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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Refinements, and Establish Forward Resource Adequacy Procurement Obligations	Rulemaking 19-11-009 (Filed November 7, 2019)

CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION, PACIFIC GAS AND ELECTRIC COMPANY (U 39 E), SOUTHERN CALIFORNIA EDISON COMPANY (U338-E), AND SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E) COMPLIANCE FILING REGARDING REFRESHED EFFECTIVE LOAD CARRYING CAPABILITY STUDY RESULTS

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Date: July 1, 2021

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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I. Introduction

In accordance with the *Assigned Commissioner's Ruling on Submission of Refreshed Effective Load Carrying Capability Study Results*, dated June 3, 2021 (Ruling), the California Independent System Operator Corporation (CAISO), Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E) hereby submit the attached compliant filing of refreshed effective load carrying capability (ELCC) study results, as outlined in Section 2 of the Ruling. Consistent with Ordering Paragraphs 2 and 3 of the Ruling, the CAISO and the investor owned utilities (IOUs) are filing and serving the compliant filing into this proceeding no later than July 1, 2021.[1]

The Ruling requires that the compliant filing include the following:

(1) Refreshed study results based upon 2020 bid data from PG&E, SCE, as well as from SDG&E;
(2) Thorough documentation of study methodology and assumptions, and explanation of how data from Load Impact Protocol (LIP) filings, if any, were utilized in or informed the study, as well as updated runs of the study (as needed);
(3) A summary of the key differences between LIP inputs and calculations versus the proposed ELCC method;
(4) A workshop report that summarizes parties' comments on the study methodology and results and attaches parties' comments.

[1] Pursuant to Rule 1.8(d) of the California Public Utilities Commission's (Commission) Rules of Practice and Procedure, the IOUs have authorized the CAISO to make this compliance filing on their behalf.

This filing is comprised of this cover pleading and the following five attachments:

- **Attachment A: Refreshed ELCC Study Results, Methodology, and Assumptions** – This attachment addresses items (1) and (2) above and also includes prior analyses for completeness.
- **Attachment B: Refreshed ELCC Study Results Table by Program and by IOU by Month – Megawatt Values and Percentages** – This attachment is a supplement to Attachment A. For ease of use, the refreshed ELCC study results required in item (1) above are provided in spreadsheet format.
- **Attachment C: Summary of Key Differences Between the proposed ELCC method and LIP Inputs and Calculations** – This attachment addresses item (3) above.
- **Attachment D: Workshop Report Summarizing Parties' Comments and Attaching Party Comments** – This attachment includes a summary of workshop comments, a summary of party comments, and the actual party comments submitted to address item (4) above.
- **Attachment E: Notice of Availability –** In addition to attachments A – D and due to the size of the compliance filing, the CAISO is providing the official service list a link to the refreshed ELCC study results via the attached Notice of Availability.

The IOUs have collaborated with CAISO to produce the information necessary to refresh the ELCC study and to file and serve the study to the Commission as permitted in the Ruling. This filing does not imply IOU endorsement or agreement related to the information contained in the attachments hereto.

Respectfully submitted,

By: *<u>/s/ Jordan Pinjuv</u>*

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Dated: July 1, 2021

ATTACHMENT A

Refreshed ELCC Study Results, Methodology, and Assumptions

Energy+Environmental Economics

Demand Response ELCC

CAISO

June 24, 2021

Zach Ming, Director
Vignesh Venugopal, Consultant
Arne Olson, Sr. Partner

Overview

- **In May 2020, E3 publicly released a study quantifying the reliability contribution of demand response in the CAISO**
  - This original study is contained in slides 4 – 37 of this presentation
- **In December 2020, E3 publicly released an update of the study based on new information provided by SCE**
  - This updated study results are contained in slides 38 – 43 of this presentation
- **In June 2021, E3 publicly released an update of the study, quantifying the ELCC based on DR bids placed by PG&E, SCE and SDG&E in 2020**
  - This updated study results are contained in slides 44 - 54 of this presentation

Outline for Today's Meeting

- Background on ELCC and RECAP
- Performance of PG&E, SCE and SDG&E programs in 2020
- Questions

Energy+Environmental Economics

Original Demand Response ELCC Study

CAISO ESDER Stakeholder Meeting

May 27, 2020

Zach Ming, Director
Vignesh Venugopal, Consultant

Overview

Background

- California has a unique approach to capacity procurement, where the CPUC administers a Resource Adequacy (RA) program to ensure sufficient resources to maintain an acceptable standard of reliability, but the CAISO retains ultimate responsibility for the reliable operation of the electricity system
- The CAISO was concerned that demand response (DR) was being overcounted in the Resource Adequacy program based on observed demand response bid data

Project

- The CAISO retained E3 to investigate the reliability contribution of DR relative to its capacity value in the CPUC administered RA program
- To the extent that DR is overvalued, the CAISO asked E3 to suggest solutions to issue
- E3 provided technical analysis to support the CAISO in this effort

Disclaimer required by the California Public Utilities Commission

This report has been prepared by E3 for the California Independent System Operator (CAISO). This report is separate from and unrelated to any work E3 is doing for the California Public Utilities Commission. While E3 provided technical support to CAISO preparation of this presentation, E3 does not endorse any specific policy or regulatory measures as a result of this analysis. The California Public Utilities Commission did not participate in this project and does not endorse the conclusions presented in this report.

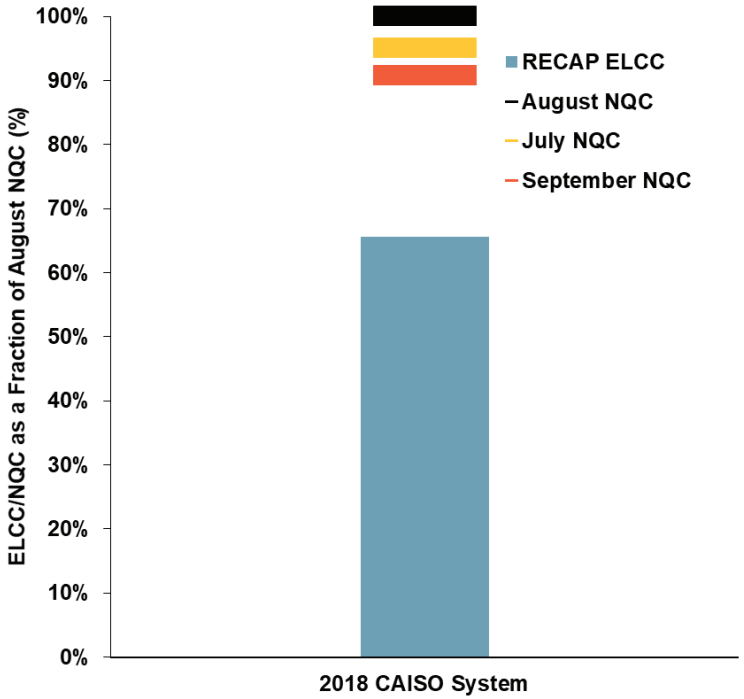
Outline

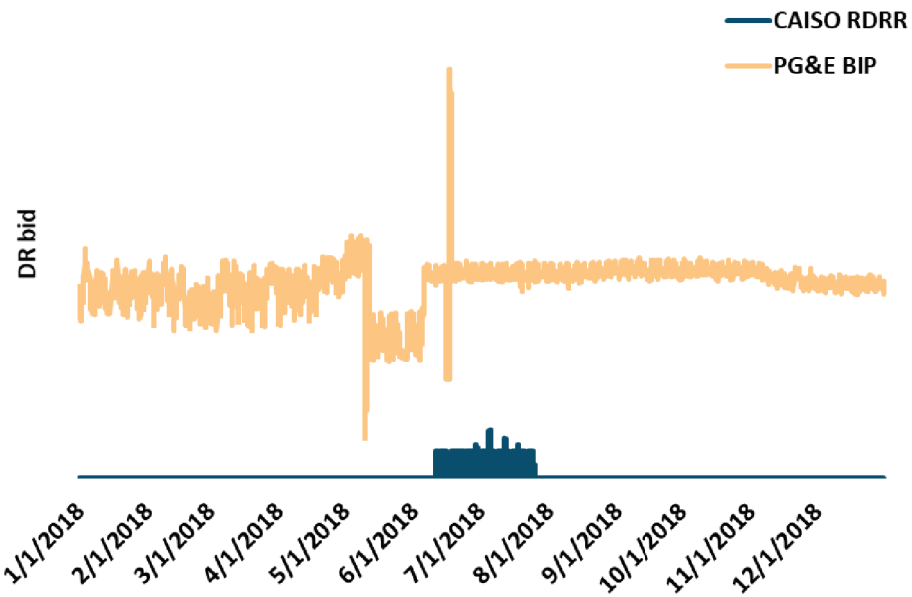
- **Refresher on March 3 CAISO stakeholder meeting presentation**
- **Background on ELCC**
- **Performance of Existing DR**
- **Characteristics of DR Needed for ELCC**
  - Time availability
  - # of calls / duration of calls
  - Penetration of DR
- **Incorporating DR ELCC into Existing CPUC RA Framework**
- **Questions**

