**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.	)	

REBUTTAL TESTIMONY OF THE

CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

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1. 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 rebuttal testimony?

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

Q. What is the purpose of this rebuttal testimony?

A. The purpose is to rebut direct testimonies filed by various parties in this proceeding, including (a) Division of Ratepayer Advocates (DRA) of the California Public Utilities Commission (CPUC); (b) Utility Consumers' Action Network (UCAN); (d) The Nevada Hydro Company (TNHC); and (e) South Bay Replacement Project (SBRP).

Q. How is the remainder of this rebuttal testimony organized?

A. Each section below addresses a specific topic brought forth by one or more of the parties. It describes the topic, states the parties' positions, and offers the CAISO's rebuttal.

Section 2 addresses accusations that the CAISO is not fulfilling its role as an independent evaluator. Section 3 addresses issues raised by the parties about the CAISO's economic analysis, encompassing energy benefits, reliability benefits, and renewable portfolio standard (RPS) benefits. Section 4 summarizes the CAISO's opinions on alternatives advanced by the parties, including the deferral cases identified by UCAN and the DRA. Section 5 considers the DRA's proposal for handling uncertainty in Sunrise evaluation. Section 6 presents the CAISO's view of the DRA's proposal of a San Diego Grid Reliability Action Plan (SDGRAP).

2. The CAISO's role as an independent evaluator and the efficacy of its Sunrise studies

Q. Why is this subject being addressed in the CAISO's rebuttal testimony?

A. It is unfortunate that, rather than focus solely on the relevant, important, time-critical and highly complex engineering and economic issues that are at issue in this proceeding, UCAN instead seeks to call into question the CAISO's independence, the efficacy of its study results and its ability to function as a transmission grid planner. The CAISO simply must respond to UCAN's baseless allegations.

Q. How has UCAN called the CAISO's independence into question?

A. UCAN has impugned the CAISO's independence and credibility with many statements sprinkled throughout its testimony. For example, UCAN states that the CAISO's "name turns out to be a bit of a misnomer, in that its actions in relation to STP [Sunrise] don't affirm an image of 'independent'".[1] In discussing the need for an Independent Evaluator for "a re-assessment of the STP [Sunrise] project", UCAN opines that "the unfortunate decision by the ISO to support the STP [Sunrise] project prior to having conducted a meaningful review of the project effectively precludes the ISO from performing this evaluation."[2] With respect to transmission grid planning issues within the CAISO footprint, in particular UCAN's proposed Path 44 upgrade alternative to Sunrise, UCAN queries "what is the ISO's job, if not to integrate the separate grids of its member PTOs into a single seamless statewide grid?"[3]

Finally, UCAN provides a list of reasons why the Commission should "discount" the CAISO's recommendations and study results. While some of these are substantive criticisms that will be addressed in later sections of this testimony, others are simply rhetorical attempts to malign the CAISO's study processes, such as:

- "… the CAISO has a history of crying transmission wolf."[4]
- "…the CAISO's support of STP [Sunrise] appears to have been predetermined."[5]
- "… the CAISO has been reluctant to seriously engage with proponents of alternatives to STP [Sunrise]."[6]

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[1] *Id.*,.
[2] Marcus, UCAN Testimony on UCAN's Alternatives and Deficiencies of SDG&E and ISO Methodologies - CONFIDENTIAL VERSION (Marcus Confidential), 192.
[3] *Id.*, 39.
[4] *Id.*, 84.
[5] *Id.*, 85
[6] *Id.*

These assertions are unwarranted, inaccurate and an unfortunate distraction from the merits of the proceeding. Once levied, however, they necessitate a response before the CAISO can address the substance of the matter before the Commission.

Q. Has the CAISO's evaluation of Sunrise been conducted independently and in accordance with its statutory mandate?

A. Yes, it has. To begin with, the CAISO is a public benefit corporation created by statute to have no financial or self-interest in the decisions that it makes. In addition, the CAISO's role is to make recommendations that best serve the citizens of California, and to provide and explain its support for those recommendations. During the course of this proceeding, the CAISO conducted many model runs taking into account specifications directed by the interveners, including UCAN, for whom the CAISO ran multiple model runs to UCAN's exact specifications[7]. Indeed, UCAN glosses over the many instances during the course of this proceeding in which the CAISO agreed with UCAN's comments and assumptions and changed its own models accordingly. UCAN instead chooses to focus on the CSRTP 2006 study process and criticizes the conclusions reached by that group which are inconsistent with the UCAN alternatives. UCAN then jumps to the conclusion that the CAISO's study results were pre-ordained and that once the CAISO's Board of Governors (Board) approved Sunrise, the CAISO has had no choice but to continue to support the project.[8] This conclusion is contradicted by the facts. It is appropriate and expected that the CAISO

[7] A case in point is the 12 runs reported in The CAISO Initial Testimony, Part III, April 20, 2007
[8] *Id.*, 85-86.

continue to refine and examine assumptions and models as circumstances change. In this case, the CAISO's continued studies and assessments supported the conclusions reached in the initial report. At all times, the CAISO maintained its appropriate role of an independent and neutral technical analyst.

Q. Do you agree with UCAN's assessment of the CSRTP group recommendations?

A. No, we do not. UCAN's implication that the CAISO and the CSRTP study group came to a predetermined conclusion simply is not correct. What is true is that the group was tasked with conducting its analysis of Sunrise under very tight time constraints, given that the timeframe for the project was dictated by the need for it to be constructed by a certain date, and that the project proponents needed a certain amount of time to seek regulatory approvals and ultimately complete the project.[9] For expediency purposes, the CSRTP group made use of studies that had already been completed, including alternatives to the project. [10]

Q. Did the Board's approval in August, 2006, preordain the CAISO's unequivocal support for Sunrise in this proceeding?

A. No, and that should be apparent from the CAISO testimony filed in this proceeding. First, however, we would note that the CAISO Board, in approving CAISO management's recommendation that a transmission project be approved, understands that the project will be subject to regulatory scrutiny and could be

[9] As described in the Report, the CSRTP group was formed to study the LEAPS and Tehachapi projects as well as Sunrise (Report, 16). The enormous amount of work involved in studying three large transmission/pumped hydro projects simultaneously has apparently led to UCAN's conclusions that its alternatives, proposed in April, 2006 and not studied until two months later, were "ignored". (Marcus, 85)
[10] CSRTP 2006 Report, July 28, 2006, 16.

altered during the CPUC approval process. Indeed, it has happened in the past that CAISO management has come back to the Board for approval of project changes.

Furthermore, as an active participant in this proceeding, the CAISO has, since January 2007, filed testimony regarding the changes in its cost-benefit calculation, input data assumptions, and cost-effectiveness results with respect to the Sunrise project that are quite different from those described in the CSRTP Report. The CAISO has also performed extensive analyses requested by interveners, and, as noted above, has made corrections and changes to its own analyses based on input from the interveners at the testimony workshops. All this work was directed by a team of CAISO staff and consultants that were not involved with the CSRTP Report, nor did the team collaborate with any CSRTP group participants in developing the conclusions set forth in its testimony.

Q. Does the CAISO's support of the Sunrise project disqualify it from being an independent evaluator of future proposed transmission projects and the statewide transmission planner?

A. It goes without saying that the CAISO is *mandated* by Section 345 of the Public Utilities Code to "ensure efficient use and reliable operation of the transmission grid consistent with achievement of planning and operating reserve criteria no less stringent than those established by NERC and WECC. This mandate has been carried out in the past through numerous transmission planning studies conducted by the CAISO and in conjunction with stakeholder and industry groups. Studies for expanded transmission planning for southern California and the regional southwest have been continuously evaluated by the CAISO and interested participants and have been the subject of sub-regional planning groups since the formation of the Southwest Transmission Expansion Plan (STEP) group in 2002.[11] Indeed, the STEP group examined alternatives to Sunrise prototypes, as well as considering the LEAPS combined transmission and generation project.[12]

Looking to the future, in January, 2007 the CAISO posted its 2007 Long Term Transmission Plan (Plan), the first annual transmission planning report in a process initiated in 2005 to transform the role of the CAISO to achieve a more proactive transmission planning role that will benefit all of the citizens of California.[13] The CAISO's Plan is driven by the ongoing effort to facilitate the development of an overall Integrated Planning Process. As expressed in the Plan, the CAISO has concluded that the preparation of a single, integrated transmission plan that describes for all stakeholders how the CAISO and PTOs are coordinating to assure that the CAISO Controlled Grid is being upgraded in an efficient and economical way. This proactive statewide planning will include a robust and open stakeholder process with transparent study assumptions made available to all participants. Whatever shortcomings UCAN believes were inherent in the CSRTP process should be dispelled with the current transmission planning protocols that the CAISO is putting in place.

[11] The CSRTP group was formed under the umbrella of the STEP group.
[12] The planning studies and other STEP materials can be found at http://www.caiso.com/docs/2002/11/04/2002110417450022131.html
[13] The 2007 Long Term Transmission Plan can be found at http://www.caiso.com/1b6b/1b6bb4d51db0.pdf

Q. Does the CAISO have “a history of crying transmission wolf”?[14]

A. UCAN has not clearly expressed its basis for this allegation. However, the CAISO assumes that this phrase refers to the Commission’s denial of SDG&E’s request for a CPCN for the Valley-Rainbow transmission project (A. 01-03-036) and the fact that the CAISO found that Valley-Rainbow was needed for reliability purposes. Apparently because the lights didn’t go out go following the denial of the CPCN, UCAN implicitly has concluded that the CAISO has a tendency to approve proposed transmission projects that are not really needed.

UCAN’s conclusions in this regard are misplaced. The determination of need for any facility is based exclusively on compliance with national and western reliability standards, which starting this month, are mandatory and carry penalties. Just like the analysis conducted in this proceeding for Sunrise, the CAISO evaluated the Valley-Rainbow project in accordance with its planning standards that call for a G-1/N-1 assessment to determine reliability needs. That analysis supported a need for the project beginning in 2006.[15] The fact that the Commission disagreed with the CAISO’s needs analysis—and the G-1/N-1 contingences did not come to pass so that load shedding conditions did not occur—does not mean that the CAISO’s planning and forecasting was flawed. Furthermore, major transmission projects such as Valley Rainbow or Sunrise are long term solutions to conditions that, over time, will eventually lead to reliability concerns. It is certainly short-sighted to dwell in the recent past or focus on short-

[14] Marcus, 84.
[15] Waite, Testimony of The Nevada Hydro Company (TNHC) (Waite), Exhibit No. 5, at 9.

term transmission "fixes" when decisions that are made today could impact future generations. There is no disagreement that the San Diego area is transmission-constrained, and the CAISO's vision for development of a robust transmission infrastructure in no way constitutes "crying wolf".

3. Economic analysis

3.1 Energy benefit estimation

Q. What are the parties' positions regarding the CAISO's estimation of energy benefits for the base case and alternatives?

A. The positions are as follows:

- Different dispatch model. TNHC uses PLEXOS, not Gridview, to quantify energy benefits of the TE/VS line.[16] SBRP uses a transportation model, claiming that it is superior to power transmission distribution factor (PTDF) models such as Gridview and PLEXOS.[17]
- Production cost difference as total economic benefit. SBRP opines that the production cost change in the WECC is the total benefit of a project.[18] Based on its analysis, SBRP concludes that "it is more cost effective to build generation in the San Diego zone than it is to build remote generation and build transmission to access the remote generation."[19]

[16] Zhang, Phase 1 Testimony on Behalf of The Nevada Hydro Company, June 1, 2007 (Zhang).
[17] Lauckhart, Prepared Testimony on Behalf of South Bay Replacement Project LLC, June 1, 2007, at 11 and 17 to 18.
[18] *Id.*, Appendix 4.
[19] *Id.*, 19.

- Producer surplus computation. SBRP states that "SDG&E and CAISO should be identifying resources that have a total MW capacity equal to the CAISO 15% PRM when choosing their resources."[20]
- Accuracy of the SSG-WI database. The DRA opines that the database has excessive generation, as evidenced by the 29% planning reserve margin and the projected capacity utilization of under 50% for the combined cycle gas turbines (CCGTs).[21] SBRP shares this view,[22] remarking that "[t]he amount of generation included in the database used by SDG&E and CAISO is so excessive that any runs they made with this database (which is essentially all their runs) would not provide credible results."[23]
- Lower energy benefit estimate for Sunrise. The DRA's $25M base case estimate for Sunrise is $10M lower than the CAISO's $35M estimate. The DRA rationalizes its lower estimate with its claim of "the infirmities that plague the CAISO energy modeling."[24]
- Energy benefit for the Talega-Escondido/Valley-Serrano (TE/VS) project. TNHC's estimate of the project's energy benefit in 2015 is $14M/year.[25]

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[20] *Id.*, 16.
[21] Suurkask, D. Report on The Sunrise Powerlink, Phase 1 Direct Testimony, Volume 3 of 5, DRA, CPUC, May 18, 2007, 6 (Suurkask).
[22] Lauckhart, Prepared Testimony on Behalf of South Bay Replacement Project LLC, June 1, 2007, 13(Lauckhart).
[23] *Id.*, 15.
[24] Woodruff, K. Report on The Sunrise Powerlink, Phase 1 Direct Testimony, Volume 1 of 5, DRA, CPUC, May 18, 2007, 37 (Woodruff).
[25] Auclair, P. Phase 1 Testimony on Behalf of The Nevada Hydro Company, June 1, 2007, 31 (Auclair).

A. Different dispatch model

Q. Is SBRP correct that PTDF-based approaches, such as Gridview and PLEXOS, have not been demonstrated to be reasonable or valid?

A. No. In fact, it is generally accepted among power engineers that PTDF models are more accurate than transportation models (e.g., the model used by SBRP in this proceeding) which completely ignore the laws of physics. Both Gridview and PLEXOS are PTDF models that have been accepted by the CAISO and the Commission in the application of the CAISO's TEAM methodology.

To be sure, there have been questions about specific aspects of Gridview related to the calculation of ancillary service costs, the dispatch of pumped storage units, and its sensitivity to assumptions and input data. However, those questions similarly apply to a transportation model and they in no way invalidate the CAISO's use of Gridview to estimate a transmission project's energy benefits.

Q. Does the CAISO believe that THNC's analysis is flawed because THNC uses PLEXOS instead of Gridview?

A. No. The CAISO believes that PLEXOS can produce reasonable and reliable results, as evidenced by the CAISO's own use of PLEXOS in other venues. The CAISO concurs with TNHC that differences in results would most likely be driven by differences in modeling assumptions, not differences in models.[26]

[26] Zhang, 11.

