San Diego Gas & Electric Co. (SDG&E) Comments on the
CAISO 2017/2018 Draft Transmission Expansion Plan (Revised)

1) During the stakeholder meeting hosted by the CAISO on February 8, 2018, several questions were asked by stakeholders about how the CAISO will treat energy storage projects going forward. To add clarity, SDG&E is very interested in how these projects will be treated from both a project review and approval process standpoint (e.g. how they are handled through the TPP and generation interconnection processes), and from a cost recovery and transmission rates standpoint.
2) On page 210, ISO identified several strategic locations for the large scale of "Preferred resource and energy storage as an alternative to recommended mitigation". SDG&E encourages the CAISO to continue studying the impact of utility-scale energy storage on the transmission system and will submit more detailed comments for the 2018/2019 TPP.
3) On page 206, the CAISO discusses the proposed rating increase for the Suncrest 500/230 kV transformers. While the CAISO is correct that upgrading the jumpers will allow the banks to be operated to their 30-minute emergency ratings, SDG&E opposes this as anything other than a short-term operational mitigation. The 30-minute bank rating is a "loss of life" rating, in that operating the banks at that rating for the time period allowed will shorten the useful life of the units. As these are critical components in a remote location with substantial lead times, SDG&E believes the proper planning approach is to use the non-loss-of-life "Max Load" rating, and add additional transformation capacity if and when that limit is reached.
4) On page 208, the CAISO discusses a proposed RAS for the Suncrest-Sycamore Canyon 230 kV lines (TL23054/55), for the purposes of relieving forecast P6 overloads on these facilities. SDG&E observes that for this RAS to be effective, it would have to drop generation in the Imperial Valley in excess of the 1400 MW limit in the CAISO's planning guideline ISO SPS3. A similar observation could also be made for the modification to the existing Miguel 500/230 kV bank RAS discussed on page 209. Furthermore, for the new RAS to be effective, the CAISO plans on opening a backbone 500 kV line that could potentially lead to a 1000 MW load drop by the SDG&E's "safety net" load shedding scheme. Load curtailment for a P6 event is not in agreement with the CAISO dense urban area criteria. SDG&E urges the CAISO to explore adding more transmission outlets at Suncrest or consider adding a flow control device between Suncrest and Sycamore. SDG&E would also note that the CAISO states that, "[t]he modified RAS is needed to be in service by approximately 2020 when most of the once-through cooled (OTC) generation units in Southern California are retired" (page 209), which raises concerns about where the generation to serve Southern California load will come from after the RAS has tripped 1150 MW of thermal generation and potentially over 1000 MW of renewables.
5) The Mission-Penasquitos 230 kV project is recommended for cancellation and discussed on page 210. SDG&E observes that the CAISO staff has indicated that the overload on TL13810 that drove the original need for this project still exists but can be mitigated with generation redispatch. Since this redispatch indicates both congestion and constrained generator deliverability, SDG&E recommends that this project not be cancelled but should be studied,

along with potential alternative (for example, the Penasquitos phase-shifting transformer) as potential economic projects.

6) On pages 204 and 258, the CAISO states that it has not identified a reliability or economic need to alleviate the "San Diego North Congestions". SDG&E recommends that the CAISO review, with SDG&E, the actual real-time and day ahead congestion costs to ensure the simulations performed using the PCM model reflects what is really happening in the market.
7) On page 205, the CAISO discusses the proposed Southwest Powerlink HVDC Conversion project. SDG&E observes that the CAISO's analysis that found no economic benefit in either LCR reduction or production cost savings for the HVDC conversion project, does not align with the CAISO's analysis that found significant economic benefits for the S-line Upgrade Project. The HVDC Conversion Project would mitigate the same contingency driving the benefits for the S-Line upgrade (the G-1/N-1 combination of loss of Imperial Valley generation followed by loss of the Imperial Valley-North Gila 500 kV line) and thus should have a similar production cost savings and economic benefit associated with a significant reduction in LCRs in the greater IV/San Diego LCR area. In addition, the HVDC conversion project would provide for economic and reliability benefits for the local San Diego load center, unlike the S-Line upgrade project, and should have a larger net benefit.
8) Also, with regards to the HVDC conversion project, CAISO should note that HVDC technology using voltage source (VSC) technology has significantly increased in capability and become cost-competitive with conventional Line Commutated Converter (LCC) technology. VSC provides significant operational flexibility (black start capability, instantaneous change of operating mode between inverter and rectifier, reactive support and voltage control to the AC system) with a reduced footprint. SDG&E is exploring the option of using VSC technology for one or more of the proposed HVDC converter stations.
9) With regards to the S-Line upgrade proposal, SDG&E would like to know what alternatives, if any, the CAISO considered before choosing this particular project?
10) IID has, in the past, proposed to upgrade the S-line and other interconnections between SDG&E and its system, either as part of "green path transmission expansion plan" or "West of River (Path 46) rating upgrade", but subsequently elected to abandon the proposed upgrades. SDG&E would like to understand what is IID's position on this project and what has changed that would cause CAISO to believe that this project will be built, and what mechanisms would be in place to ensure the proposed in-service date of 2021 is met.
11) Also with regards to the S-Line upgrade proposal, SDG&E observes that this project would be complementary with SDG&E's proposed HVDC conversion project. The S-Line upgrade would provide some reduction in LCR; however, as noted by CAISO staff in the stakeholder meeting on February 8, 2018, to obtain any additional LCR benefits once the S-Line upgrade is in place, further upgrades to IID's system become necessary, which the ISO would not have control over. In addition, increased flow across the IV-NG interface increases downstream congestion on the east of Miguel and Suncrest-Sycamore Canyon interfaces. The HVDC conversion project, in combination with the S-Line upgrade, offers full system optimization while protecting the IID and CFE systems from uncontrolled loop flow.