Acronyms

Acronym	Name	Description
API	Agricultural and Pumping Interruptible	DR program to suspend agricultural pumping
BIP	Base Interruptible Program	Participants are offered capacity credits for reducing their demand up to a pre-determined level in response to an event call
CBP	Capacity Bidding Program	DR program where aggregators work on behalf of utilities to enroll customers, arrange for load reduction, receive and transfer notices and payments
DR	Demand Response	Reductions in customer load that serve to reduce the need for traditional resources
ELCC	Effective Load Carrying Capability	Equivalent perfect capacity measurement of an intermittent or energy-limited resource, such as DR
LCA	Local Capacity Area	Transmission constrained load pocket for which minimum capacity needs are identified for reliability
LIP	Load Impact Protocol	Protocols prescribed by the CPUC for accurate and consistent measuring (and forecasting) of DR program performance
LOLP	Loss of Load Probability	Probability of a load shedding event due to insufficient generation to meet load + reserve requirements
NQC	Net Qualifying Capacity	A resource's contribution toward meeting RA after testing, verification, and accounting for performance and deliverability restrictions
PDR	Proxy Demand Response	Resources that can be bid into the CAISO market as both economic day-ahead and real-time markets providing energy, spin, non-spin, and residual unit commitment services
PRM	Planning Reserve Margin	Capacity in excess of median peak load forecast needed fore reliability
RA	Resource Adequacy	Resource capacity needed for reliability
RDRR	Reliability Demand Response Resource	Resources that can be bid into CAISO market as supply in both economic day-ahead and real-time markets dispatched for reliability services
SAC	Smart AC Cycling	Direct air conditioner load control program offered by PG&E
SDP	Summer Discount Plan	Direct air conditioner load control program offered by SCE
SEP	Smart Energy Program	SCE program wherein a smart thermostat provider adjusts A/C usage in response to an event
LCR	Local Capacity Requirement	Resources procured by SCE (incl. DR) for local capacity needs in the LA Basin
SubLAP	Sub-Load Aggregation Point	Defined by CQAISO as relatively continuous geographical areas that do not include significant transmission constraints within the area

Refresher on March 3 CAISO ESDER Meeting



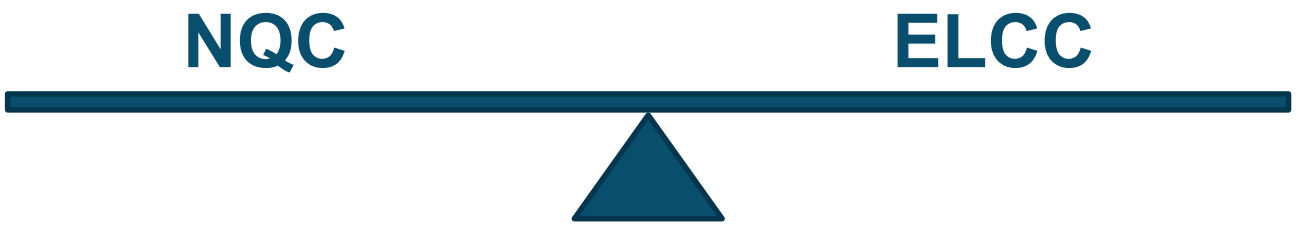


Established disconnect between ELCC and NQC

Provided E3 thoughts on how to match CAISO and utility DR bid data as well as techniques to extend this data over multiple historic weather years. Both points were addressed with the 2019 data.

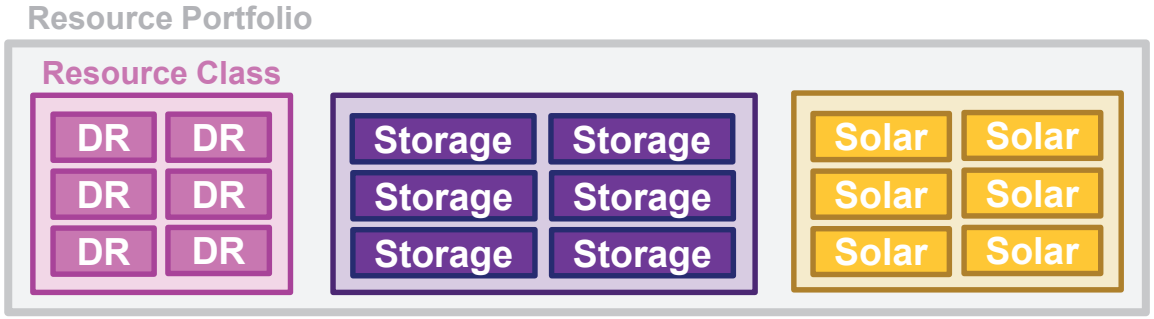
Key Questions to Answer

1) How are demand response programs performing today, relative to what they are being credited for?



2) What characteristics of demand response are needed today and in the future?

3) How should a resource adequacy program be designed to allocate and credit both DR in aggregate and individual DR programs?



Energy+Environmental Economics

Background on ELCC and RECAP

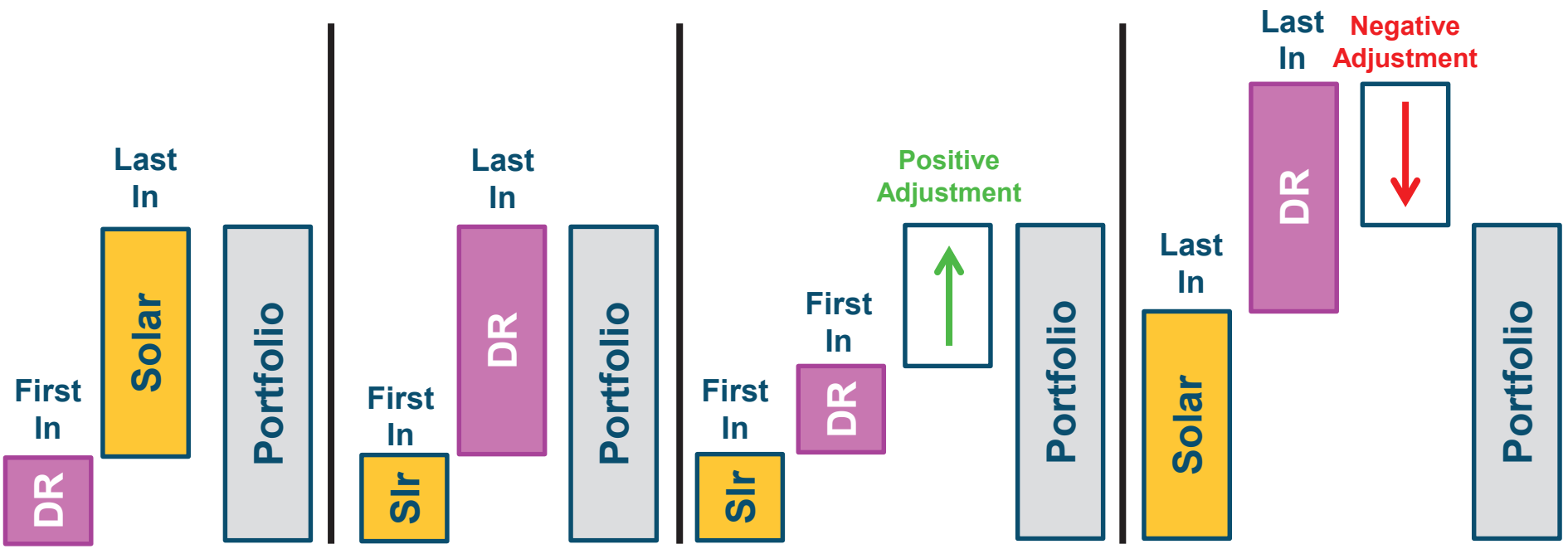
Effective Load Carrying Capability (ELCC)