B. Production cost difference as total economic benefit

Q. Is SBRP correct that the total benefit of a transmission project can be estimated using only the change in production costs?

A. No. The CAISO's TEAM methodology focuses on the economics of a project for CAISO customers. SBRP formulation of net benefits would be correct *only* if the focus is the entire WECC. In light of SBRP's misspecification of net benefits, the CAISO doubts SBRP's conclusion that building local generation in San Diego is more cost-effective than a transmission alternative such as Sunrise.

C. Producer surplus computation

Q. Is SBRP correct that producer surplus should include enough resources to equal utility demand plus their 15% planning reserve margins?

A. No. The producer surplus adjustment is used to reflect how utility profits from utility owned generation flow to the CAISO's customers through retail ratemaking. Because profits to non-utility owned generation do not flow to the CAISO's customers, it is incorrect to include the producer surplus for those generators as a net benefit under the TEAM methodology.

D. Accuracy of SSG-WI Database

Q. Does the CAISO believe that the high resource levels from the SSG-WI database lead to results that are not credible?

A. No. The TEAM methodology evaluates how consumer costs *change* with the addition of a project. The same SSG-WI resources are used in both the base case and its alternatives. The presence of alleged excess generation would not necessarily bias our analysis towards Sunrise.

To see this point, consider the CAISO estimate of Sunrise's energy benefits, which are mainly driven by the differentials in nodal prices under locational marginal pricing (LMP). The LMP price differentials are attributable to differences in marginal fuel costs and marginal line losses by location. As long as the marginal generation units within and outside California are similar natural-gas-fired units and the locational natural gas price difference is small, the excess generation levels in the SSG-WI database should not have a material effect on the CAISO's energy benefit estimate.

Q. Is it likely that excess generation in the Southwest created additional benefits for Sunrise?

A. There is a possibility that excess generation in the SSG-WI database creates small increases in Sunrise benefits. We believe that any bias in favor of Sunrise is small for two reasons. First, our own analysis indicates that the benefits are very sensitive to assumed regional differences in gas prices implying that for many hours of the year, gas fired generation resources are setting the market prices both inside and outside of California. Non-gas fired resources in general, whether they are excess or being dispatched, seem to have a second order impact on market prices and the economic evaluation of Sunrise benefits. Second, the Sunrise line in the CAISO's Sunrise case is extensively used by renewable resources. Since these resources have low variable costs, they are dispatched before other resources, thus mitigating the impact of any excess resources on market prices in California.

E. Lower estimate for Sunrise

Q. What is the CAISO's opinion on the DRA's $25M base estimate?

A. The DRA arbitrarily lowers the CAISO's $35M estimate, without any empirical evidence that the $10M reduction is justified by a correct modeling effort (e.g., a Gridview run) that remedies the alleged "infirmities that plague the CAISO energy modeling."[27] Hence, the CAISO rejects the DRA's estimate by reason of lack of evidence.

F. Energy benefit for TE/VS

Q. What is the CAISO's opinion on TNHC's estimate of the TE/VS project's $14M/year estimate of energy benefit?[28]

A. The CAISO has not performed an analysis of TE/VS as a stand-alone project. Hence, it can only note that THNC's $14M/year estimate for TE/VS is comparable to the CAISO's $10M/year estimate for (Green Path + LEAPS).[29]

3.2 Reliability benefit estimation

Q. What are the parties' positions regarding the CAISO's estimation of reliability benefits?

A. The positions are as follows:

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[27] Woodruff, 37
[28] Auclair, 31
[29] Second Errata to Initial Testimony of The California Independent System Operator Corporation, Part II, Application 06-08-010, April 20, 2007, 6.

- Resource adequacy (RA) cost. UCAN states that the RA cost floor should be $27/kW-year, instead of the fixed O&M costs of $10.72/kW-year used by the CAISO.[30]
- Replacement RA costs. UCAN argues that (a) if local RA is reduced by Sunrise, then non-local RA requirements would have to increase by the same amount; and (b) these additional system RA costs should be attributed to Sunrise.[31]
- Lower benefit estimate for Sunrise. The DRA's $66.4M estimate is $82.6M lower than the CAISO's $149M estimate. The DRA justifies its lower estimate based on its assessment of San Diego's LCR need *sans* Sunrise, which indicates no capacity deficiency until 2015.[32]
- Reliability benefit of TE/VS. TNHC's estimate of the TV/ES project's reliability benefit is twice of the CAISO's $63M/year in 2015 for (Green Path + LEAPS) because of their assumption that the TE/VS line increases import capability into San Diego by 1,000 MW, rather than the 500 MW estimated by the CAISO.[33]
- Fixed cost component of remote generation. THNC claims that the CAISO has not included the fixed cost component of remote generation SDG&E would rely on if Sunrise were built.[34]

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[30] Marcus Confidential, ,70
[31] Marcus Confidential , 69.
[32] Woodruff, Table ES-1.
[33] Auclair, 31; Depenbrock, Phase 1 Testimony on Behalf of The Nevada Hydro Company, June 1, 2007, 9 (Depenbrock).
[34] Auclair, 21.

- Mix of renewable resources throughout the West. THNC claims that the CAISO testimony itself undercuts the preference for Imperial Valley resources by making the unrealistic assumption that all identified renewable resources throughout the West include the same mix of geothermal, wind and solar resources.[35]

A. Resource adequacy (RA) costs

Q. Does the CAISO accept UCAN's suggestion of using $27/kW-yr (in 2006 dollars) as the floor for RA payments?[36]

A. Yes. The higher floor value reduces the total levelized net benefits of the CAISO Sunrise case by $6 million (from $84 million per year to $78 million per year). Table 1 below shows the levelized costs and benefits of each alternative using this new floor value for RA.

[35] *Id.*, 19.
[36] Marcus Confidential, 81.

Table 1: Levelized costs and benefits by alternative under the $27/kW-year RA price floor.

		A	B	C	D	E	F	G
	Summary of Levelized Costs and Benefits	**Costs**				**Net Benefits**		
		Base Case	Sunrise	South Bay	Green Path + LEAPS	Sunrise	South Bay	Green Path + LEAPS
	Energy and Reliability Costs							
1	Customer Payments from Gridview	15,750	15,629	15,697	15,708	121	53	42
2	Less CAISO congestion cost (reduces TAC)	(124)	(88)	(102)	(110)	(36)	(21)	(13)
3	Less URG Margin (reduces URG bal acct)	(4,748)	(4,714)	(4,724)	(4,739)	(34)	(24)	(9)
4	Less IOU excess loss payments	(809)	(793)	(803)	(800)	(16)	(6)	(9)
5	**Subtotal Energy Cost and Benefit**	10,070	10,035	10,069	10,060	**35**	**1**	**10**
6	RMR Capacity Payments - Levelized	90	66	125	86	24	(35)	4
7	RMR Operating Payments - Levelized	60	48	60	58	12	-	2
8	CT Capacity Costs - Levelized	110	31	56	61	79	54	49
9	Transmission cost for new CTs-Levelized	39	11	20	21	28	19	17
10	Remediation cost to provide reactive support	-	-	-	-	-	-	-
11	RA Costs to replace CTs and RMR contracts	-	-	-	-	-	-	-
12	**Subtotal Reliability Cost and Benefit**	299	155	261	227	**143**	**37**	**72**
13	**Total Energy and Reliability Benefits**					**179**	**38**	**82**
	RPS Procurement Cost							
14	Adjusted RPS Cost	5,320	5,264	5,320	5,264	**56**	**-**	**55**
15	**Total Benefits**					**235**	**38**	**138**
	Transmission Cost							
16	**Levelized Cost of Transmission**	-	157	9.3	205.2	**(157.0)**	**(9.3)**	**(205.2)**
17	**Total Costs and Benefits**	15,688	15,610	15,660	15,756	**78**	**29**	**(67)**

B. Non-Local RA costs

Q. UCAN also argues that reducing local RA obligations by 1000 MW would increase non-local RA obligations by 1000 MW.[37] Does this mean that SDG&E would have to procure an additional 1000MW of non-local RA once Sunrise is in service?

A. The CAISO accepts UCAN's argument that reducing local RA obligations by 1000 MW would increase non-local RA obligations; and it adjusts its estimate of the Sunrise benefits accordingly. Because some of the non-local RA is provided by the renewable resources in the Sunrise case, the CAISO estimates that 660 MW is the net increase in non-local RA requirement.

The amount of additional non-local RA that SDG&E would need to purchase is affected by the amount of RA provided by the RPS purchases in the

[37] Marcus Confidential, , 79.

base and Sunrise cases. If the Sunrise RPS mix provides more RA-qualified capacity than the renewable resources added to the base case, then this additional capacity should be netted against the 1000 MW of RA would need to be procured. RPS resources provide RA capacity because the CAISO models RPS purchases at the full cost of the renewable resource, including return on and of capital investments. Accordingly, these payments are for both the energy and capacity output from the renewable resources.

Based on the current RA counting rules, which count RA capacity as the average produced over the summer on-peak hours, the CAISO has assumed that 100% of geothermal capacity, 70% of solar thermal capacity, and 20% of the installed wind capacity are RA-qualified. Table 2 below shows the amount of RA-qualified capacity in the base case RPS resource mix and the Sunrise RPS resource mix. The table shows that the Sunrise mix provides 340MW more RA-qualified capacity than the base case. Thus, the Sunrise case would require purchases of no more than 660MW of non-local RA capacity, not 1000MW as UCAN asserts. Note that for the TEAM methodology it does not matter how much of the renewable output is purchased by SDG&E. It is reasonable to assume that the increase in RA-qualified capacity would flow to a CAISO participant either through direct purchase of the renewable energy or through secondary purchase of the RA capacity.

Table 2: Non-Local RA Difference between Base and Sunrise Case

	Installed MW			RA Qualifying MW	
	Base	Sunrise	RA %	Base	Sunrise
Geo	1190	1000	100%	1190	1000
Wind	500		20%	100	0
Solar		900	70%	0	630
Total	1690	1900		1290	1630
RA Difference					340

Q. Have you estimated the impact of the 660MW of non-local RA capacity on your estimates of net benefits for each alternative?

A. Yes. Based on UCAN's non-local RA value of $27 kW-year in 2006 dollars, Table 3 below shows the levelized annual benefits of Sunrise are reduced by another $26M/year. This brings the annual net benefits for Sunrise down to 52M/year.

Table 3: Levelized costs and benefits by alternative assuming both Supplemental Non-Local Capacity Purchases and the $27/kW-year RA price floor.

		A	B	C	D	E	F	G
	Summary of Levelized Costs and Benefits	**Costs**				**Net Benefits**		
		Base Case	Sunrise	South Bay	Green Path + LEAPS	Sunrise	South Bay	Green Path + LEAPS
	Energy and Reliability Costs							
1	Customer Payments from Gridview	15,750	15,629	15,697	15,708	121	53	42
2	Less CAISO congestion cost (reduces TAC)	(124)	(88)	(102)	(110)	(36)	(21)	(13)
3	Less URG Margin (reduces URG bal acct)	(4,748)	(4,714)	(4,724)	(4,739)	(34)	(24)	(9)
4	Less IOU excess loss payments	(809)	(793)	(803)	(800)	(16)	(6)	(9)
5	**Subtotal Energy Cost and Benefit**	10,070	10,035	10,069	10,060	**35**	**1**	**10**
6	RMR Capacity Payments - Levelized	90	66	125	86	24	(35)	4
7	RMR Operating Payments - Levelized	60	48	60	58	12	-	2
8	CT Capacity Costs - Levelized	110	31	56	61	79	54	49
9	Transmission cost for new CTs-Levelized	39	11	20	21	28	19	17
10	Remediation cost to provide reactive support	-	-	-	-	-	-	-
11	RA Costs to replace CTs and RMR contracts	-	26	-	(8)	(26)	-	8
12	**Subtotal Reliability Cost and Benefit**	299	182	261	218	**117**	**37**	**80**
13	**Total Energy and Reliability Benefits**					**152**	**38**	**90**
	RPS Procurement Cost							
14	Adjusted RPS Cost	5,320	5,264	5,320	5,264	**56**	**-**	**55**
15	**Total Benefits**					**209**	**38**	**146**
	Transmission Cost							
16	**Levelized Cost of Transmission**	-	157	9.3	205.2	**(157.0)**	**(9.3)**	**(205.2)**
17	**Total Costs and Benefits**	15,688	15,637	15,660	15,748	**52**	**29**	**(59)**

C. Lower reliability benefit for Sunrise

Q. What is the CAISO's opinion on the DRA's lower estimate of $66.4M for Sunrise's reliability benefit?

A. There are two main differences between the DRA and CAISO's estimates of reliability benefits for Sunrise. First, the DRA justifies its estimate based on its assessment that San Diego will have no capacity deficiency till 2015.[38] The CAISO concurs that SDG&E's advanced metering infrastructure (AMI) and on-going contracting efforts should be included in a reliability assessment and that they have the potential to defer the need for new capacity. As a result, the CAISO has reexamined the effect of AMI and power contracts on San Diego's capacity deficiency *sans* Sunrise. As discussed in Section 4 below, the reexamination confirms that year 2010 remains the first year of capacity deficiency.

The second major difference between the CAISO and DRA reliability analysis is that DRA assumes retirement of SDG&E's local generation at a continuous rate over a 10 year period until it has been entirely replaced. DRA has not produced any evidence that this is a more likely scenario than assuming South Bay retires and the other plants continue to operate or are mothballed until needed at a later date.

D. Reliability benefit of TE/VS

Q. What is the CAISO's opinion of TNHC's $126M/year estimate of the TE/VS project's reliability benefit in 2015?

[38] Woodruff, Table ES-1.

A. THNC's estimate is based on the erroneous conclusion that (Green Path + LEAPS) provides the same reliability benefit as Sunrise. THNC asserts that the reliability benefit of TE/VS, and hence (Green Path + LEAPS), should be the same as Sunrise's benefit, that is derived from a 1000 MW increase in SDG&E's import limit. THNC reasons that the new facility and the Imperial Valley-Miguel 500 kV line would be the two contingencies setting the import limit in either case.[39] Because the 1000 MW is double the CAISO's estimate of 500 MW, THNC doubles the $63 million in reliability benefits that the CAISO found in its analysis of the (Green Path + LEAPS) alternative.[40]

TNHC claims that the TE/VS transmission alone would reduce the San Diego area LCR requirement by 1000 MW rather than the 500 MW determined by the CAISO in its detailed studies. In the description of the analysis performed to demonstrate the 1000 MW of LCR reduction, TNHC states "[t]o conduct this analysis, I am using the study methodology used by CAISO in its 2009-11 2011 Local Capacity Technical Analysis study, dated October 31, 2006, which included an import assessment for SDG&E."[41] Mr. Depenbrock goes on to state that the N-1-1 condition would be more severe than the G-1/N-1 condition. The CAISO is puzzled by this testimony because the reference document they claim to have followed explicitly provides the following analysis which describes how the G-1/N-1 condition is worse than the N-1-1 condition:

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[39] Depenbrock, 9.
[40] Auclair, 31
[41] Depenbrock, 8.

