Comments of Pacific Gas and Electric Company on the 2016-17 Transmission Planning Process (TPP) Special Study: Characteristics of Slow Response Local Capacity Resources

Submitted by	Company	Date Submitted
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Pacific Gas and Electric Company (PG&E) appreciates the opportunity to comment on the CAISO's 2016-17 TPP Special Study, *Characteristics of Slow Response Local Capacity Resources*, and submits the following comments based on the presentation and discussion in the stakeholder call of April 26, 2016. Overall, PG&E is pleased to see the CAISO studying how best to satisfy its operational requirements through the effective use of Demand Response resources.

As PG&E explained in the appeals process to the CAISO's Proposed Revision Request (PRR) 854, it is essential that the CAISO, with the participation of stakeholders, define the requirements for a resource to be committed or dispatched pre-contingency to be counted by the CAISO in its Local Capacity Technical Study. PG&E proposes that the scope of this study be expanded to also consider the appropriate dispatch time for resources to be dispatched post-contingency.

PG&E's comments can be summarized as follows:

- PG&E will perform the Method 1 study at the Local Capacity Area level only, using scaled historical load to mimic annual hourly load forecast for the study year.
- The CAISO should provide details on how "slow start" resources will be dispatched for local reliability needs.
- The two study methods should only address the requirements for resources to provide local reliability and not be subject to "significant upward availability adjustments".

<u>Explanation of Method 1</u>

As a matter of background for stakeholders, PG&E notes that Method 1 as explained in the April 26 presentation represents the methodology jointly developed by PG&E, San Diego Gas & Electric, and Southern California Edison. PG&E has attached a joint IOU presentation illustrating the methodology using a case study for each of the IOUs that is based on the CAISO's Local Capacity Technical Study. Each case study assumes that demand response (DR) is the last resource to be dispatched, and assesses the dispatch frequency within a Local Capacity Area (LCA) or sub-area based on 1-in-10 weather conditions.

PG&E plans to carry out Method 1 for all of its LCAs but not for its sub-areas because sub-area definitions are unclear and subject to frequent change. For each LCA, PG&E will study scenarios for demand response representing 2%, 5%, and 10% of the forecasted 1-in-10 peak load. PG&E notes that in Slide 4 of the CAISO's April 26 presentation, the CAISO indicates that annual hourly load forecast data will be used for each LCA for Method 1. Instead, PG&E will be using the recorded historical load profile which will be scaled to mimic the hourly load forecast for the study year.

PG&E recommends that this study be performed periodically to re-verify that local demand response resources are meeting the pre-dispatch need. The limiting contingencies within an LCA can change relatively frequently due to changing local load profiles caused by the rapid growth of distributed generation and energy efficiency, as well as changes to the distribution of demand response customers.

<u>As Part of the Study, the CAISO Should Provide Operational Details on How Slow Response Local Reliability Resources Will Be Dispatched.</u>

PG&E sees the CAISO's study plan as a good first step in framing the discussion on requirements for resources to provide local reliability services. Ultimately, other operational and market process questions will need to be brought into the discussion. For example, how would the pre-contingency dispatch of these resources at the LCA level differ from the normal dispatch protocols for Supply Resource (SR) DR? Could Load Modifying Resource (LMR) DR be used instead and be dispatched via alternative protocols?

<u>The Study Should Focus Only on the Requirements for Resources to Provide Local Reliability</u>

The CAISO cites three factors that would require "significant upward availability adjustments" to the requirements for local reliability resources:

1. Responses to prices or triggers other than local capacity related reliability events
2. System events or by PTOs for distribution system issues
3. Planned outages and unforeseen events

PG&E questions whether any factors other than those associated with providing local reliability need to be addressed in this study. Trying to incorporate the above three factors will require the CAISO to make blanket assumptions on the intent of each resource without leaving open the possibility that some resources will be more narrow in scope. PG&E recommends that the CAISO focus this study only on the requirements for a resource to provide local reliability.

Should the CAISO insist on further investigating potential upward availability adjustments, there may not be a need for an upward availability adjustment at all. Method 1 and Method 2 likely already overstate the probability of multiple exceedances of the 1-in-10 load level in any given year, because the methodologies are simply scaling historic load data to the 1-in-10 load forecast level. So, for an LCA which would normally experience three 1-in-2 type heat events each summer this simple scaling will suggest that the LCA could experience three 1-in-10 heat events each summer. Clearly, the real likelihood that an LCA will experience three 1-in-10 heat events in a single summer is extremely low, much lower than suggested by the proposed methodology.

