64.0)	$ (22.5)	$ 22.1
2032	10,429	4,530	5,899	100%	$ 77.3	$ 350.3	$ 770	($471)	10,929	4,530	6,399	100%	$ 77.3	$ 350.3	$ 835	($494)	$ -	$ (65.3)	$ (22.9)	$ 22.6
2033	10,809	4,530	6,279	100%	$ 78.9	$ 357.3	$ 836	($498)	11,309	4,530	6,779	100%	$ 78.9	$ 357.3	$ 903	($521)	$ -	$ (66.6)	$ (23.4)	$ 23.0
2034	11,189	4,530	6,659	100%	$ 80.5	$ 364.5	$ 904	($526)	11,689	4,530	7,159	100%	$ 80.5	$ 364.5	$ 972	($549)	$ -	$ (67.9)	$ (23.9)	$ 23.5
2035	11,569	4,530	7,039	100%	$ 82.1	$ 371.7	$ 975	($555)	12,069	4,530	7,539	100%	$ 82.1	$ 371.7	$ 1,044	($579)	$ -	$ (69.3)	$ (24.3)	$ 24.0
2036	11,949	4,530	7,419	100%	$ 83.7	$ 379.2	$ 1,048	($584)	12,449	4,530	7,919	100%	$ 83.7	$ 379.2	$ 1,119	($609)	$ -	$ (70.6)	$ (24.8)	$ 24.5
2037	12,329	4,530	7,799	100%	$ 85.4	$ 386.8	$ 1,124	($615)	12,829	4,530	8,299	100%	$ 85.4	$ 386.8	$ 1,196	($640)	$ -	$ (72.1)	$ (25.3)	$ 24.9
2038	12,709	4,530	8,179	100%	$ 87.1	$ 394.5	$ 1,202	($647)	13,209	4,530	8,679	100%	$ 87.1	$ 394.5	$ 1,276	($672)	$ -	$ (73.5)	$ (25.8)	$ 25.4
2039	13,089	4,530	8,559	100%	$ 88.8	$ 402.4	$ 1,283	($679)	13,589	4,530	9,059	100%	$ 88.8	$ 402.4	$ 1,358	($705)	$ -	$ (75.0)	$ (26.4)	$ 26.0
2040	13,469	4,530	8,939	100%	$ 90.6	$ 410.4	$ 1,367	($713)	13,969	4,530	9,439	100%	$ 90.6	$ 410.4	$ 1,444	($739)	$ -	$ (76.5)	$ (26.9)	$ 26.5
2041	13,849	4,530	9,319	100%	$ 92.4	$ 418.6	$ 1,454	($748)	14,349	4,530	9,819	100%	$ 92.4	$ 418.6	$ 1,532	($775)	$ -	$ (78.0)	$ (27.4)	$ 27.0
2042	14,229	4,530	9,699	100%	$ 94.3	$ 427.0	$ 1,543	($784)	14,729	4,530	10,199	100%	$ 94.3	$ 427.0	$ 1,623	($811)	$ -	$ (79.6)	$ (28.0)	$ 27.5
2043	14,609	4,530	10,079	100%	$ 96.1	$ 435.6	$ 1,636	($821)	15,109	4,530	10,579	100%	$ 96.1	$ 435.6	$ 1,717	($849)	$ -	$ (81.1)	$ (28.5)	$ 28.1
2044	14,989	4,530	10,459	100%	$ 98.1	$ 444.3	$ 1,731	($859)	15,489	4,530	10,959	100%	$ 98.1	$ 444.3	$ 1,814	($888)	$ -	$ (82.8)	$ (29.1)	$ 28.7
2045	15,369	4,530	10,839	100%	$ 100.0	$ 453.1	$ 1,830	($898)	15,869	4,530	11,339	100%	$ 100.0	$ 453.1	$ 1,915	($928)	$ -	$ (84.4)	$ (29.7)	$ 29.2
2046	15,749	4,530	11,219	100%	$ 102.0	$ 462.2	$ 1,932	($939)	16,249	4,530	11,719	100%	$ 102.0	$ 462.2	$ 2,018	($969)	$ -	$ (86.1)	$ (30.3)	$ 29.8
2047	16,129	4,530	11,599	100%	$ 104.1	$ 471.5	$ 2,038	($981)	16,629	4,530	12,099	100%	$ 104.1	$ 471.5	$ 2,125	($1,011)	$ -	$ (87.8)	$ (30.9)	$ 30.4
2048	16,509	4,530	11,979	100%	$ 106.2	$ 480.9	$ 2,146	($1,024)	17,009	4,530	12,479	100%	$ 106.2	$ 480.9	$ 2,236	($1,055)	$ -	$ (89.6)	$ (31.5)	$ 31.0
2049	16,889	4,530	12,359	100%	$ 108.3	$ 490.5	$ 2,259	($1,069)	17,389	4,530	12,859	100%	$ 108.3	$ 490.5	$ 2,350	($1,100)	$ -	$ (91.4)	$ (32.1)	$ 31.6
Levelized Value ($ million per year)						$232.95	$287.63	($246)						$247.44	$322.14	($264)	($14.49)	($34.51)	($12.13)	$18.27

D. ED4: CAISO base case + TE/VS + Sunrise + Green Path North

Q. Please briefly describe Scenario ED4.

A. This scenario modifies the CAISO base case plan with the combination of TE/VS, Sunrise and Green Path North. This scenario reduces the San Diego LCR by 1500MW (Sunrise + TE/VS) and increases the LA Basin LCR by 500MW (TE/VS) and therefore will have the same estimated reliability benefits as ED3.

Q. Please summarize the results for Scenario ED4.

A. Based on Table 19, the results are set forth below:

- The total levelized benefit is $183M.
- The $29M of levelized energy benefits reflect the three projects' joint effect on CAISO consumers' energy payment.
- The $110M of levelized reliability benefit reflects the three projects' effect on San Diego and the LA Basin.
- Since the scenario assumes that the Sunrise project is in place, the scenario's levelized RPS benefit of $45M is the same as the CAISO's Sunrise case.

Tables 17 and 18 show the benefits of this case in 2015 and 2020, respectively. Figure 4 and Tables 20 and 21 show the assumed annual streams of reliability costs and benefits of this scenario.

Table 17: Energy Division 4, Sunrise, Green Path North plus TE/VS transmission – 2015

		A	B	C
	Summary of 2015 Cost and Benefits	**Costs** ($ millions per year, Base Case	ED4	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	13,893	13,778	115
2	Less CAISO congestion cost (reduces TAC)	(109)	(73)	(36)
3	Less URG Margin (reduces URG bal acct)	(4,188)	(4,152)	(36)
4	Less IOU excess loss payments	(713)	(697)	(16)
5	**Subtotal Energy Cost and Benefit**	8,883	8,856	**27**
6	RMR Capacity Payments	274	252	22
7	RMR Operating Payments	60	11	49
8	CT Capacity Costs	21	4	17
9	Transmission cost for new CTs	10	-	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(226)	(205)	(21)
12	**Subtotal Reliability Cost and Benefit**	139	61	**78**
13	**Total Energy and Reliability Benefits**			**105**
	RPS Procurement Cost			
14	Adjusted RPS Cost	3,313	3,335	(22)
15	**Total Benefits**			**82**

Table 18: Energy Division 4, Sunrise, Green Path North plus TE/VS transmission 2020

		A	B	C
	Summary of 2020 Costs and Benefits	**Costs** ($ millions per year, Base Case	ED4	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,392	15,300	91
2	Less CAISO congestion cost (reduces TAC)	(454)	(429)	(25)
3	Less URG Margin (reduces URG bal acct)	(4,109)	(4,082)	(27)
4	Less IOU excess loss payments	(816)	(803)	(13)
5	**Subtotal Energy Cost and Benefit**	10,013	9,986	**27**
6	RMR Capacity Payments	364	305	59
7	RMR Operating Payments	60	30	30
8	CT Capacity Costs	218	189	29
9	Transmission cost for new CTs	77	67	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(334)	(311)	(24)
12	**Subtotal Reliability Cost and Benefit**	385	281	**104**
13	**Total Energy and Reliability Benefits**			**131**
	RPS Procurement Cost			
14	Adjusted RPS Cost	5,366	5,361	6
15	**Total Benefits**			**136**

Table 19: Energy Division 4, Sunrise, Green Path North plus TE/VS transmission - Levelized

		A	*B*	*C*
	Summary of Levelized Costs and Benefits	**Costs** ($ millions per year, nominal)		**Net Benefits** (Base case cost - Alt. case cost)
		Base Case	ED4	
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,771	15,662	109
2	Less CAISO congestion cost (reduces TAC)	(325)	(293)	(32)
3	Less URG Margin (reduces URG bal acct)	(4,433)	(4,400)	(33)
4	Less IOU excess loss payments	(825)	(810)	(15)
5	**Subtotal Energy Cost and Benefit**	10,187	10,159	**29**
6	RMR Capacity Payments - Levelized	323	289	34
7	RMR Operating Payments - Levelized	60	27	33
8	CT Capacity Costs - Levelized	396	345	51
9	Transmission cost for new CTs-Levelized	139	121	18
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(375)	(349)	(26)
12	**Subtotal Reliability Cost and Benefit**	544	434	**110**
13	**Total Energy and Reliability Benefits**			**138**
	RPS Procurement Cost			
14	Adjusted RPS Cost	4,265	4,220	**45**
15	**Total Benefits**			**183**

Figure 4: Energy Division 4, Sunrise, Green Path North plus TE/VS transmission – Reliability benefits (2010 dollars)

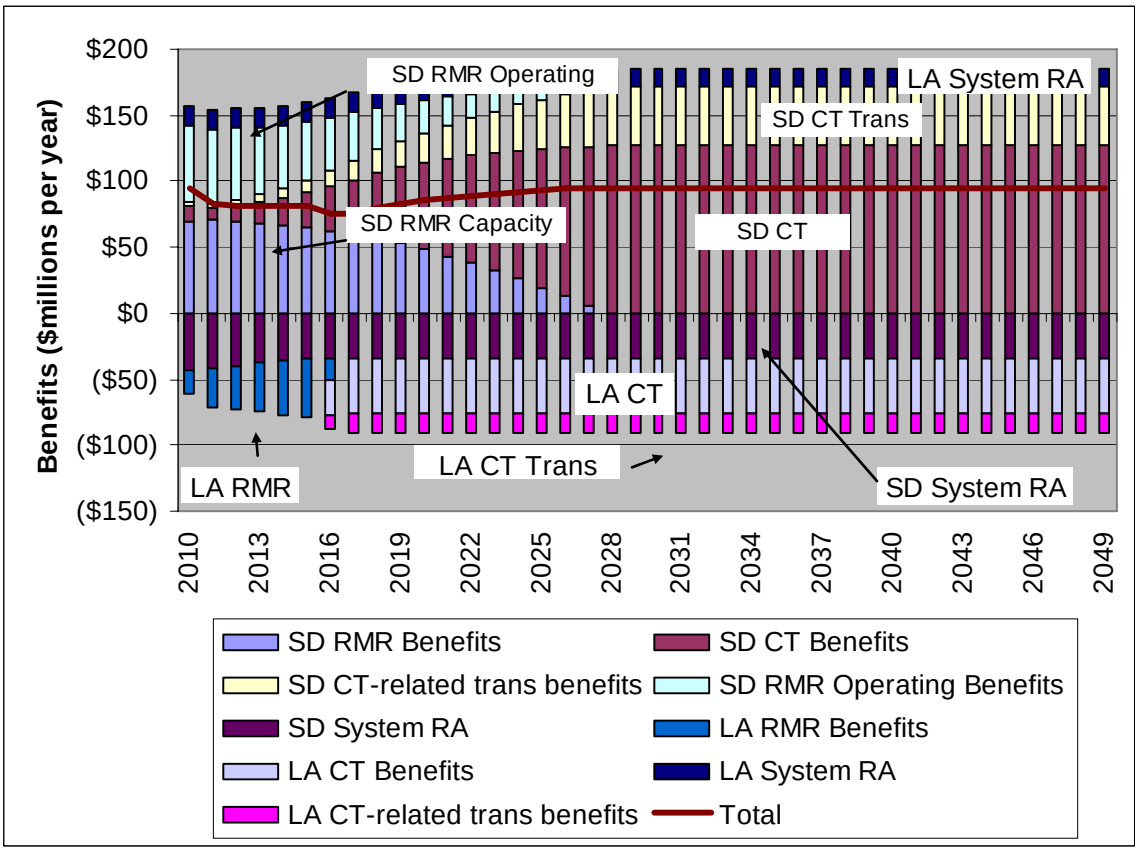

Table 20: Energy Division 4, Sunrise, Green Path North plus TE/VS transmission – Reliability benefits table – San Diego

	Base Case - San Diego Only (Nominal Dollars)								ED4 - San Diego Only							
Year	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)
2010	1,440	133	73	50.02	$ 72.0	$ 15.2	$ 60.0	$ (46.0)	73	-	73	29.23	$ 2.1	-	$ 3.0	$ (2.1)
2011	1,440	100	366	51.02	$ 73.5	$ 11.7	$ 60.0	$ (53.6)	40	-	366	29.81	$ 1.2	-	$ 1.7	$ (10.9)
2012	1,440	146	738	52.04	$ 74.9	$ 17.3	$ 60.0	$ (63.9)	86	-	738	30.41	$ 2.6	-	$ 3.6	$ (22.4)
2013	1,440	187	1,105	53.08	$ 76.4	$ 22.6	$ 60.0	$ (74.5)	127	-	1,105	31.01	$ 3.9	-	$ 5.3	$ (34.3)
2014	1,440	244	1,488	54.14	$ 78.0	$ 30.2	$ 60.0	$ (85.9)	184	-	1,488	31.63	$ 5.8	-	$ 7.7	$ (47.1)
2015	1,440	313	1,883	55.23	$ 79.5	$ 39.4	$ 60.0	$ (98.2)	253	-	1,883	32.27	$ 8.2	-	$ 10.5	$ (60.8)
2016	1,440	403	1,973	56.33	$ 81.1	$ 51.8	$ 60.0	$ (103.1)	343	-	1,973	32.91	$ 11.3	-	$ 14.3	$ (64.9)
2017	1,440	495	2,065	57.46	$ 82.7	$ 64.9	$ 60.0	$ (108.3)	435	-	2,065	33.57	$ 14.6	-	$ 18.1	$ (69.3)
2018	1,440	588	2,158	58.61	$ 84.4	$ 78.6	$ 60.0	$ (113.6)	528	-	2,158	34.24	$ 18.1	-	$ 22.0	$ (73.9)
2019	1,440	683	2,253	59.78	$ 86.1	$ 93.1	$ 60.0	$ (119.2)	623	-	2,253	37.22	$ 23.2	-	$ 26.0	$ (78.7)
2020	1,440	779	2,349	60.97	$ 87.8	$ 108.4	$ 60.0	$ (125.0)	719	-	2,349	40.68	$ 29.3	-	$ 30.0	$ (83.7)
2021	1,440	872	2,442	62.19	$ 89.6	$ 123.7	$ 60.0	$ (130.9)	812	-	2,442	44.15	$ 35.8	-	$ 33.8	$ (88.7)
2022	1,440	966	2,536	63.44	$ 91.3	$ 139.8	$ 60.0	$ (137.0)	906	-	2,536	47.79	$ 43.3	-	$ 37.8	$ (94.0)
2023	1,440	1,060	2,630	64.71	$ 93.2	$ 156.5	$ 60.0	$ (143.3)	1,000	-	2,630	51.56	$ 51.6	-	$ 41.7	$ (99.4)
2024	1,440	1,154	2,724	66.00	$ 95.0	$ 173.8	$ 60.0	$ (149.8)	1,094	-	2,724	55.46	$ 60.7	-	$ 45.6	$ (105.1)
2025	1,440	1,248	2,818	67.32	$ 96.9	$ 191.7	$ 60.0	$ (156.5)	1,188	-	2,818	59.49	$ 70.7	-	$ 49.5	$ (110.9)
2026	1,440	1,342	2,912	68.67	$ 98.9	$ 210.3	$ 60.0	$ (163.4)	1,282	-	2,912	63.67	$ 81.6	-	$ 53.4	$ (116.8)
2027	1,440	1,436	3,006	70.04	$ 100.9	$ 229.5	$ 60.0	$ (170.5)	1,376	-	3,006	67.98	$ 93.6	-	$ 57.4	$ (123.0)
2028	1,440	1,531	3,101	71.44	$ 102.9	$ 249.4	$ 60.0	$ (177.8)	1,440	31	3,101	71.44	$ 102.9	5.0	$ 60.0	$ (129.4)
2029	1,440	1,625	3,195	72.87	$ 104.9	$ 270.1	$ 60.0	$ (185.4)	1,440	125	3,195	72.87	$ 104.9	20.7	$ 60.0	$ (136.0)
2030	1,440	1,719	3,289	74.33	$ 107.0	$ 291.4	$ 60.0	$ (193.2)	1,440	219	3,289	74.33	$ 107.0	37.1	$ 60.0	$ (142.8)
2031	1,440	1,813	3,383	75.81	$ 109.2	$ 313.5	$ 60.0	$ (201.2)	1,440	313	3,383	75.81	$ 109.2	54.1	$ 60.0	$ (149.8)
2032	1,440	1,907	3,477	77.33	$ 111.4	$ 336.4	$ 60.0	$ (209.5)	1,440	407	3,477	77.33	$ 111.4	71.8	$ 60.0	$ (157.1)
2033	1,440	2,001	3,571	78.88	$ 113.6	$ 360.1	$ 60.0	$ (218.0)	1,440	501	3,571	78.88	$ 113.6	90.1	$ 60.0	$ (164.6)
2034	1,440	2,095	3,665	80.45	$ 115.9	$ 384.5	$ 60.0	$ (226.8)	1,440	595	3,665	80.45	$ 115.9	109.2	$ 60.0	$ (172.3)
2035	1,440	2,189	3,759	82.06	$ 118.2	$ 409.8	$ 60.0	$ (235.9)	1,440	689	3,759	82.06	$ 118.2	129.0	$ 60.0	$ (180.2)
2036	1,440	2,283	3,853	83.70	$ 120.5	$ 436.0	$ 60.0	$ (245.2)	1,440	783	3,853	83.70	$ 120.5	149.6	$ 60.0	$ (188.4)
2037	1,440	2,377	3,947	85.38	$ 122.9	$ 463.0	$ 60.0	$ (254.8)	1,440	877	3,947	85.38	$ 122.9	170.9	$ 60.0	$ (196.9)
2038	1,440	2,471	4,041	87.08	$ 125.4	$ 491.0	$ 60.0	$ (264.7)	1,440	971	4,041	87.08	$ 125.4	193.0	$ 60.0	$ (205.6)
2039	1,440	2,565	4,135	88.83	$ 127.9	$ 519.9	$ 60.0	$ (274.8)	1,440	1,065	4,135	88.83	$ 127.9	215.9	$ 60.0	$ (214.6)
2040	1,440	2,660	4,230	90.60	$ 130.5	$ 549.7	$ 60.0	$ (285.3)	1,440	1,160	4,230	90.60	$ 130.5	239.7	$ 60.0	$ (223.9)
2041	1,440	2,754	4,324	92.41	$ 133.1	$ 580.5	$ 60.0	$ (296.1)	1,440	1,254	4,324	92.41	$ 133.1	264.3	$ 60.0	$ (233.5)
2042	1,440	2,848	4,418	94.26	$ 135.7	$ 612.4	$ 60.0	$ (307.2)	1,440	1,348	4,418	94.26	$ 135.7	289.8	$ 60.0	$ (243.3)
2043	1,440	2,942	4,512	96.15	$ 138.5	$ 645.3	$ 60.0	$ (318.6)	1,440	1,442	4,512	96.15	$ 138.5	316.3	$ 60.0	$ (253.5)
2044	1,440	3,036	4,606	98.07	$ 141.2	$ 679.2	$ 60.0	$ (330.4)	1,440	1,536	4,606	98.07	$ 141.2	343.6	$ 60.0	$ (263.9)
2045	1,440	3,130	4,700	100.03	$ 144.0	$ 714.3	$ 60.0	$ (342.5)	1,440	1,630	4,700	100.03	$ 144.0	372.0	$ 60.0	$ (274.7)
2046	1,440	3,224	4,794	102.03	$ 146.9	$ 750.5	$ 60.0	$ (355.0)	1,440	1,724	4,794	102.03	$ 146.9	401.3	$ 60.0	$ (285.8)
2047	1,440	3,318	4,888	104.07	$ 149.9	$ 787.8	$ 60.0	$ (367.8)	1,440	1,818	4,888	104.07	$ 149.9	431.7	$ 60.0	$ (297.2)
2048	1,440	3,412	4,982	106.16	$ 152.9	$ 826.4	$ 60.0	$ (381.0)	1,440	1,912	4,982	106.16	$ 152.9	463.1	$ 60.0	$ (309.0)
2049	1,440	3,506	5,076	108.28	$ 155.9	$ 866.1	$ 60.0	$ (394.5)	1,440	2,006	5,076	108.28	$ 155.9	495.6	$ 60.0	$ (321.2)
Levelized Cost ($ million per year)					$ 90.1	$ 147.1	$ 60.0	$ (129.1)					$ 41.4	31.6	$ 27.2	$ (84.6)
Levelized Benefit (Base Case Cost - Alternative Cost)													$ 48.7	$ 115.6	$ 32.8	$ (44.6)