> In 2011 the most limiting contingency in the San Diego area is described by the outage of the 500 kV Southwest Power Link (SWPL) between Imperial Valley and Miguel Substations with the Otay Mesa Combined-Cycle Power plant (561 MW) out of service while staying within the maximum import achieved after the new Imperial Valley-San Felipe-Central 500 kV is in service (3,500 MW).
>
> *   *   *
>
> The outage of 500 kV Southwest Power Link (SWPL) between Imperial Valley and Miguel Substations followed by San Felipe-Central 500 kV line will push the flow on South of San Onofre (WECC Path 44) to above its 2,500 MW rating; however all equipment will be within Applicable Rating. For consideration of LCR and in order to return the system to the import capability rating of Path 44 to 2,500 MW (within 30 minutes) the reliability criteria would permit load drop in San Diego if additional resource capacity in the area is not available.[42]

Presumably, TNHC missed this description of the LCR analysis of the San Diego area with the Sunrise project modeled, and this has caused them to come to incorrect conclusions about the relative LCR elimination benefits of the LEAPS transmission versus the Sunrise project.

Furthermore, THNC ignores the CAISO's analysis showing loading on the San Onofre – San Luis Rey 13 230kV # 1 line to be 99% of its emergency rating (1150 MVA) under the contingency of its parallel line at 500 MW of increased imports into San Diego Higher imports would require adding a fourth San Onofre – San Luis Rey 230kV line (18 miles). If the San Diego import capability were increased further, there would be a contingency overload of both the San Luis Rey-Mission #1 and #2 230 kV lines due to the loss of the Penasquitos-Old Town

[42] *Id.*, 75

230 kV line. The San Luis Rey-Mission #1 and #2 lines were at 91% of their emergency ratings.

THNC has provided no credible evidence that would convince the CAISO to alter its conclusion that the (Green Path + LEAPS) alternative would increase import capability of the San Diego area by 500 MW. Hence, the CAISO sees no reason to change its $63 million estimate of the reliability benefits of (Green Path + LEAPS).

E. Fixed cost components of remote generation in the Sunrise case.

Q. Does the CAISO agree with THNC's statement that its Sunrise case "replaces the avoided in-basin generation with remote generation and renewable energy resources that are price only at LMP"[43] and does not include a fixed cost component?

A. No. The CAISO included the fixed cost component of the remote generation in the Sunrise case when estimating the RPS compliance costs included in the case. THNC misunderstands the CAISO's methodology, and its statement is without merit.

F. Mix of renewable resources throughout the West.

Q. Does the CAISO agree with THNC's claim that the CAISO testimony undercuts the preference for Imperial Valley resources by making the

[43] Auclair, 26

unrealistic assumption that all identified renewable resources throughout the West include the same mix of geothermal, wind and solar resources?[44]

A. No, THNC misunderstands the CAISO's methodology. The CAISO's analysis uses a different mix of renewable resources for the base case and Sunrise case. Each alternative can also have a different mix, depending on the transmission links that are constructed for the case, as explained in the CAISO's April 20, 2007 submission.[45]

3.3 RPS benefit estimation

Q. What are the parties' positions regarding the CAISO's estimation of RPS benefits?

A. The positions are as follows:

- Renewable energy deliverability. UCAN opines that renewable resources in Imperial Valley are deliverable to San Diego without Sunrise.[46] UCAN's reasoning is that "when the ISO was asked to model a situation with full development of Imperial Valley renewable energy – about 2700 new MW by 2015 – and no STP, its Gridview modeling showed that more than 99.94% of the 20,700+ GWh of Imperial Valley generation in 2015 in the with-STP case would also occur without STP."[47]

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[44] *Id.*,19.
[45] Second Errata to Initial Testimony of The California Independent System Operator Corporation, Part II, Application 06-08-010, April 20, 2007, Section 4.
[46] Marcus Confidential, 90.
[47] *Id.* , at 93

- Exclusion of non-CAISO customers and the "sunk" costs of Tehachapi transmission from RPS benefit computation. The DRA's base-case estimate is $37M,[48] lower than the CAISO's estimate of $56M.
- Range of RPS benefits**.** The DRA opines that a reasonable range of RPS benefits is $0M/year to $137M/year.[49]
- RPS benefit of TE/VS. TNHC adopts the CAISO's 2015 estimate of -$28M for the TE/VS line.[50]

A. Renewable energy deliverability

Q. Does the CAISO agree with UCAN that 2700 MWs of renewable energy resources are likely to be developed in the Imperial Valley without Sunrise?[51]

A. No. The CAISO's reliability analysis of UCAN's alternatives to Sunrise shows that less than 700 MW of the 2700 MW potential could be reliably interconnected to the system and delivered to loads. The CAISO believes that UCAN has erroneously relied on the results of the Gridview runs conducted by the CAISO to support its conclusion that 2700 MW of new renewable load can be connected to the system and reliably delivered to load.

UCAN asked the CAISO to perform a reliability analysis on the 2015 Heavy Summer power flow model with 2700 MW of new renewable generation in Imperial County. UCAN also specified that a third Miguel 500/230 kV

[48] Woodruff, Table ES-2.
[49] Woodruff, 36.
[50] Auclair, 32.
[51] In its initial testimony, the CAISO assumed that 200MW of Imperial County renewables would be developed by IID. Therefore, the CAISO used 2500MW as the incremental amount of new renewables for the purposes of its analysis. However, because UCAN has used the full 2700 MW in its testimony, we will refer to that amount for this discussion.

transformer should be modeled to alleviate the Miguel transformer loading limit, and that Path 42 should be upgraded. The CAISO modeled the case to UCAN's specifications, performed a powerflow, post-transient and stability analysis of that case and provided the results to UCAN.[52]. In those results the CAISO found that mitigating the Miguel transformer loading limit and upgrading Path 42 was not an adequate plan of service to accommodate 2700 MW of generation in Imperial County, due to several reliability criteria violations produced by this model. Specifically, the most restrictive criteria violation was the transient frequency dip problem that the new generation would create in the Mexico CFE system. This problem would limit the installation of new generation in the Imperial County area without the Sunrise project, to 500 MW. Adding more generation in Imperial County only makes the impacts of this contingency worse.

Due to time constraints, the Gridview studies of this UCAN alternative were performed in parallel with the reliability studies and they did not consider these identified transmission constraints. Again as instructed by UCAN, the Gridview case included 2700 MW of Imperial County renewables generation. Thus, UCAN's testimony on renewable energy deliverability misinterprets the CAISO's two-prong approach to assess a transmission project's benefits by relying solely on the economic case while ignoring the transient stability results.

[52] On March 30, 2007 the CAISO provided UCAN confidential transient stability results in the file named "transient_stability_results_v01.xls". These results identified a NERC/WECC System Adequacy and Security Criteria violation. Part III of the CAISO Testimony filed on April 20, 2007 described these results in the discussions of UCAN18 on Page 27, UCAN2 on Page 31, UCAN3 on Page 35, UCAN10 on Page 38, and UCAN12 on Page 42. On May 11, 2007, a confidential workpaper with a file name of "supplemental UCAN alternative analysis.doc" was provided to UCAN providing additional detail about the same reliability problem.

The reliability analysis clearly shows that adding 2700 MW of generation in Imperial County without Sunrise would result in several reliability criteria violations.[53,]

Adding more than 700 MW of new generation in Imperial County *sans* Sunrise would degrade the transmission system's capability to withstand the Imperial Valley-Miguel 500 kV outage, already the worst single contingency in the San Diego area and possibly the entire CAISO control area.

B. Exclusion of both non-CAISO customers and Tehachapi's "sunk" costs for the RPS procurement benefits.

Q. Do you agree with DRA's proposal to remove RPS procurement benefits related to non-TAC customers?

A. Yes. The DRA is correct that the RPS benefit estimation should exclude non-CAISO consumers. The DRA proposes to fix the CAISO error by removing the RPS benefits for non-TAC customers, resulting in (a) a reduction in levelized benefits of $11M/year for the CAISO's case, or (b) $9M/year for the DRA case where Tehachapi transmission costs are removed.

Q. Do you agree with the DRA's proposal to remove Tehachapi transmission costs from the renewable resource supply curve, which reduces Sunrise's RPS benefit?

A. No. While the CPUC has approved a portion of the estimated transmission cost for Tehachapi, including segments 1-3 at an estimated cost of approximately $250

[53] Second Errata to Initial Testimony of The California Independent System Operator Corporation, Part II, Application 06-08-010, April 20, 2007, Table 5.1 at 80.

million, the vast majority of the project's total estimated costs of $1.8 billion have not been approved yet and are therefore appropriately included in the cost of Tehachapi resources in this context. Despite the substantial amounts of incremental investments still required to fully develop Tehachapi, the DRA has removed the entire Tehachapi transmission cost from its RPS benefit estimation, making the 4500 MW of wind resources less expensive than the geothermal and solar resources in the Imperial Valley. The net impact of the DRA's cost removal on the CAISO's analysis is a $10M/year reduction in Sunrise's levelized RPS benefits.

The CAISO does not agree with DRA's adjustment. In fact, if the CAISO were to make any adjustment related to the Tehachapi project, it would be to increase our conservative estimates of the costs of the area's wind resources. With regard to the wind cost, the CAISO has assumed a wind resource cost of $66MWh.[54] Recently released figures from the CEC's June 2007 draft report on "Comparative Costs of Central Station Generation Technologies" indicate that the costs of wind have substantially increased to as high as $99/MWh.[55] While the CEC report is a draft staff report, the utilities attending the June 12, IPER workshop indicated that the bids they were receiving in their RFO's were near the market price referent levels, i.e., $85-90/MWh in 2010.[56]. Clearly the CAISO estimate is on the low side.

[54] Second Errata to Initial Testimony of The California Independent System Operator Corporation, Part II, Application 06-08-010, April 20, 2007, 59.
[55] http://www.energy.ca.gov/2007publications/CEC-200-2007-011/CEC-200-2007-011-SD.PDF
[56] The adopted market price referent is $86.52/MWh for a 20-year contract in CPUC Resolution E – 4049, December 14, 2006.

Q. Based on the evidence presented by DRA, does the CAISO propose to modify its levelized estimate of RPS procurement benefits for Sunrise?

A. Yes. The CAISO has modified its estimate of Sunrise's RPS benefit to eliminate benefits from non-TAC paying customers. This modification reduces the CAISO's estimate of RPS benefits from \$56M/year to \$45M/year, and reduces the estimate of Sunrise net benefits from the \$52M/year estimate shown in Table 3 above, to \$41M/year.

However, the CAISO rejects the DRA's removal of Tehachapi transmission because of the higher wind cost and unspent transmission dollars explained in the last answer. This lower estimate of RPS benefits, along with the proposed modifications already described, are shown in Table 4 below

Table 4: Levelized costs and benefits by alternative assuming Supplemental Non-Local Capacity Purchases, the \$27/kW-year RA price floor and Exclusion of Non-TAC paying utilities.

		A	*B*	*C*	*D*	*E*	*F*	*G*
	Summary of Levelized Costs and Benefits	**Costs**				**Net Benefits**		
		Base Case	Sunrise	South Bay	Green Path + LEAPS	Sunrise	South Bay	Green Path + LEAPS
	Energy and Reliability Costs							
1	Customer Payments from Gridview	15,750	15,629	15,697	15,708	121	53	42
2	Less CAISO congestion cost (reduces TAC)	(124)	(88)	(102)	(110)	(36)	(21)	(13)
3	Less URG Margin (reduces URG bal acct)	(4,748)	(4,714)	(4,724)	(4,739)	(34)	(24)	(9)
4	Less IOU excess loss payments	(809)	(793)	(803)	(800)	(16)	(6)	(9)
5	**Subtotal Energy Cost and Benefit**	10,070	10,035	10,069	10,060	**35**	**1**	**10**
6	RMR Capacity Payments - Levelized	90	66	125	86	24	(35)	4
7	RMR Operating Payments - Levelized	60	48	60	58	12	-	2
8	CT Capacity Costs - Levelized	110	31	56	61	79	54	49
9	Transmission cost for new CTs-Levelized	39	11	20	21	28	19	17
10	Remediation cost to provide reactive support	-	-	-	-	-	-	-
11	RA Costs to replace CTs and RMR contracts	-	26	-	(8)	(26)	-	8
12	**Subtotal Reliability Cost and Benefit**	299	182	261	218	**117**	**37**	**80**
13	**Total Energy and Reliability Benefits**					**152**	**38**	**90**
	RPS Procurement Cost							
14	Adjusted RPS Cost	4,272	4,227	4,272	4,227	**45**	**-**	**45**
15	**Total Benefits**					**198**	**38**	**135**
	Transmission Cost							
16	**Levelized Cost of Transmission**	-	157	9.3	205.2	**(157.0)**	**(9.3)**	**(205.2)**
17	**Total Costs and Benefits**	14,640	14,600	14,612	14,711	**41**	**29**	**(70)**

C San Diego Capacity Need Date

Q. The DRA's assessment of San Diego's local capacity requirement (LCR) need *sans* Sunrise indicates no capacity deficiency until 2015.[57] Does the CAISO agree with this assessment?

A. No, the CAISO does not concur that 2015 is the first year of capacity deficiency. The DRA's LCR revises SDG&E's assessment by including the capacity (MW) provided by SDG&E's Advanced Metering Infrastructure (AMI) and contracts with J Power (Pala), Wellhead Power Maragarita and EnerNOC. The CAISO concurs that AMI, demand response and planned new generation should be part of the determination of LCR, and we have updated our calculations accordingly. However, San Diego loads are growing more rapidly than anticipated, as evidenced by the latest CEC staff forecast (May 2007, CEC-200-2007-006). Because the new CEC forecast has higher SDG&E demand and growth than the prior forecast, the revised capacity deficiency date remains at 2010, as shown in Table 5 below.