Determination of “Pre-Dispatch” Requirements for DR to Meet Local Capacity Needs

Draft Methodology

April 2016

Agenda

- Review Proposed Methodology
  - Background
  - Proposed approach
- SCE Example (Rector Sub Area)
- PG&E Example (Sierra Sub Area)
- SDG&E Area Analysis
- Next Steps

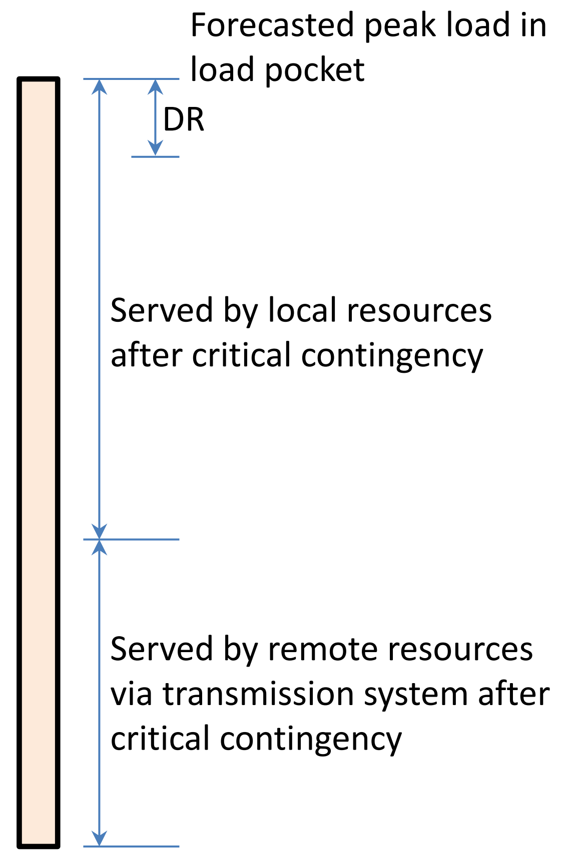
2016 CAISO LOCAL CAPACITY TECHNICAL ANALYSIS

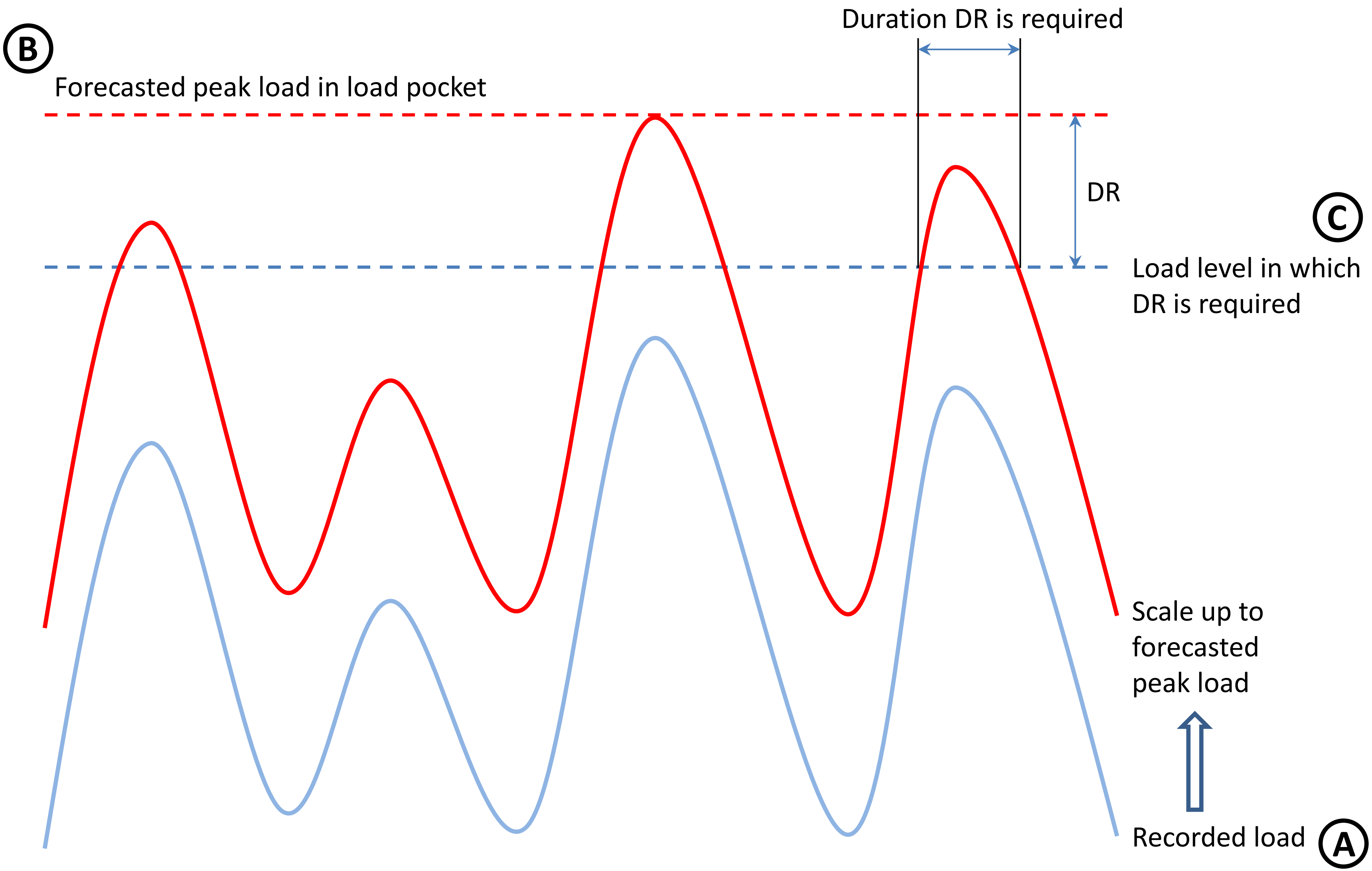
- Published - April 30, 2015
- Objectives - Identify specific CAISO areas that have limited import capability & determine minimum generation (MW) necessary to mitigate local reliability problems