- **Effective Load Carrying Capability (ELCC) is a measure of the amount of equivalent perfect capacity that can be provided by an intermittent or energy-limited resource**
  - **Intermittent resources:** wind, solar
  - **Energy-limited resources:** storage, demand response
- **Industry has begin to shift toward ELCC as best practice, and the CPUC has been at the leading edge of this trend**

A resource's ELCC is equal to the amount of perfect capacity removed from the system in Step 3

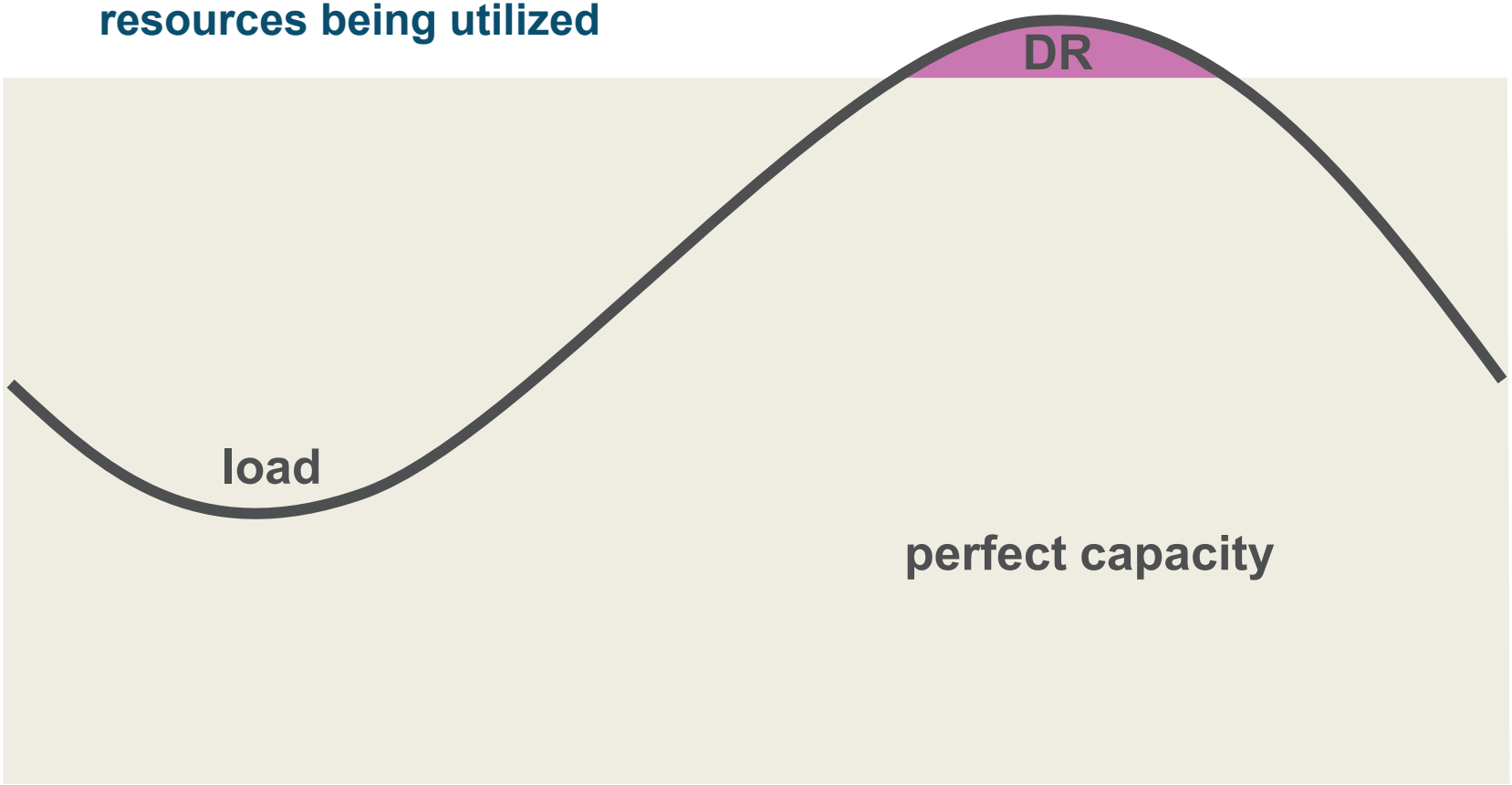
Measuring ELCC

+ **There are multiple approaches to measuring the ELCC of a resource(s)**
  - **Portfolio ELCC:** measures the combined ELCC of all intermittent and energy-limited resources on the system
  - **First-In ELCC:** measures the marginal ELCC of a resource as if it were the only intermittent or energy-limited resource on the system, thus ignoring interactive effects
  - **Last-In ELCC:** measures the marginal ELCC of a resource after all other intermittent or energy-limited resources have been added to the system, capturing all interactive effects with other resources



“First-In” ELCC

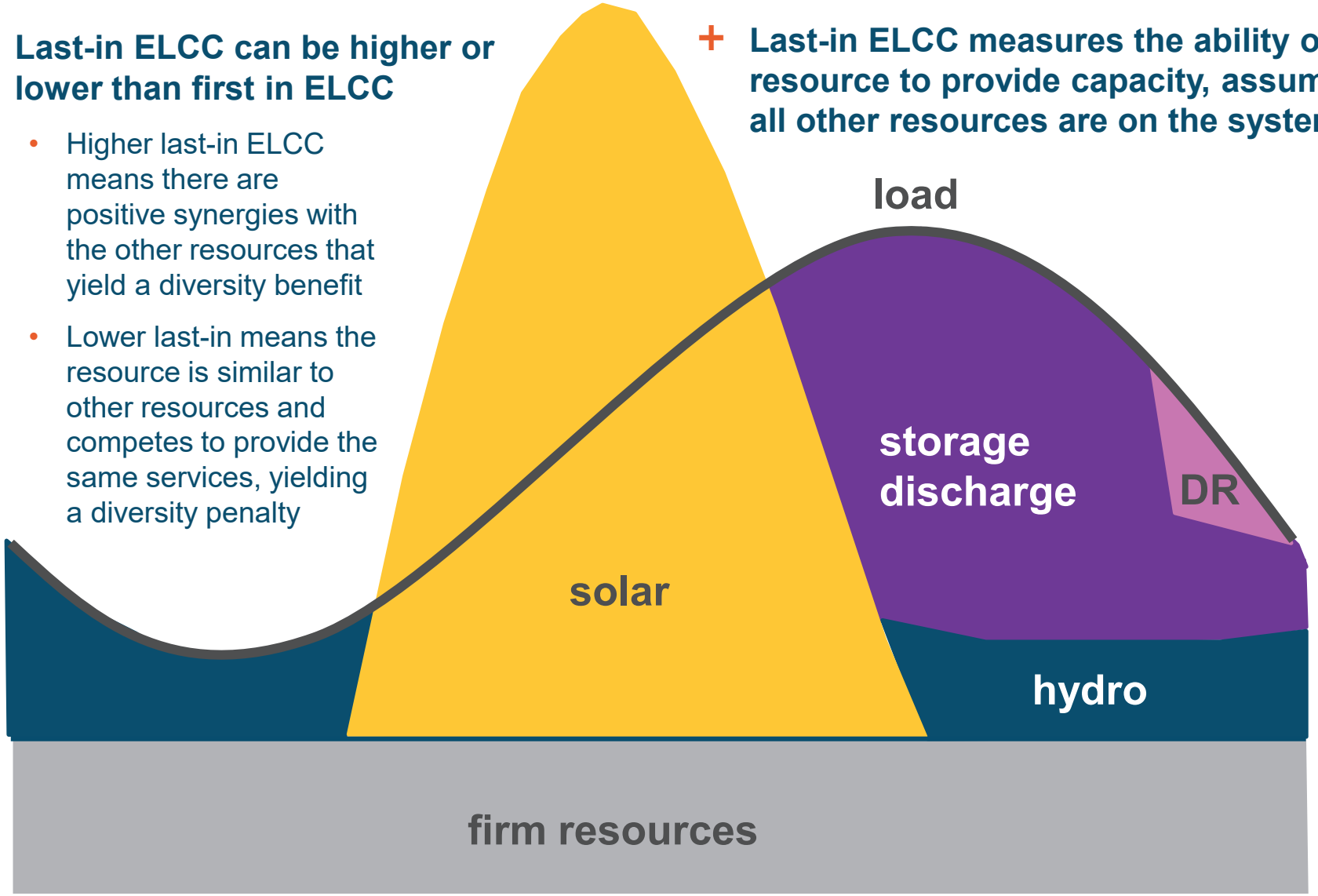
- First-in ELCC measures the ability of a resource to provide capacity, absent any other resource on the system
- This measures the ability of a resource to “clip the peak” and is often analogous to how many industry participants imagine capacity resources being utilized