Table 21: Energy Division 4, Sunrise, Green Path North plus TE/VS transmission – Reliability benefits table – LA Basin

	LA Reference Case								LA Alternative case								Benefits			
Year	Ref Case non-IOU RMR Requirement	Ref Case RMR (MW)	CT Capacity (MW)	Ref Case % of type 2 Cost	Ref Case RMR Cost ($/kW-yr)	Ref Case RMR Cost ($M)	Ref Case CT Cost ($M)	System RA Value ($M)	Alt Case non-IOU RMR Requirement	Alt Case RMR (MW)	CT Capacity (MW)	Alt Case % of type 2 Cost	Alt Case RMR Cost ($/kW-yr)	Alt Case RMR Cost ($M	Alt Case CT Cost ($M)	System RA Value ($M)	LA RMR Capacity ($M)	LA CT Capacity ($M)	LA Ct-Trans ($M)	LA System RA ($M)
2010	2,069	2,069	-	58%	$ 29.2	$ 60.5	$ -	($60)	2,569	2,569	-	61%	$ 30.3	$ 77.9	$ -	($75)	$ (17.4)	$ -	$ -	$ 14.6
2011	2,449	2,449	-	58%	$ 29.8	$ 73.0	$ -	($73)	2,949	2,949	-	68%	$ 34.8	$ 102.7	$ -	($88)	$ (29.7)	$ -	$ -	$ 14.9
2012	2,829	2,829	-	66%	$ 34.3	$ 96.9	$ -	($86)	3,329	3,329	-	76%	$ 39.5	$ 131.4	$ -	($101)	$ (34.5)	$ -	$ -	$ 15.2
2013	3,209	3,209	-	73%	$ 39.0	$ 125.1	$ -	($100)	3,709	3,709	-	84%	$ 44.3	$ 164.4	$ -	($115)	$ (39.3)	$ -	$ -	$ 15.5
2014	3,589	3,589	-	81%	$ 43.9	$ 157.6	$ -	($114)	4,089	4,089	-	91%	$ 49.3	$ 201.8	$ -	($129)	$ (44.2)	$ -	$ -	$ 15.8
2015	3,969	3,969	-	89%	$ 49.0	$ 194.5	$ -	($128)	4,469	4,469	-	99%	$ 54.5	$ 243.8	$ -	($144)	$ (49.3)	$ -	$ -	$ 16.1
2016	4,349	4,349	-	96%	$ 54.3	$ 236.1	$ -	($143)	4,849	4,530	319	100%	$ 56.3	$ 255.2	$ 30	($160)	$ (19.1)	$ (30.3)	$ (10.7)	$ 16.5
2017	4,729	4,530	199	100%	$ 57.5	$ 260.3	$ 19	($159)	5,229	4,530	699	100%	$ 57.5	$ 260.3	$ 68	($176)	$ -	$ (48.5)	$ (17.0)	$ 16.8
2018	5,109	4,530	579	100%	$ 58.6	$ 265.5	$ 57	($175)	5,609	4,530	1,079	100%	$ 58.6	$ 265.5	$ 107	($192)	$ -	$ (49.5)	$ (17.4)	$ 17.1
2019	5,489	4,530	959	100%	$ 59.8	$ 270.8	$ 97	($192)	5,989	4,530	1,459	100%	$ 59.8	$ 270.8	$ 147	($209)	$ -	$ (50.5)	$ (17.7)	$ 17.5
2020	5,869	4,530	1,339	100%	$ 61.0	$ 276.2	$ 138	($209)	6,369	4,530	1,839	100%	$ 61.0	$ 276.2	$ 189	($227)	$ -	$ (51.5)	$ (18.1)	$ 17.8
2021	6,249	4,530	1,719	100%	$ 62.2	$ 281.7	$ 180	($227)	6,749	4,530	2,219	100%	$ 62.2	$ 281.7	$ 233	($245)	$ -	$ (52.5)	$ (18.5)	$ 18.2
2022	6,629	4,530	2,099	100%	$ 63.4	$ 287.4	$ 225	($246)	7,129	4,530	2,599	100%	$ 63.4	$ 287.4	$ 278	($264)	$ -	$ (53.5)	$ (18.8)	$ 18.5
2023	7,009	4,530	2,479	100%	$ 64.7	$ 293.1	$ 271	($265)	7,509	4,530	2,979	100%	$ 64.7	$ 293.1	$ 325	($284)	$ -	$ (54.6)	$ (19.2)	$ 18.9
2024	7,389	4,530	2,859	100%	$ 66.0	$ 299.0	$ 319	($285)	7,889	4,530	3,359	100%	$ 66.0	$ 299.0	$ 374	($304)	$ -	$ (55.7)	$ (19.6)	$ 19.3
2025	7,769	4,530	3,239	100%	$ 67.3	$ 305.0	$ 368	($306)	8,269	4,530	3,739	100%	$ 67.3	$ 305.0	$ 425	($325)	$ -	$ (56.8)	$ (20.0)	$ 19.7
2026	8,149	4,530	3,619	100%	$ 68.7	$ 311.1	$ 419	($327)	8,649	4,530	4,119	100%	$ 68.7	$ 311.1	$ 477	($347)	$ -	$ (58.0)	$ (20.4)	$ 20.1
2027	8,529	4,530	3,999	100%	$ 70.0	$ 317.3	$ 473	($349)	9,029	4,530	4,499	100%	$ 70.0	$ 317.3	$ 532	($369)	$ -	$ (59.1)	$ (20.8)	$ 20.5
2028	8,909	4,530	4,379	100%	$ 71.4	$ 323.6	$ 528	($372)	9,409	4,530	4,879	100%	$ 71.4	$ 323.6	$ 588	($393)	$ -	$ (60.3)	$ (21.2)	$ 20.9
2029	9,289	4,530	4,759	100%	$ 72.9	$ 330.1	$ 585	($395)	9,789	4,530	5,259	100%	$ 72.9	$ 330.1	$ 647	($417)	$ -	$ (61.5)	$ (21.6)	$ 21.3
2030	9,669	4,530	5,139	100%	$ 74.3	$ 336.7	$ 645	($420)	10,169	4,530	5,639	100%	$ 74.3	$ 336.7	$ 707	($442)	$ -	$ (62.7)	$ (22.1)	$ 21.7
2031	10,049	4,530	5,519	100%	$ 75.8	$ 343.4	$ 706	($445)	10,549	4,530	6,019	100%	$ 75.8	$ 343.4	$ 770	($467)	$ -	$ (64.0)	$ (22.5)	$ 22.1
2032	10,429	4,530	5,899	100%	$ 77.3	$ 350.3	$ 770	($471)	10,929	4,530	6,399	100%	$ 77.3	$ 350.3	$ 835	($494)	$ -	$ (65.3)	$ (22.9)	$ 22.6
2033	10,809	4,530	6,279	100%	$ 78.9	$ 357.3	$ 836	($498)	11,309	4,530	6,779	100%	$ 78.9	$ 357.3	$ 903	($521)	$ -	$ (66.6)	$ (23.4)	$ 23.0
2034	11,189	4,530	6,659	100%	$ 80.5	$ 364.5	$ 904	($526)	11,689	4,530	7,159	100%	$ 80.5	$ 364.5	$ 972	($549)	$ -	$ (67.9)	$ (23.9)	$ 23.5
2035	11,569	4,530	7,039	100%	$ 82.1	$ 371.7	$ 975	($555)	12,069	4,530	7,539	100%	$ 82.1	$ 371.7	$ 1,044	($579)	$ -	$ (69.3)	$ (24.3)	$ 24.0
2036	11,949	4,530	7,419	100%	$ 83.7	$ 379.2	$ 1,048	($584)	12,449	4,530	7,919	100%	$ 83.7	$ 379.2	$ 1,119	($609)	$ -	$ (70.6)	$ (24.8)	$ 24.5
2037	12,329	4,530	7,799	100%	$ 85.4	$ 386.8	$ 1,124	($615)	12,829	4,530	8,299	100%	$ 85.4	$ 386.8	$ 1,196	($640)	$ -	$ (72.1)	$ (25.3)	$ 24.9
2038	12,709	4,530	8,179	100%	$ 87.1	$ 394.5	$ 1,202	($647)	13,209	4,530	8,679	100%	$ 87.1	$ 394.5	$ 1,276	($672)	$ -	$ (73.5)	$ (25.8)	$ 25.4
2039	13,089	4,530	8,559	100%	$ 88.8	$ 402.4	$ 1,283	($679)	13,589	4,530	9,059	100%	$ 88.8	$ 402.4	$ 1,358	($705)	$ -	$ (75.0)	$ (26.4)	$ 26.0
2040	13,469	4,530	8,939	100%	$ 90.6	$ 410.4	$ 1,367	($713)	13,969	4,530	9,439	100%	$ 90.6	$ 410.4	$ 1,444	($739)	$ -	$ (76.5)	$ (26.9)	$ 26.5
2041	13,849	4,530	9,319	100%	$ 92.4	$ 418.6	$ 1,454	($748)	14,349	4,530	9,819	100%	$ 92.4	$ 418.6	$ 1,532	($775)	$ -	$ (78.0)	$ (27.4)	$ 27.0
2042	14,229	4,530	9,699	100%	$ 94.3	$ 427.0	$ 1,543	($784)	14,729	4,530	10,199	100%	$ 94.3	$ 427.0	$ 1,623	($811)	$ -	$ (79.6)	$ (28.0)	$ 27.5
2043	14,609	4,530	10,079	100%	$ 96.1	$ 435.6	$ 1,636	($821)	15,109	4,530	10,579	100%	$ 96.1	$ 435.6	$ 1,717	($849)	$ -	$ (81.1)	$ (28.5)	$ 28.1
2044	14,989	4,530	10,459	100%	$ 98.1	$ 444.3	$ 1,731	($859)	15,489	4,530	10,959	100%	$ 98.1	$ 444.3	$ 1,814	($888)	$ -	$ (82.8)	$ (29.1)	$ 28.7
2045	15,369	4,530	10,839	100%	$ 100.0	$ 453.1	$ 1,830	($898)	15,869	4,530	11,339	100%	$ 100.0	$ 453.1	$ 1,915	($928)	$ -	$ (84.4)	$ (29.7)	$ 29.2
2046	15,749	4,530	11,219	100%	$ 102.0	$ 462.2	$ 1,932	($939)	16,249	4,530	11,719	100%	$ 102.0	$ 462.2	$ 2,018	($969)	$ -	$ (86.1)	$ (30.3)	$ 29.8
2047	16,129	4,530	11,599	100%	$ 104.1	$ 471.5	$ 2,038	($981)	16,629	4,530	12,099	100%	$ 104.1	$ 471.5	$ 2,125	($1,011)	$ -	$ (87.8)	$ (30.9)	$ 30.4
2048	16,509	4,530	11,979	100%	$ 106.2	$ 480.9	$ 2,146	($1,024)	17,009	4,530	12,479	100%	$ 106.2	$ 480.9	$ 2,236	($1,055)	$ -	$ (89.6)	$ (31.5)	$ 31.0
2049	16,889	4,530	12,359	100%	$ 108.3	$ 490.5	$ 2,259	($1,069)	17,389	4,530	12,859	100%	$ 108.3	$ 490.5	$ 2,350	($1,100)	$ -	$ (91.4)	$ (32.1)	$ 31.6
Levelized Value ($ million per year)						$232.95	$287.63	($246)						$247.44	$322.14	($264)	($14.49)	($34.51)	($12.13)	$18.27

E. ED5: CAISO base case + Sunrise + TE/VS + LEAPS

Q. Please briefly describe Scenario ED5.

A. This scenario modifies the CAISO base case plan with the combination of Sunrise, TE/VS and LEAPS generation. This scenario reduces San Diego LCR by 1500MW, and increases the LA Basin LCR by 500MW. Since the scenario adds generation, it also provides 500MW of generation deemed to be inside the LA Basin LCR area from the LEAPS pumped storage unit.

Q. Please summarize the results for Scenario ED5.

A. Based on Table 24, the results are set forth below:

- The total levelized benefit is $213M.
- The $32M of levelized energy benefit reflects the three projects' joint effect on CAISO consumers' energy payment.
- The $136M of levelized reliability benefit reflects the three projects' effect on San Diego's LCR and the non-local RA costs.
- Since the scenario assumes Sunrise project in place, the scenario's levelized RPS benefit of $45M is the same as the CAISO's Sunrise case.

Tables 22 and 23 show the benefits of this case in 2015 and 2020, respectively. Figure 5 and Tables 25 and 26 show the assumed annual stream of reliability costs and benefits of this scenario.

Table 22: Energy Division 5, CAISO base case + TE/VS + Green Path North + LEAPS – 2015

		A	B	C
	Summary of 2015 Cost and Benefits	**Costs** ($ millions per year, Base Case	ED5	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	13,893	13,782	111
2	Less CAISO congestion cost (reduces TAC)	(109)	(75)	(34)
3	Less URG Margin (reduces URG bal acct)	(4,188)	(4,152)	(36)
4	Less IOU excess loss payments	(713)	(700)	(14)
5	**Subtotal Energy Cost and Benefit**	8,883	8,855	**28**
6	RMR Capacity Payments	274	252	22
7	RMR Operating Payments	60	11	49
8	CT Capacity Costs	21	4	17
9	Transmission cost for new CTs	10	-	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(226)	(205)	(21)
12	**Subtotal Reliability Cost and Benefit**	139	61	**78**
13	**Total Energy and Reliability Benefits**			**105**
	RPS Procurement Cost			
14	Adjusted RPS Cost	3,313	3,335	(22)
15	**Total Benefits**			**83**

Table 23: Energy Division 5, CAISO base case + TE/VS + Green Path North + LEAPS – 2020

	Summary of 2020 Costs and Benefits	A Costs ($ millions per year, Base Case	B Costs ($ millions per year, ED5	C Net Benefits (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,392	15,306	85
2	Less CAISO congestion cost (reduces TAC)	(454)	(434)	(20)
3	Less URG Margin (reduces URG bal acct)	(4,109)	(4,084)	(25)
4	Less IOU excess loss payments	(816)	(807)	(9)
5	**Subtotal Energy Cost and Benefit**	10,013	9,982	**31**
6	RMR Capacity Payments	364	336	28
7	RMR Operating Payments	60	30	30
8	CT Capacity Costs	218	138	80
9	Transmission cost for new CTs	77	48	28
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(334)	(311)	(24)
12	**Subtotal Reliability Cost and Benefit**	385	242	**143**
13	**Total Energy and Reliability Benefits**			**174**
	RPS Procurement Cost			
14	Adjusted RPS Cost	5,366	5,361	6
15	**Total Benefits**			**180**

Table 24: Energy Division 5, CAISO base case + TE/VS + Green Path North + LEAPS – Levelized

	Summary of Levelized Costs and Benefits	A Costs ($ millions per year, nominal) Base Case	B Costs ($ millions per year, nominal) ED5	C Net Benefits (Base case cost - Alt. case cost)
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,771	15,667	103
2	Less CAISO congestion cost (reduces TAC)	(325)	(297)	(28)
3	Less URG Margin (reduces URG bal acct)	(4,433)	(4,401)	(32)
4	Less IOU excess loss payments	(825)	(814)	(12)
5	**Subtotal Energy Cost and Benefit**	10,187	10,156	**32**
6	RMR Capacity Payments - Levelized	323	309	14
7	RMR Operating Payments - Levelized	60	27	33
8	CT Capacity Costs - Levelized	396	311	86
9	Transmission cost for new CTs-Levelized	139	109	30
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(375)	(349)	(26)
12	**Subtotal Reliability Cost and Benefit**	544	408	**136**
13	**Total Energy and Reliability Benefits**			**168**
	RPS Procurement Cost			
14	Adjusted RPS Cost	4,265	4,220	**45**
15	**Total Benefits**			**213**

Figure 5: Energy Division 5, CAISO base case + TE/VS + Green Path North + LEAPS – Reliability benefits (2010 dollars)

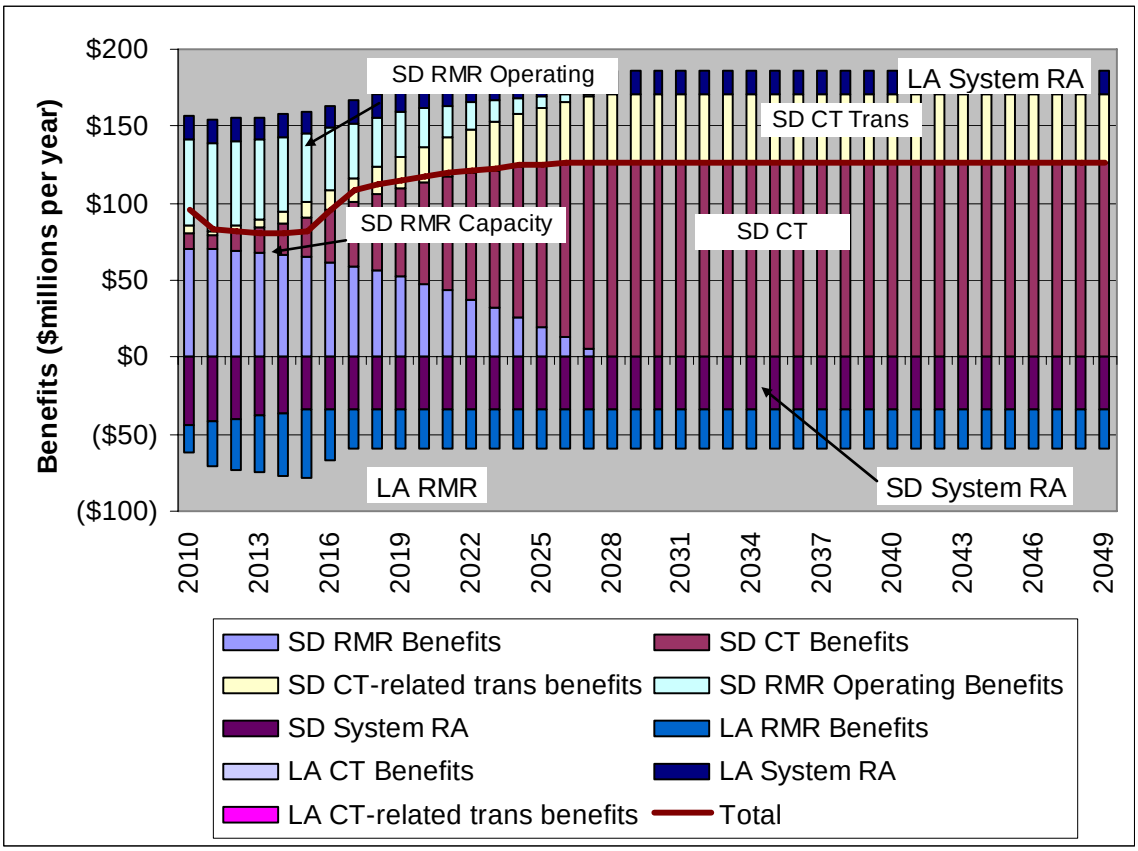

Table 25: Energy Division 5, CAISO base case + TE/VS + Green Path North + LEAPS – Reliability benefits table – San Diego Only