SCE LOCAL AREAS	LOAD POCKET	EFFECTIVENESS FACTORS	2016 LCR (MW)	CONTINGENCY	VIOLATION
LA Basin	Defined	Provided	8,887	Lugo - Victorville 500kV & Sylmar - Gould 230kV (Cat C)	not specified
			7,576	Redondo Unit #7 & Sylmar - Gould 230kV (Cat B)	thermal overload
El Nido			508	La Fresa - Hinson 230kV & La Fresa - Redondo #1 & #2 230kV	voltage collapse
Western LA Basin			4,472	Serrano - Villa Park #2 230kV & Serrano - Lewis 230kV	thermal overload
West of Devers			488	San Bernardino - Etiwanda 230kV & San Bernardino - Vista 230kV	voltage collapse
Valley-Devers			1,722	Palo Verde - Colorado River 500kV & Valley SC - Serrano 500kV	thermal overload
Valley			n/a	Meeting Valley-Devers LCR sufficient to meet this area.	
Eastern LA Basin		Provided	n/a	Meeting West of Devers and Valley-Devers LCR sufficient to meet this area.	
Big Creek/Ventura	Defined	Provided	2,398	Lugo - Victorville 500kV & Sylmar - Pardee #1 or #2 230kV (Cat C)	thermal overload
			2,141	Ormond Beach Unit #2 & Sylmar - Pardee #1 or #2 230kV (Cat B)	thermal overload
Rector		Provided	492	Eastwood & Rector - Vestal 230kV	thermal overload
Vestal		Provided	739	Eastwood & Magunden - Vestal 230kV	thermal overload
S. Clara			247	Pardee - S. Clara 230kV & Moorpark - S. Clara #1 & 2 230kV	voltage collapse
Moorpark			462	Pardee - Moorpark #1 230kV & Pardee - Moorpark #2 & #3 230kV	voltage collapse

Base Assumptions

- Probability of peak load forecast, contingency type (e.g. N-1, N-1-1, N-1-2) and system performance violation fully incorporated into CAISO's analysis
- Local RA showing assumes peak load and contingency will occur and sufficient LCR resources must be available during peak load
- Assume sufficient resources to meet LCR and that DR is last to be used with pre-dispatch DR first type to be utilized
- Scale recorded hourly load shapes of load pocket to forecasted peak load





Duration DR is required
B
Forecasted peak load in load pocket
DR
C
Load level in which DR is required
Scale up to forecasted peak load
Recorded load
A

EXAMPLE

CAISO 2016 LOCAL CAPACITY TECHNICAL ANALYSIS (April 30, 2015)