[57] Woodruff, Table ES-1.

Table 5: San Diego Locational Capacity Requirement[58]

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Reference
	Load Forecast														
1	1 in 10 CEC Forecast	4999	5084	5170	5258	5348	5439	5531	5625	5721	5818	5917	6017	6120	CEC-200-2007-006
2	-CA Solar Initiative	2	6	10	25	60	100	130	150	150	150	150	150	150	SDGE testimony 1/26/07
3	-Celerity(Demand Response)	20	20	20	20	20	20	20	20	20	20	20	20	20	SDGE testimony 1/26/07
4	-Comverge(Demand Response)	9	9	9	9	9	9	9	9	9	9	9	9	9	SDGE testimony 1/26/07
5	-EnerNOC(Demand Response)	30	30	30	30	30	30	30	30	30	30	30	30	30	
6	-AMI(Demand Response)	0	43.3	81.8	179	187	196	201	206	211	216	221	226	232	SDGE data response
7	Net 1 in 10 Load Forecast	4938	4976	5020	4996	5041	5084	5141	5210	5301	5393	5487	5582	5679	
	Generation														
8	2008 Posted NQC	2917	2917	2917	2917	2917	2917	2917	2917	2917	2917	2917	2917	2917	Net Qualifying Capacity Values and LCR for Compliance Year 2008 - Corrections as of 30-May-2007
9	+SDCWA - Rancho Penasquitos	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	SDGE testimony 8/4/06
10	+Bull Moose (Biomass)		20	20	20	20	20	20	20	20	20	20	20	20	SDGE testimony 8/4/06
11	+Otay Mesa Combined Cycle		561	561	561	561	561	561	561	561	561	561	561	561	CEC website
12	+Lake Hodges Pump Storage Hydro	40	40	40	40	40	40	40	40	40	40	40	40	40	ISO Queue
13	+J Power (Pala)	94	94	94	94	94	94	94	94	94	94	94	94	94	2008 SDGE contract info
14	+Wellhead Power Margarita	44	44	44	44	44	44	44	44	44	44	44	44	44	2008 SDGE contract info
15	+Palomar inlet air chiller			20	20	20	20	20	20	20	20	20	20	20	
16	-South Bay Retirement			-702	-702	-702	-702	-702	-702	-702	-702	-702	-702	-702	
17	Total Generation	3100	3681	2999	2999	2999	2999	2999	2999	2999	2999	2999	2999	2999	
	Locational Capacity Requirement														
18	Largest G-1	541.5	561	561	561	561	561	561	561	561	561	561	561	561	
19	Loss Adjustment (Note 2)	58	58	58	58	58	58	58	58	58	58	58	58	58	Table 5.1 ISO testimony 4/20/07 (Reference case vs N-1)
20	Import Capacity Need (Load-Gen)	2438	1914	2640	2616	2662	2704	2762	2831	2921	3014	3107	3203	3300	
21	Import Capacity Limit	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	
22	Surplus (Deficiency)	62	586	(140)	(116)	(162)	(204)	(262)	(331)	(421)	(514)	(607)	(703)	(800)	

Note 1: Sunrise Powerlink or alternative transmission projects are not considered in this table
Note 2: Loss adjustment needed to reflect N-1/G-1 condition

[58] The San Diego area 1 in 10-year extreme weather load forecast data in line 1 comes from the May 2007 CEC Staff Forecast of 2008 Peak Demand. The San Diego area load growth between 2006 and 2008 is 1.7% per year. This growth rate was assumed constant through the year 2020.
Adjustments were made to this load forecast in lines 2 through 6 to represent the California Solar Initiative and three different demand response programs. The CAISO position on counting demand response programs for local reliability purposes is still evolving. However, for the purposes of this proceeding, the CAISO will count the revised SDG&E load reduction attributed to AMI for determining the resource need year. The revised SDG&E estimates are based on SDG&E's response to Energy Division data request number 4 which was also provided to the CAISO in response to our data request. <u>These estimates were then adjusted to reflect the impact of losses.</u>

Line 8 = generation capacity expected to be in operation in 2008. Lines 9 through 15 = new resources expected to come into operation over the next few years, based on SDG&E resource procurement information. Line 16 = the expected retirement of South Bay Power Plant in 2010.

Local capacity requirements in the San Diego area are established so that during the outage of the largest generating unit followed by worst single transmission line outage all load in the San Diego area (i.e. line 7 of the attachment) can be reliably served. Currently the largest generator in the area is the 541.5 MW Palomar unit. In 2010 the 561 MW Otay Mesa unit will be the largest unit in the area as shown on line 18. The worst single transmission line outage is the Imperial Valley-Miguel 500 kV line outage, and in order to avoid load shedding, the import power flow into San Diego must be maintained at or below 2500 MW. Also, during this transmission line outage condition power losses increase by approximately 58 MW as shown on line 19, and this incremental increase in losses must be met by internal resources in order to maintain import flows below 2500 MW. This value of 58 MW is the difference between the 155 MW of losses in the Reference Case during the G-1/N-1 condition in Table 5.1 of the CAISO testimony and the 97 MW of losses in the same case for only the G-1 condition. Line 20 = local load (line 7 + line 19) less (line 17 – line 18. Line 22 = the surplus capacity available to meet the San Diego local load (Line 20 – Line 21).

Q. How does this estimation of LCR differ from what the CAISO used in its 04/20/07 testimony?

A. The reference case results in Table 5.1 of the CAISO's 4/20/07 testimony showed the need for 565 MW of local resources in 2015 to meet the San Diego local capacity requirements. The new table reduces the need to 331MW in 2015 (Line 22). The table also shows that the first year of deficiency occurs in 2010.

Q. What major drivers underlie the change in need requirements?

A. The major drivers are listed below. We have also indicated how much each driver changes the local capacity deficiency in 2015. The net effect is a 252MW reduction in 2015 compared to the results shown on Table 5.1 of the CAISO's April 20, 2007, testimony.

- The San Diego area 1-in-10-year extreme weather load forecast data in line 1 comes from the May 2007 CEC Staff Forecast of 2008 Peak Demand. The San Diego area load growth between 2006 and 2008 is 1.7% per year, and is higher than the prior 2006 CEC forecast. This growth rate was assumed constant through the year 2020. This change amounted to an increase in load of +186MW between 2010 and 2020.
- Additional demand response reduction was included for the EnerNOC program (-30MW)
- AMI has been included as a reduction to peak demand. The CAISO position on counting demand response programs for local reliability purposes is still evolving. However, for the purposes of this proceeding, the CAISO will count the load reduction attributed to AMI by SDG&E for determining the

resource need year. SDG&E provided its translation of the assumptions in D.07-04-043 into peak load reductions beginning in 2010 through 2020 in response to a data request, and the CAISO will accept interpretation of the Commission's decision for the purposes of this analysis.[59] The CAISO has adjusted the values upward for 5.86 percent distribution losses and 2.68% transmission losses. (-223MW)

- Net Qualifying Capacity Values and LCR for Compliance Year 2008 was corrected as of 30-May-2007. (-2.5MW)
- SDCWA and Bull Moose generation were added (-24.5MW)
- J. Power and Wellhead Power generators were added (-138MW)
- Palomar air inlet chiller was added (-20MW)

Q. What is the impact of the new LCR estimates on the economics of the alternatives?

A. The lower LCR requirements reduce the levelized net benefits of the Sunrise project another $3M from $41M/year to $38M/year.

[59] See SDG&E's 6/14/07 response to the CAISO's Second data request.

Table 6: Levelized costs and benefits by alternative assuming Supplemental Non-Local Capacity Purchases, the $27/kW-year RA price floor, Exclusion of Non-TAC paying utilities, and Revised Local Capacity Requirements

		A	B	C	D	E	F	G
	Summary of Levelized Costs and Benefits	**Costs**				**Net Benefits**		
		Base Case	Sunrise	South Bay	Green Path + LEAPS	Sunrise	South Bay	Green Path + LEAPS
	Energy and Reliability Costs							
1	Customer Payments from Gridview	15,750	15,629	15,697	15,708	121	53	42
2	Less CAISO congestion cost (reduces TAC)	(124)	(88)	(102)	(110)	(36)	(21)	(13)
3	Less URG Margin (reduces URG bal acct)	(4,748)	(4,714)	(4,724)	(4,739)	(34)	(24)	(9)
4	Less IOU excess loss payments	(809)	(793)	(803)	(800)	(16)	(6)	(9)
5	**Subtotal Energy Cost and Benefit**	10,070	10,035	10,069	10,060	**35**	**1**	**10**
6	RMR Capacity Payments - Levelized	90	58	120	79	32	(30)	11
7	RMR Operating Payments - Levelized	60	42	60	55	18	-	5
8	CT Capacity Costs - Levelized	93	26	48	52	67	45	41
9	Transmission cost for new CTs-Levelized	33	9	17	18	24	16	15
10	Remediation cost to provide reactive support	-	-	-	-	-	-	-
11	RA Costs to replace CTs and RMR contracts	-	26	-	(8)	(26)	-	8
12	**Subtotal Reliability Cost and Benefit**	276	162	245	196	**114**	**31**	**81**
13	**Total Energy and Reliability Benefits**					**150**	**32**	**91**
	RPS Procurement Cost							
14	Adjusted RPS Cost	4,272	4,227	4,272	4,227	**45**	**-**	**45**
15	**Total Benefits**					**195**	**32**	**136**
	Transmission Cost							
16	**Levelized Cost of Transmission**	-	157	9.3	205.2	**(157.0)**	**(9.3)**	**(205.2)**
17	**Total Costs and Benefits**	14,618	14,580	14,596	14,688	**38**	**22**	**(70)**

D. Range of RPS benefits.

Q. What is the CAISO's opinion on the DRA's range of RPS benefit estimates for Sunrise?

A. The CAISO finds the DRA's range unreasonable. Although zero benefits is possible, it is extremely unlikely and therefore should *not* be the low end of a plausible range. The CAISO believes that its Sunrise RPS benefit estimate is conservative and should be adopted as the low end of a plausible range.

The CAISO's opinion is based on the following information and conclusions:

- SDG&E has indicated in public workshops that it has signed contracts with Stirling at a price significantly below the 12 cents per KWh estimate used by the CAISO. (March 27, 2007 Workshop). Also, other studies have projected costs in the 8-10 cents per kWh range.[60] Reducing the solar thermal cost to 10 cents per kWh would increase the annual RPS procurement benefit to CAISO participants by approximately $32M/year.[61]

- As noted above, the updated cost estimate and actual bids for wind resources are substantially higher than the $66/MWh assumed in the CAISO's analysis.[62] The CEC recently estimates Class 5 Wind costs at $99/MWh.[63] Being conservative, the CAISO has used, a wind cost of $85/MWh in 2010[64] for estimating the high end of RPS benefit range. The $85/MWh wind cost would increase the Sunrise RPS benefits to CAISO participants by another $35M/year.
- The recent rejection of the Palo Verde-Devers II project by the Arizona Public Service Commission highlights the difficulty of developing new transmission projects for the purpose of importing power from another jurisdiction into California. The CAISO's base case recognizes this difficulty and assumes that only 50% of the renewable projects requiring long transmission lines connecting to other jurisdictions would ultimately

[60] See, for example, "Presentation to the CEC on Solar Thermal Electricity Costs, 2003 Integrated Electricity Report" that references an independent report prepared by Sargent and Lundy under the auspices of DOE indicating levelized costs of Solar Thermal in the 8 to 10 cent range in the 2007 time frame.
[61] The lower solar thermal cost estimate also reduces any economic benefits from Sunrise project deferral. Section 4 details the Sunrise deferral cases.
[62] Second Errata to Initial Testimony of The California Independent System Operator Corporation, Part II, Application 06-08-010, April 20, 2007, 62.
[63] CEC Draft Report :Comparative Costs of Central Station Electricity Generation Technologies, June 2007, Table 2.
[64] This is less than the adopted market price referent of $86.52/MWh for a 20-year contract in CPUC Resolution E – 4049, December 14, 2006.

> materialize.[65] In light of Arizona's recent decision, our base case assumption may be optimistic. To be sure, states like Wyoming and Montana may welcome new resource development for power export. However, California's closest neighbors all have growing loads and their own renewables portfolio standards. A more realistic assumption may be that only 25% of the projects requiring extensive transmission projects could be implemented. This modification would increase the RPS benefits to CAISO participants by an additional $108M/year.

These three changes in assumptions lead the CAISO to estimate that the high end of a plausible range of RPS benefit estimates to CAISO participants would be $220M/year, which is the sum of (a) the CAISO's original $45M/year levelized benefit for Sunrise (after adjusting for non-TAC customers);[66] (b) $32M/year for lower solar thermal costs; (c) $35M/year for wind costs at $85/MWh level, and (d) $108M/year due to less renewable energy supply from other jurisdictions that oppose new transmission designed exclusively for exports into California.

[65] Second Errata to Initial Testimony of The California Independent System Operator Corporation, Part II, Application 06-08-010, April 20, 2007, at 67.
[66] Second Errata to Initial Testimony of The California Independent System Operator Corporation, Part II, Application 06-08-010, April 20, 2007, at 45.