	Base Case - San Diego Only (Nominal Dollars)								ED5 - San Diego Only							
Year	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)
2010	1,440	133	73	50.02	$ 72.0	$ 15.2	$ 60.0	$ (46.0)	73	-	73	29.23	$ 2.1	-	$ 3.0	$ (2.1)
2011	1,440	100	366	51.02	$ 73.5	$ 11.7	$ 60.0	$ (53.6)	40	-	366	29.81	$ 1.2	-	$ 1.7	$ (10.9)
2012	1,440	146	738	52.04	$ 74.9	$ 17.3	$ 60.0	$ (63.9)	86	-	738	30.41	$ 2.6	-	$ 3.6	$ (22.4)
2013	1,440	187	1,105	53.08	$ 76.4	$ 22.6	$ 60.0	$ (74.5)	127	-	1,105	31.01	$ 3.9	-	$ 5.3	$ (34.3)
2014	1,440	244	1,488	54.14	$ 78.0	$ 30.2	$ 60.0	$ (85.9)	184	-	1,488	31.63	$ 5.8	-	$ 7.7	$ (47.1)
2015	1,440	313	1,883	55.23	$ 79.5	$ 39.4	$ 60.0	$ (98.2)	253	-	1,883	32.27	$ 8.2	-	$ 10.5	$ (60.8)
2016	1,440	403	1,973	56.33	$ 81.1	$ 51.8	$ 60.0	$ (103.1)	343	-	1,973	32.91	$ 11.3	-	$ 14.3	$ (64.9)
2017	1,440	495	2,065	57.46	$ 82.7	$ 64.9	$ 60.0	$ (108.3)	435	-	2,065	33.57	$ 14.6	-	$ 18.1	$ (69.3)
2018	1,440	588	2,158	58.61	$ 84.4	$ 78.6	$ 60.0	$ (113.6)	528	-	2,158	34.24	$ 18.1	-	$ 22.0	$ (73.9)
2019	1,440	683	2,253	59.78	$ 86.1	$ 93.1	$ 60.0	$ (119.2)	623	-	2,253	37.22	$ 23.2	-	$ 26.0	$ (78.7)
2020	1,440	779	2,349	60.97	$ 87.8	$ 108.4	$ 60.0	$ (125.0)	719	-	2,349	40.68	$ 29.3	-	$ 30.0	$ (83.7)
2021	1,440	872	2,442	62.19	$ 89.6	$ 123.7	$ 60.0	$ (130.9)	812	-	2,442	44.15	$ 35.8	-	$ 33.8	$ (88.7)
2022	1,440	966	2,536	63.44	$ 91.3	$ 139.8	$ 60.0	$ (137.0)	906	-	2,536	47.79	$ 43.3	-	$ 37.8	$ (94.0)
2023	1,440	1,060	2,630	64.71	$ 93.2	$ 156.5	$ 60.0	$ (143.3)	1,000	-	2,630	51.56	$ 51.6	-	$ 41.7	$ (99.4)
2024	1,440	1,154	2,724	66.00	$ 95.0	$ 173.8	$ 60.0	$ (149.8)	1,094	-	2,724	55.46	$ 60.7	-	$ 45.6	$ (105.1)
2025	1,440	1,248	2,818	67.32	$ 96.9	$ 191.7	$ 60.0	$ (156.5)	1,188	-	2,818	59.49	$ 70.7	-	$ 49.5	$ (110.9)
2026	1,440	1,342	2,912	68.67	$ 98.9	$ 210.3	$ 60.0	$ (163.4)	1,282	-	2,912	63.67	$ 81.6	-	$ 53.4	$ (116.8)
2027	1,440	1,436	3,006	70.04	$ 100.9	$ 229.5	$ 60.0	$ (170.5)	1,376	-	3,006	67.98	$ 93.6	-	$ 57.4	$ (123.0)
2028	1,440	1,531	3,101	71.44	$ 102.9	$ 249.4	$ 60.0	$ (177.8)	1,440	31	3,101	71.44	$ 102.9	5.0	$ 60.0	$ (129.4)
2029	1,440	1,625	3,195	72.87	$ 104.9	$ 270.1	$ 60.0	$ (185.4)	1,440	125	3,195	72.87	$ 104.9	20.7	$ 60.0	$ (136.0)
2030	1,440	1,719	3,289	74.33	$ 107.0	$ 291.4	$ 60.0	$ (193.2)	1,440	219	3,289	74.33	$ 107.0	37.1	$ 60.0	$ (142.8)
2031	1,440	1,813	3,383	75.81	$ 109.2	$ 313.5	$ 60.0	$ (201.2)	1,440	313	3,383	75.81	$ 109.2	54.1	$ 60.0	$ (149.8)
2032	1,440	1,907	3,477	77.33	$ 111.4	$ 336.4	$ 60.0	$ (209.5)	1,440	407	3,477	77.33	$ 111.4	71.8	$ 60.0	$ (157.1)
2033	1,440	2,001	3,571	78.88	$ 113.6	$ 360.1	$ 60.0	$ (218.0)	1,440	501	3,571	78.88	$ 113.6	90.1	$ 60.0	$ (164.6)
2034	1,440	2,095	3,665	80.45	$ 115.9	$ 384.5	$ 60.0	$ (226.8)	1,440	595	3,665	80.45	$ 115.9	109.2	$ 60.0	$ (172.3)
2035	1,440	2,189	3,759	82.06	$ 118.2	$ 409.8	$ 60.0	$ (235.9)	1,440	689	3,759	82.06	$ 118.2	129.0	$ 60.0	$ (180.2)
2036	1,440	2,283	3,853	83.70	$ 120.5	$ 436.0	$ 60.0	$ (245.2)	1,440	783	3,853	83.70	$ 120.5	149.6	$ 60.0	$ (188.4)
2037	1,440	2,377	3,947	85.38	$ 122.9	$ 463.0	$ 60.0	$ (254.8)	1,440	877	3,947	85.38	$ 122.9	170.9	$ 60.0	$ (196.9)
2038	1,440	2,471	4,041	87.08	$ 125.4	$ 491.0	$ 60.0	$ (264.7)	1,440	971	4,041	87.08	$ 125.4	193.0	$ 60.0	$ (205.6)
2039	1,440	2,565	4,135	88.83	$ 127.9	$ 519.9	$ 60.0	$ (274.8)	1,440	1,065	4,135	88.83	$ 127.9	215.9	$ 60.0	$ (214.6)
2040	1,440	2,660	4,230	90.60	$ 130.5	$ 549.7	$ 60.0	$ (285.3)	1,440	1,160	4,230	90.60	$ 130.5	239.7	$ 60.0	$ (223.9)
2041	1,440	2,754	4,324	92.41	$ 133.1	$ 580.5	$ 60.0	$ (296.1)	1,440	1,254	4,324	92.41	$ 133.1	264.3	$ 60.0	$ (233.5)
2042	1,440	2,848	4,418	94.26	$ 135.7	$ 612.4	$ 60.0	$ (307.2)	1,440	1,348	4,418	94.26	$ 135.7	289.8	$ 60.0	$ (243.3)
2043	1,440	2,942	4,512	96.15	$ 138.5	$ 645.3	$ 60.0	$ (318.6)	1,440	1,442	4,512	96.15	$ 138.5	316.3	$ 60.0	$ (253.5)
2044	1,440	3,036	4,606	98.07	$ 141.2	$ 679.2	$ 60.0	$ (330.4)	1,440	1,536	4,606	98.07	$ 141.2	343.6	$ 60.0	$ (263.9)
2045	1,440	3,130	4,700	100.03	$ 144.0	$ 714.3	$ 60.0	$ (342.5)	1,440	1,630	4,700	100.03	$ 144.0	372.0	$ 60.0	$ (274.7)
2046	1,440	3,224	4,794	102.03	$ 146.9	$ 750.5	$ 60.0	$ (355.0)	1,440	1,724	4,794	102.03	$ 146.9	401.3	$ 60.0	$ (285.8)
2047	1,440	3,318	4,888	104.07	$ 149.9	$ 787.8	$ 60.0	$ (367.8)	1,440	1,818	4,888	104.07	$ 149.9	431.7	$ 60.0	$ (297.2)
2048	1,440	3,412	4,982	106.16	$ 152.9	$ 826.4	$ 60.0	$ (381.0)	1,440	1,912	4,982	106.16	$ 152.9	463.1	$ 60.0	$ (309.0)
2049	1,440	3,506	5,076	108.28	$ 155.9	$ 866.1	$ 60.0	$ (394.5)	1,440	2,006	5,076	108.28	$ 155.9	495.6	$ 60.0	$ (321.2)
Levelized Cost ($ million per year)					$ 90.1	$ 147.1	$ 60.0	$ (129.1)					$ 41.4	31.6	$ 27.2	$ (84.6)
Levelized Benefit (Base Case Cost - Alternative Cost)													$ 48.7	$ 115.6	$ 32.8	$ (44.6)

Table 26: Energy Division 5, CAISO base case + TE/VS + Green Path North + LEAPS – Reliability benefits table – Los Angeles Basin

	LA Reference Case								LA Alternative case								Benefits			
Year	Ref Case non-IOU RMR Requirement	Ref Case RMR (MW)	CT Capacity (MW)	Ref Case % of type 2 Cost	Ref Case RMR Cost ($/kW-yr)	Ref Case RMR Cost ($M)	Ref Case CT Cost ($M)	System RA Value ($M)	Alt Case non-IOU RMR Requirement	Alt Case RMR (MW)	CT Capacity (MW)	Alt Case % of type 2 Cost	Alt Case RMR Cost ($/kW-yr)	Alt Case RMR Cost ($M	Alt Case CT Cost ($M)	System RA Value ($M)	LA RMR Capacity ($M)	LA CT Capacity ($M)	LA Ct-Trans ($M)	LA System RA ($M)
2010	2,069	2,069	-	58%	$ 29.2	$ 60.5	$ -	($60)	2,569	2,569	-	61%	$ 30.3	$ 77.9	$ -	($75)	$ (17.4)	$ -	$ -	$ 14.6
2011	2,449	2,449	-	58%	$ 29.8	$ 73.0	$ -	($73)	2,949	2,949	-	68%	$ 34.8	$ 102.7	$ -	($88)	$ (29.7)	$ -	$ -	$ 14.9
2012	2,829	2,829	-	66%	$ 34.3	$ 96.9	$ -	($86)	3,329	3,329	-	76%	$ 39.5	$ 131.4	$ -	($101)	$ (34.5)	$ -	$ -	$ 15.2
2013	3,209	3,209	-	73%	$ 39.0	$ 125.1	$ -	($100)	3,709	3,709	-	84%	$ 44.3	$ 164.4	$ -	($115)	$ (39.3)	$ -	$ -	$ 15.5
2014	3,589	3,589	-	81%	$ 43.9	$ 157.6	$ -	($114)	4,089	4,089	-	91%	$ 49.3	$ 201.8	$ -	($129)	$ (44.2)	$ -	$ -	$ 15.8
2015	3,969	3,969	-	89%	$ 49.0	$ 194.5	$ -	($128)	4,469	4,469	-	99%	$ 54.5	$ 243.8	$ -	($144)	$ (49.3)	$ -	$ -	$ 16.1
2016	4,349	4,349	-	96%	$ 54.3	$ 236.1	$ -	($143)	4,849	4,849	-	100%	$ 56.3	$ 273.1	$ -	($160)	$ (37.1)	$ -	$ -	$ 16.5
2017	4,729	4,530	199	100%	$ 57.5	$ 260.3	$ 19	($159)	5,229	5,030	199	100%	$ 57.5	$ 289.0	$ 19	($176)	$ (28.7)	$ -	$ -	$ 16.8
2018	5,109	4,530	579	100%	$ 58.6	$ 265.5	$ 57	($175)	5,609	5,030	579	100%	$ 58.6	$ 294.8	$ 57	($192)	$ (29.3)	$ -	$ -	$ 17.1
2019	5,489	4,530	959	100%	$ 59.8	$ 270.8	$ 97	($192)	5,989	5,030	959	100%	$ 59.8	$ 300.7	$ 97	($209)	$ (29.9)	$ -	$ -	$ 17.5
2020	5,869	4,530	1,339	100%	$ 61.0	$ 276.2	$ 138	($209)	6,369	5,030	1,339	100%	$ 61.0	$ 306.7	$ 138	($227)	$ (30.5)	$ -	$ -	$ 17.8
2021	6,249	4,530	1,719	100%	$ 62.2	$ 281.7	$ 180	($227)	6,749	5,030	1,719	100%	$ 62.2	$ 312.8	$ 180	($245)	$ (31.1)	$ -	$ -	$ 18.2
2022	6,629	4,530	2,099	100%	$ 63.4	$ 287.4	$ 225	($246)	7,129	5,030	2,099	100%	$ 63.4	$ 319.1	$ 225	($264)	$ (31.7)	$ -	$ -	$ 18.5
2023	7,009	4,530	2,479	100%	$ 64.7	$ 293.1	$ 271	($265)	7,509	5,030	2,479	100%	$ 64.7	$ 325.5	$ 271	($284)	$ (32.4)	$ -	$ -	$ 18.9
2024	7,389	4,530	2,859	100%	$ 66.0	$ 299.0	$ 319	($285)	7,889	5,030	2,859	100%	$ 66.0	$ 332.0	$ 319	($304)	$ (33.0)	$ -	$ -	$ 19.3
2025	7,769	4,530	3,239	100%	$ 67.3	$ 305.0	$ 368	($306)	8,269	5,030	3,239	100%	$ 67.3	$ 338.6	$ 368	($325)	$ (33.7)	$ -	$ -	$ 19.7
2026	8,149	4,530	3,619	100%	$ 68.7	$ 311.1	$ 419	($327)	8,649	5,030	3,619	100%	$ 68.7	$ 345.4	$ 419	($347)	$ (34.3)	$ -	$ -	$ 20.1
2027	8,529	4,530	3,999	100%	$ 70.0	$ 317.3	$ 473	($349)	9,029	5,030	3,999	100%	$ 70.0	$ 352.3	$ 473	($369)	$ (35.0)	$ -	$ -	$ 20.5
2028	8,909	4,530	4,379	100%	$ 71.4	$ 323.6	$ 528	($372)	9,409	5,030	4,379	100%	$ 71.4	$ 359.3	$ 528	($393)	$ (35.7)	$ -	$ -	$ 20.9
2029	9,289	4,530	4,759	100%	$ 72.9	$ 330.1	$ 585	($395)	9,789	5,030	4,759	100%	$ 72.9	$ 366.5	$ 585	($417)	$ (36.4)	$ -	$ -	$ 21.3
2030	9,669	4,530	5,139	100%	$ 74.3	$ 336.7	$ 645	($420)	10,169	5,030	5,139	100%	$ 74.3	$ 373.9	$ 645	($442)	$ (37.2)	$ -	$ -	$ 21.7
2031	10,049	4,530	5,519	100%	$ 75.8	$ 343.4	$ 706	($445)	10,549	5,030	5,519	100%	$ 75.8	$ 381.3	$ 706	($467)	$ (37.9)	$ -	$ -	$ 22.1
2032	10,429	4,530	5,899	100%	$ 77.3	$ 350.3	$ 770	($471)	10,929	5,030	5,899	100%	$ 77.3	$ 389.0	$ 770	($494)	$ (38.7)	$ -	$ -	$ 22.6
2033	10,809	4,530	6,279	100%	$ 78.9	$ 357.3	$ 836	($498)	11,309	5,030	6,279	100%	$ 78.9	$ 396.7	$ 836	($521)	$ (39.4)	$ -	$ -	$ 23.0
2034	11,189	4,530	6,659	100%	$ 80.5	$ 364.5	$ 904	($526)	11,689	5,030	6,659	100%	$ 80.5	$ 404.7	$ 904	($549)	$ (40.2)	$ -	$ -	$ 23.5
2035	11,569	4,530	7,039	100%	$ 82.1	$ 371.7	$ 975	($555)	12,069	5,030	7,039	100%	$ 82.1	$ 412.8	$ 975	($579)	$ (41.0)	$ -	$ -	$ 24.0
2036	11,949	4,530	7,419	100%	$ 83.7	$ 379.2	$ 1,048	($584)	12,449	5,030	7,419	100%	$ 83.7	$ 421.0	$ 1,048	($609)	$ (41.9)	$ -	$ -	$ 24.5
2037	12,329	4,530	7,799	100%	$ 85.4	$ 386.8	$ 1,124	($615)	12,829	5,030	7,799	100%	$ 85.4	$ 429.4	$ 1,124	($640)	$ (42.7)	$ -	$ -	$ 24.9
2038	12,709	4,530	8,179	100%	$ 87.1	$ 394.5	$ 1,202	($647)	13,209	5,030	8,179	100%	$ 87.1	$ 438.0	$ 1,202	($672)	$ (43.5)	$ -	$ -	$ 25.4
2039	13,089	4,530	8,559	100%	$ 88.8	$ 402.4	$ 1,283	($679)	13,589	5,030	8,559	100%	$ 88.8	$ 446.8	$ 1,283	($705)	$ (44.4)	$ -	$ -	$ 26.0
2040	13,469	4,530	8,939	100%	$ 90.6	$ 410.4	$ 1,367	($713)	13,969	5,030	8,939	100%	$ 90.6	$ 455.7	$ 1,367	($739)	$ (45.3)	$ -	$ -	$ 26.5
2041	13,849	4,530	9,319	100%	$ 92.4	$ 418.6	$ 1,454	($748)	14,349	5,030	9,319	100%	$ 92.4	$ 464.8	$ 1,454	($775)	$ (46.2)	$ -	$ -	$ 27.0
2042	14,229	4,530	9,699	100%	$ 94.3	$ 427.0	$ 1,543	($784)	14,729	5,030	9,699	100%	$ 94.3	$ 474.1	$ 1,543	($811)	$ (47.1)	$ -	$ -	$ 27.5
2043	14,609	4,530	10,079	100%	$ 96.1	$ 435.6	$ 1,636	($821)	15,109	5,030	10,079	100%	$ 96.1	$ 483.6	$ 1,636	($849)	$ (48.1)	$ -	$ -	$ 28.1
2044	14,989	4,530	10,459	100%	$ 98.1	$ 444.3	$ 1,731	($859)	15,489	5,030	10,459	100%	$ 98.1	$ 493.3	$ 1,731	($888)	$ (49.0)	$ -	$ -	$ 28.7
2045	15,369	4,530	10,839	100%	$ 100.0	$ 453.1	$ 1,830	($898)	15,869	5,030	10,839	100%	$ 100.0	$ 503.2	$ 1,830	($928)	$ (50.0)	$ -	$ -	$ 29.2
2046	15,749	4,530	11,219	100%	$ 102.0	$ 462.2	$ 1,932	($939)	16,249	5,030	11,219	100%	$ 102.0	$ 513.2	$ 1,932	($969)	$ (51.0)	$ -	$ -	$ 29.8
2047	16,129	4,530	11,599	100%	$ 104.1	$ 471.5	$ 2,038	($981)	16,629	5,030	11,599	100%	$ 104.1	$ 523.5	$ 2,038	($1,011)	$ (52.0)	$ -	$ -	$ 30.4
2048	16,509	4,530	11,979	100%	$ 106.2	$ 480.9	$ 2,146	($1,024)	17,009	5,030	11,979	100%	$ 106.2	$ 534.0	$ 2,146	($1,055)	$ (53.1)	$ -	$ -	$ 31.0
2049	16,889	4,530	12,359	100%	$ 108.3	$ 490.5	$ 2,259	($1,069)	17,389	5,030	12,359	100%	$ 108.3	$ 544.6	$ 2,259	($1,100)	$ (54.1)	$ -	$ -	$ 31.6
Levelized Value ($ million per year)						$232.95	$287.63	($246)						$267.89	$287.63	($264)	($34.94)	$0.00	$0.00	$18.27

F. ED6: CAISO base case + TE/VS + Sunrise + LEAPS + Green Path North

Q. Please briefly describe Scenario ED6.

A. This scenario modifies the CAISO base case to include TE/VS, Sunrise, LEAPS and Green Path North. It is identical to Scenario ED5 combined with Green Path North.

Q. Please summarize the results for Scenario ED6.

A. Based on Table 29, the results are set forth below:

- The total levelized benefit is $208M.
- The $27M of levelized energy benefits reflect the three projects' joint effect on CAISO consumers' energy payment.
- The $136M of levelized reliability benefits reflect the three projects' effect on San Diego's LCR and the non-local RA costs.
- Since the scenario assumes Sunrise project in place, the scenario's levelized RPS benefit of $45M is the same as the one for the CAISO's Sunrise case.

Tables 27 and 28 show the benefits of this case in 2015 and 2020, respectively. Figure 6 and Tables 30 and 31 show the assumed annual streams of reliability costs and benefits of this scenario.