12) On page 207, there is a discussion of the Mira Sorrento Loop-In Project. SDG&E continues to receive customer load additions in the area. In addition, public links below identify a couple major projects in the area contributing to the continued growth.

http://www.sandiegouniontribune.com/business/real-estate/sd-fi-westfield-residential-20170907-story.html

http://www.sandiegouniontribune.com/business/growth-development/sdut-utc-expansion-nordstrom-parking-2015jul14-story.html

The Mira Sorrento load pocket has a high percentage of industrial and commercial customers. Based on SDG&E Loss of Load estimates, it will cost millions to customers if load is dropped in this area. Furthermore, if needed based on future load forecast trends, the scope of the proposed project can easily be adjusted to replace small segments of underground conductors needed to relieve the Peak Shift scenario overloads. This small adjustment is estimated to be around $5.5 M.

Finally, SDG&E and the CAISO have had several discussions regarding a ***P3 overload*** in the area that can only be mitigated by shedding load. As this is not in agreement with CAISO standard practice, SDG&E urges the CAISO to reconsider the Mira Sorrento Loop-in Project.

Mira Sorrento Loss of Load Value Computation

The large and small customer count for the Mira Sorrento load pocket is reflected below, by substation. Large customers are those with estimated demand greater than 0.75 MW. The number and type of customers are used to estimate the economic impact of a loss of load event.

Substation	Large Commercial Customers #	Small Commercial Customer #	Total Commercial Customers #
MTO	19	913	932
GE	77	1485	1562
TP	38	1141	1179
UCM	1	0	1

Transmission Lines 662-6905-6943-6959* 10 Year Outage History					
Number of Events	Type	Id	kV	Outage Date/Time	Restoration Date/Time
1	TL	6905	69	1/7/2008 0:51	1/7/2008 0:51
2	TL	6905	69	1/7/2008 0:54	1/7/2008 0:54
3	TL	6905	69	4/27/2008 12:03	4/27/2008 12:04
4	TL	6905	69	4/29/2008 17:57	4/29/2008 23:01
5	TL	662	69	4/29/2008 20:39	4/29/2008 23:01
6	TL	662	69	11/18/2008 22:30	11/18/2008 22:57
7	TL	6905	69	1/21/2010 11:49	1/21/2010 11:49
8	TL	6905	69	1/27/2010 10:07	1/27/2010 10:07
9	TL	662	69	1/27/2010 10:07	1/28/2010 1:02
10	TL	6905	69	1/27/2010 10:56	1/28/2010 0:57
11	TL	662	69	1/29/2010 10:49	1/29/2010 14:43
12	TL	6905	69	1/29/2010 10:49	1/29/2010 14:44
13	TL	662	69	12/3/2010 8:32	12/3/2010 8:38
14	TL	662	69	1/14/2013 13:32	1/14/2013 15:06
15	TL	6905	69	2/13/2016 1:25	2/13/2016 1:25
16	TL	6905	69	2/13/2016 5:44	2/13/2016 5:45
17	TL	6905	69	2/13/2016 6:57	2/13/2016 6:57
18	TL	6905	69	2/13/2016 15:06	2/14/2016 1:25
19	TL	6943	69	9/11/2017 3:52	9/11/2017 11:54
	total hours during 10 years				63.7
	No of events/Year				1.9
	Number non-momentary outages				13.0
	Average hours /non-momentary outages				4.9

CPI	1.90%	
Discount Rate	7%	
Cost-to-Capital ratio	1.45	
Economic Life (years)	50	

Loss of Load Value	**2012$**	**2020$**
small customers	35,417	41,172
large customers	8,774	10,200

*** Source : Estimating the value of lost load (Priefing Paper prepared for the Electric Reliability Councel Of Texas, Inc By London Economics International LLC**

Project cost M$ (2017$)	**13.0**	10.0
Project cost M$ (2020$)	13.8	10.6
Capital Cost M$	19.9	15.3
Levelized cost M$	1.4	1.1

Interrupted Load (MW)	Cost of interruption for small I&C M$/Event	Cost of Interruption for large I&C (M$)
30	6.1	1.5
60	12.1	3.0

Small Customers Interrupted Load (MW)	Number of interruption needed over 50 years	Cost of Interruption for small I&C (M$)	Project Capital cost(M$)
30	2.5	15.1	from 15 to 19
60	1.3	15.7	

Large Customers Interrupted Load (MW)	Number of interruption needed over 50 years	Cost of Interruption for large I&C (M$)	Project NPV(M$)
30	10.0	15.0	from 15 to 19
60	5.0	15.0	