Table 7: Levelized costs and benefits by alternative assuming Supplemental Non-Local Capacity Purchases, the $27/kW-year RA price floor, Exclusion of Non-TAC paying utilities, Revised Local Capacity Requirements, and High End RPS Benefits

		A	*B*	*C*	*D*	*E*	*F*	*G*
	Summary of Levelized Costs and Benefits	**Costs**				**Net Benefits**		
		Base Case	Sunrise	South Bay	Green Path + LEAPS	Sunrise	South Bay	Green Path + LEAPS
	Energy and Reliability Costs							
1	Customer Payments from Gridview	15,750	15,629	15,697	15,708	121	53	42
2	Less CAISO congestion cost (reduces TAC)	(124)	(88)	(102)	(110)	(36)	(21)	(13)
3	Less URG Margin (reduces URG bal acct)	(4,748)	(4,714)	(4,724)	(4,739)	(34)	(24)	(9)
4	Less IOU excess loss payments	(809)	(793)	(803)	(800)	(16)	(6)	(9)
5	**Subtotal Energy Cost and Benefit**	10,070	10,035	10,069	10,060	**35**	**1**	**10**
6	RMR Capacity Payments - Levelized	90	58	120	79	32	(30)	11
7	RMR Operating Payments - Levelized	60	42	60	55	18	-	5
8	CT Capacity Costs - Levelized	93	26	48	52	67	45	41
9	Transmission cost for new CTs-Levelized	33	9	17	18	24	16	15
10	Remediation cost to provide reactive support	-	-	-	-	-	-	-
11	RA Costs to replace CTs and RMR contracts	-	26	-	(8)	(26)	-	8
12	**Subtotal Reliability Cost and Benefit**	276	162	245	196	**114**	**31**	**81**
13	**Total Energy and Reliability Benefits**					**150**	**32**	**91**
	RPS Procurement Cost							
14	Adjusted RPS Cost	4,725	4,505	4,725	4,505	**220**	**-**	**220**
15	**Total Benefits**					**369**	**32**	**311**
	Transmission Cost							
16	**Levelized Cost of Transmission**	-	157	9.3	205.2	**(157.0)**	**(9.3)**	**(205.2)**
17	**Total Costs and Benefits**	15,071	14,859	15,049	14,965	**212**	**22**	**106**

Q. Why do the different RPS procurement assumptions cause the large changes in Sunrise RPS benefits?

A. The price changes are the easiest to explain. The Sunrise case has more solar thermal resources, and the base case has more wind resources. Therefore any decrease in solar costs will lower the cost of the procuring renewable in Sunrise. Similarly, any increase in the wind cost will increase the cost of procuring renewable resources in the base case. The effect of changing our assumption that 50% of the long distance out-of-state resources could be purchased by CA utilities to 25% is best explained with the aid of two RPS supply curves. Figure 1 below shows the RPS supply curve under the assumption that 50% of out-of-state renewables could be purchased by California utilities. The ellipse in the middle of the chart shows the cost and supply of Imperial Valley renewables that would be built if Sunrise is constructed. It shows that the Sunrise induced mix of resources costs slightly more than 105 $/MWh. If Sunrise is not constructed, the output from those Imperial Valley renewables would need to be replaced by the resources identified by the second ellipse. One can see that the replacement renewables are only slightly higher cost than the Imperial Valley renewables. This is the reason why the CAISO estimates that the construction of Sunrise will result in a positive but moderate amount of RPS cost savings, under the conservative assumptions used in our Initial Testimony.

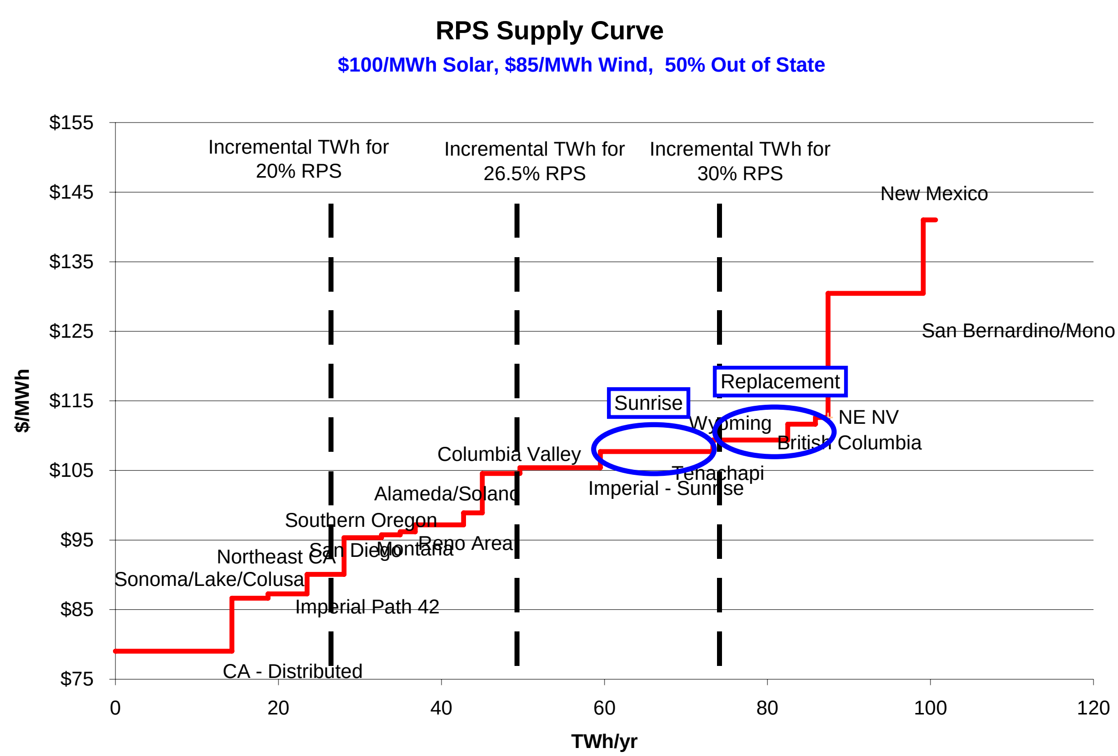

Figure 1: RPS Supply Curve - 50% of Out-of-State Resources

Figure 2 shows the RPS supply curve if only 25%, rather than 50%, of long distance out-of-state renewable resources can be imported to California. The ellipses again indicate the Sunrise Imperial Valley renewables, and the replacement renewables that would be needed if Sunrise were not built (looking at years 2020 and beyond). In this case, the replacement renewables are far more costly (127 $/MWh) than the Imperial Valley renewables (105 $/MWh), hence the large RPS savings from building Sunrise in the 25% out-of-state scenario.

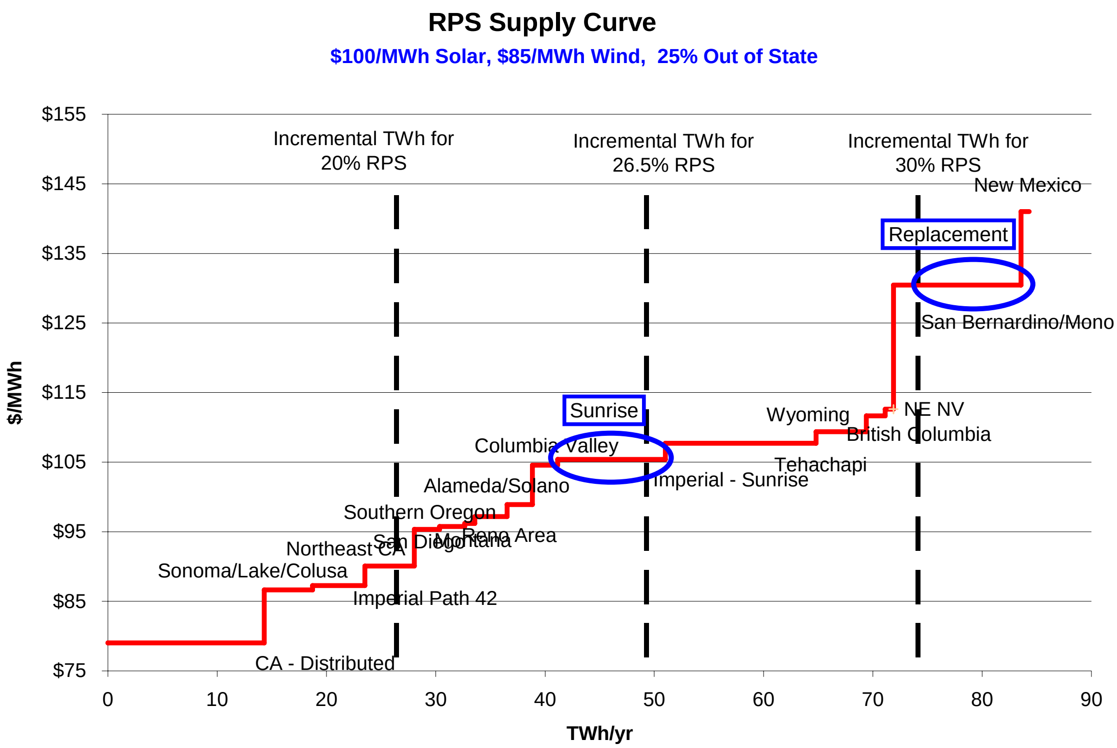

Figure 2: RPS Supply Curve - 25% of Out-of-State Resources

Q. Will building Green Path North before Sunrise reduce Sunrise's RPS benefits to zero?

A. No, it will not for the following reasons:

- Even though our economic evaluation for Green Path North makes the generous assumption that all of the Imperial Valley renewable resource potential could be delivered to loads over this new transmission line, the

CAISO's recently developed reliability analysis indicates that only 500 MW is deliverable.[67] Sunrise would still be required to facilitate the development of the remaining resources.

- The CAISO's assumed 900 MW of solar thermal resources developed in the Imperial Valley is probably too low. If both Green Path North and Sunrise were built, it would be very likely that the area would be built to its full solar thermal potential of approximately 2,000 MW. The 2000-MW estimate is consistent with studies completed by CRS and NREL;[68] and we have confirmed these estimates in telephone conversations with Stirling.

E. RPS benefit of TE/VS

Q. Does the CAISO concur with THNC that the RPS compliance benefits of the TE/VS transmission line in the absence of Green Path North would be negative $28M [in 2015], identical to the benefits under the (Green Path + LEAPS) alternative?[69]

A. No. The CAISO has not studied the TE/VS alternative's RPS compliance costs. However, the TE/VS line alone would not allow the development of the Imperial

[67] Second Errata to Initial Testimony of The California Independent System Operator Corporation, Part II, Application 06-08-010, April 20, 2007, Table 5.1 at 80.

[68] The estimate of 2000 MW of solar thermal generation potential in the Salton Sea/IID area is derived from the estimate of 10,000 MW of solar thermal potential in California in the "CRS Report" 33% report completed for the CEC in 2005 and referenced on page 55 of the CAISO April 20th 2007 Testimony.

This 2000 MW estimate is confirmed by NREL, which estimated a potential of about 10,000 MW for the area of California with a solar resource greater than 7.5 kWh/m2-day, and which passed the screen of terrain with a slope of 1% or less. Of this amount, about 20% of the state's resource is in the Salton Sea/IID area based on NREL solar mapping, and most of the rest is in the Mojave Desert.

The 2000 MW figure conservative estimate because it refers to locations with only the very highest quality resource. An acceptable solar generation resource of 6.75 kWh/m2-day would imply that Imperial Valley alone has a solar potential of about 30 GW.

[69] Auclair, 32.

Valley renewable resources that are the source of the RPS benefits for Sunrise and the (Green Path + LEAPS) alternative. It is more reasonable to assume that the RPS resources developed under TE/VS would be identical to those developed in the Base Case. Therefore, the RPS benefits of a standalone TE/VS line would be zero.

4. The CAISO's opinions on alternatives recommended by the interveners.

Q. How did the CAISO proceed with studying the intervener's alternative scenarios and presenting these scenarios in its direct testimony?

A. Although the active parties in this case are very familiar with the process that has been followed by the CAISO for studying intervener alternative scenarios since the issuance of the November 1, 2006 Assigned Commissioner/ALJ Scoping Ruling, a short summary will be helpful here.

On December 7, 2006, the interveners submitted requests for the CAISO to study numerous alternative scenarios. When it became apparent that the CAISO could not possibly complete all of the necessary model runs and file testimony on January 26, 2007, in accordance with the procedural schedule for the case, the CAISO requested an extension of time to complete these studies. Based on informal conversations with the Commission staff prior to filing its motion for extension on January 8, 2007, the CAISO agreed to complete its analysis of four cases for the January 26, 2007 testimony: 1) a base case with certain specified assumption changes; 2) the base case with Sunrise; 3) the base case with LEAPS

+ GreenPath North; and 4) the base case with South Bay repowered. The CAISO agreed to proceed with its analysis of the other proposed alternative scenarios in accordance with a schedule set forth in the motion. In an ALJ/ACR ruling on January 26, the CAISO-proposed procedural schedule was modified, and with certain minor changes, that schedule has been followed to date.

Q. What has the CAISO done in analyzing the other alternatives not addressed in Parts I and II of its initial testimony?

A. The CAISO provided the "raw" results of the model runs to the interveners in two large batches at the end of February and March, 2007, and in numerous other transmittals during the course of its ongoing study process. In its April 20, 2007 testimony,[70] the CAISO "packaged" numerous computer runs and provided subsequent analysis to estimate the benefits of alternatives specified by the parties and to assess the reliability performance of the alternatives. Additional runs were also conducted for Rancho Penasquitos Concerned Citizens (RPCC) and UCAN following the submission of the April 20, 2007 testimony, and these results were packaged and submitted on May 14, 2007. Finally, on June 22, 2007, the CAISO will submit packaged results for model runs requested by the Commission's Energy Division and by the Aspen environmental consultants.

It is important to note that with the exception of the four alternatives studied in Parts I and II of its initial testimony, the CAISO has not offered an opinion as to the feasibility or viability of the alternative scenarios. Now that the

[70] The CAISO Initial Testimony, Part III, April 20, 2007.

inteverners have filed testimony advancing certain scenarios as alternatives to Sunrise, the CAISO will take a position on these proposals.

Q. Please describe the alternatives analyzed by the CAISO at the request of third parties and now proposed to the Commission as alternatives to Sunrise.

A. These alternatives are:

(1) <u>Miguel limitation relief</u>. UCAN states that the Commission should order SDG&E to upgrade the Miguel substation to increase the import capability to 1900 MW and outflow capability to 2100 MW.[71]

(2) <u>Mexico Light</u>. UCAN opines that the Commission should order SDG&E to study the feasibility of implementing Mexico Light, whether or not Sunrise is going to be built.[72] The DRA does not consider Mexico Light as a feasible alternative to Sunrise to meet San Diego's reliability needs.[73]

(3) <u>Path 44 upgrade</u>. UCAN recommends the upgrade be pursued, whether Sunrise is going to be built or not.[74] In its Path 44 upgrade discussion, UCAN also indicates that the CAISO's current reliability criteria are too conservative by not taking probability into account.[75]

(4) <u>Sunrise deferral</u>. UCAN opines that Sunrise should be deferred because it is not cost-effective until 2018;[76] this is notwithstanding that UCAN also recommends SDG&E to obtain rights-of-way now to avoid cost escalation due

[71] Marcus, Confidential, 12.
[72] *Id.* 50.
[73] Zanininger, K. Report on The Sunrise Powerlink, Phase 1 Direct Testimony, Volume 2 of 5, DRA, CPUC, May 18, 2007, at 11 (Zanininger).
[74] Marcus Confidential, 13.
[75] Marcus Confidential, 21, footnote 58.
[76] Shames, UCAN Testimony on Overview of Technical Testimony, SDG&E Misinformation and Alternatives, at 5 (Shames).

to urban development in the western portion of Sunrise's route.[77] The DRA's assessment of San Diego's local capacity requirement (LCR) need *sans* Sunrise indicates no capacity deficiency until 2015.[78]

(5) Second Southwest Power Link (SWPL II). UCAN recommends that SWPL II should be reconsidered.[79] The DRA also considers SWPL II as a feasible alternative to Sunrise to meet San Diego's reliability needs.[80]

(6) Talega-Escondido/Valley-Serrano (TE/VS). TNHC believes that TE/VS should not be bundled into the (Green Path + LEAPS) analysis,[81] and that TE/VS provides nearly equal benefits as Sunrise at one-third of Sunrise's cost.[82]

4.1 Miguel limitation relief

Q. Does the CAISO agree with UCAN that the import and outflow capabilities on the Miguel line should be increased?

A. The CAISO agrees that if Sunrise were not built and new renewable generation were to be added to Imperial County, the current Miguel transformer constraint would need to be alleviated. In fact, the CAISO assumed in its reference case, which included 600 MW of new renewable generation in Imperial County, that a third Miguel transformer would be installed to alleviate the constraint.