Table 27: Energy Division 6, Sunrise, Green Path North plus TE/VS transmission and LEAPS storage – 2015

		A	*B*	*C*
	Summary of 2015 Cost and Benefits	**Costs** ($ millions per year, Base Case	ED6	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	13,893	13,774	118
2	Less CAISO congestion cost (reduces TAC)	(109)	(72)	(37)
3	Less URG Margin (reduces URG bal acct)	(4,188)	(4,151)	(37)
4	Less IOU excess loss payments	(713)	(697)	(16)
5	**Subtotal Energy Cost and Benefit**	8,883	8,854	**28**
6	RMR Capacity Payments	274	252	22
7	RMR Operating Payments	60	11	49
8	CT Capacity Costs	21	4	17
9	Transmission cost for new CTs	10	-	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(226)	(205)	(21)
12	**Subtotal Reliability Cost and Benefit**	139	61	**78**
13	**Total Energy and Reliability Benefits**			**106**
	RPS Procurement Cost			
14	Adjusted RPS Cost	3,313	3,335	(22)
15	**Total Benefits**			**84**

Table 28: Energy Division 6, Sunrise, Green Path North plus TE/VS transmission and LEAPS – 2020

		A	B	C
	Summary of 2020 Costs and Benefits	**Costs** ($ millions per year, Base Case	ED6	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,392	15,306	86
2	Less CAISO congestion cost (reduces TAC)	(454)	(429)	(25)
3	Less URG Margin (reduces URG bal acct)	(4,109)	(4,083)	(26)
4	Less IOU excess loss payments	(816)	(804)	(12)
5	**Subtotal Energy Cost and Benefit**	10,013	9,990	**23**
6	RMR Capacity Payments	364	336	28
7	RMR Operating Payments	60	30	30
8	CT Capacity Costs	218	138	80
9	Transmission cost for new CTs	77	48	28
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(334)	(311)	(24)
12	**Subtotal Reliability Cost and Benefit**	385	242	**143**
13	**Total Energy and Reliability Benefits**			**166**
	RPS Procurement Cost			
14	Adjusted RPS Cost	5,366	5,361	6
15	**Total Benefits**			**172**

Table 29: Energy Division 6, Sunrise, Green Path North plus TE/VS transmission and LEAPS-Levelized

		A	B	C
	Summary of Levelized Costs and Benefits	**Costs** ($ millions per year, nominal)		**Net Benefits** (Base case cost - Alt. case cost)
		Base Case	ED6	
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,771	15,664	107
2	Less CAISO congestion cost (reduces TAC)	(325)	(293)	(32)
3	Less URG Margin (reduces URG bal acct)	(4,433)	(4,400)	(33)
4	Less IOU excess loss payments	(825)	(810)	(15)
5	**Subtotal Energy Cost and Benefit**	10,187	10,160	**27**
6	RMR Capacity Payments - Levelized	323	309	14
7	RMR Operating Payments - Levelized	60	27	33
8	CT Capacity Costs - Levelized	396	311	86
9	Transmission cost for new CTs-Levelized	139	109	30
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(375)	(349)	(26)
12	**Subtotal Reliability Cost and Benefit**	544	408	**136**
13	**Total Energy and Reliability Benefits**			**163**
	RPS Procurement Cost			
14	Adjusted RPS Cost	4,265	4,220	**45**
15	**Total Benefits**			**208**

Figure 6: Energy Division 6, Sunrise, Green Path North plus TE/VS transmission and LEAPS – Reliability benefits (2010 dollars)

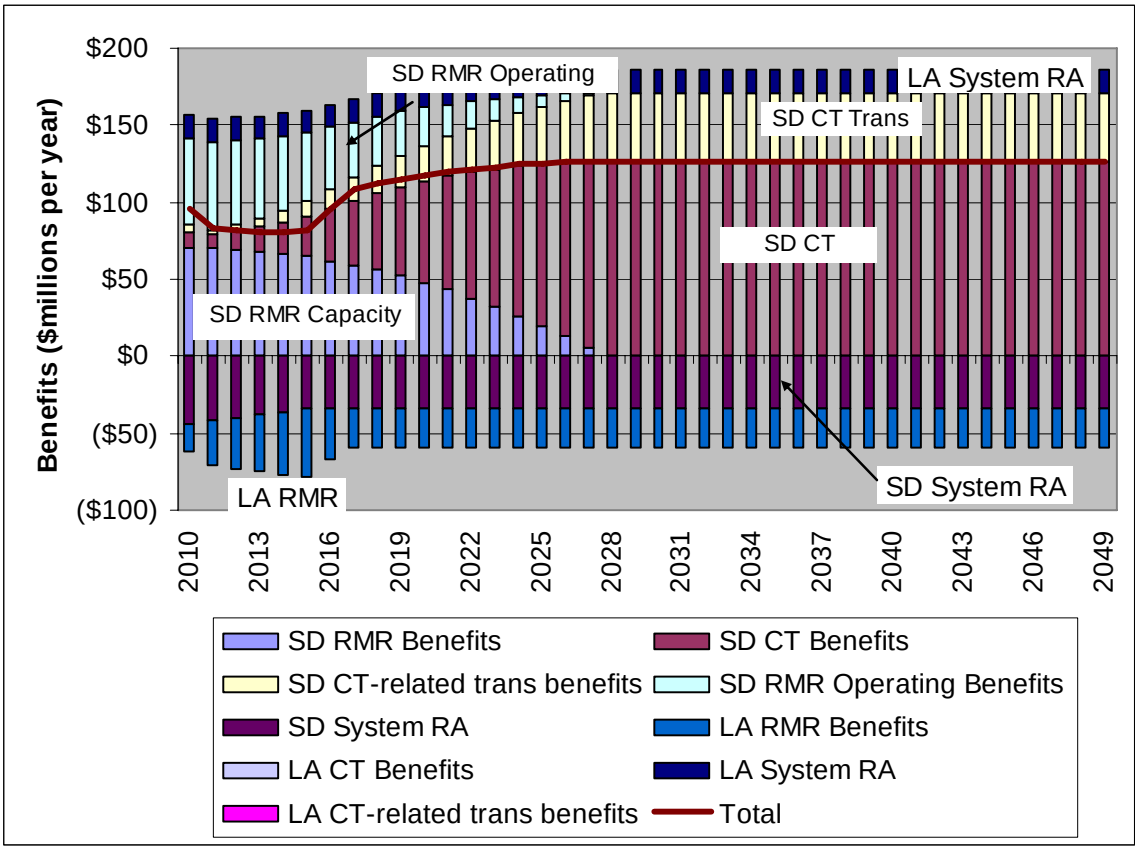

Table 30: Energy Division 6, Sunrise, Green Path North plus TE/VS transmission and LEAPS – Reliability benefits table – San Diego Only

	Base Case - San Diego Only (Nominal Dollars)								ED6 - San Diego Only							
Year	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)
2010	1,440	133	73	50.02	$ 72.0	$ 15.2	$ 60.0	$ (46.0)	73	-	73	29.23	$ 2.1	-	$ 3.0	$ (2.1)
2011	1,440	100	366	51.02	$ 73.5	$ 11.7	$ 60.0	$ (53.6)	40	-	366	29.81	$ 1.2	-	$ 1.7	$ (10.9)
2012	1,440	146	738	52.04	$ 74.9	$ 17.3	$ 60.0	$ (63.9)	86	-	738	30.41	$ 2.6	-	$ 3.6	$ (22.4)
2013	1,440	187	1,105	53.08	$ 76.4	$ 22.6	$ 60.0	$ (74.5)	127	-	1,105	31.01	$ 3.9	-	$ 5.3	$ (34.3)
2014	1,440	244	1,488	54.14	$ 78.0	$ 30.2	$ 60.0	$ (85.9)	184	-	1,488	31.63	$ 5.8	-	$ 7.7	$ (47.1)
2015	1,440	313	1,883	55.23	$ 79.5	$ 39.4	$ 60.0	$ (98.2)	253	-	1,883	32.27	$ 8.2	-	$ 10.5	$ (60.8)
2016	1,440	403	1,973	56.33	$ 81.1	$ 51.8	$ 60.0	$ (103.1)	343	-	1,973	32.91	$ 11.3	-	$ 14.3	$ (64.9)
2017	1,440	495	2,065	57.46	$ 82.7	$ 64.9	$ 60.0	$ (108.3)	435	-	2,065	33.57	$ 14.6	-	$ 18.1	$ (69.3)
2018	1,440	588	2,158	58.61	$ 84.4	$ 78.6	$ 60.0	$ (113.6)	528	-	2,158	34.24	$ 18.1	-	$ 22.0	$ (73.9)
2019	1,440	683	2,253	59.78	$ 86.1	$ 93.1	$ 60.0	$ (119.2)	623	-	2,253	37.22	$ 23.2	-	$ 26.0	$ (78.7)
2020	1,440	779	2,349	60.97	$ 87.8	$ 108.4	$ 60.0	$ (125.0)	719	-	2,349	40.68	$ 29.3	-	$ 30.0	$ (83.7)
2021	1,440	872	2,442	62.19	$ 89.6	$ 123.7	$ 60.0	$ (130.9)	812	-	2,442	44.15	$ 35.8	-	$ 33.8	$ (88.7)
2022	1,440	966	2,536	63.44	$ 91.3	$ 139.8	$ 60.0	$ (137.0)	906	-	2,536	47.79	$ 43.3	-	$ 37.8	$ (94.0)
2023	1,440	1,060	2,630	64.71	$ 93.2	$ 156.5	$ 60.0	$ (143.3)	1,000	-	2,630	51.56	$ 51.6	-	$ 41.7	$ (99.4)
2024	1,440	1,154	2,724	66.00	$ 95.0	$ 173.8	$ 60.0	$ (149.8)	1,094	-	2,724	55.46	$ 60.7	-	$ 45.6	$ (105.1)
2025	1,440	1,248	2,818	67.32	$ 96.9	$ 191.7	$ 60.0	$ (156.5)	1,188	-	2,818	59.49	$ 70.7	-	$ 49.5	$ (110.9)
2026	1,440	1,342	2,912	68.67	$ 98.9	$ 210.3	$ 60.0	$ (163.4)	1,282	-	2,912	63.67	$ 81.6	-	$ 53.4	$ (116.8)
2027	1,440	1,436	3,006	70.04	$ 100.9	$ 229.5	$ 60.0	$ (170.5)	1,376	-	3,006	67.98	$ 93.6	-	$ 57.4	$ (123.0)
2028	1,440	1,531	3,101	71.44	$ 102.9	$ 249.4	$ 60.0	$ (177.8)	1,440	31	3,101	71.44	$ 102.9	5.0	$ 60.0	$ (129.4)
2029	1,440	1,625	3,195	72.87	$ 104.9	$ 270.1	$ 60.0	$ (185.4)	1,440	125	3,195	72.87	$ 104.9	20.7	$ 60.0	$ (136.0)
2030	1,440	1,719	3,289	74.33	$ 107.0	$ 291.4	$ 60.0	$ (193.2)	1,440	219	3,289	74.33	$ 107.0	37.1	$ 60.0	$ (142.8)
2031	1,440	1,813	3,383	75.81	$ 109.2	$ 313.5	$ 60.0	$ (201.2)	1,440	313	3,383	75.81	$ 109.2	54.1	$ 60.0	$ (149.8)
2032	1,440	1,907	3,477	77.33	$ 111.4	$ 336.4	$ 60.0	$ (209.5)	1,440	407	3,477	77.33	$ 111.4	71.8	$ 60.0	$ (157.1)
2033	1,440	2,001	3,571	78.88	$ 113.6	$ 360.1	$ 60.0	$ (218.0)	1,440	501	3,571	78.88	$ 113.6	90.1	$ 60.0	$ (164.6)
2034	1,440	2,095	3,665	80.45	$ 115.9	$ 384.5	$ 60.0	$ (226.8)	1,440	595	3,665	80.45	$ 115.9	109.2	$ 60.0	$ (172.3)
2035	1,440	2,189	3,759	82.06	$ 118.2	$ 409.8	$ 60.0	$ (235.9)	1,440	689	3,759	82.06	$ 118.2	129.0	$ 60.0	$ (180.2)
2036	1,440	2,283	3,853	83.70	$ 120.5	$ 436.0	$ 60.0	$ (245.2)	1,440	783	3,853	83.70	$ 120.5	149.6	$ 60.0	$ (188.4)
2037	1,440	2,377	3,947	85.38	$ 122.9	$ 463.0	$ 60.0	$ (254.8)	1,440	877	3,947	85.38	$ 122.9	170.9	$ 60.0	$ (196.9)
2038	1,440	2,471	4,041	87.08	$ 125.4	$ 491.0	$ 60.0	$ (264.7)	1,440	971	4,041	87.08	$ 125.4	193.0	$ 60.0	$ (205.6)
2039	1,440	2,565	4,135	88.83	$ 127.9	$ 519.9	$ 60.0	$ (274.8)	1,440	1,065	4,135	88.83	$ 127.9	215.9	$ 60.0	$ (214.6)
2040	1,440	2,660	4,230	90.60	$ 130.5	$ 549.7	$ 60.0	$ (285.3)	1,440	1,160	4,230	90.60	$ 130.5	239.7	$ 60.0	$ (223.9)
2041	1,440	2,754	4,324	92.41	$ 133.1	$ 580.5	$ 60.0	$ (296.1)	1,440	1,254	4,324	92.41	$ 133.1	264.3	$ 60.0	$ (233.5)
2042	1,440	2,848	4,418	94.26	$ 135.7	$ 612.4	$ 60.0	$ (307.2)	1,440	1,348	4,418	94.26	$ 135.7	289.8	$ 60.0	$ (243.3)
2043	1,440	2,942	4,512	96.15	$ 138.5	$ 645.3	$ 60.0	$ (318.6)	1,440	1,442	4,512	96.15	$ 138.5	316.3	$ 60.0	$ (253.5)
2044	1,440	3,036	4,606	98.07	$ 141.2	$ 679.2	$ 60.0	$ (330.4)	1,440	1,536	4,606	98.07	$ 141.2	343.6	$ 60.0	$ (263.9)
2045	1,440	3,130	4,700	100.03	$ 144.0	$ 714.3	$ 60.0	$ (342.5)	1,440	1,630	4,700	100.03	$ 144.0	372.0	$ 60.0	$ (274.7)
2046	1,440	3,224	4,794	102.03	$ 146.9	$ 750.5	$ 60.0	$ (355.0)	1,440	1,724	4,794	102.03	$ 146.9	401.3	$ 60.0	$ (285.8)
2047	1,440	3,318	4,888	104.07	$ 149.9	$ 787.8	$ 60.0	$ (367.8)	1,440	1,818	4,888	104.07	$ 149.9	431.7	$ 60.0	$ (297.2)
2048	1,440	3,412	4,982	106.16	$ 152.9	$ 826.4	$ 60.0	$ (381.0)	1,440	1,912	4,982	106.16	$ 152.9	463.1	$ 60.0	$ (309.0)
2049	1,440	3,506	5,076	108.28	$ 155.9	$ 866.1	$ 60.0	$ (394.5)	1,440	2,006	5,076	108.28	$ 155.9	495.6	$ 60.0	$ (321.2)
Levelized Cost ($ million per year)					$ 90.1	$ 147.1	$ 60.0	$ (129.1)					$ 41.4	31.6	$ 27.2	$ (84.6)
Levelized Benefit (Base Case Cost - Alternative Cost)													$ 48.7	$ 115.6	$ 32.8	$ (44.6)

Table 31: Energy Division 6, Sunrise, Green Path North plus TE/VS transmission and LEAPS-Reliability benefits table – Los Angeles Basin Only

	LA Reference Case								LA Alternative case								Benefits			
Year	Ref Case non-IOU RMR Requirement	Ref Case RMR (MW)	CT Capacity (MW)	Ref Case % of type 2 Cost	Ref Case RMR Cost ($/kW-yr)	Ref Case RMR Cost ($M)	Ref Case CT Cost ($M)	System RA Value ($M)	Alt Case non-IOU RMR Requirement	Alt Case RMR (MW)	CT Capacity (MW)	Alt Case % of type 2 Cost	Alt Case RMR Cost ($/kW-yr)	Alt Case RMR Cost ($M	Alt Case CT Cost ($M)	System RA Value ($M)	LA RMR Capacity ($M)	LA CT Capacity ($M)	LA Ct-Trans ($M)	LA System RA ($M)
2010	2,069	2,069	-	58%	$ 29.2	$ 60.5	$ -	($60)	2,569	2,569	-	61%	$ 30.3	$ 77.9	$ -	($75)	$ (17.4)	$ -	$ -	$ 14.6
2011	2,449	2,449	-	58%	$ 29.8	$ 73.0	$ -	($73)	2,949	2,949	-	68%	$ 34.8	$ 102.7	$ -	($88)	$ (29.7)	$ -	$ -	$ 14.9
2012	2,829	2,829	-	66%	$ 34.3	$ 96.9	$ -	($86)	3,329	3,329	-	76%	$ 39.5	$ 131.4	$ -	($101)	$ (34.5)	$ -	$ -	$ 15.2
2013	3,209	3,209	-	73%	$ 39.0	$ 125.1	$ -	($100)	3,709	3,709	-	84%	$ 44.3	$ 164.4	$ -	($115)	$ (39.3)	$ -	$ -	$ 15.5
2014	3,589	3,589	-	81%	$ 43.9	$ 157.6	$ -	($114)	4,089	4,089	-	91%	$ 49.3	$ 201.8	$ -	($129)	$ (44.2)	$ -	$ -	$ 15.8
2015	3,969	3,969	-	89%	$ 49.0	$ 194.5	$ -	($128)	4,469	4,469	-	99%	$ 54.5	$ 243.8	$ -	($144)	$ (49.3)	$ -	$ -	$ 16.1
2016	4,349	4,349	-	96%	$ 54.3	$ 236.1	$ -	($143)	4,849	4,849	-	100%	$ 56.3	$ 273.1	$ -	($160)	$ (37.1)	$ -	$ -	$ 16.5
2017	4,729	4,530	199	100%	$ 57.5	$ 260.3	$ 19	($159)	5,229	5,030	199	100%	$ 57.5	$ 289.0	$ 19	($176)	$ (28.7)	$ -	$ -	$ 16.8
2018	5,109	4,530	579	100%	$ 58.6	$ 265.5	$ 57	($175)	5,609	5,030	579	100%	$ 58.6	$ 294.8	$ 57	($192)	$ (29.3)	$ -	$ -	$ 17.1
2019	5,489	4,530	959	100%	$ 59.8	$ 270.8	$ 97	($192)	5,989	5,030	959	100%	$ 59.8	$ 300.7	$ 97	($209)	$ (29.9)	$ -	$ -	$ 17.5
2020	5,869	4,530	1,339	100%	$ 61.0	$ 276.2	$ 138	($209)	6,369	5,030	1,339	100%	$ 61.0	$ 306.7	$ 138	($227)	$ (30.5)	$ -	$ -	$ 17.8
2021	6,249	4,530	1,719	100%	$ 62.2	$ 281.7	$ 180	($227)	6,749	5,030	1,719	100%	$ 62.2	$ 312.8	$ 180	($245)	$ (31.1)	$ -	$ -	$ 18.2
2022	6,629	4,530	2,099	100%	$ 63.4	$ 287.4	$ 225	($246)	7,129	5,030	2,099	100%	$ 63.4	$ 319.1	$ 225	($264)	$ (31.7)	$ -	$ -	$ 18.5
2023	7,009	4,530	2,479	100%	$ 64.7	$ 293.1	$ 271	($265)	7,509	5,030	2,479	100%	$ 64.7	$ 325.5	$ 271	($284)	$ (32.4)	$ -	$ -	$ 18.9
2024	7,389	4,530	2,859	100%	$ 66.0	$ 299.0	$ 319	($285)	7,889	5,030	2,859	100%	$ 66.0	$ 332.0	$ 319	($304)	$ (33.0)	$ -	$ -	$ 19.3
2025	7,769	4,530	3,239	100%	$ 67.3	$ 305.0	$ 368	($306)	8,269	5,030	3,239	100%	$ 67.3	$ 338.6	$ 368	($325)	$ (33.7)	$ -	$ -	$ 19.7
2026	8,149	4,530	3,619	100%	$ 68.7	$ 311.1	$ 419	($327)	8,649	5,030	3,619	100%	$ 68.7	$ 345.4	$ 419	($347)	$ (34.3)	$ -	$ -	$ 20.1
2027	8,529	4,530	3,999	100%	$ 70.0	$ 317.3	$ 473	($349)	9,029	5,030	3,999	100%	$ 70.0	$ 352.3	$ 473	($369)	$ (35.0)	$ -	$ -	$ 20.5
2028	8,909	4,530	4,379	100%	$ 71.4	$ 323.6	$ 528	($372)	9,409	5,030	4,379	100%	$ 71.4	$ 359.3	$ 528	($393)	$ (35.7)	$ -	$ -	$ 20.9
2029	9,289	4,530	4,759	100%	$ 72.9	$ 330.1	$ 585	($395)	9,789	5,030	4,759	100%	$ 72.9	$ 366.5	$ 585	($417)	$ (36.4)	$ -	$ -	$ 21.3
2030	9,669	4,530	5,139	100%	$ 74.3	$ 336.7	$ 645	($420)	10,169	5,030	5,139	100%	$ 74.3	$ 373.9	$ 645	($442)	$ (37.2)	$ -	$ -	$ 21.7
2031	10,049	4,530	5,519	100%	$ 75.8	$ 343.4	$ 706	($445)	10,549	5,030	5,519	100%	$ 75.8	$ 381.3	$ 706	($467)	$ (37.9)	$ -	$ -	$ 22.1
2032	10,429	4,530	5,899	100%	$ 77.3	$ 350.3	$ 770	($471)	10,929	5,030	5,899	100%	$ 77.3	$ 389.0	$ 770	($494)	$ (38.7)	$ -	$ -	$ 22.6
2033	10,809	4,530	6,279	100%	$ 78.9	$ 357.3	$ 836	($498)	11,309	5,030	6,279	100%	$ 78.9	$ 396.7	$ 836	($521)	$ (39.4)	$ -	$ -	$ 23.0
2034	11,189	4,530	6,659	100%	$ 80.5	$ 364.5	$ 904	($526)	11,689	5,030	6,659	100%	$ 80.5	$ 404.7	$ 904	($549)	$ (40.2)	$ -	$ -	$ 23.5
2035	11,569	4,530	7,039	100%	$ 82.1	$ 371.7	$ 975	($555)	12,069	5,030	7,039	100%	$ 82.1	$ 412.8	$ 975	($579)	$ (41.0)	$ -	$ -	$ 24.0
2036	11,949	4,530	7,419	100%	$ 83.7	$ 379.2	$ 1,048	($584)	12,449	5,030	7,419	100%	$ 83.7	$ 421.0	$ 1,048	($609)	$ (41.9)	$ -	$ -	$ 24.5
2037	12,329	4,530	7,799	100%	$ 85.4	$ 386.8	$ 1,124	($615)	12,829	5,030	7,799	100%	$ 85.4	$ 429.4	$ 1,124	($640)	$ (42.7)	$ -	$ -	$ 24.9
2038	12,709	4,530	8,179	100%	$ 87.1	$ 394.5	$ 1,202	($647)	13,209	5,030	8,179	100%	$ 87.1	$ 438.0	$ 1,202	($672)	$ (43.5)	$ -	$ -	$ 25.4
2039	13,089	4,530	8,559	100%	$ 88.8	$ 402.4	$ 1,283	($679)	13,589	5,030	8,559	100%	$ 88.8	$ 446.8	$ 1,283	($705)	$ (44.4)	$ -	$ -	$ 26.0
2040	13,469	4,530	8,939	100%	$ 90.6	$ 410.4	$ 1,367	($713)	13,969	5,030	8,939	100%	$ 90.6	$ 455.7	$ 1,367	($739)	$ (45.3)	$ -	$ -	$ 26.5
2041	13,849	4,530	9,319	100%	$ 92.4	$ 418.6	$ 1,454	($748)	14,349	5,030	9,319	100%	$ 92.4	$ 464.8	$ 1,454	($775)	$ (46.2)	$ -	$ -	$ 27.0
2042	14,229	4,530	9,699	100%	$ 94.3	$ 427.0	$ 1,543	($784)	14,729	5,030	9,699	100%	$ 94.3	$ 474.1	$ 1,543	($811)	$ (47.1)	$ -	$ -	$ 27.5
2043	14,609	4,530	10,079	100%	$ 96.1	$ 435.6	$ 1,636	($821)	15,109	5,030	10,079	100%	$ 96.1	$ 483.6	$ 1,636	($849)	$ (48.1)	$ -	$ -	$ 28.1
2044	14,989	4,530	10,459	100%	$ 98.1	$ 444.3	$ 1,731	($859)	15,489	5,030	10,459	100%	$ 98.1	$ 493.3	$ 1,731	($888)	$ (49.0)	$ -	$ -	$ 28.7
2045	15,369	4,530	10,839	100%	$ 100.0	$ 453.1	$ 1,830	($898)	15,869	5,030	10,839	100%	$ 100.0	$ 503.2	$ 1,830	($928)	$ (50.0)	$ -	$ -	$ 29.2
2046	15,749	4,530	11,219	100%	$ 102.0	$ 462.2	$ 1,932	($939)	16,249	5,030	11,219	100%	$ 102.0	$ 513.2	$ 1,932	($969)	$ (51.0)	$ -	$ -	$ 29.8
2047	16,129	4,530	11,599	100%	$ 104.1	$ 471.5	$ 2,038	($981)	16,629	5,030	11,599	100%	$ 104.1	$ 523.5	$ 2,038	($1,011)	$ (52.0)	$ -	$ -	$ 30.4
2048	16,509	4,530	11,979	100%	$ 106.2	$ 480.9	$ 2,146	($1,024)	17,009	5,030	11,979	100%	$ 106.2	$ 534.0	$ 2,146	($1,055)	$ (53.1)	$ -	$ -	$ 31.0
2049	16,889	4,530	12,359	100%	$ 108.3	$ 490.5	$ 2,259	($1,069)	17,389	5,030	12,359	100%	$ 108.3	$ 544.6	$ 2,259	($1,100)	$ (54.1)	$ -	$ -	$ 31.6
Levelized Value ($ million per year)						$232.95	$287.63	($246)						$267.89	$287.63	($264)	($34.94)	$0.00	$0.00	$18.27

G. ED7: CAISO's base case + Sunrise + South Bay

Q. Please briefly describe Scenario ED7.

A. This scenario modifies the CAISO's base case by including Sunrise and South Bay Repowering.

Q. Please summarize the results for Scenario ED7.

A. Based on Table 34, the results are set forth below:

- The total levelized benefit is $219M.
- The $46M of levelized energy benefits reflects the two projects' joint effect on CAISO consumers' energy payment.
- The $129M of levelized reliability benefits reflect the two projects' effect on San Diego's LCR and the non-local RA costs.
- Since the scenario assumes that the Sunrise project is in place, the scenario's levelized RPS benefit of $45M is the same as the one for the CAISO's Sunrise case.