“Last-In” ELCC

+ **Last-in ELCC can be higher or lower than first in ELCC**
  - Higher last-in ELCC means there are positive synergies with the other resources that yield a diversity benefit
  - Lower last-in means the resource is similar to other resources and competes to provide the same services, yielding a diversity penalty

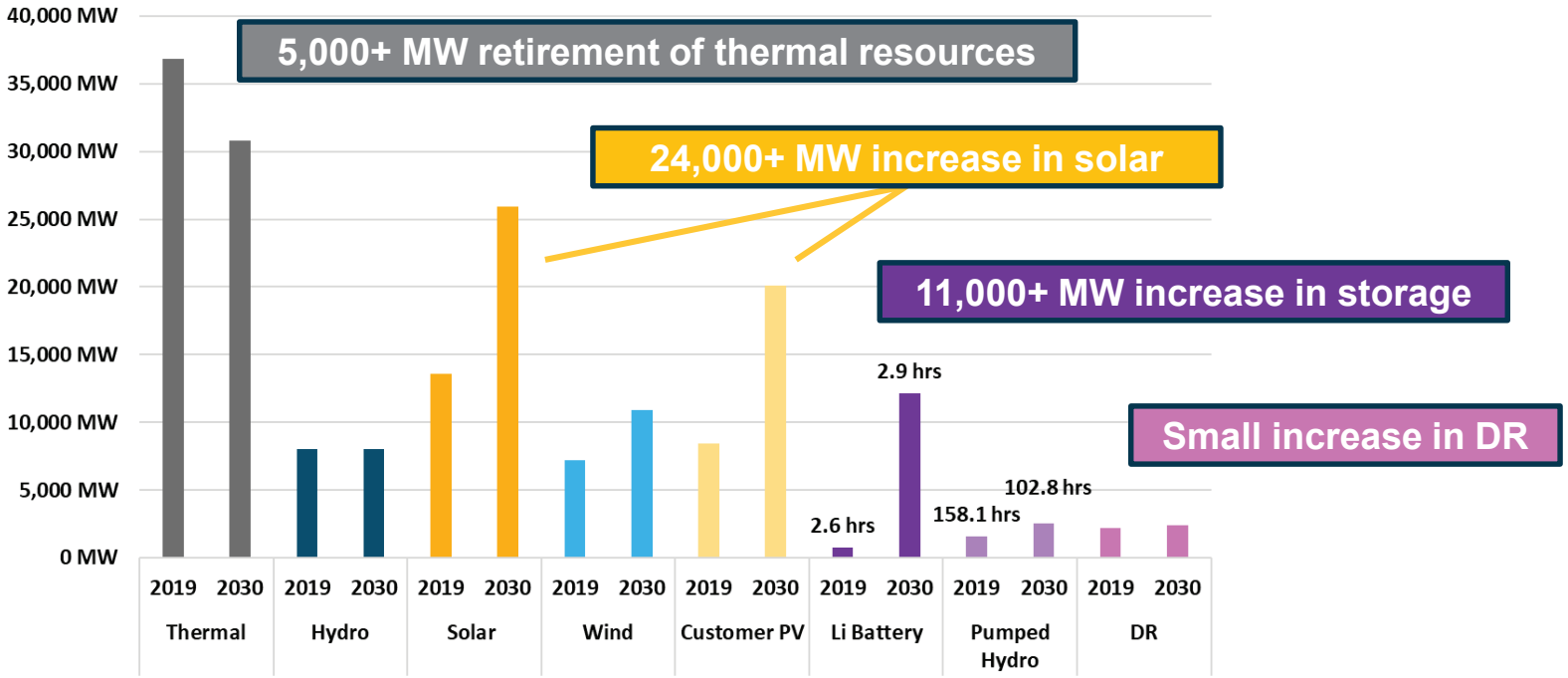
+ **Last-in ELCC measures the ability of a resource to provide capacity, assuming all other resources are on the system**



Today (2019) vs. Future (2030)

- E3 analyzed the value of DR to the CAISO system today (2019) and the future (2030) to assess how coming changes to the electricity system might impact value
- Primary changes are on the resource side (shown below) with modest changes to loads (49 GW 2019 peak load vs 53 GW 2030 peak load)

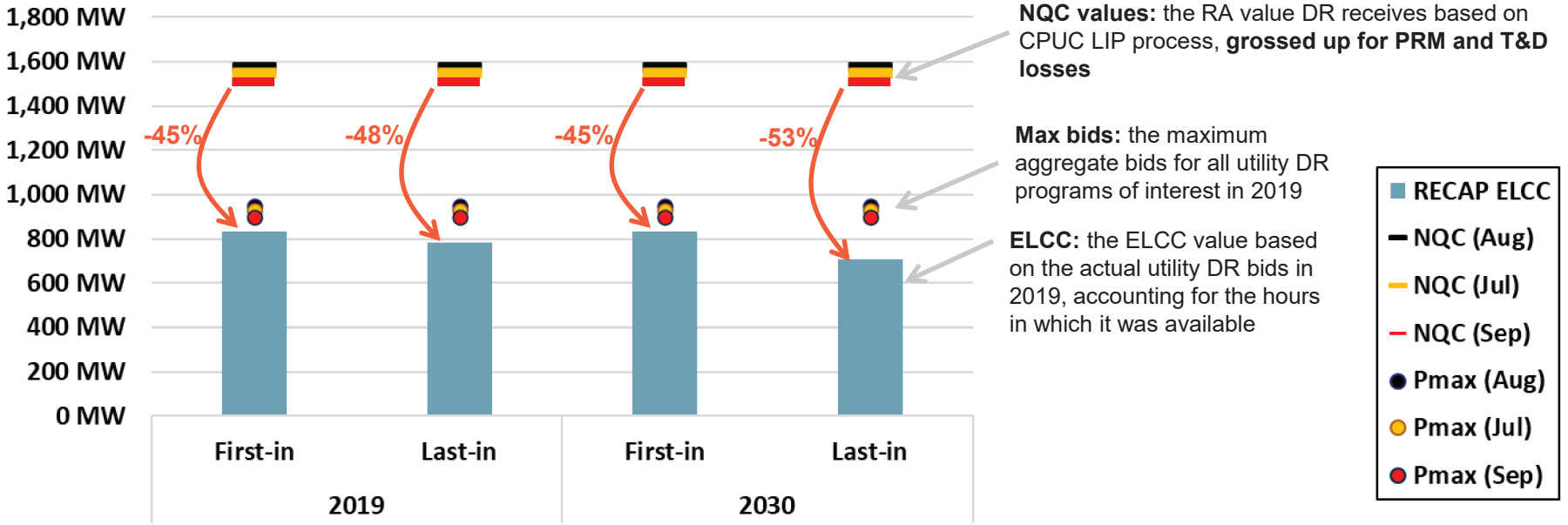
2019 and 2030 CAISO Resource Portfolio



Source: CPUC Integrated Resource Plan (IRP) Reference System Plan (RSP)