77 Marcus Confidential, 215.
78 Woodruff, Table ES-1.
79 Marcus Confidential, e 48.
80 Zaninger, 6.
81 Depenbrock, 13
82 Auclair, 33.

UCAN has proposed a cheaper alternative for alleviating this constraint, which the CAISO agrees should be considered when it is needed. However, currently the Miguel transformer limit is not causing any significant uneconomic generation dispatch.

If Sunrise were built, it would mitigate the Miguel transformer flows so neither a third Miguel transformer nor the UCAN's proposed Miguel transformer tripping scheme would be needed.

Q. Does the CAISO agree with UCANs position that 2700 MW of new renewable generation in the Imperial County can be reliably interconnected and delivered by relieving the Miguel Transformer limit and upgrading Path 42 (IID-SCE)?

A. No. As explained above in Section 3.3 A., UCAN has erroneously concluded that because the CAISO and San Diego were able to model 2500 MW of new renewable generation in Imperial County without the Sunrise Powerlink project in the Gridview model, this new generation can be reliably delivered to load. However, the reliability studies performed by the CAISO for the same scenario showed that mitigating the Miguel transformer loading limit and upgrading Path 42 was not an adequate plan of service to accommodate 2700 MW of generation in Imperial Valley.

4.2 Mexico Light

Q. What is the CAISO's opinion on Mexico Light?

A. UCAN states that "The Mexico Light alternative is a very low-cost way to add 165 Mw of capacity, for reliability purposes, to SDG&E's system."[83] The CAISO's does not believe that this option could be easily implemented in the immediate future for the following reasons:

- The statement assumes that detailed operating procedures could be developed to allow the Mexico Light alternative to create generation capacity available to San Diego load during the critical contingency. This may not occur without (a) the necessary capacity contracts to be signed by SDG&E or the CAISO with the generation owner; and (b) and operating agreements and transmission service agreements with CFE.
- The statement assumes that the CFE would continue to be connected to the CAISO system during the critical Imperial Valley-Miguel transmission contingency. Based on its recent actions to modify their special protection systems for this summer season, however, the CFE may end up connected to the IID system, rather than the CAISO system, after the outage of the Imperial Valley- Miguel line. This change of settings to the special protection system in the future would render the UCAN alternative infeasible.

4.3 Path 44 Upgrade

Q. What is the CAISO's opinion on Path 44 Upgrade?

A. UCAN states "The Path 44 upgrade option consists of taking a fresh look at the Path 44 study to see what has changed since the original study, and what might be

[83] Marcus Confidential, 50.

changed in the future, in order to allow the Path 44 limit to be increased above 2500 Mw under N-1 conditions."[84]

The CAISO found bulk system reliability criteria violations when we analyzed this alternative. Although UCAN offers mitigation costs for these identified problems, the CAISO remains concerned that increasing the Path 44 rating would degrade the security of the CAISO transmission system compared to the system with the Sunrise project. This is because the upgrade without Sunrise can cause a transient frequency dip on the Mexico CFE system as well as thermal overloads.[85]

The CAISO believes that the stability performance issues found earlier are primarily caused by increasing generation in Imperial County without adding the Sunrise project. Increasing reliance on Path 44 would also tend to exacerbate this same stability performance issue.

Even if one were willing to accept the reduction in system performance, the cost savings for this alternative are questionable because increasing reliance on Path 44 to reduce the San Diego LCR requirements will cause an almost equal increase the SCE LCR requirements. To see this point, assume that the Path 44 upgrade would reduce the San Diego area LCR requirement by 350 MW. This LCR reduction would cause 350 MW of additional generation in the San Diego area to be temporarily mothballed, until load growth was sufficient to drive up

[84] Marcus Confidential, 14.
[85] The CAISO Initial Testimony, Part III, April 20, 2007, 28.

LCR contract prices to cover the plants' fixed and variable operating costs.[86] However, a brief analysis and a review of the existing studies[87] showed that this reduction of generation in San Diego would increase the LCR requirements in the LA Basin by approximately 350 MW. The brief analysis also showed that the San Diego area generation has approximately the same effectiveness as the LA Basin generation on reducing flow on the South of Lugo constraint which dictates the LCR requirements in the LA Basin

4.4 Sunrise deferral

Q. UCAN states that "deferring STP saves ratepayers $33 million levelized dollars per year in 2010-2049, using the ISO's numbers and methodology."[88] Does the CAISO concur with UCAN's statement?

A. The CAISO concurs that deferring STP can result in incremental benefits relative to the original timing under certain assumptions. However, the CAISO's estimate of the benefits of deferral is considerably smaller than UCAN's, and is highly sensitive to the assumed construction cost escalation rate. Under what the CAISO believes is the most plausible escalation rate, UCAN's suggestion of deferring STP until 2018 results in negative incremental benefits.

[86] We have assumed that the mothballed plants would not be available to sign contracts to meet the LCR needs of the LA Basin. If the mothballed generators in the SDG&E area were available to provide capacity support to the LA Basin, then they could be used to meet the increased LCR requirement in the LA Basin.
[87] CAISO 2008 Local Capacity Technical Analysis can be found at http://www.caiso.com/1bb5/1bb5ed3d46430.pdf Pages 69-71 show effectiveness factors of generation on the South of Lugo constraint. SONGS could be used as a proxy for San Diego generation and has an effectiveness factor that is approximately the median value in the list of factors.
[88] Marcus Confidential, 77.

In order to respond to UCAN's deferral recommendation, the CAISO performed a timing analysis to evaluate the economics of deferring the Sunrise project. The economics of deferral depend critically on both the cost escalation rate for the transmission project and the assumptions used to forecast the cost of different renewable resource types.

While the CAISO does not agree with UCAN's assumed 3.1% annual escalation rate, its analysis determines that using the UCAN 3.1% escalation rate, incorporating many of UCAN's assumptions, and deferring Sunrise to 2018 would increase the levelized net benefits of Sunrise by $15.7M per year. The "optimal" in-service date that maximizes Sunrise's net benefits under UCAN's assumptions would be 2016. At a more plausible transmission cost escalation rate of 5.5 percent, the 2018 in-service date *reduces* the levelized annual net benefit by $6M per year. The "optimal" in-service date under the CAISO's assumptions would be 2013.

Q. How did the CAISO construct its deferral analysis that yields the $15M per year estimate of UCAN's 2018 deferral case?

A. The CAISO constructed a deferral analysis based on its April 20th filing. The CAISO then included several changes to address the following issues raised by UCAN and DRA:

- The SDG&E loads and resources that determine LCR have been updated to include load reductions for SDG&E's AMI, DR and new CT generation. (See Table 5 above)

- The floor for RMR contract payments has been changed from $10.72/kW-year to $27/kW-year.
- The discount rate has been changed from 8.18%/year to 8.23%/year to incorporate the Commission findings in SDG&E's AMI Decision.
- The annual growth in capacity requirements has been changed to match those in Table 5 above.
- The CAISO has modeled a system RA benefit of $27/kW-yr (2006 dollars) that is assigned to all RMR, new in-area CTs, and capacity provided by renewable resources purchased in both the base and Sunrise cases. The main effect of this change is to reduce the benefits of the Sunrise case because that case purchases fewer local RMR capacity (MW), and therefore is credited with less system RA benefit. This reduction in RA from local RMR is somewhat offset by the increased RA-qualifying capacity available from the Sunrise renewable resource mix compared to the base case renewable resource mix. The Sunrise mix provides more RA-qualifying capacity because it replaces some of the base case wind resources with solar thermal resources. The CAISO has counted 70% of the installed capacity of solar thermal for RA, as compared to 20% for wind.
- RPS benefits are reduced by 19.7% to reflect RPS purchases by non-TAC paying entities.

Other updates to the analysis include:

- The base 1-in-10-year SDG&E load forecast is based on the CEC's latest May 2007 demand forecast.

- The present value and levelization period was previously fixed to cover the 40 year period of 2010 - 2049. To develop a full investigation of deferral benefits, the study period now is 40 years after the Sunrise in-service date, which may vary from 2010 to 2020.

Q. How do Sunrise's benefits vary with the planned on line date?

A. The pattern of benefits over the range of different in-service dates is as follows:

- RPS benefits. These benefits increase with the Sunrise project deferral. This occurs primarily because the Sunrise case includes 900 MW of solar thermal resources that have a relatively high delivered cost when compared to renewable resources in the base case. Thus, deferring Sunrise up to five years helps consumers achieve procurement cost savings. As the years progress, the base case resource plan has the CAISO consumers procuring increasing amounts of renewable energy from increasingly costly sources. Eventually, the base case's renewable resource mix is more costly than the Sunrise-enabled resource mix; and the RPS benefits begin to decline if Sunrise is delayed past 2016.[89]
- Energy benefits. These benefits decline with the Sunrise deferral. The Sunrise project is estimated to provide energy-related benefits each year that it is in service. Delaying Sunrise eliminates those benefits in the years 2010 until the delayed in-service date.

[89] Although the CAISO continues to believe that its RPS procurement benefits provide a conservative base case, the deferral benefits are in large part driven by the assumed differences in costs between wind resources purchased at $66 /MWh and solar thermal thermal costs purchased at $120 per MWh. As described earlier in our testimony, an alternative plausible case brings the costs of these two resources closer and essentially eliminates any deferral benefit.

- RMR (local capacity) benefits. These also decline because delaying Sunrise increases the RMR costs. Without Sunrise, more RMR MWs are purchased at a higher RMR price.
- RMR operating benefits. These benefits decline because the RMR operation cost increases with the amount of RMR MWs purchased. Without Sunrise, higher RMR purchases equate to higher operating costs in the deferral period.
- CT benefits. These decline because more CT capacity is purchased in the years prior to the Sunrise in-service date. This additional CT capacity directly increases the CT costs in the deferral period. The CAISO also expects that the new CT capacity would be signed under long-term contracts and obligates SDG&E to continue paying any new CTs even after Sunrise is built.
- CT-related transmission benefits. These benefits decline for the same reason that the costs of CTs themselves decline.
- System RA benefits. System RA is a cost (or negative benefit) in the Sunrise case because the additional RA that must be purchased to replace the RA reduction made possible by Sunrise. This cost declines with the deferral of Sunrise because the deferral delays the need for SDG&E to procure RA to replace the RA reduction.

Q. What is the overall benefit impact of deferring Sunrise's in-service date?

A. The total <u>benefits</u> of Sunrise implemented in 2010 are approximately $195M/year. If the project is delayed 10 years to 2020, its benefits decline to $142 million/year.

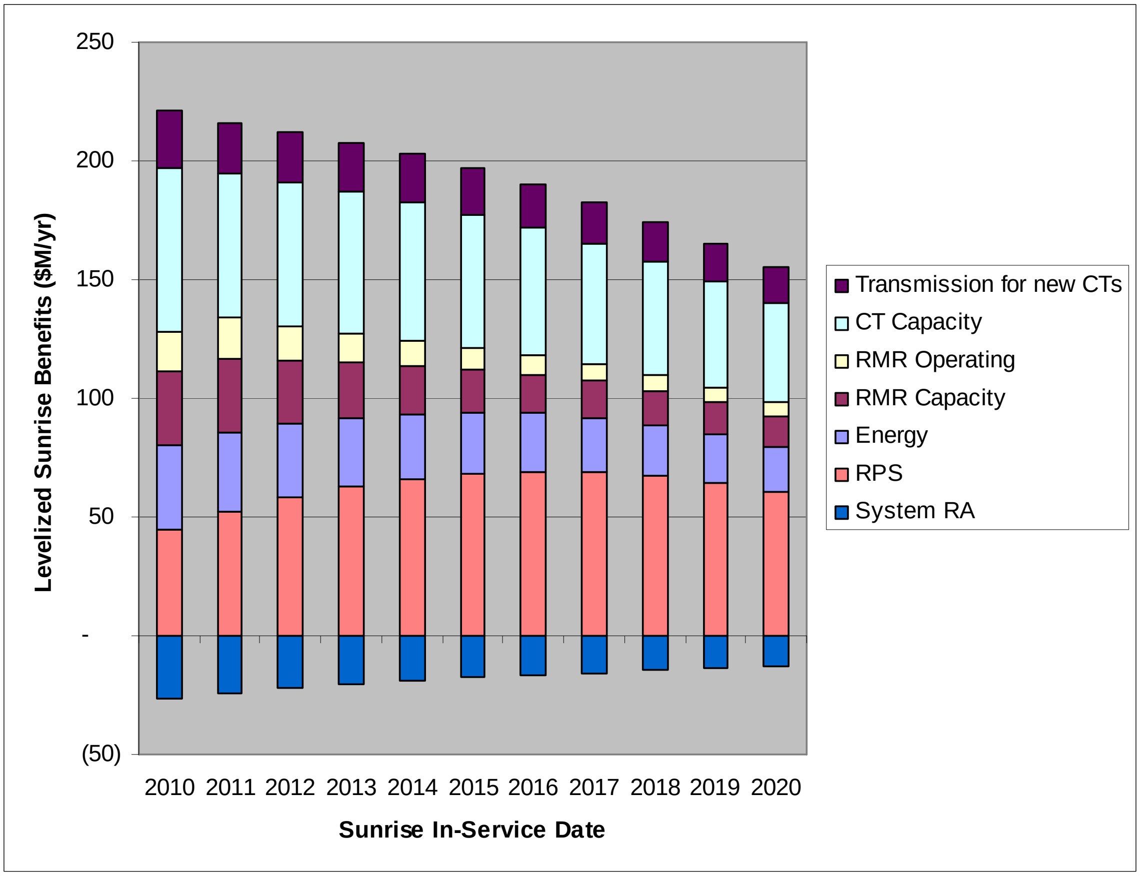

Figure 3: Levelized Benefits Incorporating 4/20/07 Estimate of RPS Benefits (does not include the change in construction costs from deferring transmission)

Q. What is the <u>net benefit</u> impact of deferring Sunrise's in-service date to 2018, as recommended by UCAN?

A. To derive the net benefit impact, the CAISO first estimates the cost savings to ratepayers from deferring capital investment. This estimation entails taking the $157M levelized value in 2010 dollars, escalated it by UCAN's 3.1% per year, and discounted it by UCAN's 8.23% discount rate. The net result for UCAN's suggested 2018 in-service data is an increase of $15.7M in the net benefits of Sunrise.