Tables 32 and 33 show the benefits of this case in 2015 and 2020, respectively. Figure 7 and Tables 35 and 36 show the assumed annual streams of reliability costs and benefits of this scenario.

Table 32: Energy Division 7, Sunrise + South Bay re-power- 2015

		A	B	C
	Summary of 2015 Cost and Benefits	**Costs** ($ millions per year, Base Case	ED7	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	13,893	13,766	127
2	Less CAISO congestion cost (reduces TAC)	(109)	(77)	(32)
3	Less URG Margin (reduces URG bal acct)	(4,188)	(4,151)	(37)
4	Less IOU excess loss payments	(713)	(697)	(16)
5	**Subtotal Energy Cost and Benefit**	8,883	8,841	**41**
6	RMR Capacity Payments	80	28	51
7	RMR Operating Payments	60	31	29
8	CT Capacity Costs	29	-	29
9	Transmission cost for new CTs	10	-	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(98)	(77)	(21)
12	**Subtotal Reliability Cost and Benefit**	81	(17)	**98**
13	**Total Energy and Reliability Benefits**			**139**
	RPS Procurement Cost			
14	Adjusted RPS Cost	3,313	3,335	(22)
15	**Total Benefits**			**117**

Table 33: Energy Division 7, Sunrise + South Bay re-power – 2020

		A	B	C
	Summary of 2020 Costs and Benefits	**Costs** ($ millions per year, Base Case	ED7	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,392	15,279	113
2	Less CAISO congestion cost (reduces TAC)	(454)	(429)	(25)
3	Less URG Margin (reduces URG bal acct)	(4,109)	(4,077)	(32)
4	Less IOU excess loss payments	(816)	(804)	(12)
5	**Subtotal Energy Cost and Benefit**	10,013	9,969	**44**
6	RMR Capacity Payments	88	67	21
7	RMR Operating Payments	60	51	9
8	CT Capacity Costs	80	-	80
9	Transmission cost for new CTs	28	-	28
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(125)	(102)	(24)
12	**Subtotal Reliability Cost and Benefit**	131	16	**115**
13	**Total Energy and Reliability Benefits**			**159**
	RPS Procurement Cost			
14	Adjusted RPS Cost	5,366	5,361	6
15	**Total Benefits**			**165**

Table 34: Energy Division 7, Sunrise + South Bay re-power – Levelized

		A	B	C
	Summary of Levelized Costs and Benefits	**Costs** ($ millions per year, nominal)		**Net Benefits** (Base case cost - Alt. case cost)
		Base Case	ED7	
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,771	15,644	127
2	Less CAISO congestion cost (reduces TAC)	(325)	(295)	(30)
3	Less URG Margin (reduces URG bal acct)	(4,433)	(4,396)	(37)
4	Less IOU excess loss payments	(825)	(810)	(15)
5	**Subtotal Energy Cost and Benefit**	10,187	10,142	**46**
6	RMR Capacity Payments - Levelized	90	73	17
7	RMR Operating Payments - Levelized	60	43	17
8	CT Capacity Costs - Levelized	109	20	89
9	Transmission cost for new CTs-Levelized	38	7	31
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(129)	(103)	(26)
12	**Subtotal Reliability Cost and Benefit**	168	40	**129**
13	**Total Energy and Reliability Benefits**			**174**
	RPS Procurement Cost			
14	Adjusted RPS Cost	4,265	4,220	**45**
15	**Total Benefits**			**219**

Figure 7: Energy Division 7, Sunrise + South Bay re-power – Reliability benefits (2010 dollars)

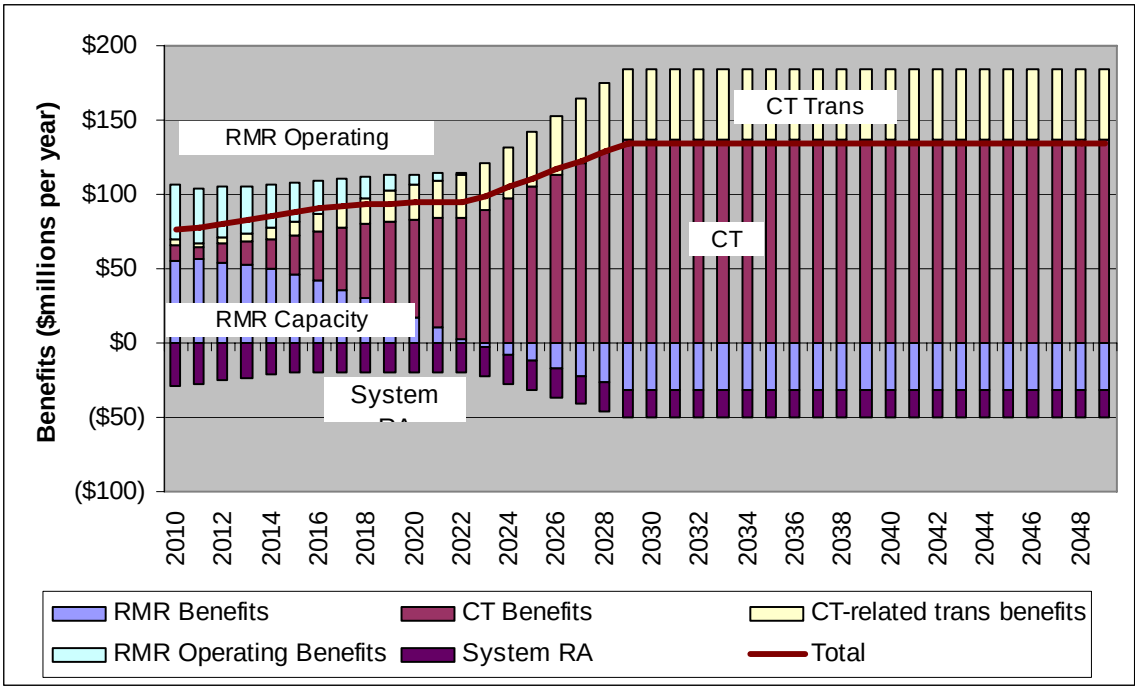

Table 35: Energy Division 7, Sunrise + South Bay re-power – Reliability benefits table

	Base Case (Nominal Dollars)								Alternative							
Year	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)
2010	1,440	133	573	50.02	$ 72.0	$ 15.2	$ 60.0	$ (46.0)	573	-	573	29.98	$ 17.2	-	$ 23.9	$ (16.7)
2011	1,440	100	866	51.02	$ 73.5	$ 11.7	$ 60.0	$ (53.6)	540	-	866	29.82	$ 16.1	-	$ 22.5	$ (25.8)
2012	1,440	146	1,238	52.04	$ 74.9	$ 17.3	$ 60.0	$ (63.9)	586	-	1,238	31.50	$ 18.4	-	$ 24.4	$ (37.6)
2013	1,440	187	1,605	53.08	$ 76.4	$ 22.6	$ 60.0	$ (74.5)	627	-	1,605	33.14	$ 20.8	-	$ 26.1	$ (49.8)
2014	1,440	244	1,988	54.14	$ 78.0	$ 30.2	$ 60.0	$ (85.9)	684	-	1,988	35.24	$ 24.1	-	$ 28.5	$ (62.9)
2015	1,440	313	2,383	55.23	$ 79.5	$ 39.4	$ 60.0	$ (98.2)	753	-	2,383	37.70	$ 28.4	-	$ 31.4	$ (76.9)
2016	1,440	403	2,473	56.33	$ 81.1	$ 51.8	$ 60.0	$ (103.1)	843	-	2,473	40.80	$ 34.4	-	$ 35.1	$ (81.4)
2017	1,440	495	2,565	57.46	$ 82.7	$ 64.9	$ 60.0	$ (108.3)	935	-	2,565	44.05	$ 41.2	-	$ 39.0	$ (86.1)
2018	1,440	588	2,658	58.61	$ 84.4	$ 78.6	$ 60.0	$ (113.6)	1,028	-	2,658	47.46	$ 48.8	-	$ 42.8	$ (91.0)
2019	1,440	683	2,753	59.78	$ 86.1	$ 93.1	$ 60.0	$ (119.2)	1,123	-	2,753	51.02	$ 57.3	-	$ 46.8	$ (96.2)
2020	1,440	779	2,849	60.97	$ 87.8	$ 108.4	$ 60.0	$ (125.0)	1,219	-	2,849	54.76	$ 66.8	-	$ 50.8	$ (101.5)
2021	1,440	872	2,942	62.19	$ 89.6	$ 123.7	$ 60.0	$ (130.9)	1,312	-	2,942	58.51	$ 76.8	-	$ 54.7	$ (106.9)
2022	1,440	966	3,036	63.44	$ 91.3	$ 139.8	$ 60.0	$ (137.0)	1,406	-	3,036	62.44	$ 87.8	-	$ 58.6	$ (112.5)
2023	1,440	1,060	3,130	64.71	$ 93.2	$ 156.5	$ 60.0	$ (143.3)	1,500	-	3,130	64.71	$ 97.1	-	$ 60.0	$ (118.3)
2024	1,440	1,154	3,224	66.00	$ 95.0	$ 173.8	$ 60.0	$ (149.8)	1,594	-	3,224	66.00	$ 105.2	-	$ 60.0	$ (124.3)
2025	1,440	1,248	3,318	67.32	$ 96.9	$ 191.7	$ 60.0	$ (156.5)	1,688	-	3,318	67.32	$ 113.7	-	$ 60.0	$ (130.5)
2026	1,440	1,342	3,412	68.67	$ 98.9	$ 210.3	$ 60.0	$ (163.4)	1,782	-	3,412	68.67	$ 122.4	-	$ 60.0	$ (136.9)
2027	1,440	1,436	3,506	70.04	$ 100.9	$ 229.5	$ 60.0	$ (170.5)	1,876	-	3,506	70.04	$ 131.4	-	$ 60.0	$ (143.5)
2028	1,440	1,531	3,601	71.44	$ 102.9	$ 249.4	$ 60.0	$ (177.8)	1,971	-	3,601	71.44	$ 140.8	-	$ 60.0	$ (150.3)
2029	1,440	1,625	3,695	72.87	$ 104.9	$ 270.1	$ 60.0	$ (185.4)	2,060	5	3,695	72.87	$ 150.1	0.8	$ 60.0	$ (157.3)
2030	1,440	1,719	3,789	74.33	$ 107.0	$ 291.4	$ 60.0	$ (193.2)	2,060	99	3,789	74.33	$ 153.1	16.7	$ 60.0	$ (164.5)
2031	1,440	1,813	3,883	75.81	$ 109.2	$ 313.5	$ 60.0	$ (201.2)	2,060	193	3,883	75.81	$ 156.2	33.3	$ 60.0	$ (172.0)
2032	1,440	1,907	3,977	77.33	$ 111.4	$ 336.4	$ 60.0	$ (209.5)	2,060	287	3,977	77.33	$ 159.3	50.6	$ 60.0	$ (179.7)
2033	1,440	2,001	4,071	78.88	$ 113.6	$ 360.1	$ 60.0	$ (218.0)	2,060	381	4,071	78.88	$ 162.5	68.6	$ 60.0	$ (187.6)
2034	1,440	2,095	4,165	80.45	$ 115.9	$ 384.5	$ 60.0	$ (226.8)	2,060	475	4,165	80.45	$ 165.7	87.2	$ 60.0	$ (195.8)
2035	1,440	2,189	4,259	82.06	$ 118.2	$ 409.8	$ 60.0	$ (235.9)	2,060	569	4,259	82.06	$ 169.0	106.5	$ 60.0	$ (204.2)
2036	1,440	2,283	4,353	83.70	$ 120.5	$ 436.0	$ 60.0	$ (245.2)	2,060	663	4,353	83.70	$ 172.4	126.6	$ 60.0	$ (212.9)
2037	1,440	2,377	4,447	85.38	$ 122.9	$ 463.0	$ 60.0	$ (254.8)	2,060	757	4,447	85.38	$ 175.9	147.5	$ 60.0	$ (221.9)
2038	1,440	2,471	4,541	87.08	$ 125.4	$ 491.0	$ 60.0	$ (264.7)	2,060	851	4,541	87.08	$ 179.4	169.1	$ 60.0	$ (231.1)
2039	1,440	2,565	4,635	88.83	$ 127.9	$ 519.9	$ 60.0	$ (274.8)	2,060	945	4,635	88.83	$ 183.0	191.6	$ 60.0	$ (240.6)
2040	1,440	2,660	4,730	90.60	$ 130.5	$ 549.7	$ 60.0	$ (285.3)	2,060	1,040	4,730	90.60	$ 186.6	214.9	$ 60.0	$ (250.4)
2041	1,440	2,754	4,824	92.41	$ 133.1	$ 580.5	$ 60.0	$ (296.1)	2,060	1,134	4,824	92.41	$ 190.4	239.0	$ 60.0	$ (260.5)
2042	1,440	2,848	4,918	94.26	$ 135.7	$ 612.4	$ 60.0	$ (307.2)	2,060	1,228	4,918	94.26	$ 194.2	264.0	$ 60.0	$ (270.9)
2043	1,440	2,942	5,012	96.15	$ 138.5	$ 645.3	$ 60.0	$ (318.6)	2,060	1,322	5,012	96.15	$ 198.1	289.9	$ 60.0	$ (281.6)
2044	1,440	3,036	5,106	98.07	$ 141.2	$ 679.2	$ 60.0	$ (330.4)	2,060	1,416	5,106	98.07	$ 202.0	316.8	$ 60.0	$ (292.6)
2045	1,440	3,130	5,200	100.03	$ 144.0	$ 714.3	$ 60.0	$ (342.5)	2,060	1,510	5,200	100.03	$ 206.1	344.6	$ 60.0	$ (303.9)
2046	1,440	3,224	5,294	102.03	$ 146.9	$ 750.5	$ 60.0	$ (355.0)	2,060	1,604	5,294	102.03	$ 210.2	373.4	$ 60.0	$ (315.6)
2047	1,440	3,318	5,388	104.07	$ 149.9	$ 787.8	$ 60.0	$ (367.8)	2,060	1,698	5,388	104.07	$ 214.4	403.2	$ 60.0	$ (327.6)
2048	1,440	3,412	5,482	106.16	$ 152.9	$ 826.4	$ 60.0	$ (381.0)	2,060	1,792	5,482	106.16	$ 218.7	434.0	$ 60.0	$ (340.0)
2049	1,440	3,506	5,576	108.28	$ 155.9	$ 866.1	$ 60.0	$ (394.5)	2,060	1,886	5,576	108.28	$ 223.1	466.0	$ 60.0	$ (352.8)
Levelized Cost ($ million per year)					$ 90.1	$ 147.1	$ 60.0	$ (129.1)					$ 72.8	27.1	$ 42.5	$ (102.8)
Levelized Benefit (Base Case Cost - Alternative Cost)													$ 17.3	$ 120.0	$ 17.5	$ (26.3)

H. ED8: CAISO base case + Sunrise + South Bay + Green Path North

Q. Please briefly describe Scenario ED8.

A. This scenario modifies the CAISO base case by including the combination of Sunrise, South Bay and Green Path North. It is the same as ED7 plus the Green Path North project.

Q. Please summarize the results for Scenario ED8.

A. Based on Table 38, the results are set forth below:

- The total levelized benefit is $214M.
- The $40M of levelized energy benefits reflect the three projects' joint effect on CAISO consumers' energy payment.
- The $129M of levelized reliability benefits reflect the three projects' effect on San Diego's LCR and the non-local RA costs.
- Since the scenario assumes that the Sunrise project is in place, the scenario's levelized RPS benefit of $45M is the same as the CAISO's Sunrise case.

Tables 36 and 37 show the benefits of this case in 2015 and 2020, respectively. Figure 8 and Tables 39 and 40 show the assumed annual stream of reliability costs and benefits of this scenario.