Performance of Existing PG&E and SCE event-based DR Programs

+ **Demand response (DR) resource adequacy qualifying capacity is currently calculated using the load impact protocols (LIP), which are performed by the utilities under the oversight of the CPUC**
  - LIP uses regression and other techniques to estimate the availability of demand response during peak load hours
+ **E3 has analysis suggests that LIP overvalues the capacity contribution DR relative to ELCC by 30%+ for two reasons:**
  1) DR does not bid into the CAISO market, in aggregate, at levels equal to its NQC value
  2) The times when DR is bid are either not at optimal times or not for long enough to earn full ELCC value



Load impacts are grossed up for transmission and distribution losses, as also the 15% PRM, owing to demand response being a demand reduction measure

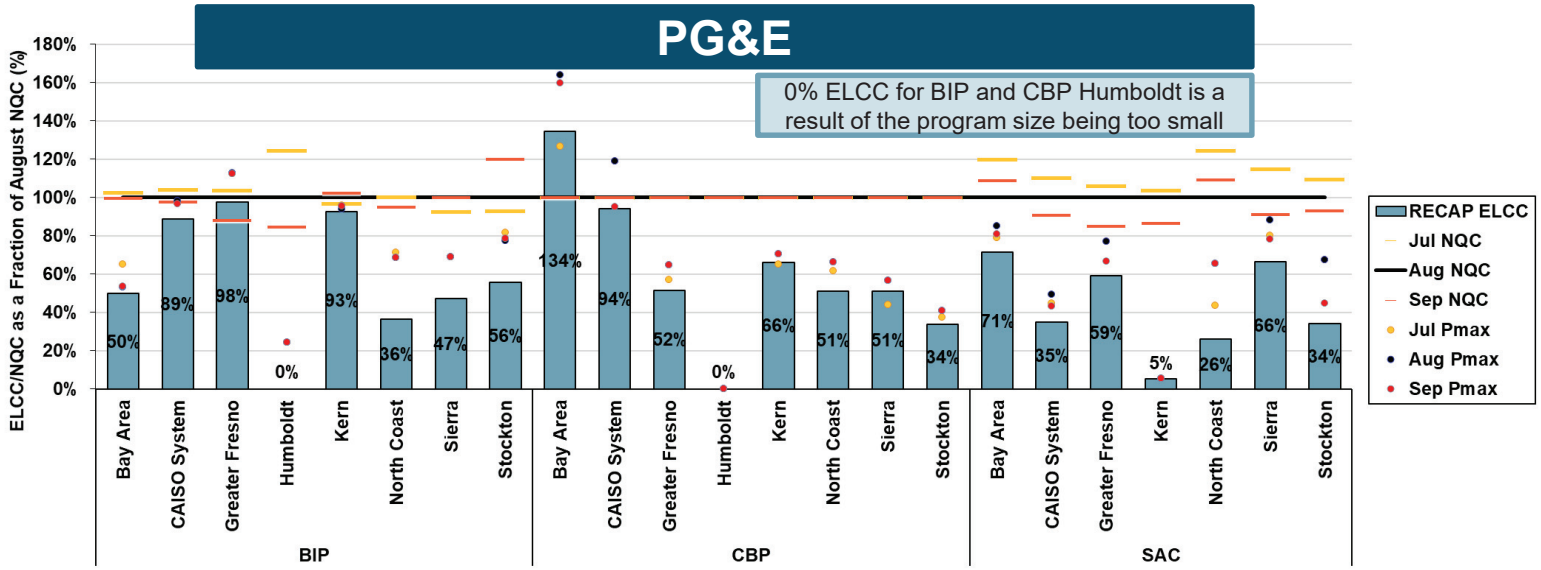
$$NQC = LI * 1.15\ (PRM) * T\&D\ loss\ factor$$ [1]

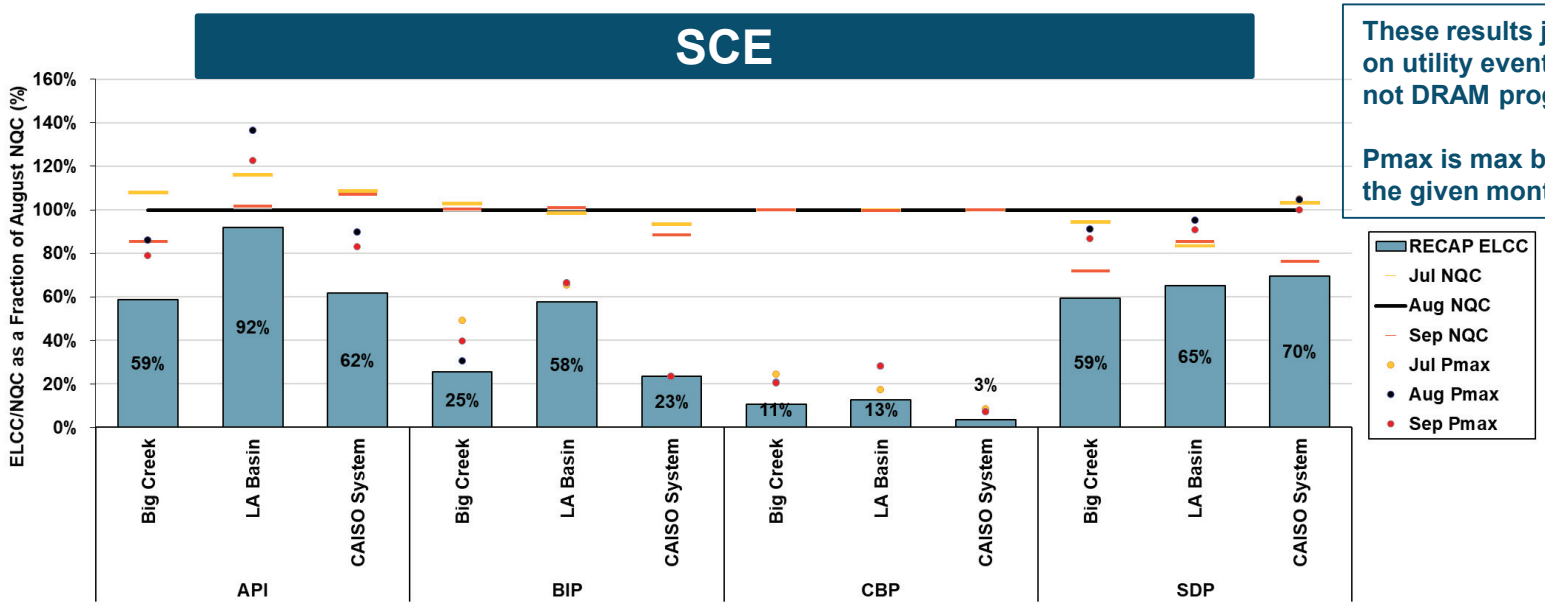
Load impacts for the year 2019 are referenced from the CPUC's RA Compliance documents[2]

Load impacts are defined on an LCA level from 1 pm to 6 pm, Apr to Oct, and from 4 pm to 9 pm in the rest of the year, both with and without line losses