Q. Can the Commission rely upon a single $15.7M/year deferral value to decide the optimal timing of the Sunrise project?

A. No because (a) if the future project cost escalation rates are higher than UCAN's 3.1% estimate, as the CAISO believes, the benefits of deferring Sunrise decline; and (b) the benefits of deferral are highly sensitive to changes in RPS costs.

Q. What is the basis for the CAISO's belief that transmission escalation will exceed UCAN's 3.1% estimate?

A. Recent years have seen rapid increases in construction costs due to factors such as global demand for raw materials in China and India. The DRA acknowledges this rapid escalation in its testimony.[90] The Edison Electric Institute shows transmission cost escalation rates that average 9.0% per year (9.5%, 8.0%, and 9.4%) for the 2004 -2006 period.[91] VELCO's Northwest Vermont Reliability Project, Docket 6860, shows a 10% per year escalation rate.[92] SDG&E responded to the CAISO data request that labor costs have increased 30% in two years, and component cost increases are approximately 80% per year.[93]

Q. How would Sunrise net benefits change under different transmission cost escalation assumptions?

A. The figure below shows Sunrise net benefits by in-service date and cost escalation. Based on Table 5, each line on the figure shows the relationship

[90] Woodruff, 45.
[91] Table 9.1 Construction Expenditures for Transmission and Distribution, available at http://www.eei.org/industry_issues/energy_infrastructure/transmission/Transmission-Investment-expenditures.pdf. The cost escalation rate is computed as the difference between (a) the nominal expenditure growth rate; and (b) the real expenditure growth rate.
[92] The original estimate was filed on June 5, 2005 based on estimates prepared in 2002 and 2003. The adopted estimates were 29% higher and presented to VELCO in June 2005. Assuming 2.5 years of inflation, the annual inflation rate is 10%.
[93] SDG&E response number 3 to CAISO data request No. 1.

between Sunrise benefits and in-service dates, conditional on a specific transmission cost escalation rate. From this figure, the following observations can be made:

- At the 3.1% escalation rate, the in-service date with the highest net benefits is 2016.
- At the 5.5% escalation rate, the in-service date with the highest net benefits is 2013.
- At the 9% escalation rate, the 2010 in-service date produces the highest net benefits.
- If the escalation rate turns out to be 15%, Sunrise's benefits declines rapidly with deferral, turning negative in year 2013 due to increased construction costs.

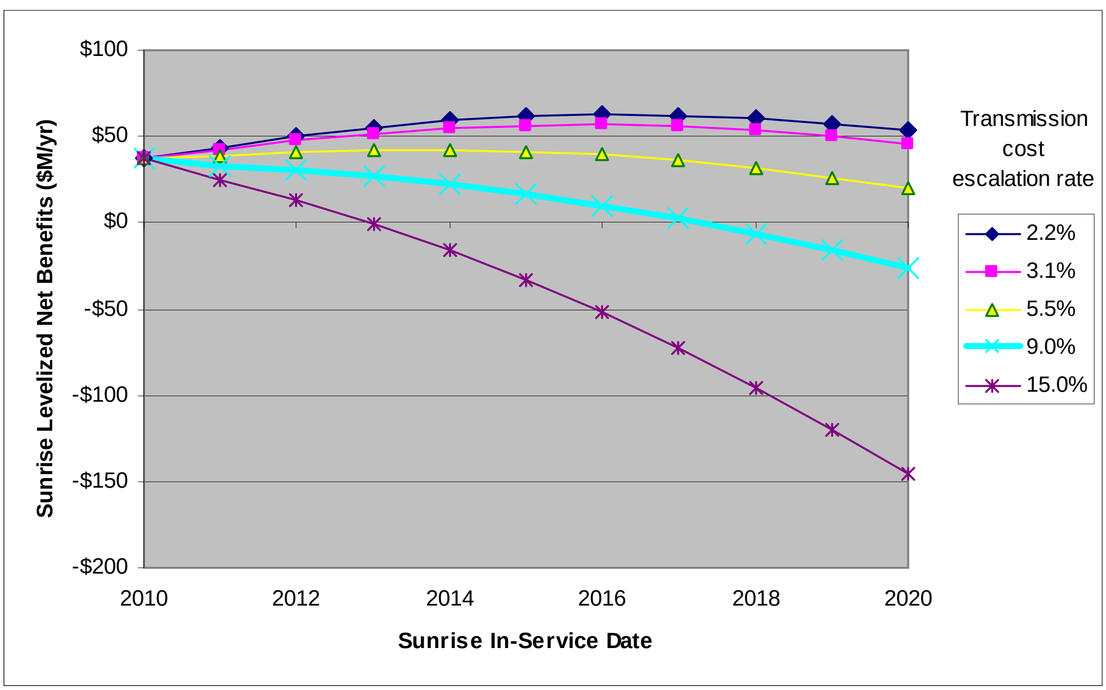

Figure 4: Sunrise Levelized Net Benefits

Table 5: Sunrise Levelized Net Benefits ($million/yr)

	Transmission cost escalation rate				
	2.2%	3.1%	5.5%	9.0%	15.0%
2010	$ 37.4	$ 37.4	$ 37.4	$ 37.4	$ 37.4
2011	$ 43.1	$ 41.8	$ 38.3	$ 33.2	$ 24.5
2012	$ 50.1	$ 47.6	$ 40.9	$ 30.9	$ 12.9
2013	$ 55.3	$ 51.8	$ 42.1	$ 27.2	$ (0.8)
2014	$ 58.9	$ 54.5	$ 42.0	$ 22.2	$ (16.4)
2015	$ 61.3	$ 56.0	$ 41.0	$ 16.5	$ (33.5)
2016	$ 62.6	$ 56.6	$ 39.2	$ 10.1	$ (52.0)
2017	$ 62.1	$ 55.5	$ 35.9	$ 2.3	$ (72.8)
2018	$ 60.3	$ 53.1	$ 31.6	$ (6.6)	$ (95.5)
2019	$ 57.4	$ 49.7	$ 26.4	$ (16.2)	$ (119.9)
2020	$ 53.5	$ 45.4	$ 20.4	$ (26.5)	$ (146.0)

Q. What other significant uncertainties can affect the deferral value of Sunrise?

A. As shown in Figure 3 above, the RPS cost of renewable resources is the major reason for the positive deferral value that accrues under relatively low rates of transmission cost inflation.

The CAISO recognizes that the cost of delivered renewable resources is uncertain, as is the assumption regarding the amount of renewable resources that California could import from regions outside of California. As an alternate scenario, the CAISO has modeled solar thermal at $100/MWh, wind at $85/MWh, and has assumed that California could import only 25% of the renewable energy available from long distance out-of-state sources (as compared to the 50% assumption in the CAISO's April 20, 2007 analysis).

This alternative RPS procurement Scenario is consistent with the following assumptions:

- The solar thermal industry can benefit from market transformation and technological improvements;[94]
- The higher wind prices are much closer to the market price referent for 2010, consistent with utility reports of recent bids received; and
- California utilities will have a very difficult time procuring out-of-state renewable resources due to the many difficult siting issues associated with "long-line" multi-jurisdictional transmission projects, as evidenced by the Arizona Corporation Commission's recent rejection of the Palo Verde-Devers project.

Figure 5 (based on Table 8) shows that the benefits of delaying Sunrise disappear under this alternate RPS cost scenario. At each escalation rate shown in the figure, the 2010 in-service date has the highest benefit. Moreover, this small change in renewable technology cost assumptions increases the annual net benefits of the Sunrise project to over $200 million per year.

[94] House, L. Report on The Sunrise Powerlink, Phase 1 Direct Testimony, Volume 5 of 5, DRA, CPUC, May 18, 2007.

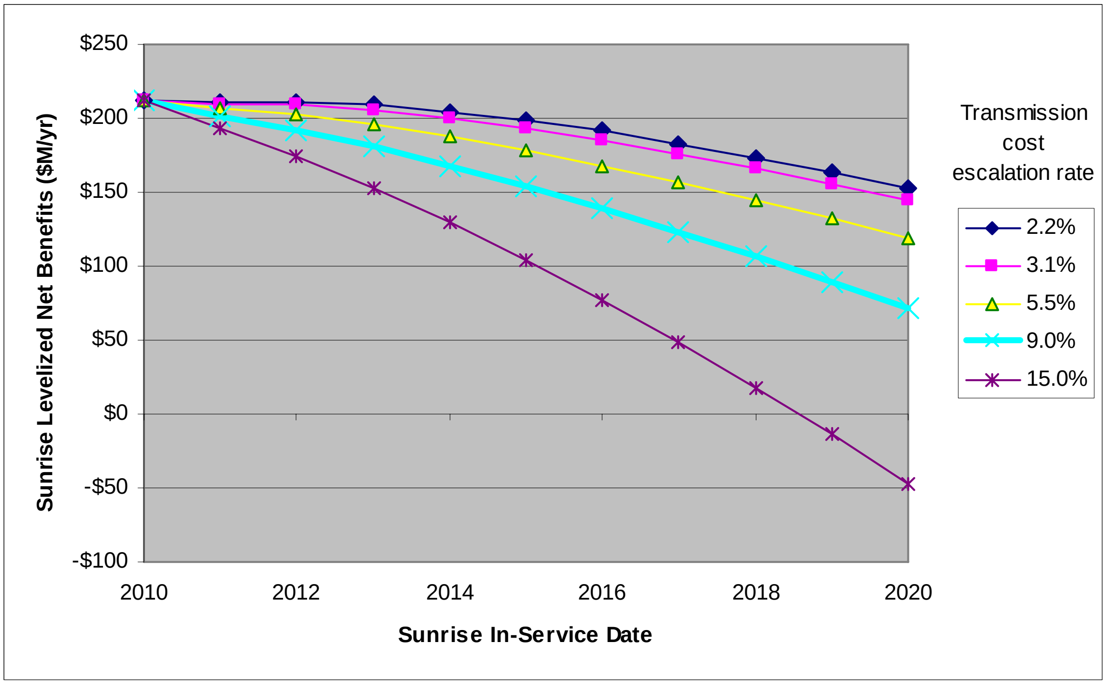

Figure 5: Sunrise Project Levelized Net Benefits - Alternate RPS Scenario

Table 8: Sunrise Project Levelized Net Benefits - Alternate RPS Scenario

	Transmission cost escalation rate				
	2.2%	3.1%	5.5%	9.0%	15.0%
2010	$ 212.0	$ 212.0	$ 212.0	$ 212.0	$ 212.0
2011	$ 211.4	$ 210.1	$ 206.6	$ 201.5	$ 192.8
2012	$ 211.4	$ 209.0	$ 202.3	$ 192.2	$ 174.2
2013	$ 209.1	$ 205.6	$ 195.9	$ 180.9	$ 153.0
2014	$ 204.7	$ 200.3	$ 187.8	$ 168.0	$ 129.4
2015	$ 198.8	$ 193.5	$ 178.5	$ 154.0	$ 104.0
2016	$ 191.6	$ 185.6	$ 168.2	$ 139.1	$ 76.9
2017	$ 183.0	$ 176.3	$ 156.8	$ 123.1	$ 48.0
2018	$ 173.5	$ 166.2	$ 144.7	$ 106.5	$ 17.6
2019	$ 163.2	$ 155.5	$ 132.1	$ 89.5	$ (14.2)
2020	$ 152.3	$ 144.2	$ 119.2	$ 72.3	$ (47.2)

Q. UCAN uses CAISO 2010 Gridview runs in its analysis .[95] Did the CAISO use the 2010 Gridview information for the deferral analysis presented above?

A. No. The CAISO uses the 2015 Gridview information for its deferral analysis presented above. This is consistent with the CAISO's April 20, 2007 testimony.

[95] Marcus Confidential, 74.

Q. Would the use of the 2010 Gridview results alter the results presented above?

A. No. Figure 6 shows the results of using the 2010 Gridview energy-related benefits, and interpolating those benefits between 2010 and 2015. Benefits for years beyond 2015 continue to escalate at 2% per year. The figure reports the same findings those revealed in Figure 4: the highest net benefit occurs in 2016 under UCAN's 3.1% escalation rate; and 2010 under the 9% escalation rate. Similarly, Figure 7 shows that with the alternate RPS cost assumptions, the benefits of deferral remain small or negative, depending on the transmission escalation rate.