Table 36: Energy Division 8, Sunrise + South Bay re-power + Green Path North- 2015

		A	B	C
	Summary of 2015 Cost and Benefits	**Costs** ($ millions per year, Base Case	ED8	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	13,893	13,780	113
2	Less CAISO congestion cost (reduces TAC)	(109)	(76)	(33)
3	Less URG Margin (reduces URG bal acct)	(4,188)	(4,156)	(32)
4	Less IOU excess loss payments	(713)	(696)	(17)
5	**Subtotal Energy Cost and Benefit**	8,883	8,853	**30**
6	RMR Capacity Payments	80	28	51
7	RMR Operating Payments	60	31	29
8	CT Capacity Costs	29	-	29
9	Transmission cost for new CTs	10	-	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(98)	(77)	(21)
12	**Subtotal Reliability Cost and Benefit**	81	(17)	**98**
13	**Total Energy and Reliability Benefits**			**128**
	RPS Procurement Cost			
14	Adjusted RPS Cost	3,313	3,335	(22)
15	**Total Benefits**			**106**

Table 37: Energy Division 8, Sunrise + South Bay re-power + Green Path North – 2020

		A	B	C
	Summary of 2020 Costs and Benefits	**Costs** ($ millions per year, Base Case	ED8	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,392	15,270	122
2	Less CAISO congestion cost (reduces TAC)	(454)	(424)	(30)
3	Less URG Margin (reduces URG bal acct)	(4,109)	(4,074)	(34)
4	Less IOU excess loss payments	(816)	(801)	(15)
5	**Subtotal Energy Cost and Benefit**	10,013	9,970	**43**
6	RMR Capacity Payments	88	67	21
7	RMR Operating Payments	60	51	9
8	CT Capacity Costs	80	-	80
9	Transmission cost for new CTs	28	-	28
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(125)	(102)	(24)
12	**Subtotal Reliability Cost and Benefit**	131	16	**115**
13	**Total Energy and Reliability Benefits**			**158**
	RPS Procurement Cost			
14	Adjusted RPS Cost	5,366	5,361	6
15	**Total Benefits**			**164**

Table 38: Energy Division 8, Sunrise + South Bay re-power + Green Path North – Levelized

	Summary of Levelized Costs and Benefits	A Costs ($ millions per year, nominal) Base Case	A Costs ($ millions per year, nominal) ED8	C Net Benefits (Base case cost - Alt. case cost)
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,771	15,645	126
2	Less CAISO congestion cost (reduces TAC)	(325)	(291)	(34)
3	Less URG Margin (reduces URG bal acct)	(4,433)	(4,397)	(36)
4	Less IOU excess loss payments	(825)	(808)	(17)
5	**Subtotal Energy Cost and Benefit**	10,187	10,147	**40**
6	RMR Capacity Payments - Levelized	90	73	17
7	RMR Operating Payments - Levelized	60	43	17
8	CT Capacity Costs - Levelized	109	20	89
9	Transmission cost for new CTs-Levelized	38	7	31
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(129)	(103)	(26)
12	**Subtotal Reliability Cost and Benefit**	168	40	**129**
13	**Total Energy and Reliability Benefits**			**169**
	RPS Procurement Cost			
14	Adjusted RPS Cost	4,265	4,220	**45**
15	**Total Benefits**			**214**

Figure 8: Energy Division 8, Sunrise + South Bay re-power + Green Path North – Reliability benefits (2010 dollars)

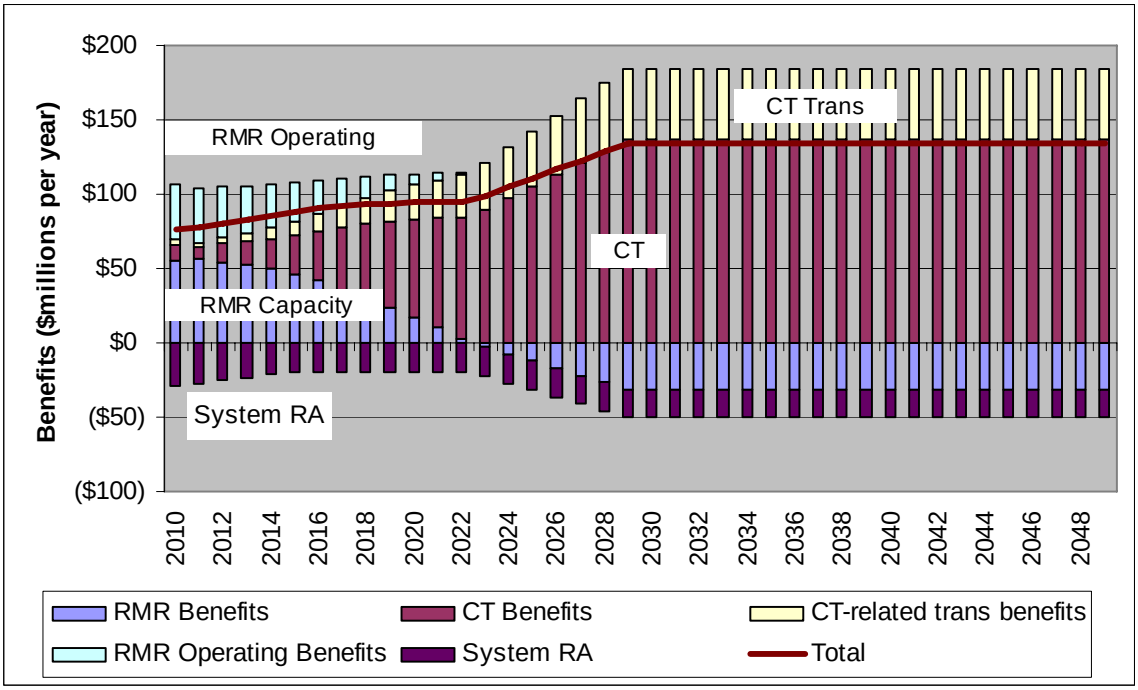

Table 39: Energy Division 8, Sunrise + South Bay re-power + Green Path North – Reliability benefits table

	Base Case (Nominal Dollars)								Alternative							
Year	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)
2010	1,440	133	573	50.02	$ 72.0	$ 15.2	$ 60.0	$ (46.0)	573	-	573	29.98	$ 17.2	-	$ 23.9	$ (16.7)
2011	1,440	100	866	51.02	$ 73.5	$ 11.7	$ 60.0	$ (53.6)	540	-	866	29.82	$ 16.1	-	$ 22.5	$ (25.8)
2012	1,440	146	1,238	52.04	$ 74.9	$ 17.3	$ 60.0	$ (63.9)	586	-	1,238	31.50	$ 18.4	-	$ 24.4	$ (37.6)
2013	1,440	187	1,605	53.08	$ 76.4	$ 22.6	$ 60.0	$ (74.5)	627	-	1,605	33.14	$ 20.8	-	$ 26.1	$ (49.8)
2014	1,440	244	1,988	54.14	$ 78.0	$ 30.2	$ 60.0	$ (85.9)	684	-	1,988	35.24	$ 24.1	-	$ 28.5	$ (62.9)
2015	1,440	313	2,383	55.23	$ 79.5	$ 39.4	$ 60.0	$ (98.2)	753	-	2,383	37.70	$ 28.4	-	$ 31.4	$ (76.9)
2016	1,440	403	2,473	56.33	$ 81.1	$ 51.8	$ 60.0	$ (103.1)	843	-	2,473	40.80	$ 34.4	-	$ 35.1	$ (81.4)
2017	1,440	495	2,565	57.46	$ 82.7	$ 64.9	$ 60.0	$ (108.3)	935	-	2,565	44.05	$ 41.2	-	$ 39.0	$ (86.1)
2018	1,440	588	2,658	58.61	$ 84.4	$ 78.6	$ 60.0	$ (113.6)	1,028	-	2,658	47.46	$ 48.8	-	$ 42.8	$ (91.0)
2019	1,440	683	2,753	59.78	$ 86.1	$ 93.1	$ 60.0	$ (119.2)	1,123	-	2,753	51.02	$ 57.3	-	$ 46.8	$ (96.2)
2020	1,440	779	2,849	60.97	$ 87.8	$ 108.4	$ 60.0	$ (125.0)	1,219	-	2,849	54.76	$ 66.8	-	$ 50.8	$ (101.5)
2021	1,440	872	2,942	62.19	$ 89.6	$ 123.7	$ 60.0	$ (130.9)	1,312	-	2,942	58.51	$ 76.8	-	$ 54.7	$ (106.9)
2022	1,440	966	3,036	63.44	$ 91.3	$ 139.8	$ 60.0	$ (137.0)	1,406	-	3,036	62.44	$ 87.8	-	$ 58.6	$ (112.5)
2023	1,440	1,060	3,130	64.71	$ 93.2	$ 156.5	$ 60.0	$ (143.3)	1,500	-	3,130	64.71	$ 97.1	-	$ 60.0	$ (118.3)
2024	1,440	1,154	3,224	66.00	$ 95.0	$ 173.8	$ 60.0	$ (149.8)	1,594	-	3,224	66.00	$ 105.2	-	$ 60.0	$ (124.3)
2025	1,440	1,248	3,318	67.32	$ 96.9	$ 191.7	$ 60.0	$ (156.5)	1,688	-	3,318	67.32	$ 113.7	-	$ 60.0	$ (130.5)
2026	1,440	1,342	3,412	68.67	$ 98.9	$ 210.3	$ 60.0	$ (163.4)	1,782	-	3,412	68.67	$ 122.4	-	$ 60.0	$ (136.9)
2027	1,440	1,436	3,506	70.04	$ 100.9	$ 229.5	$ 60.0	$ (170.5)	1,876	-	3,506	70.04	$ 131.4	-	$ 60.0	$ (143.5)
2028	1,440	1,531	3,601	71.44	$ 102.9	$ 249.4	$ 60.0	$ (177.8)	1,971	-	3,601	71.44	$ 140.8	-	$ 60.0	$ (150.3)
2029	1,440	1,625	3,695	72.87	$ 104.9	$ 270.1	$ 60.0	$ (185.4)	2,060	5	3,695	72.87	$ 150.1	0.8	$ 60.0	$ (157.3)
2030	1,440	1,719	3,789	74.33	$ 107.0	$ 291.4	$ 60.0	$ (193.2)	2,060	99	3,789	74.33	$ 153.1	16.7	$ 60.0	$ (164.5)
2031	1,440	1,813	3,883	75.81	$ 109.2	$ 313.5	$ 60.0	$ (201.2)	2,060	193	3,883	75.81	$ 156.2	33.3	$ 60.0	$ (172.0)
2032	1,440	1,907	3,977	77.33	$ 111.4	$ 336.4	$ 60.0	$ (209.5)	2,060	287	3,977	77.33	$ 159.3	50.6	$ 60.0	$ (179.7)
2033	1,440	2,001	4,071	78.88	$ 113.6	$ 360.1	$ 60.0	$ (218.0)	2,060	381	4,071	78.88	$ 162.5	68.6	$ 60.0	$ (187.6)
2034	1,440	2,095	4,165	80.45	$ 115.9	$ 384.5	$ 60.0	$ (226.8)	2,060	475	4,165	80.45	$ 165.7	87.2	$ 60.0	$ (195.8)
2035	1,440	2,189	4,259	82.06	$ 118.2	$ 409.8	$ 60.0	$ (235.9)	2,060	569	4,259	82.06	$ 169.0	106.5	$ 60.0	$ (204.2)
2036	1,440	2,283	4,353	83.70	$ 120.5	$ 436.0	$ 60.0	$ (245.2)	2,060	663	4,353	83.70	$ 172.4	126.6	$ 60.0	$ (212.9)
2037	1,440	2,377	4,447	85.38	$ 122.9	$ 463.0	$ 60.0	$ (254.8)	2,060	757	4,447	85.38	$ 175.9	147.5	$ 60.0	$ (221.9)
2038	1,440	2,471	4,541	87.08	$ 125.4	$ 491.0	$ 60.0	$ (264.7)	2,060	851	4,541	87.08	$ 179.4	169.1	$ 60.0	$ (231.1)
2039	1,440	2,565	4,635	88.83	$ 127.9	$ 519.9	$ 60.0	$ (274.8)	2,060	945	4,635	88.83	$ 183.0	191.6	$ 60.0	$ (240.6)
2040	1,440	2,660	4,730	90.60	$ 130.5	$ 549.7	$ 60.0	$ (285.3)	2,060	1,040	4,730	90.60	$ 186.6	214.9	$ 60.0	$ (250.4)
2041	1,440	2,754	4,824	92.41	$ 133.1	$ 580.5	$ 60.0	$ (296.1)	2,060	1,134	4,824	92.41	$ 190.4	239.0	$ 60.0	$ (260.5)
2042	1,440	2,848	4,918	94.26	$ 135.7	$ 612.4	$ 60.0	$ (307.2)	2,060	1,228	4,918	94.26	$ 194.2	264.0	$ 60.0	$ (270.9)
2043	1,440	2,942	5,012	96.15	$ 138.5	$ 645.3	$ 60.0	$ (318.6)	2,060	1,322	5,012	96.15	$ 198.1	289.9	$ 60.0	$ (281.6)
2044	1,440	3,036	5,106	98.07	$ 141.2	$ 679.2	$ 60.0	$ (330.4)	2,060	1,416	5,106	98.07	$ 202.0	316.8	$ 60.0	$ (292.6)
2045	1,440	3,130	5,200	100.03	$ 144.0	$ 714.3	$ 60.0	$ (342.5)	2,060	1,510	5,200	100.03	$ 206.1	344.6	$ 60.0	$ (303.9)
2046	1,440	3,224	5,294	102.03	$ 146.9	$ 750.5	$ 60.0	$ (355.0)	2,060	1,604	5,294	102.03	$ 210.2	373.4	$ 60.0	$ (315.6)
2047	1,440	3,318	5,388	104.07	$ 149.9	$ 787.8	$ 60.0	$ (367.8)	2,060	1,698	5,388	104.07	$ 214.4	403.2	$ 60.0	$ (327.6)
2048	1,440	3,412	5,482	106.16	$ 152.9	$ 826.4	$ 60.0	$ (381.0)	2,060	1,792	5,482	106.16	$ 218.7	434.0	$ 60.0	$ (340.0)
2049	1,440	3,506	5,576	108.28	$ 155.9	$ 866.1	$ 60.0	$ (394.5)	2,060	1,886	5,576	108.28	$ 223.1	466.0	$ 60.0	$ (352.8)
Levelized Cost ($ million per year)					$ 90.1	$ 147.1	$ 60.0	$ (129.1)					$ 72.8	27.1	$ 42.5	$ (102.8)
Levelized Benefit (Base Case Cost - Alternative Cost)													$ 17.3	$ 120.0	$ 17.5	$ (26.3)

J. ED9: CAISO base case + Sunrise + Green Path North

Q. Please briefly describe Scenario ED9.

A. This scenario modifies the CAISO base case by including Sunrise and Green Path North.

Q. Please summarize the results for Scenario ED9.

A. Based on Table 42, the results are set forth below:

- The total levelized benefit is $190M.
- The $32M of levelized energy benefit reflects the two projects' joint effect on CAISO consumers' energy payment.
- The $112M of levelized reliability benefit reflects the three projects' effect on San Diego's LCR and the non-local RA costs.
- Since the scenario assumes that the Sunrise project is in place, the scenario's levelized RPS benefit of $45M is the same as the one for the CAISO's Sunrise case.

Tables 40 and 41 show the benefits of this case in 2015 and 2020, respectively. Figure 4 and Tables 20 and 21 show the assumed annual streams of reliability costs and benefits of this scenario.

Table 40: Energy Division 9, Sunrise + Green Path North – 2015

		A	B	C
	Summary of 2015 Cost and Benefits	**Costs** ($ millions per year, Base Case	ED9	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	13,893	13,778	115
2	Less CAISO congestion cost (reduces TAC)	(109)	(72)	(37)
3	Less URG Margin (reduces URG bal acct)	(4,188)	(4,154)	(34)
4	Less IOU excess loss payments	(713)	(697)	(16)
5	**Subtotal Energy Cost and Benefit**	8,883	8,854	**28**
6	RMR Capacity Payments	80	28	51
7	RMR Operating Payments	60	31	29
8	CT Capacity Costs	29	-	29
9	Transmission cost for new CTs	10	-	10
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(98)	(77)	(21)
12	**Subtotal Reliability Cost and Benefit**	81	(17)	**98**
13	**Total Energy and Reliability Benefits**			**126**
	RPS Procurement Cost			
14	Adjusted RPS Cost	3,313	3,335	(22)
15	**Total Benefits**			**104**

Table 41: Energy Division 9, Sunrise + Green Path North – 2020

		A	B	C
	Summary of 2020 Costs and Benefits	**Costs** ($ millions per year, Base Case	ED9	**Net Benefits** (Base case cost -
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,392	15,290	102
2	Less CAISO congestion cost (reduces TAC)	(454)	(425)	(29)
3	Less URG Margin (reduces URG bal acct)	(4,109)	(4,080)	(28)
4	Less IOU excess loss payments	(816)	(803)	(13)
5	**Subtotal Energy Cost and Benefit**	10,013	9,982	**32**
6	RMR Capacity Payments	88	67	21
7	RMR Operating Payments	60	51	9
8	CT Capacity Costs	80	-	80
9	Transmission cost for new CTs	28	-	28
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(125)	(102)	(24)
12	**Subtotal Reliability Cost and Benefit**	131	16	**115**
13	**Total Energy and Reliability Benefits**			**147**
	RPS Procurement Cost			
14	Adjusted RPS Cost	5,366	5,361	6
15	**Total Benefits**			**152**

Table 42: Energy Division 9, Sunrise + Green Path North – Levelized

		A	B	C
	Summary of Levelized Costs and Benefits	**Costs** ($ millions per year, nominal)		**Net Benefits** (Base case cost - Alt. case cost)
		Base Case	ED9	
	Energy and Reliability Costs			
1	Customer Payments from Gridview	15,771	15,655	115
2	Less CAISO congestion cost (reduces TAC)	(325)	(290)	(35)
3	Less URG Margin (reduces URG bal acct)	(4,433)	(4,400)	(33)
4	Less IOU excess loss payments	(825)	(810)	(15)
5	**Subtotal Energy Cost and Benefit**	10,187	10,155	**32**
6	RMR Capacity Payments - Levelized	90	60	30
7	RMR Operating Payments - Levelized	60	43	17
8	CT Capacity Costs - Levelized	109	41	68
9	Transmission cost for new CTs-Levelized	38	14	24
10	Remediation cost to provide reactive support	-	-	-
11	System RA Provided by local capacity & RPS	(129)	(103)	(26)
12	**Subtotal Reliability Cost and Benefit**	168	56	**112**
13	**Total Energy and Reliability Benefits**			**145**
	RPS Procurement Cost			
14	Adjusted RPS Cost	4,265	4,220	**45**
15	**Total Benefits**			**190**

Figure 9: Energy Division 9, Sunrise + Green Path North – Reliability benefits (2010 dollars)

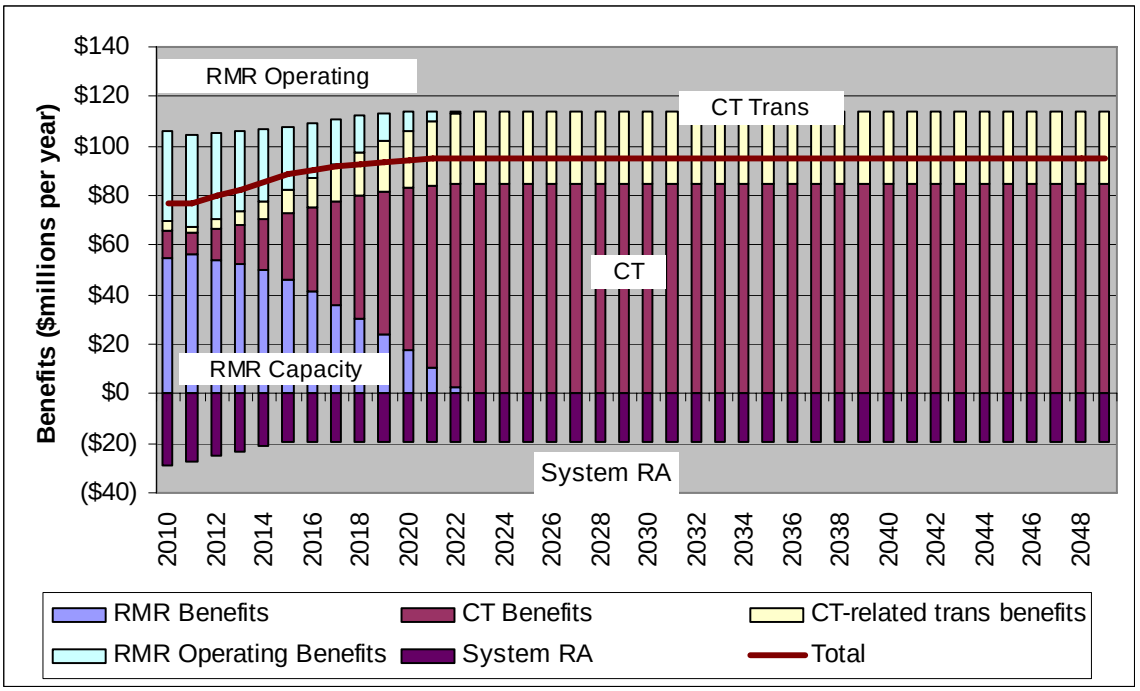

Table 43: Energy Division 9, Sunrise + Green Path North – Reliability benefits table