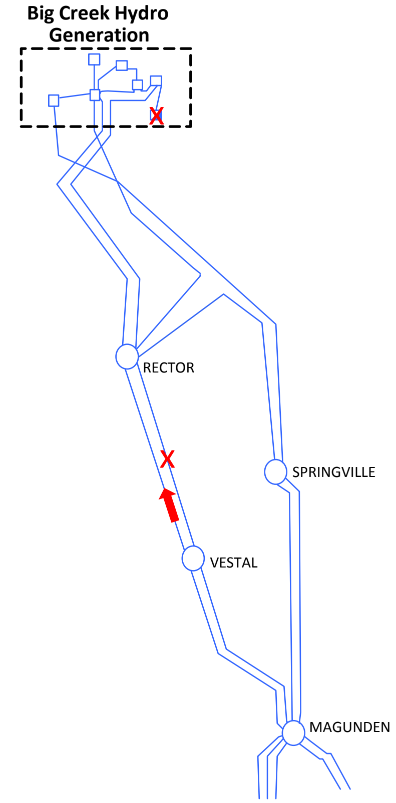
Rector Sub-area

The most critical contingency for the Rector sub-area is the loss of one of the Rector-Vestal 230 kV lines with the Eastwood unit out of service, which would thermally overload the remaining Rector-Vestal 230 kV line. This limiting contingency establishes a LCR of 492 MW (includes 9 MW of QF generation) in 2016 as the minimum capacity necessary for reliable load serving capability within this sub-area.

Effectiveness factors:

The following table has units that have at least 5% effectiveness to the above-mentioned constraint within Rector sub-area:

Gen Bus	Gen Name	Gen ID	MW Eff Fctr (%)
24370	KAWGEN	1	51
24306	B CRK1-1	1	45
24306	B CRK1-1	2	45
24307	B CRK1-2	3	45
24307	B CRK1-2	4	45
24319	EASTWOOD	1	45
24323	PORTAL	1	45
24308	B CRK2-1	1	45
24308	B CRK2-1	2	45
24309	B CRK2-2	3	45
24309	B CRK2-2	4	45
24310	B CRK2-3	5	45
24310	B CRK2-3	6	45
24315	B CRK 8	81	45
24315	B CRK 8	82	45
24311	B CRK3-1	1	45
24311	B CRK3-1	2	45
24312	B CRK3-2	3	45
24312	B CRK3-2	4	45
24313	B CRK3-3	5	45
24317	MAMOTH1G	1	45
24318	MAMOTH2G	2	45
24314	B CRK 4	41	43
24314	B CRK 4	42	43



Analysis Steps

1. LCR of 492 MW required based on forecasted peak load to guard against a thermal overload triggered by critical contingency.
2. Since SCE builds CAISO’s LCR cases, 2016 peak load modeled at Rector is known.
3. Get recorded hourly flows for 2011 - 2015 (most recent five years) through Rector A-Banks and subtract KAWGEN production (local gen).
4. Scale recorded load curve up to modeled load to examine peak periods.
5. Examine DR at 10, 20, 50 & 100 MW levels.

Initial Results

2016 Forecasted Peak	847

Recorded Peak	678	737	719	719	712
Scaling Factor	1.25	1.15	1.18	1.18	1.19

DR Amount MW / % of Peak		2011				2012				2013				2014				2015			
		Days	Hours			Days	Hours			Days	Hours			Days	Hours			Days	Hours		
			Max	Avg	Total		Max	Avg	Total		Max	Avg	Total		Max	Avg	Total		Max	Avg	Total
10	1.2%	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1
20	2.4%	1	1	1	1	3	2	2	5	3	3	2	6	2	3	3	5	2	2	2	3
50	5.9%	3	5	3	9	6	6	5	27	12	7	3	36	13	6	3	44	8	6	4	32
100	11.8%	12	7	4	43	18	8	4	75	31	9	4	133	28	9	5	132	27	8	4	105