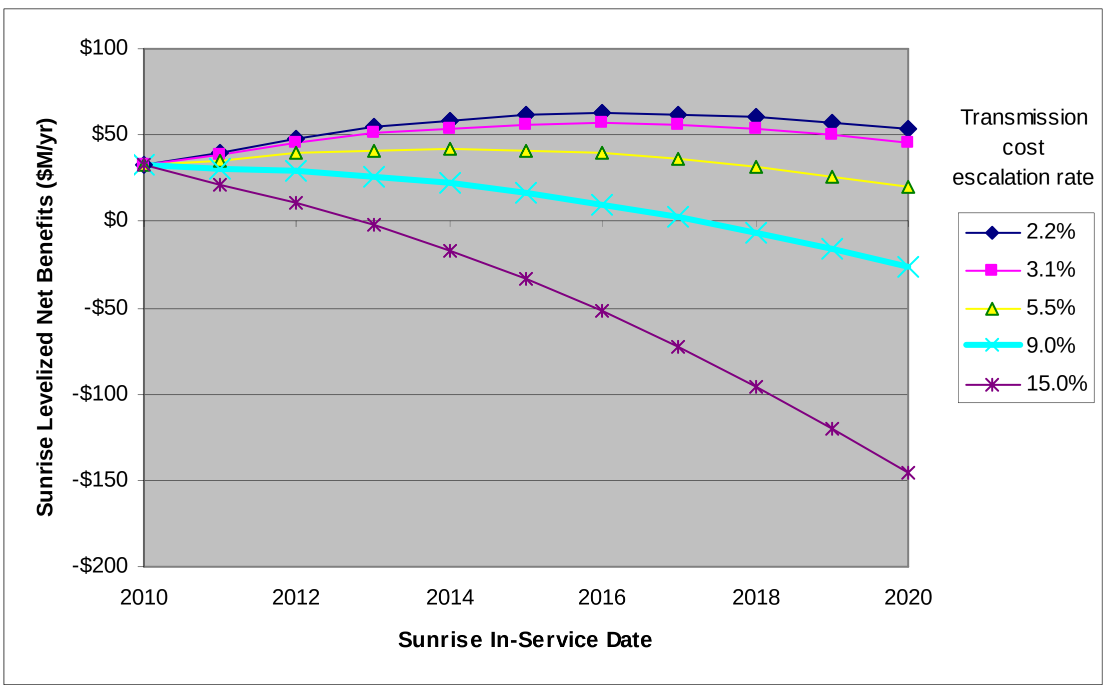

Figure 6: Levelized Net Benefits using 2010 Gridview and 4/20/07 RPS Costs

Table 9: Levelized Net Benefits - w/2010 Gridview and 4/20/07 RPS Costs ($Millions/yr)

	Transmission cost escalation rate				
	2.2%	3.1%	5.5%	9.0%	15.0%
2010	$ 32.6	$ 32.6	$ 32.6	$ 32.6	$ 32.6
2011	$ 40.1	$ 38.8	$ 35.3	$ 30.2	$ 21.5
2012	$ 48.4	$ 45.9	$ 39.2	$ 29.2	$ 11.2
2013	$ 54.5	$ 51.0	$ 41.3	$ 26.4	$ (1.6)
2014	$ 58.7	$ 54.2	$ 41.8	$ 22.0	$ (16.6)
2015	$ 61.3	$ 56.0	$ 41.0	$ 16.5	$ (33.5)
2016	$ 62.6	$ 56.6	$ 39.2	$ 10.1	$ (52.0)
2017	$ 62.1	$ 55.5	$ 35.9	$ 2.3	$ (72.8)
2018	$ 60.3	$ 53.1	$ 31.6	$ (6.6)	$ (95.5)
2019	$ 57.4	$ 49.7	$ 26.4	$ (16.2)	$ (119.9)
2020	$ 53.5	$ 45.4	$ 20.4	$ (26.5)	$ (146.0)

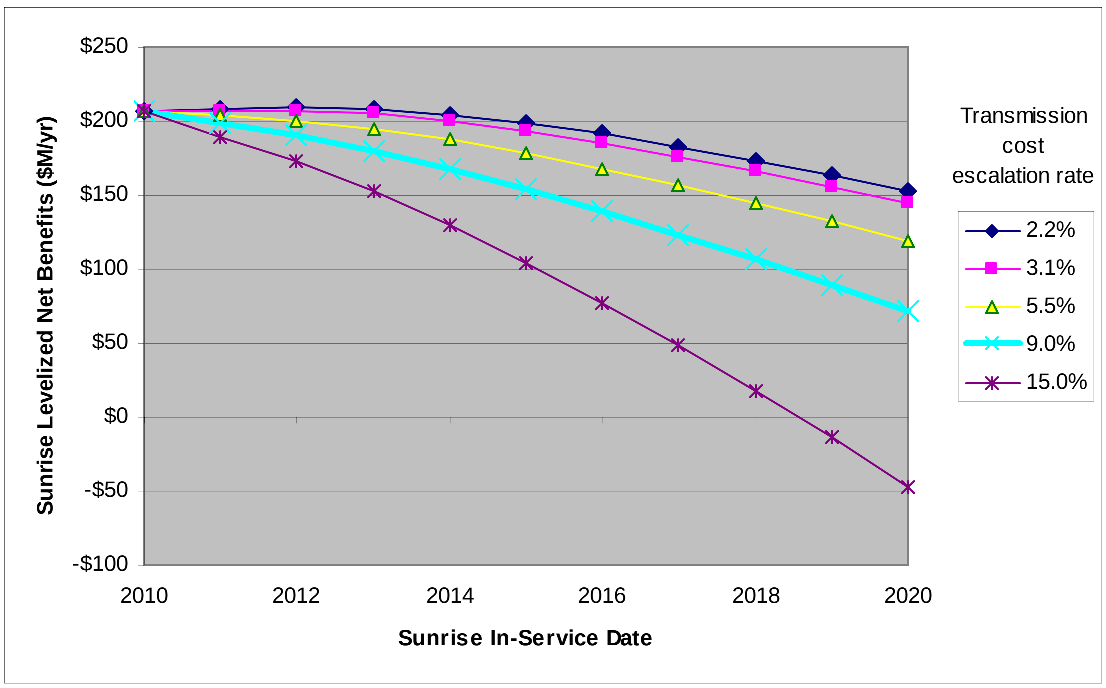

Figure 7: Levelized Net Benefits - w/2010 Gridview and Alternate RPS Costs ($Millions/yr)

Table 10: Levelized Net Benefits - w/2010 Gridview and Alternate RPS Costs ($Millions/yr)

	Transmission cost escalation rate				
	2.2%	3.1%	5.5%	9.0%	15.0%
2010	$ 207.2	$ 207.2	$ 207.2	$ 207.2	$ 207.2
2011	$ 208.4	$ 207.1	$ 203.6	$ 198.5	$ 189.8
2012	$ 209.8	$ 207.3	$ 200.6	$ 190.5	$ 172.5
2013	$ 208.3	$ 204.8	$ 195.1	$ 180.1	$ 152.2
2014	$ 204.5	$ 200.0	$ 187.6	$ 167.8	$ 129.2
2015	$ 198.8	$ 193.5	$ 178.5	$ 154.0	$ 104.0
2016	$ 191.6	$ 185.6	$ 168.2	$ 139.1	$ 76.9
2017	$ 183.0	$ 176.3	$ 156.8	$ 123.1	$ 48.0
2018	$ 173.5	$ 166.2	$ 144.7	$ 106.5	$ 17.6
2019	$ 163.2	$ 155.5	$ 132.1	$ 89.5	$ (14.2)
2020	$ 152.3	$ 144.2	$ 119.2	$ 72.3	$ (47.2)

Q. UCAN credits their 2018 Sunrise deferral case with an $8 million per year benefit from having more CTs for some years than if Sunrise were not deferred.[96] Do you agree that this adjustment is correct?

A. No, we do not. UCAN states that this adjustment is based on the CAISO's value of $51/kW-year for the energy benefits of a CT. Unfortunately, the CAISO cannot match the footnote to any CAISO workpapers. Based on UCAN's description of the value, however, the CAISO has determined to exclude that benefit in its deferral analysis for the following reasons:

- The CTs are not owned by SDG&E and its profits flow to third parties, thus not reducing the CAISO customer bills.
- Even if the CTs are owned by SDG&E, the post-Sunrise energy prices in San Diego could be relatively low because of the excess generation. Hence, a new CT is unlikely to earn a profit that equals to $51/kW-year.
- If the new CTs are owned by SDG&E and they do not suppress the local energy prices, they would likely displace SDG&E's existing generation. The

[96] Marcus Confidential, 76.

profit earned by the new CTs should be offset by the loss suffered by the existing generation.

4.5 SWPL II

Q. **What is the CAISO's opinion on SWPL II?**

A. The CAISO finds that SWPL does not violate applicable reliability criteria.[97] Thus, the CAISO concurs with the DRA that SWPL II is a feasible alternative to Sunrise.[98] However, the CAISO has not analyzed the economics of this alternative.

4.6 TE/VS

Q. **What is the CAISO's opinion on TE/VS?**

A. The CAISO opinion is as follows:

- As shown in Section 3, the CAISO finds TNHC's $126M reliability benefit estimate unreasonable. If this estimate were consistent with the CAISO's $63M level, the net benefit of TE/VS would be negative.[99]
- It appears that TNHC is attempting to insert a new alternative at this stage. Third parties had an opportunity to request that the CAISO study alternative scenarios; and the CAISO presented its results of the alternatives requested by interveners.[100]

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[97] The CAISO Initial Testimony, Part III, April 20, 2007, at 63.
[98] Zanininger, 6.
[99] Based on Auclair (p.33), the total benefit is $112M if the reliability benefit is $126M. Hence, the net benefit would be $49M if the reliability benefit became $63M (= $112M-63M). The line's cost is $51.3M. Hence the net benefit is -$2.3M (= $49M – 51.3M).
[100] The CAISO Initial Testimony, Part III, April 20, 2007.

- At the request of TNHC, the CAISO performed an analysis of Scenario TNHC1 LEAPS Project (i.e., CAISO Base Case modified by LEAPS), finding thermal reliability criteria violations.[101] By focusing on a standalone TE/VS, TNHC's testimony is a feeble attempt to distract the reliability issues related to the LEAPS Project.

5. Uncertainties

Q. What is DRA's proposal for handling uncertainties in Sunrise evaluation?

A. The DRA proposes a hybrid approach, which combines decision tree modeling, optimal dispatch, and stochastic simulation.[102]

Q. How has the CAISO dealt with uncertainties?

A. Under the CAISO's TEAM methodology, Sunrise's benefits are estimated for a given scenario, defined by numerous variables such as legislative and regulatory actions (e.g., LCR, RAR and RPS targets), the SSG-WI data base and its revisions by the CAISO, the forecasts of UDC loads, adjusted for the projected effects of demand-side-management and energy efficiency (DSM/EE), reliability-related payments and CT costs.[103] The CAISO recognizes the varying degrees of uncertainty inherent in these variables in each scenario, implying a potentially large spectrum of probable scenarios, each of which may realize with a differing

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[101] *Id.,* 68.
[102] Palmerton, K. Report on The Sunrise Powerlink, Phase 1 Direct Testimony, Volume 4 of 5, DRA, CPUC, May 18, 2007,.9 (Palmerton).
[103] Initial Testimony of The California Independent System Operator Corporation, Part II, Application 06-08-010, April 20, 2007, red lined version, Section 2.

likelihood.[104] To avoid overstating Sunrise's cost-effectiveness, the CAISO has estimated Sunrise's benefits using scenario assumptions that are conservative and likely result in some under-estimation of net benefits.

Examples of being conservative are illustrated by the following assumptions:

- Reliability benefit is driven by reasonably known impact of Sunrise on San Diego's local reliability compliance cost.
- The energy benefit is estimated using a low natural gas price forecast ($7/MMBTU) and relatively low locational differences in the costs of fuel between the desert southwest and CA ($.20 /MMBTU and reasonable load growth forecasts adjusted for DSM/EE/DR/rooftop solar and AMI induced price response programs.
- Sunrise's completion does not create a learning curve effect that can reduce renewable energy's per MWH cost in Imperial Valley.
- There is no tightening of the GHG legislation either at the State or Federal level that can increase the value of renewable energy from the Salton Sea area.
- There is no large LMP differential across the WECC as a result of market power abuse and/or significant transmission congestion.[105]
- There is no consideration for Sunrise's option value in the benefit estimation.[106]

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[104] *Id.*.7.
[105] The PV Devers II project was partially justified based on its ability to mitigate market power.
[106] This is notwithstanding of the DRA witness' suggestion to include the value, see Palmerton, .11.

The CAISO could have substantially increased the estimated net benefits of Sunrise by altering anyone of the above assumptions. It has chosen not to do so to avoid overestimating Sunrise's benefit to the CAISO's customers.

Q. What is the CAISO's opinion on the DRA's hybrid approach?

A. As currently solved by the CAISO, the Sunrise evaluation problem is already a complicated one, entailing time-consuming and data-intensive modeling and computation. As an expert in transmission planning and operation, the CAISO knows resource planning under uncertainty. It has chosen to bypass the decision tree modeling and stochastic simulation, as suggested by the DRA, for two reasons. First, a decision tree cannot be reasonably represented if there are too many uncertain variables with unknown probabilities of realization (e.g., generation mix and expansion by year over different location in the WECC over a 40-year period). Second, even if the tree can be represented, its solution may only be driven by few likely key events (e.g., load and fuel forecast, RPS-compliance and reliability-compliance). Hence, the CAISO has taken the conservative approach to defining all input assumptions to develop a solid estimate of the low end of the net benefits range.

6. San Diego Grid Reliability Action Plan (SDGRAP)

Q. What is this plan?

A. The DRA proposes this plan to review "San Diego's local reliability needs every two years in a routine, integrated manner and identify and implement the likely best means for meeting such needs."[107] It suggests the plan to be implemented as part of SDG&E's regular Long-Term Procurement Plan (LTPP) cases.

Q. What is the CAISO's opinion on the DRA's proposal?

A. This proceeding has generated a large set of alternatives, ranging from generation-only solutions (e.g., repowering of South Bay plus new combustion turbines) to transmission-only solutions (e.g., Sunrise, Second Southwest Power Link). Nonetheless, the DRA believes that there are other options that merit further review.[108]

The CAISO has serious reservations about the potential for "paralysis by analysis" that could be triggered by the DRA's proposal. The reliability problem in the San Diego area is real and imminent. The CAISO would be remiss by searching for the cost savings from analyzing an infinite number of alternatives, precisely because inaction can lead to reliability deterioration, with significant outage cost consequences.

To be fair, the DRA "does recommend the Commission take steps to ensure that Sunrise's most critical purported objective – meeting local grid reliability needs in San Diego – is met in as timely and cost-effective a manner as possible."[109] But such steps are not an endless search for unrealistic or infeasible alternatives. Furthermore, the statewide long term transmission planning process that we described above provides a similar mechanism for studying the transmission needs of SDG&E.

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[107] Woodruff, 49.
[108] *Id.*, ES-6.
[109] *Id.*,t ES-8.

Regardless of the outcome of this proceeding, the CAISO envisions an annual transmission planning process during which the very issue raised by the DRA can be considered. There simply is no need for duplicative studies that might lead to confusing results. The CAISO does not believe that the SDGRAP proposal should be adopted.

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.

CERTIFICATE OF SERVICE

I hereby certify that I have served, by electronic and United States mail, a copy of the foregoing Rebuttal Testimony of The California Independent System Operator Corporation to each party in Docket No. A.06-08-010.

Executed on June 15, 2007 at Folsom, California.

/s/ Charity N. Wilson
Charity N. Wilson

An Employee of the California Independent
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