	Base Case (Nominal Dollars)								Alternative							
Year	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)	RMR Contract (MW)	New CT (MW)	System RA Provided (MW)	RMR Contract Price ($/kW-yr)	RMR Contract Cost ($M)	New CT and Trans Cost ($M)	RMR Operating Cost ($M)	System RA Cost ($M)
2010	1,440	133	573	50.02	$ 72.0	$ 15.2	$ 60.0	$ (46.0)	573	-	573	29.98	$ 17.2	-	$ 23.9	$ (16.7)
2011	1,440	100	866	51.02	$ 73.5	$ 11.7	$ 60.0	$ (53.6)	540	-	866	29.82	$ 16.1	-	$ 22.5	$ (25.8)
2012	1,440	146	1,238	52.04	$ 74.9	$ 17.3	$ 60.0	$ (63.9)	586	-	1,238	31.50	$ 18.4	-	$ 24.4	$ (37.6)
2013	1,440	187	1,605	53.08	$ 76.4	$ 22.6	$ 60.0	$ (74.5)	627	-	1,605	33.14	$ 20.8	-	$ 26.1	$ (49.8)
2014	1,440	244	1,988	54.14	$ 78.0	$ 30.2	$ 60.0	$ (85.9)	684	-	1,988	35.24	$ 24.1	-	$ 28.5	$ (62.9)
2015	1,440	313	2,383	55.23	$ 79.5	$ 39.4	$ 60.0	$ (98.2)	753	-	2,383	37.70	$ 28.4	-	$ 31.4	$ (76.9)
2016	1,440	403	2,473	56.33	$ 81.1	$ 51.8	$ 60.0	$ (103.1)	843	-	2,473	40.80	$ 34.4	-	$ 35.1	$ (81.4)
2017	1,440	495	2,565	57.46	$ 82.7	$ 64.9	$ 60.0	$ (108.3)	935	-	2,565	44.05	$ 41.2	-	$ 39.0	$ (86.1)
2018	1,440	588	2,658	58.61	$ 84.4	$ 78.6	$ 60.0	$ (113.6)	1,028	-	2,658	47.46	$ 48.8	-	$ 42.8	$ (91.0)
2019	1,440	683	2,753	59.78	$ 86.1	$ 93.1	$ 60.0	$ (119.2)	1,123	-	2,753	51.02	$ 57.3	-	$ 46.8	$ (96.2)
2020	1,440	779	2,849	60.97	$ 87.8	$ 108.4	$ 60.0	$ (125.0)	1,219	-	2,849	54.76	$ 66.8	-	$ 50.8	$ (101.5)
2021	1,440	872	2,942	62.19	$ 89.6	$ 123.7	$ 60.0	$ (130.9)	1,312	-	2,942	58.51	$ 76.8	-	$ 54.7	$ (106.9)
2022	1,440	966	3,036	63.44	$ 91.3	$ 139.8	$ 60.0	$ (137.0)	1,406	-	3,036	62.44	$ 87.8	-	$ 58.6	$ (112.5)
2023	1,440	1,060	3,130	64.71	$ 93.2	$ 156.5	$ 60.0	$ (143.3)	1,440	60	3,130	64.71	$ 93.2	8.9	$ 60.0	$ (118.3)
2024	1,440	1,154	3,224	66.00	$ 95.0	$ 173.8	$ 60.0	$ (149.8)	1,440	154	3,224	66.00	$ 95.0	23.2	$ 60.0	$ (124.3)
2025	1,440	1,248	3,318	67.32	$ 96.9	$ 191.7	$ 60.0	$ (156.5)	1,440	248	3,318	67.32	$ 96.9	38.1	$ 60.0	$ (130.5)
2026	1,440	1,342	3,412	68.67	$ 98.9	$ 210.3	$ 60.0	$ (163.4)	1,440	342	3,412	68.67	$ 98.9	53.6	$ 60.0	$ (136.9)
2027	1,440	1,436	3,506	70.04	$ 100.9	$ 229.5	$ 60.0	$ (170.5)	1,440	436	3,506	70.04	$ 100.9	69.7	$ 60.0	$ (143.5)
2028	1,440	1,531	3,601	71.44	$ 102.9	$ 249.4	$ 60.0	$ (177.8)	1,440	531	3,601	71.44	$ 102.9	86.5	$ 60.0	$ (150.3)
2029	1,440	1,625	3,695	72.87	$ 104.9	$ 270.1	$ 60.0	$ (185.4)	1,440	625	3,695	72.87	$ 104.9	103.8	$ 60.0	$ (157.3)
2030	1,440	1,719	3,789	74.33	$ 107.0	$ 291.4	$ 60.0	$ (193.2)	1,440	719	3,789	74.33	$ 107.0	121.9	$ 60.0	$ (164.5)
2031	1,440	1,813	3,883	75.81	$ 109.2	$ 313.5	$ 60.0	$ (201.2)	1,440	813	3,883	75.81	$ 109.2	140.6	$ 60.0	$ (172.0)
2032	1,440	1,907	3,977	77.33	$ 111.4	$ 336.4	$ 60.0	$ (209.5)	1,440	907	3,977	77.33	$ 111.4	160.0	$ 60.0	$ (179.7)
2033	1,440	2,001	4,071	78.88	$ 113.6	$ 360.1	$ 60.0	$ (218.0)	1,440	1,001	4,071	78.88	$ 113.6	180.1	$ 60.0	$ (187.6)
2034	1,440	2,095	4,165	80.45	$ 115.9	$ 384.5	$ 60.0	$ (226.8)	1,440	1,095	4,165	80.45	$ 115.9	201.0	$ 60.0	$ (195.8)
2035	1,440	2,189	4,259	82.06	$ 118.2	$ 409.8	$ 60.0	$ (235.9)	1,440	1,189	4,259	82.06	$ 118.2	222.6	$ 60.0	$ (204.2)
2036	1,440	2,283	4,353	83.70	$ 120.5	$ 436.0	$ 60.0	$ (245.2)	1,440	1,283	4,353	83.70	$ 120.5	245.0	$ 60.0	$ (212.9)
2037	1,440	2,377	4,447	85.38	$ 122.9	$ 463.0	$ 60.0	$ (254.8)	1,440	1,377	4,447	85.38	$ 122.9	268.3	$ 60.0	$ (221.9)
2038	1,440	2,471	4,541	87.08	$ 125.4	$ 491.0	$ 60.0	$ (264.7)	1,440	1,471	4,541	87.08	$ 125.4	292.3	$ 60.0	$ (231.1)
2039	1,440	2,565	4,635	88.83	$ 127.9	$ 519.9	$ 60.0	$ (274.8)	1,440	1,565	4,635	88.83	$ 127.9	317.2	$ 60.0	$ (240.6)
2040	1,440	2,660	4,730	90.60	$ 130.5	$ 549.7	$ 60.0	$ (285.3)	1,440	1,660	4,730	90.60	$ 130.5	343.0	$ 60.0	$ (250.4)
2041	1,440	2,754	4,824	92.41	$ 133.1	$ 580.5	$ 60.0	$ (296.1)	1,440	1,754	4,824	92.41	$ 133.1	369.7	$ 60.0	$ (260.5)
2042	1,440	2,848	4,918	94.26	$ 135.7	$ 612.4	$ 60.0	$ (307.2)	1,440	1,848	4,918	94.26	$ 135.7	397.3	$ 60.0	$ (270.9)
2043	1,440	2,942	5,012	96.15	$ 138.5	$ 645.3	$ 60.0	$ (318.6)	1,440	1,942	5,012	96.15	$ 138.5	425.9	$ 60.0	$ (281.6)
2044	1,440	3,036	5,106	98.07	$ 141.2	$ 679.2	$ 60.0	$ (330.4)	1,440	2,036	5,106	98.07	$ 141.2	455.5	$ 60.0	$ (292.6)
2045	1,440	3,130	5,200	100.03	$ 144.0	$ 714.3	$ 60.0	$ (342.5)	1,440	2,130	5,200	100.03	$ 144.0	486.1	$ 60.0	$ (303.9)
2046	1,440	3,224	5,294	102.03	$ 146.9	$ 750.5	$ 60.0	$ (355.0)	1,440	2,224	5,294	102.03	$ 146.9	517.7	$ 60.0	$ (315.6)
2047	1,440	3,318	5,388	104.07	$ 149.9	$ 787.8	$ 60.0	$ (367.8)	1,440	2,318	5,388	104.07	$ 149.9	550.4	$ 60.0	$ (327.6)
2048	1,440	3,412	5,482	106.16	$ 152.9	$ 826.4	$ 60.0	$ (381.0)	1,440	2,412	5,482	106.16	$ 152.9	584.2	$ 60.0	$ (340.0)
2049	1,440	3,506	5,576	108.28	$ 155.9	$ 866.1	$ 60.0	$ (394.5)	1,440	2,506	5,576	108.28	$ 155.9	619.1	$ 60.0	$ (352.8)
Levelized Cost ($ million per year)					$ 90.1	$ 147.1	$ 60.0	$ (129.1)					$ 60.2	55.7	$ 42.5	$ (102.8)
Levelized Benefit (Base Case Cost - Alternative Cost)													$ 29.8	$ 91.4	$ 17.5	$ (26.3)

III. ASPEN-REQUESTED RUNS

Q. In the CAISO's Initial Testimony Part III, the CAISO analyzed Aspen alternatives 1, 10, and 13 at 3000 MW of San Diego area imports, and did not find any criteria violations. However, Sunrise is designed to allow 4200 MW of imports into the San Diego area. Has the CAISO analyzed these alternatives at the maximum import level of 4200 MW?

A. Yes. The CAISO has since analyzed these three Aspen alternatives at 4200 MW of San Diego area imports with all lines in service using the 2010 Heavy Summer Power flow model. These alternatives were also analyzed at 3500 MW of San Diego area imports with the Imperial Valley-Miguel 500 kV line removed from service in the 2010 Heavy Summer base case model. In addition, this same analysis was performed on the Sunrise Powerlink alternative as proposed by SDG&E. However, it was found that there were numerical convergence problems for the SONGS G-2 outage, indicating that there was a reactive deficiency at 4200 MW of import. Therefore, the import level was reduced to 4000 MW and acceptable system performance was found at this import level for this contingency. This potential reduction in import level does not affect the CAISO economic analysis of the Sunrise Powerlink because all of the Gridview analysis assumed a maximum San Diego import limit of 4000 MW.

Q. Please describe Scenario ASPEN1.

A. Scenario ASPEN1modifies the CAISO's Sunrise Powerlink 2010 base case by eliminating the Central Substation, moving the 500/230 kV transformers at Central substation to San Felipe substation, and extending the two Sycamore Canyon-Central 230 kV lines to create two San Felipe-Sycamore Canyon 230 kV lines.

Q. Please summarize the results for Scenario ASPEN1.

A. Power flow thermal loading, post-transient, and stability analyses were performed on ASPEN1 at the 3500 MW import level under the N-1 conditions and at 4200 MW import level. The performance of this alternative was found to be equivalent to that of the Sunrise Powerlink alternative proposed by SDG&E. ASPEN1 was not analyzed at the 4000 MW of import level, but it is assumed that this alternative would perform similarly as the Sunrise Powerlink, which performed adequately under the SONGS G-2 outage case at this import level.

Q. Please describe the Scenario ASPEN10.

A. ASPEN10 can generally be described as an alternative where a second 500 kV line is built that runs parallel to the existing Imperial Valley-Miguel 500 kV line up to the existing Boulevard substation. The existing Imperial Valley-Miguel 500 kV line is approximately 83 miles in length and the new parallel 500 kV line to Boulevard would be about 42 miles in length. Based on conversations between

the CAISO and Aspen, the CAISO understands that the expected frequency of common mode outages between the two 500 kV lines could be reasonably expected to be less than 1 in 20 years.[10] In addition, in our Rebuttal testimony on page 62, the CAISO loosely referred to this alternative as SWPL II. However, this alternative is not a second Imperial Valley-Miguel 500 kV line. This scenario modifies the CAISO Sunrise 2010 Heavy Summer case by:

- Eliminating the Imperial Valley-San Felipe and San Felipe-Central 500 kV lines;
- Eliminating the San Felipe and Central Substations;
- Adding a 500 kV line from Imperial Valley 500 kV station to a new 500 kV bus installed at the existing Boulevard substation;
- Adding 500 MW of wind generation at the Boulevard substation (dispatched at 85 MW); and
- Adding two Boulevard-Sycamore Canyon 230 kV lines.
- Adding two 500/230 kV transformers at Boulevard substation

[10] In this situation a common mode outage could be caused by fire, as discussed by the CAISO in its Comments on SDG&E's Corridor B, C, and D on October 12, 2007. However, based on the information provided by Aspen regarding the frequency of fires in the area where the Aspen10 proposed alternative parallels SWPL, the common mode outage would be evaluated as Category C rather than Category B according to WECC/NERC reliability standards. We would note that in the event that common mode outages on these two lines occurred more than once in the previous three years, then this could force the more stringent Category B evaluation and drastically limit the transfer capability benefits of the line.

Q. Please summarize the results for Scenario ASPEN10.

A. Power flow thermal loading, post-transient, and stability analysis was performed on ASPEN10 at the 3500 MW import level under the N-1 conditions and at 4000 MW import level. With the exception of the common mode outage of the two 500 kV lines west of Imperial Valley substation, the performance of this alternative was found to be equivalent to that of the Sunrise Powerlink alternative proposed by SDG&E. For the common mode outage of the two 500 kV lines west of Imperial Valley substation, the CAISO found that a Special Protection Scheme would be needed that would shed up to 500 to 1000 MW of load in the San Diego area and 1000 to 2000 MW of generation dropping around Imperial Valley Substation.

Q. Please describe Scenario ASPEN13.

A. ASPEN13 is the same as ASPEN 10 with the following exceptions:

- A different routing of the 2X230kV lines to Los Coches, rather than Sycamore Canyon; and
- The existing Miguel- Mission 230 kV line and a Miguel Sycamore Canyon 230 kV line looped into the new 230 kV bus at Los Coches substation.

Q. Please summarize the results for Scenario ASPEN13.

A. Power flow thermal loading analysis was performed on ASPEN13 at the 3500 MW import level under the N-1 conditions and at 4200 MW import level. This

analysis revealed three new normal overloads and three new contingency overloads. Given the superior performance of Aspen10 over Aspen13, no further analysis was performed on Aspen13.

Q. What is the CAISO's opinion of the three Aspen alternatives?

A. ASPEN13 performed the worst of the three alternatives. ASPEN1 appears to provide the best performance of the three Aspen alternatives. ASPEN10 provides adequate performance but requires a load dropping SPS as described above. However, compared to Sunrise as proposed by SDG&E, ASPEN1 and ASPEN10 do not provide the same potential for connecting the 500 kV facilities serving the San Diego area and the Southern California Edison system for improved system security and future economic transfers for both areas. As renewable areas to the north such as Tehachapi are developed, the CAISO may find a need for bidirectional transfers between the SCE and SDG&E systems to integrate the intermittent sources of wind and solar resources in Imperial County into the grid. Furthermore, Sunrise and ASPEN1 provide a better transmission backbone to renewables in both the Imperial Valley and Salton Sea areas than ASPEN 10, because they can be looped into San Felipe substation, which is adjacent to the Salton Sea geothermal area and provide a third connection between the CAISO and IID systems. Nonetheless, the potential for a 500 kV connection to resource areas to the north (such as Tehachapi) that is provided by Sunrise, coupled with this stronger connection to IID and the Salton Sea resources, make Sunrise a more flexible alternative from an engineering standpoint.

IV. CONCLUSION

Q. Can you summarize the results of your analysis?

A. Yes. Table 44 below summarizes the benefits of each of the ED scenarios along with Sunrise project by itself. The Sunrise project produces an estimated $193 million of levelized benefits if it is implemented in 2010 as recommended by SDG&E.[11] The TE/VS transmission line produces an estimated levelized benefit of $21 million. TE/VS combined with Green Path North produce an estimated $76 million per year, more than half of which comes from RPS procurement benefits. All of the other cases include Sunrise plus some combination of the other alternatives and produce estimated benefits that range from $183 to $219 million per year.

Table 44 Total Levelized Benefits ($M/yr)

Sunrise	193
Energy Division Scenarios	
1. TEVS	21
2. TEVS + Green Path North	76
3. Sunrise + TEVS	188
4. Sunrise + TEVS + Green Path North	183
5. Sunrise + TEVS + LEAPS pumped storage	213
6. Sunrise + TEVS + LEAPS pumped storage + Green path North	208
7. Sunrise + South Bay Repower	219
8. Sunrise + South Bay Repower + Green Path North	214
9. Sunrise + Green Path North.	190

[11] This is 2 million less than the 195 million of benefits estimated in our rebuttal testimony and will be modified in errata to our rebuttal testimony. This reduction was caused by a small modification in the projected escalation rate of RMR costs in the SDG&E area caused by the new CAISO Locational Capacity Requirements assumptions.

Q. Do any of these alternatives provide greater net benefits than Sunrise?

A. Yes, there is one scenario that does provide greater net benefits than Sunrise alone. Using the rough cost estimates set forth in our previous testimony, the Sunrise plus South Bay repowering scenario (ED-7), produces greater net benefits than those produced by Sunrise alone. ED-7 could be expected to produce $52.7 million in levelized annual benefits.[12]

Q. Do any of these net benefits estimates or any of the assumptions you made in this analysis change the CAISO's position with regard to the Sunrise project?

A. No. The CAISO's key findings remain consistent with those stated in Phase 1 of its Initial Testimony, (January 26th, 2007). First, Sunrise is expected to remedy the foreseeable reliability problems in the San Diego area for a period in excess of 10 years in addition to compensating for the retirement of the South Bay power plant[13]. Second, Sunrise will facilitate SDG&E's compliance with its legislated RPS target of 20% by 2010 and the likely RPS target of 33% by 2020 of its electricity sales. Third, Sunrise is expected to reduce the CAISO consumers' electricity expenditures by somewhere between, a conservatively estimated $36

[12] This assumes that South Bay is paid only RMR costs, and includes $9.3 million per year of transmission costs (See Table 6, CAISO Rebuttal Testimony). When the Sunrise levelized benefits of $193 million are subtracted from the combined levelized benefits of $219 million, the difference is $26 million, compared to the South Bay repowering transmission costs of $9.3 million, which produces a net benefit for South Bay of $16.7 million. When added to the net benefits for Sunrise of $36 million, the total net benefits for this scenario are $52.7 million per year.

[13] See Table 5 p 31 of CAISO Rebuttal testimony which shows a generation deficit of 800 MW in 2020, which is less that then 1000 MW of increased capacity provided by Sunrise.

million dollars per year[14] and an alternatively defined RPS scenario that increases benefits to $212 million dollar per year[15].

Q. Does this conclude the CAISO initial testimony, Part V?

A. Yes, it does.

[14] See Table 6 p 34 of CAISO Rebuttal testimony.
[15] See Table 7 p 37 of CAISO Rebuttal testimony.

CERTIFICATE OF SERVICE

I hereby certify that I have this day served, by electronic and U.S. Mail, a copy of the Motion Of The California Independent System Operator Corporation For Extension Of Time To Submit Results Of The Alternative Scenarios Requested By The Energy Division in Docket Number A06-08-010.
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Dated at Folsom, CA, on this 25th day of June, 2007.

/s/Susan L. Montana
Susan L. Montana
916-608-7021
smontana@caiso.com

SARA FELDMAN
CA STATE PARKS FOUNDATION
714 W. OLYMPIC BLVD., SUITE 717
LOS ANGELES, CA 90015sara@calparks.org

DON WOOD SR.
PACIFIC ENERGY POLICY CENTER
4539 LEE AVENUE
LA MESA, CA 91941dwood8@cox.net

DAVID LLOYD
CABRILLO POWER I, LLC
4600 CARLSBAD BLVD.
CARLSBAD, CA
92008david.lloyd@nrgenergy.com

PAM WHALEN
24444 RUTHERFORD ROAD
RAMONA, CA 92065pwhalen2@cox.net

MARY ALDERN
COMMUNITY ALLIANCE FOR SENSIBLE ENERGY
PO BOX 321
WARNER SPRINGS, CA
SHAWN D. HAGERTY
BEST BEST & KRIEGER LLP
655 W. BROADWAY, 15TH FLOOR
SAN DIEGO, CA 92101-3301shagerty@bbklaw.com
EDWARD GORHAM
WESTERNERS INCENSED BY WRECKLESS ELECTRI
4219 LOMA RIVIERA LANE
SAN DIEGO, CA
JOHN W. LESLIE
LUCE, FORWARD, HAMILTON & SCRIPPS, LLP
11988 EL CAMINO REAL, SUITE 200
SAN DIEGO, CA 92130jleslie@luce.com
PATRICIA C. SCHNIER
14575 FLATHEAD RD.
APPLE VALLEY, CA
92307barbschnier@yahoo.com

Joe Como
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214joc@cpuc.ca.gov
RORY COX
RATEPAYERS FOR AFFORDABLE CLEAN ENERGY
311 CALIFORNIA STREET, SUITE 650
SAN FRANCISCO, CA
WILLIAM F. DIETRICH
DIETRICH LAW
2977 YGNACIO VALLEY ROAD, 613
WALNUT CREEK, CA 94598-3535dietrichlaw2@earthlink.net
JEFFERY D. HARRIS
ELLISON, SCHNEIDER & HARRIS LLP
2015 H STREET
SACRAMENTO, CA 95814jdh@eslawfirm.com

MICHAEL J. GERGEN
LATHAM & WATKINS LLP
555 ELEVENTH STREET, NW
WASHINGTON, DC 20004-1304michael.gergen@lw.com
LORRAINE A. PASKETT
LADWP
111 N. HOWARD ST., ROOM 1536
LOS ANGELES, CA
90012Lorraine.Paskett@ladwp.com
DARELL HOLMES
SOUTHERN CALIFORNIA EDISON
2244 WALNIT GROVE AVE, 238M, QUADB, G01
ROSEMEAD, CA
REBECCA PEARL
ENVIRONMENTAL HEALTH COALITION
401 MILE OF CARS WAY, STE. 310
NATIONAL CITY, CA
91950rebeccap@environmentalhealth.org
PAT/ALBERT BIANEZ
1223 ARMSTRONG CIRCLE
ESCONDIDO, CA
92027patricia_fallon@sbcglobal.net

MARTHA BAKER
VOLCAN MOUNTAIN PRESERVE FOUNDATION
PO BOX 1625
JULIAN, CA 92036vmp@sbcglobal.net

PAUL RIDGWAY
PO BOX 1435
JULIAN, CA 92036-1435cpuc@92036.com

S. NANCY WHANG
MANATT, PHELPS & PHILLIPS, LLP
11355 WEST OLYMPIC BLVD.
LOS ANGELES, CA
90064nwhang@manatt.com
DIANA LINSDAY
ANZA-BORREGO FOUNDATION & INSTITUTE
PO BOX 2001
BORREGO SPRINGS, CA
92004dlindsay@sunbeltpub.com

CONNIE BULL
24572 RUTHERFORD ROAD
RAMONA, CA 92065conniebull@cox.net

MICHAEL PAGE
17449 OAK HOLLOW ROAD
RAMONA, CA 92065-6758oakhollowranch@wildblue.net

E. GREGORY BARNES
SAN DIEGO GAS & ELECTRIC COMPANY
101 ASH STREET, HQ 13D
SAN DIEGO, CA 92101gbarnes@sempra.com

DONALD C. LIDDELL
DOUGLASS & LIDDELL
2928 2ND AVENUE
SAN DIEGO, CA
92103liddell@energyattorney.com
KEVIN O'BEIRNE
SAN DIEGO GAS & ELECTRIC COMPANY
8330 CENTURY PARK COURT, CP32D
SAN DIEGO, CA
92123ko'beirne@semprautilities.com