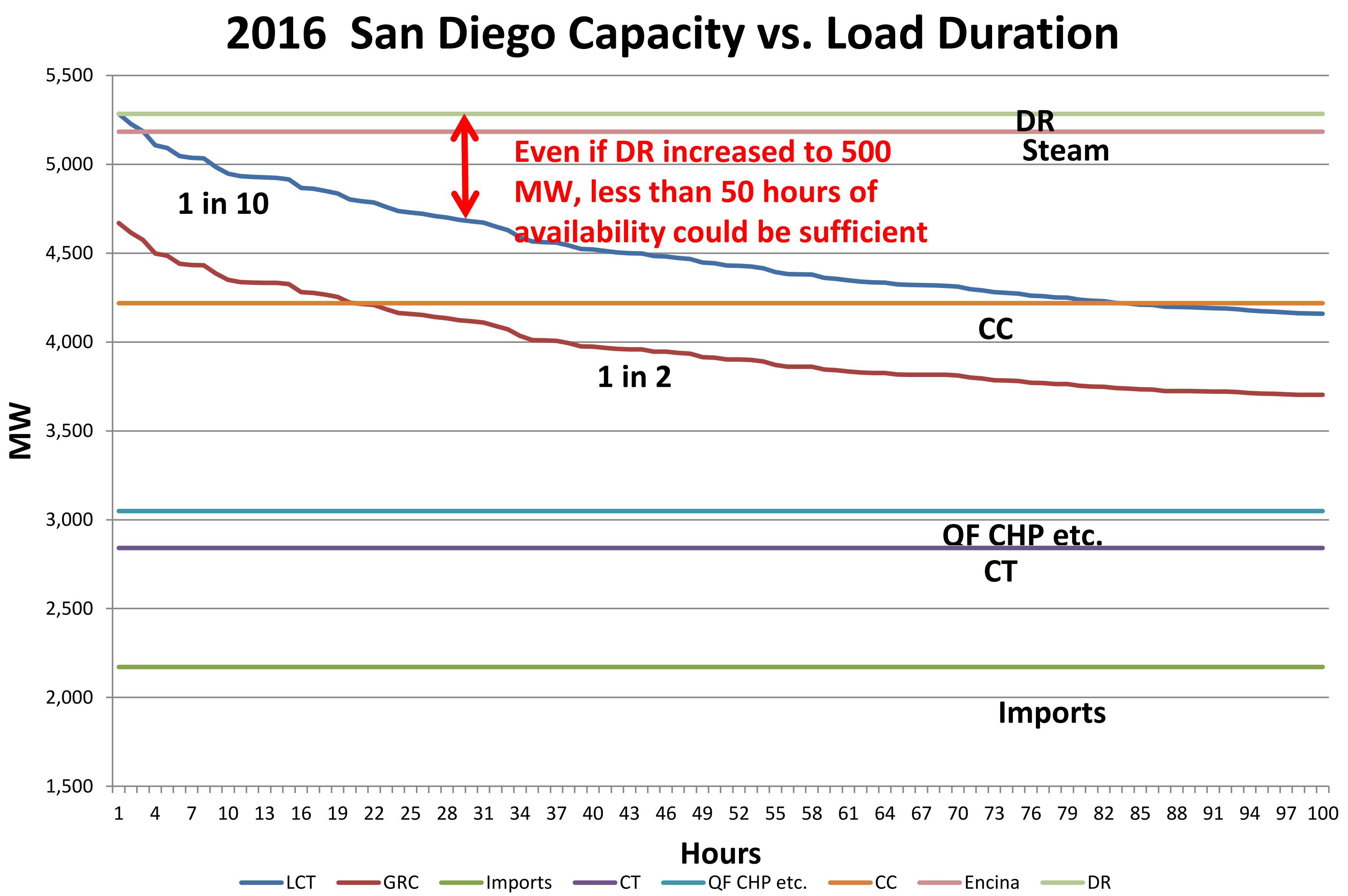
PG&E Example - Analysis Steps

1. Get recorded hourly load for 2014 - 2015 in Sierra area.
2. Scale recorded load curve up to modeled load to examine peak periods.
3. Examine DR at 23 (existing), 47, 94 & 188 MW levels.

Initial Results

2016 1-in-10 Peak Forecast (MW)	1171.48	
Recorded Year	2014	2015
Recorded Peak (MW)	1151.34	1183.43
Scaling Factor	1.02	0.99

Resource Deficiency (Needed DR Amount)		2015				2014			
MW/% of Peak		Days	Hours			Days	Hours		
			Max	Avg.	Total		Max	Avg.	Total
22.98	2.0%	1	3	3	3	1	2	2	2
47	4.0%	1	3	3	3	3	3	2	6
94	8.0%	4	5	3	12	4	5	4	14
188	16.0%	15	7	3	52	15	7	4	60


2016 San Diego Capacity vs. Load Duration
MW
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
Hours
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
52
55
58
61
64
67
70
73
76
79
82
85
88
91
94
97
100
DR
Steam
Even if DR increased to 500 MW, less than 50 hours of availability could be sufficient
1 in 10
CC
1 in 2
QF CHP etc.
CT
Imports
LCT
GRC
Imports
CT
QF CHP etc.
CC
Encina
DR

Discussion / Next Steps

- Methodology is LCR area specific: wide area requirements (e.g. LA Basin and Big Creek / Ventura) may be different from sub-areas
  - SCE & PG&E will need to expand the study to other sub-areas
  - Results may or may not be similar across areas
- DR Requirements dependent on DR quantity
  - Counting rules / requirements change as level of DR increases in a given area