[1] CPUC 2019 RA Guide
[2] CPUC 2019 IoU DR Program Totals

First-in ELCC of PG&E and SCE Programs





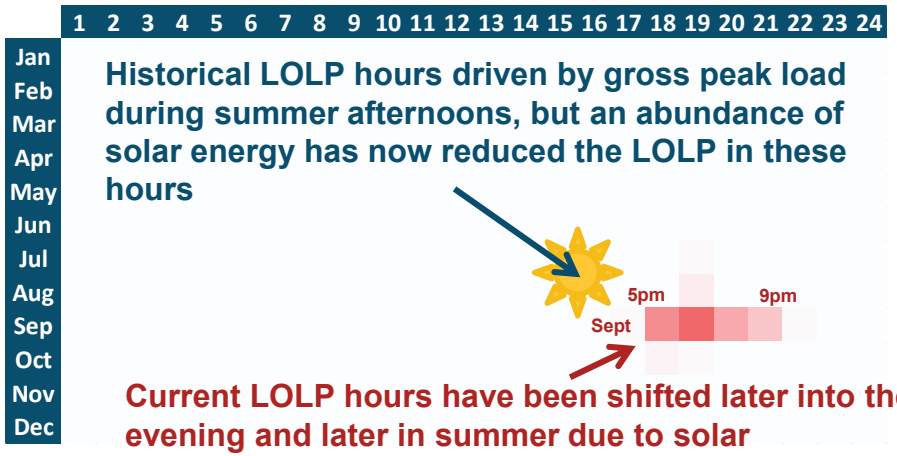
These results just focus on utility event-based DR, not DRAM programs

Pmax is max bid placed in the given month

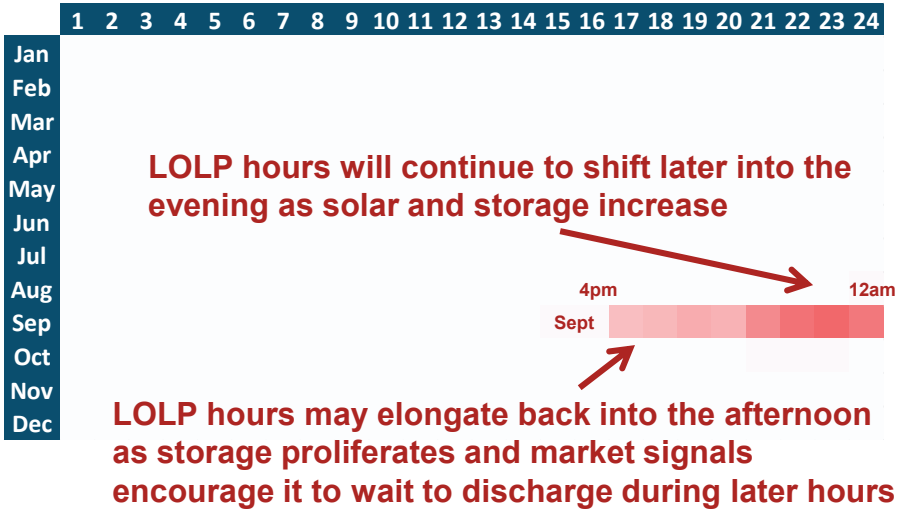
Time Window Availability Needs for DR in 2019 & 2030

- Month/hour (12x24) loss of load probability heat maps provide a quick overview of "high risk" hours
- Key findings from this project are showing that strong interactions between storage and DR may elongate the peak period by 2030

LOLP in 2019



LOLP in 2030



RECAP: Renewable Energy Capacity Planning Model

+ **RECAP evaluates adequacy through time-sequential simulations over many years**

Inputs

Load
- *Hourly load for many weather years*

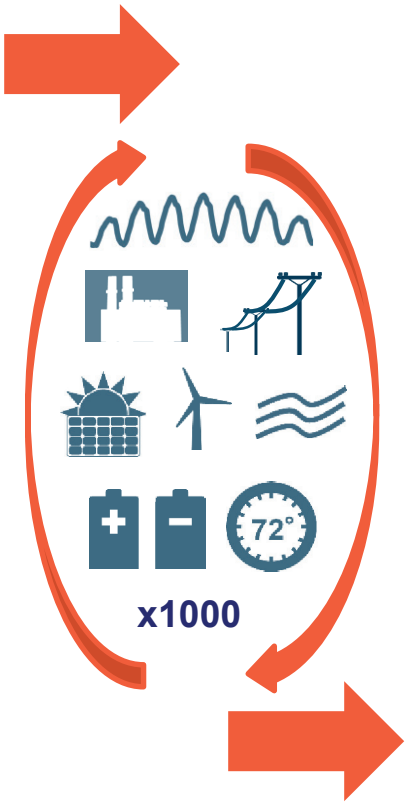
Dispatchable Generation
- *Capacity*
- *FOR*
- *Maintenance*

Renewables
- *Capacity*
- *Hourly generation profiles for many weather years*

Hydro
- *Hydro availability for many hydro years*
- *Max/min constraints*

Storage
- *Capacity*
- *Duration*
- *Roundtrip efficiency*
- *FOR*

Demand Response
- *Capacity/ Hourly Availability*
- *Max # of calls*
- *Duration of each call*



Outputs

LOLE
- *Loss of load expectation*
- *days/yr of total expected lost load*

ALOLP
- *Annual loss of load probability*
- *% probability of having a single loss of load in any given year*

EUE
- *Expected unserved energy*
- *MWh/yr of energy that cannot be served*

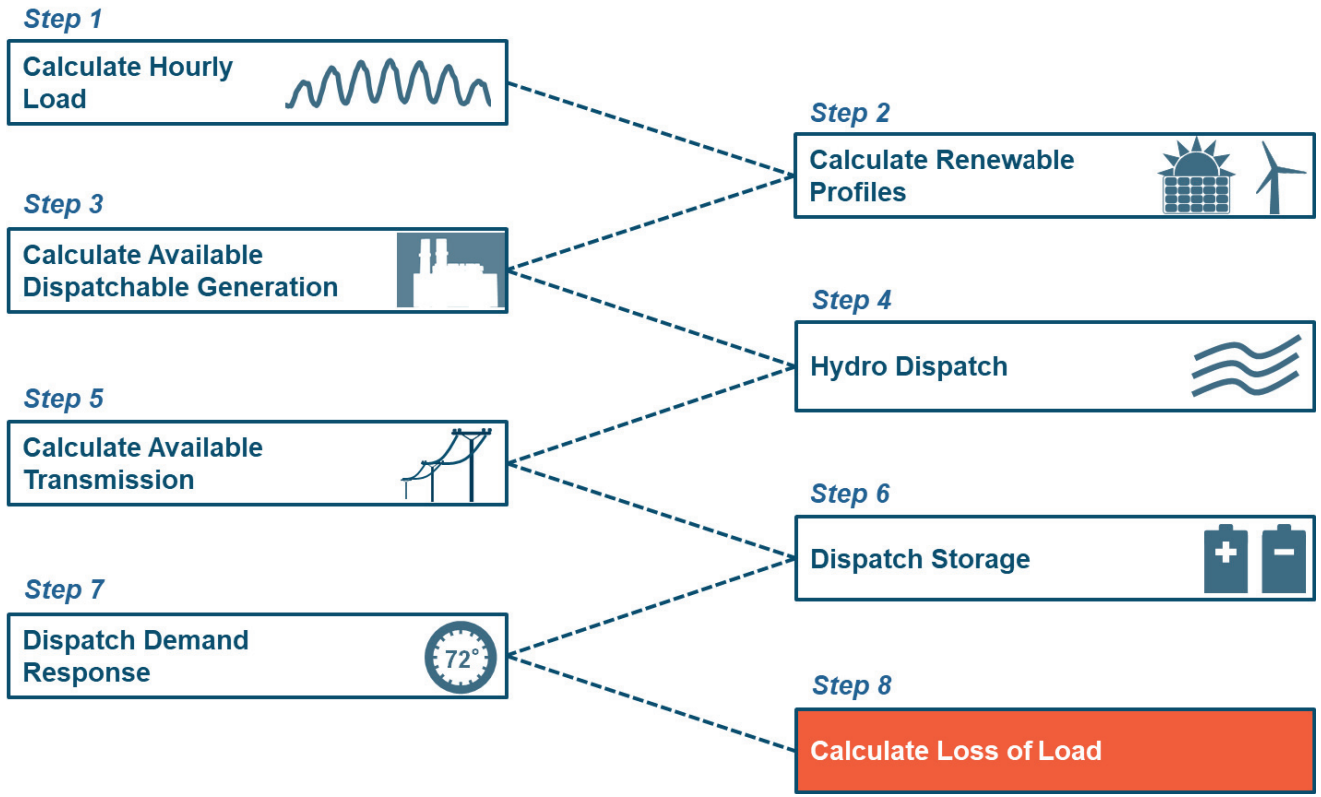
ELCC
- *Effective load carrying capability*
- *Equivalent quantity of 'perfect capacity' for a variable or energy-limited resource*