JOETTA MIHALOVICH
11705 ALDERCREST POINT
SAN DIEGO, CA 92131

BILLY BLATTNER
SAN DIEGO GAS & ELECTRIC COMPANY
601 VAN NESS AVENUE, SUITE 2060
SAN FRANCISCO, CA
94102wblattner@semprautilities.com
Nicholas Sher
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214nms@cpuc.ca.gov
BRIAN T. CRAGG
GOODIN MACBRIDE SQUERI RITCHIE & DAY
505 SANSOME STREET, SUITE 900
SAN FRANCISCO, CA
DAVID KATES
DAVID MARK AND COMPANY
3510 UNOCAL PLACE, SUITE 200
SANTA ROSA, CA 95403-5571dkates@sonic.net
KAREN NORENE MILLS
CALIFORNIA FARM BUREAU FEDERATION
2300 RIVER PLAZA DRIVE
SACRAMENTO, CA 95833kmills@cfbf.com
MICHAEL J. THOMPSON
WRIGHT & TALISMAN, PC
1200 G STREET,NW, SUITE 600
WASHINGTON, DC
20005thompson@wrightlaw.com
RANDY S. HOWARD
LOS ANGELES DEPT. OF WATER AND POWER
111 NORTH HOPE STREET, ROOM 921
LOS ANGELES, CA
DONNA TISDALE
BOULEVARD SPONSOR GROUP
PO BOX 1272
BOULEVARD, CA
91905donnatisdale@hughes.net
LINDA A. CARSON
ANZA-BORREGO FOUNDATION
PO BOX 2001
BORREGO SPRINGS, CA 92004

WALLY BESUDEN
SPANGLER PEAK RANCH, INC
PO BOX 1959
ESCONDIDO, CA 92033

JOHN RAIFSNIDER
PO BOX 121
JULIAN, CA 92036-0121skyword@sbcglobal.net

DAVID VOSS
502 SPRINGFIELD AVENUE
OCEANSIDE, CA 92057dwvoss@cox.net

ARTHUR FINE
MITCHELL SILBERBERG & KNUPP LLP
11377 W. OLYMPIC BLVD.
LOS ANGELES, CA 90064-1683sptp@msk.com
MICHAEL L. WELLS
CALIFORNIA DEPARTMENTOF PARKS&RECREATION
200 PALM CANYON DRIVE
BORREGO SPRINGS, CA
92004mwells@parks.ca.gov
DIANE J. CONKLIN
MUSSEY GRADE ROAD ALLIANCE
PO BOX 683
RAMONA, CA 92065dj0conklin@earthlink.net

HEIDI FARKASH
JOHN & HEIDI FARKASH TRUST
PO BOX 576
RANCHO SANTA FE, CA
92067jhfark@pacbell.net
FREDERICK M. ORTLIEB
CITY OF SAN DIEGO
1200 THIRD AVENUE, SUITE 1100
SAN DIEGO, CA 92101fortlieb@sandiego.gov

MICHAEL SHAMES
UTILITY CONSUMERS' ACTION NETWORK
3100 FIFTH AVENUE, SUITE B
SAN DIEGO, CA 92103mshames@ucan.org
HARVEY PAYNE
RANCHO PENASQUITOS CONCERNED CITIZENS
13223 - 1 BLACK MOUNTAIN ROAD, 264
SAN DIEGO, CA 92129hpayne@sdgllp.com
DAVID HOGAN
CENTER FOR BIOLOGICAL DIVERSITY
PO BOX 7745
SAN DIEGO, CA
92167dhogan@biologicaldiversity.org
MICHEL PETER FLORIO
THE UTILITY REFORM NETWORK (TURN)
711 VAN NESS AVENUE, SUITE 350
SAN FRANCISCO, CA 94102mflorio@turn.org

JUSTIN AUGUSTINE
THE CENTER FOR BIOLOGICAL DIVERSITY
1095 MARKET ST., SUITE 511
SAN FRANCISCO, CA
VIDHYA PRABHAKARAK
GOODIN MACBRIDE SQUERI DAY & LAMPREY LLP
505 SANSOME STREET, SUITE 900
SAN FRANCISCO, CA
JUDITH B. SANDERS
CALIFORNIA INDEPENDENT SYSTEM OPERATOR
151 BLUE RAVINE ROAD
FOLSOM, CA 95630jsanders@caiso.com
KEVIN LYNCH
PPM ENERGY INC.
1125 NW COUCH ST., SUITE 700
PORTLAND, OR 97209

STEVEN SIEGEL
CENTER FOR BIOLOGICAL DIVERSITY
3421 PARK PLACE
EVANSTON, IL
60201ssiegel@biologicaldiversity.org
CLAY E. FABER
SOUTHERN CALIFORNIA GAS COMPANY
555 WEST FIFTH STREET, GT-14D6
LOS ANGELES, CA
90013cfaber@semprautilities.com

JOHN GRISAFI
PO BOX 310125
GUATAY, CA 91931

BOB & MARGARET BARELMANN
6510 FRANCISCAN ROAD
CARLSBAD, CA 92011ecp9@roadrunner.com

DAVID W. CAREY
DAVID CAREY & ASSOCIATES, INC.
PO BOX 2481
JULIAN, CA 92036dandbcarey@julianweb.com

BRIAN KRAMER
PO BOX 516
JULIAN, CA 92036-0516colobiker@gmail.com

SCOTT KARDEL
PALOMAR OBSERVATORY
PO BOX 200
PALOMAR MOUNTAIN, CA
92060WSK@astro.caltech.edu

THOMAS A. BURHENN
SOUTHERN CALIFORNIA EDISON
2244 WALNUT GROVE AVENUE
ROSEMEAD, CA
91770thomas.burhenn@sce.com

SCOT MARTIN
PO BOX 1549
BORREGO SPRINGS, CA
92004scotmartin478@msn.com

ELIZABETH EDWARDS
RAMONA VALLEY VINEYARD ASSOCIATION
26502 HIGHWAY 78
RAMONA, CA 92065edwrdsgrfx@aol.com
DENIS TRAFECANTY
COMMUNITY OF SANTA YSABEL & RELATED COMM
PO BOX 305
SANTA YSABEL, CA
MICHAEL P. CALABRESE
CITY ATTORNEY'S OFFICE
1200 THIRD AVENUE, SUITE 1100
SAN DIEGO, CA
92101mcalabrese@sandiego.gov
PAUL BLACKBURN
SIERRA CLUB, SAN DIEGO CHAPTER
3820 RAY STREET
SAN DIEGO, CA
92104sdenergy@sierraclubsandiego.org

KEITH RITCHEY
8744 CREEKWOOD LANE
SAN DIEGO, CA 92129kritchey@san.rr.com

CARRIE DOWNEY
HORTON KNOX CARTER & FOOTE
895 BROADWAY
ELCENTRO, CA 92243cadowney@san.rr.com

OSA L. WOLFF
SHUTE, MIHALY & WEINBERGER, LLC
396 HAYES STREET
SAN FRANCISCO, CA
94102wolff@smwlaw.com
NORMAN J. FURUTA
FEDERAL EXECUTIVE AGENCIES
1455 MARKET ST., SUITE 1744
SAN FRANCISCO, CA 94103-1399norman.furuta@navy.mil
VIDHYA PRABHAKARAN
GOODIN,MACBRIDE,SQUERI,DAY,LAMPREY
505 SANSOME STREET, SUITE 900
SAN FRANCISCO, CA
BRADLY S. TORGAN
CALIFORNIA DEPT. OF PARKS & RECREATION
1416 NINTH STREET, ROOM 1404-06
SACRAMENTO, CA
JUILE B. GREENISEN
LATHAM & WATKINS LLP
555 ELEVENTH STREET, NW
WASHINGTON, DC 20004-1304juile.greenisen@lw.com
HENRY MARTINEZ
LADWP
111 N. HOPE ST., ROOM 921
LOS ANGELES, CA
90012Henry.Martinez@ladwp.com
CASE ADMINISTRATION
SOUTHERN CALIFORNIA EDISON COMPANY
2244 WALNUT GROVE AVENUE
ROSEMEAD, CA 91770case.admin@sce.com
MATTHEW JUMPER
SAN DIEGO INTERFAITH HOUSING FOUNDATION
7956 LESTER AVE
LEMON GROVE, CA
DAVE DOWNEY
NORTH COUNTY TIMES
207 E. PENNSYLVANIA AVENUE
ESCONDIDO, CA
92025ddowney@nctimes.com

LAUREL GRANQUIST
PO BOX 2486
JULIAN, CA 92036celloinpines@sbcglobal.net

NANCY PARINELLO
PO BOX 516
JULIAN, CA 92036-0516nparinello@gmail.com

CAROLYN A. DORROH
RAMONA COMMUNITY PLANNING GROUP
17235 VOORHES LANE
RAMONA, CA

CHRISTOPHER P. JEFFERS
24566 DEL AMO ROAD
RAMONA, CA 92065polo-player@cox.net

PHILLIP &ELIANE BREEDLOVE
1804 CEDAR STREET
RAMONA, CA 92065wolfmates@cox.net

STEVE/CAROLYN ESPOSITO
37784 MONTEZUMA VALLEY ROAD
RANCHITA, CA
92066cesposit@sdcoe.k12.ca.us

JOHN&PHYLLIS BREMER
PO BOX 510
SANTA YSABEL, CA
92070gecko_greens@juno.com

WILLIE M. GATERS
1295 EAST VISTA WAY
VISTA, CA 92084williegaters@earthlink.net

KIM KIENER
504 CATALINA BLVD
SAN DIEGO, CA 92106kmkiener@cox.net

SCOTT J. ANDERS
UNIVERSITY OF SAN DIEGO - LAW
5998 ALCALA PARK
SAN DIEGO, CA
92110scottanders@sandiego.edu

IRENE STILLINGS
CALIFORNIA CENTER FOR SUSTAINABLE ENERGY
8520 TECH WAY, SUITE 110
SAN DIEGO, CA

DAHVIA LOCKE
COUNTY OF SAN DIEGO
5201 RUFFIN ROAD, SUITE B
SAN DIEGO, CA 92123-1666Dahvia.Lynch@sdcounty.ca.gov

THOMAS ZALE
BUREAU OF LAND MANAGEMENT
1661 SO. 4TH STREET
EL CENTRO, CA
92243Thomas_Zale@blm.gov

DIANE I. FELLMAN
FPL ENERGY, LLC
234 VAN NESS AVENUE
SAN FRANCISCO, CA
94102diane_fellman@fpl.com

JASON YAN
PACIFIC GAS AND ELECTRIC COMPANY
77 BEALE STREET, MAIL CODE B13L
SAN FRANCISCO, CA 94105jay2@pge.com

JULIE L. FIEBER
FOLGER LEVIN & KAHN LLP
275 BATTERY STREET, 23RD FLOOR
SAN FRANCISCO, CA 94111jfieber@flk.com

HENRY ZAININGER
ZAININGER ENGINEERING COMPANY, INC.
1718 NURSERY WAY
PLEASANTON, CA 94588hzainninger@aol.com

DAVID MARCUS
PO BOX 1287
BERKELEY, CA
94701dmarcus2@sbcglobal.net

DAVID BRANCHCOMB
BRANCHCOMB ASSOCIATES, LLC
9360 OAKTREE LANE
ORANGEVILLE, CA
95662david@branchcomb.com

ANDREW B. BROWN
ELLISON, SCHNEIDER & HARRIS, LLP
2015 H STREET
SACRAMENTO, CA
95814abb@eslawfirm.com

RICHARD LAUCKHART
GLOBAL ENERGY
2379 GATEWAY OAKS DRIVE, SUITE 200
SACRAMENTO, CA
95833rlauckhart@globalenergy.com

JACK BURKE
CALIFORNIA CENTER FOR SUSTAINABLE ENERGY
8690 BALBOA AVE., SUITE 100
SAN DIEGO, CA

Keith D White
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214kwh@cpuc.ca.gov

LARA LOPEZ
16828 OPEN VIEW RD
RAMONA, CA 92065soliviasmom@cox.net

WILLIAM TULLOCH
28223 HIGHWAY 78
RAMONA, CA 92065

BONNIE GENDRON
4812 GLENSIDE ROAD
SANTA YSABEL, CA
92070bgendron@nethere.com

RON WEBB
PO BOX 375
SANTA YSABEL, CA
92070webron7@yahoo.com

ABBAS M. ABED
NAVIGANT CONSULTING, INC.
402 WEST BROADWAY, SUITE 400
SAN DIEGO, CA
92101aabed@navigantconsulting.com

JIM BELL
4862 VOLTAIRE ST.
SAN DIEGO, CA 92107jimbellelsi@cox.net

CRAIG ROSE
THE SAN DIEGO UNION TRIBUNE
PO BOX 120191S
SAN DIEGO, CA 92112-0191craig.rose@uniontrib.com

JENNIFER PORTER
CALIFORNIA CENTER FOR SUSTAINABLE ENERGY
8690 BALBOA AVENUE, SUITE 100
SAN DIEGO, CA

JALEH (SHARON) FIROOZ, P.E.
ADVANCED ENERGY SOLUTIONS
17114 TALLOW TREE LANE
SAN DIEGO, CA 92127jfirooz@iesnet.com

SUZANNE WILSON
PO BOX 798
IDYLLWILD, CA 92549swilson@pcta.org

SHERIDAN PAUKER
SHUTE,MIHALY & WEINBERGER LLP
396 HAYES STREET
SAN FRANCISCO, CA
94102wolff@smwlaw.com

KATARZYNA M. SMOLEN
PACIFIC GAS AND ELECTRIC COMPANY
77 BEALE STREET, MC B9A
SAN FRANCISCO, CA 94105KMSn@pge.com

RICHARD W. RAUSHENBUSH
LATHAM & WATKINS LLP
505 MONTGOMERY STREET, SUITE 2000
SAN FRANCISCO, CA
94111richard.raushenbush@lw.com

PHILIPPE AUCLAIR
11 RUSSELL COURT
WALNUT CREEK, CA
94598philha@astound.net

KEN BAGLEY
R.W. BECK
14635 N. KIERLAND BLVD., SUITE 130
SOCTTSDALE, AZ
95254kbagley@rwbeck.com

PAUL G. SCHEUERMAN
SHEUERMAN CONSULTING
3915 RAWHIDE RD.
ROCKLIN, CA 95677PGS@IEEE.org

AUDRA HARTMANN
DYNEGY, INC.
980 NINTH STREET, SUITE 2130
SACRAMENTO, CA
95814Audra.Hartmann@Dynegy.com

G. ALAN COMNES
CABRILLO POWER I LLC
3934 SE ASH STREET
PORTLAND, OR
97214alan.comnes@nrgenergy.com

Billie C. Blanchard
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214bcb@cpuc.ca.gov

Laurence Chaset
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214lau@cpuc.ca.gov

MARY KAY FERWALT
24569 DEL AMO ROAD
RAMONA, CA 92065mkferwalt@yahoo.com

CAROLYN MORROW
GOLIGHTLY FARMS
36255 GRAPEVINE CANYON ROAD
RANCHITA, CA 92066Csmmarket@aol.com

GLENDA KIMMERLY
PO BOX 305
SANTA YSABEL, CA
92070kimmerlys@yahoo.com

DAN PERKINS
ENERGY SMART HOMES
983 PHILLIPS ST.
VISTA, CA 92083perkydanp@yahoo.com

SUSAN FREEDMAN
SAN DIEGO ASSOCIATION OF GOVERNMENTS
401 B STREET, SUITE 800
SAN DIEGO, CA 92101sfr@sandag.org

STEPHEN ROGERS
1340 OPAL STREET
SN DIEGO, CA 92109srogers647@aol.com

GEORGE COURSER
3142 COURSER AVENUE
SAN DIEGO, CA 92117gcourser@hotmail.com

SEPHRA A. NINOW
CALIFORNIA CENTER FOR SUSTAINABLE ENERGY
8690 BALBOA AVENUE, SUITE 100
SAN DIEGO, CA

EILEEN BIRD
12430 DORMOUSE ROAD
SAN DIEGO, CA 92129sanrocky@aol.com

LOUIS NASTRO
PO BOX 942896
SACRAMENTO, CA 92860-0001Lnastro@parks.ca.gov

AARON QUINTANAR
RATE PAYERS FOR AFFORDABLE CLEAN ENERGY
311 CALIFORNIA STREET, STE 650
SAN FRANCISCO, CA

MICHAEL S. PORTER
PACIFIC GAS AND ELECTRIC COMPANY
77 BEALE ST., MAIL CODE 13L RM 1318
SAN FRANCISCO, CA 94105mspe@pge.com

DAVID T. KRASKA
PACIFIC GAS AND ELECTRIC COMPANY
PO BOX 7442
SAN FRANCISCO, CA 94120dtk5@pge.com

J.A. SAVAGE
CALIFORNIA ENERGY CIRCUIT
3006 SHEFFIELD AVE
OAKLAND, CA
94602editorial@californiaenergycircuit.net

W. KENT PALMERTON
WK PALMERTON ASSOCIATES, LLC
2106 HOMEWOOD WAY, SUITE 100
CARMICHAEL, CA
95608kent@wkpalmerton.com

LON W. HOUSE
WATER & ENERGY CONSULTING
4901 FLYING C RD.
CAMERON PARK, CA
95682lonwhouse@waterandenergyconsulting.co

KELLIE SMITH
SENATE ENERGY/UTILITIES & COMMUNICATION
STATE CAPITOL, ROOM 4038
SACRAMENTO, CA

DANIEL SUURKASK
WILD ROSE ENERGY SOLUTIONS, INC.
430 8170 50TH STREET
EDMONTON, AB T6B 1E6daniel@wildroseenergy.com

David Ng
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214dhn@cpuc.ca.gov

Robert Elliott
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214rae@cpuc.ca.gov

PETER SCHULTZ
OLD JULIAN CO.
PO BOX 2269
RAMONA, CA
92065oldjulianco@integrity.com

JOSEPH RAUH
RANCHITA REALTY
37554 MONTEZUMA VALLEY RD
RANCHITA, CA 92066joe@ranchitarealty.com

GLENN E. DROWN
PO BOX 330
SANTA YSABEL, CA
92070gedrown@mindspring.com

KARL HIGGINS
HIGGINS & ASSOCIATES
1517 ROMA DRIVE
VISTA, CA 92083karlhiggins@adelphia.net

MICAH MITROSKY
SIERRA CLUB
3820 RAY STREET
SAN DIEGO, CA 92104-3623mmitrosky@sierraclubsandiego.org

EPIC INTERN
EPIC/USD SCHOOL OF LAW
5998 ALCALA PARK
SAN DIEGO, CA 92110usdepic@gmail.com

CENTRAL FILES
SAN DIEGO GAS & ELECTRIC
8330 CENTURY PARK COURT, CP31E
SAN DIEGO, CA
92123centralfiles@semprautilities.com

TOM BLAIR
CITY OF SAN DIEGO
9601 RIDGEHAVEN COURT, SUITE 120
SAN DIEGO, CA 92123-1636TBlair@sandiego.gov

LYNDA KASTOLL
BUREAU OF LAND MANAGEMENT
1661 SOUTH 4TH STREET
EL CENTRO, CA 92243

BRUCE FOSTER
SOUTHERN CALIFORNIA EDISON COMPANY
601 VAN NESS AVENUE, STE. 2040
SAN FRANCISCO, CA

BREWSTER BIRDSALL
ASPEN ENVIRONMENTAL GROUP
235 MONTGOMERY STREET, SUITE 935
SAN FRANCISCO, CA
94104bbirdsall@aspeneg.com

CALIFORNIA ENERGY MARKETS
517 - B POTRERO AVENUE
SAN FRANCISCO, CA
94110cem@newsdata.com

JOSEPH M. PAUL
DYNEGY, INC.
2420 CAMINO RAMON, SUITE 215
SAN RAMON, CA
94583Joe.paul@dynegy.com

MRW & ASSOCIATES, INC.
1814 FRANKLIN STREET, SUITE 720
OAKLAND, CA 94612mrw@mrwassoc.com

CALIFORNIA ISO
151 BLUE RAVINE ROAD
FOLSOM, CA 95630e-recipient@caiso.com

DARRELL FREEMAN
1304 ANTRIM DR.
ROSEVILLE, CA 95747ddfreeman@yahoo.com

KEVIN WOODRUFF
WOODRUFF EXPERT SERVICES, INC.
1100 K STREET, SUITE 204
SACRAMENTO, CA 95814kdw@woodruff-expert-services.com

Marcus Nixon
CALIF PUBLIC UTILITIES COMMISSION
320 WEST 4TH STREET SUITE 500
LOS ANGELES, CA 90013mrx@cpuc.ca.gov

Donald R. Smith
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214dsh@cpuc.ca.gov

Scott Cauchois
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3214wsc@cpuc.ca.gov

Scott Logan
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-
3214sjl@cpuc.ca.gov

SUSAN LEE
ASPEN ENVIRONMENTAL GROUP
235 MONTGOMERY STREET, SUITE 935
SAN FRANCISCO, CA
94104slee@aspeneg.com

JUDY GRAU
CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET MS-46
SACRAMENTO, CA 95814-
5512jgrau@energy.state.ca.us

Steven A. Weissman
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-
3214saw@cpuc.ca.gov

CLARE LAUFENBERG
CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET, MS 46
SACRAMENTO, CA
95814Claufenb@energy.state.ca.us

TOM MURPHY
ASPEN ENVIRONMENTAL GROUP
8801 FOLSOM BLVD., SUITE 290
SACRAMENTO, CA
95826tmurphy@aspeneg.com

Terrie D. Prosper
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-
3214tdp@cpuc.ca.gov

MARC PRYOR
CALIFORNIA ENERGY COMMISSION
1516 9TH ST, MS 20
SACRAMENTO, CA
95814mpryor@energy.state.ca.us

Traci Bone
CALIF PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-
3214tbo@cpuc.ca.gov

Thomas Flynn
CALIF PUBLIC UTILITIES COMMISSION
770 L STREET, SUITE 1050
SACRAMENTO, CA 95814trf@cpuc.ca.gov