TPRM
- *Target planning reserve margin*
- *PRM required to achieve a specified reliability threshold (i.e. LOLE, ALOLP, or EUE)*

DR Interaction with Storage

- Historically, DR is dispatched as a resource of "last resort" which is how RECAP dispatched DR
- A system with high penetrations of storage require much more coordination in the dispatch of DR and storage in order to achieve maximum reliability

E3 RECAP Model Methodology



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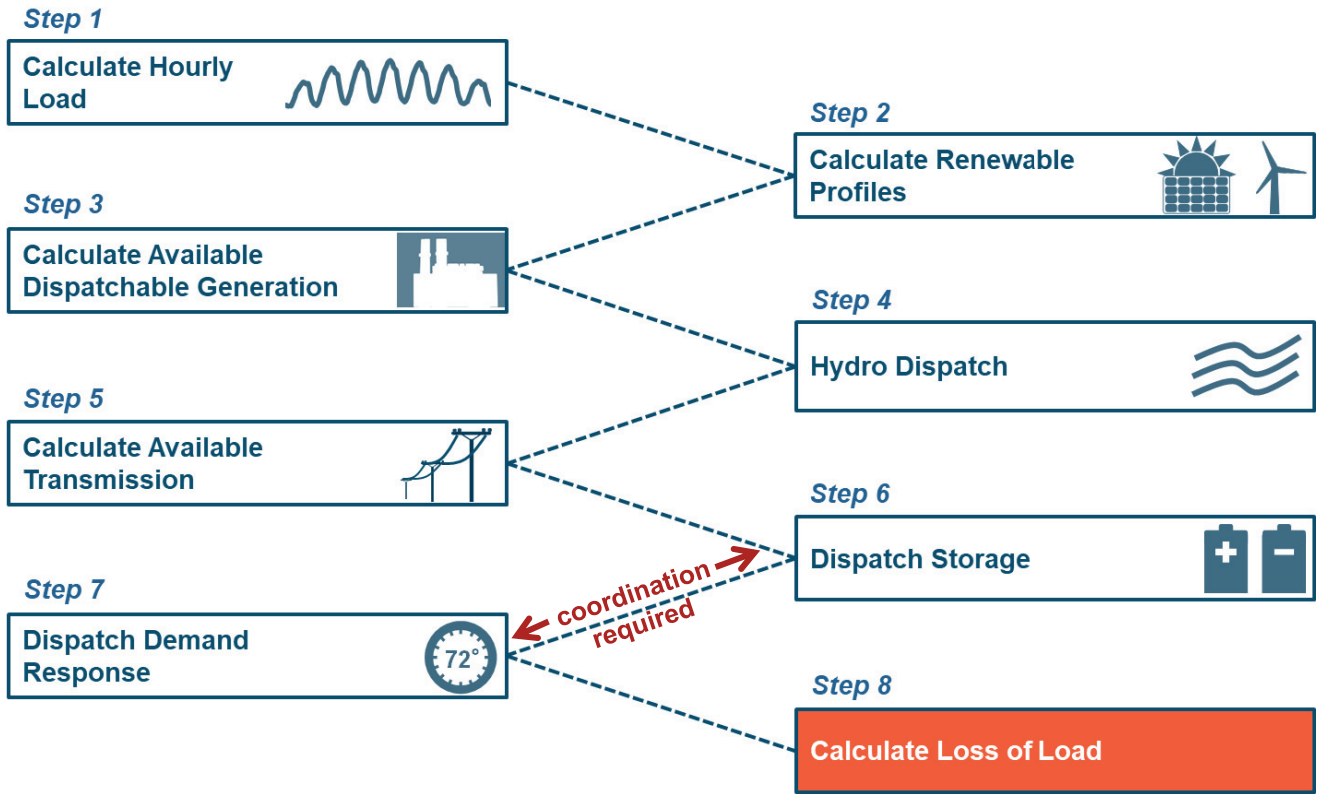
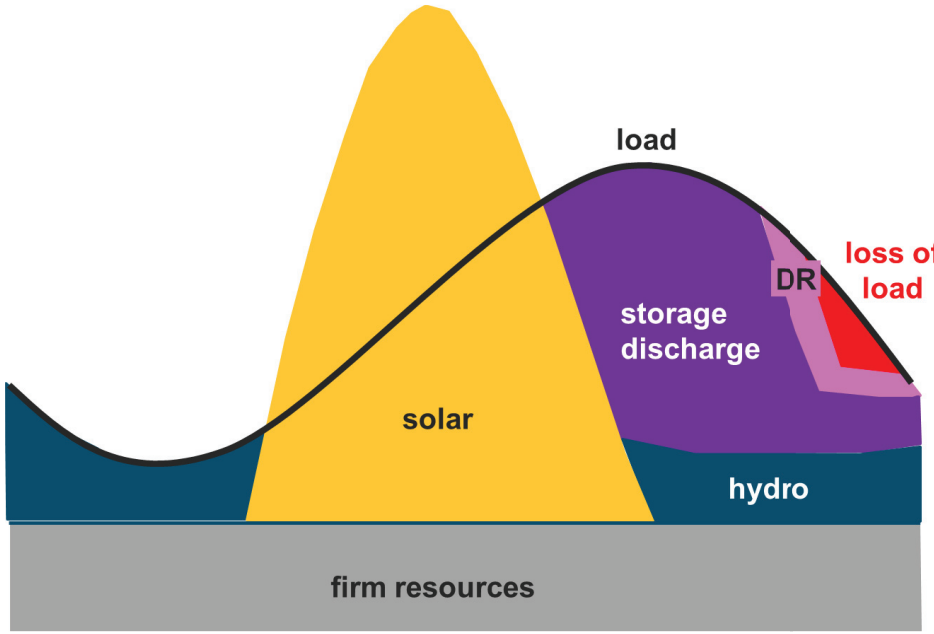
E3 RECAP Model Methodology



Last Resort vs. Optimal Dispatch

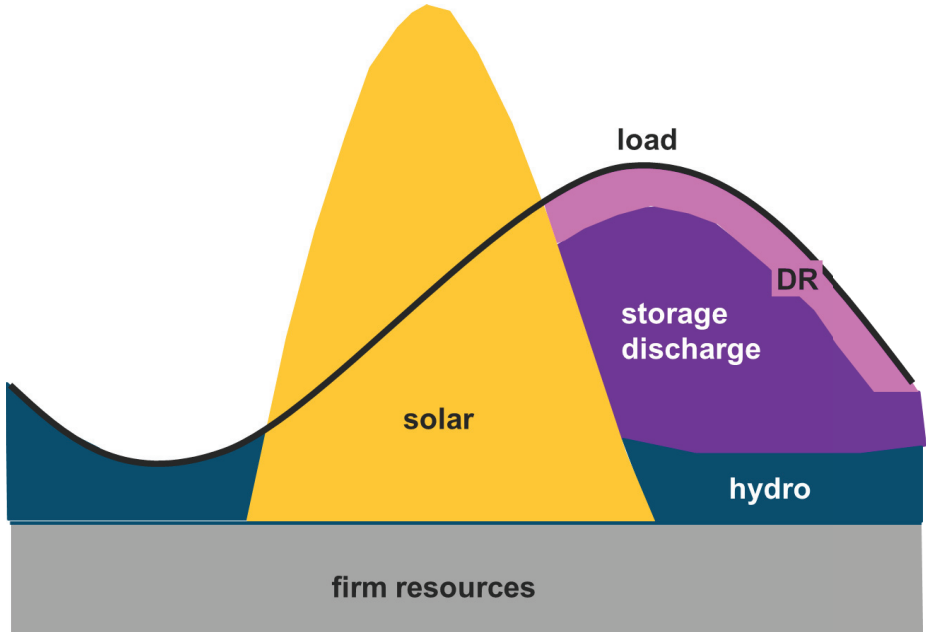
DR as Resource of Last Resort

When DR is dispatched as the resource of last resort, there is loss of load



DR Dispatch to Delay Storage Discharge

Preemptively dispatching DR to delay storage discharge eliminates loss of load event



Key takeaway: DR should be dispatched to delay storage discharge on days with potential loss of load

Call and Duration ELCC Results

First-in ELCC

2019

ELCC (% of nameplate)	Max annual calls						
Max call duration (hrs)	1	2	4	5	10	15	20
1	46%	50%	51%	51%	51%	51%	51%
2	63%	73%	78%	78%	78%	78%	78%
4	70%	81%	94%	95%	95%	95%	95%
6	70%	81%	94%	95%	95%	95%	95%
8	70%	81%	94%	95%	95%	95%	95%

No interactions with storage – therefore no expected significant differences

2030

ELCC (% of nameplate)	Max annual calls						
Max call duration (hrs)	1	2	4	5	10	15	20
1	41%	43%	43%	43%	43%	43%	43%
2	60%	65%	65%	65%	65%	65%	65%
4	72%	91%	95%	95%	95%	95%	95%
6	73%	92%	98%	98%	98%	98%	98%
8	73%	92%	98%	98%	98%	98%	98%

Last-in ELCC

2019

ELCC (% of nameplate)	Max annual calls						
Max call duration (hrs)	1	2	4	5	10	15	20
1	59%	73%	73%	73%	73%	73%	73%
2	74%	90%	94%	94%	94%	94%	94%
4	77%	98%	100%	100%	100%	100%	100%
6	77%	98%	100%	100%	100%	100%	100%
8	77%	98%	100%	100%	100%	100%	100%

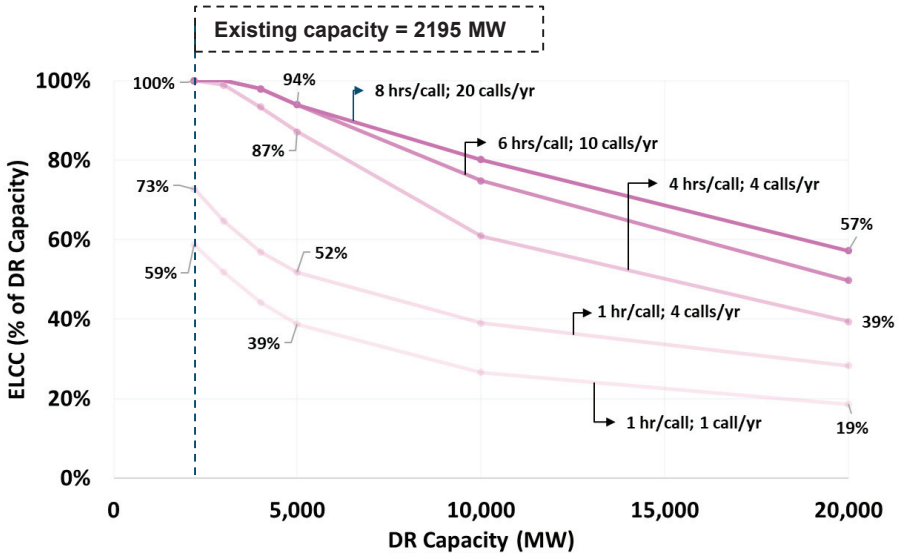
Significant degradation in last-in ELCC in 2030 is driven by saturation of energy-limited resources, primarily storage

2030

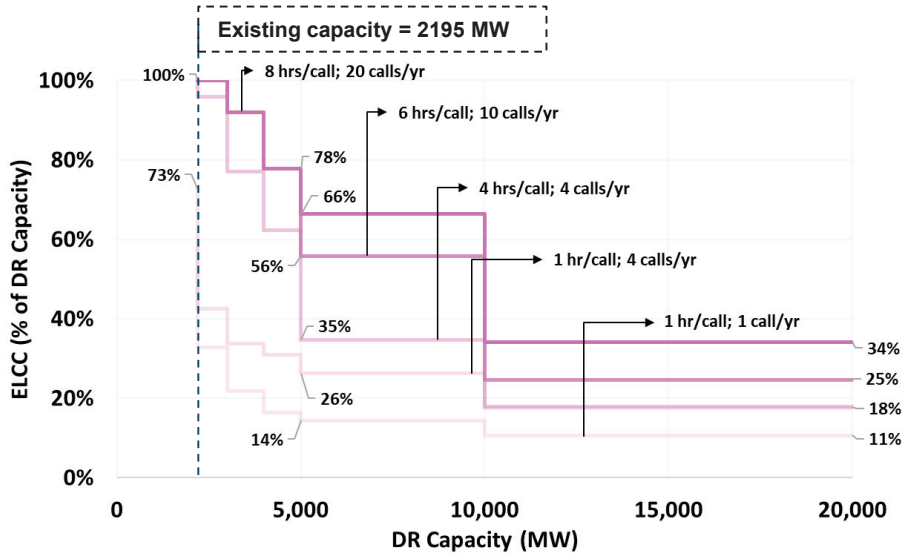
ELCC (% of nameplate)	Max annual calls						
Max call duration (hrs)	1	2	4	5	10	15	20
1	35%	37%	37%	37%	37%	37%	37%
2	44%	49%	49%	49%	49%	49%	49%
4	52%	65%	69%	69%	69%	69%	69%
6	56%	77%	77%	77%	77%	77%	77%
8	75%	91%	93%	93%	93%	93%	93%

DR ELCC Performance at Increasing Penetrations (2019)

Average Last-in ELCC



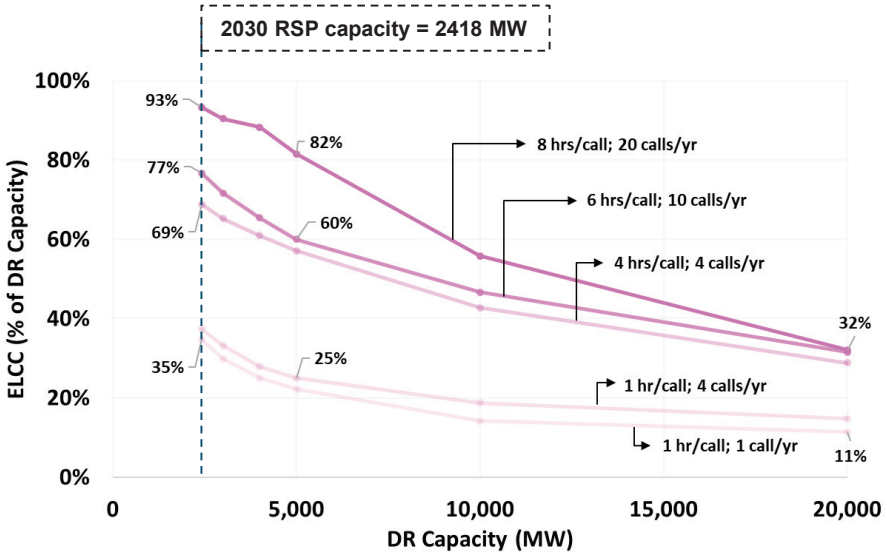
Incremental Last-in ELCC



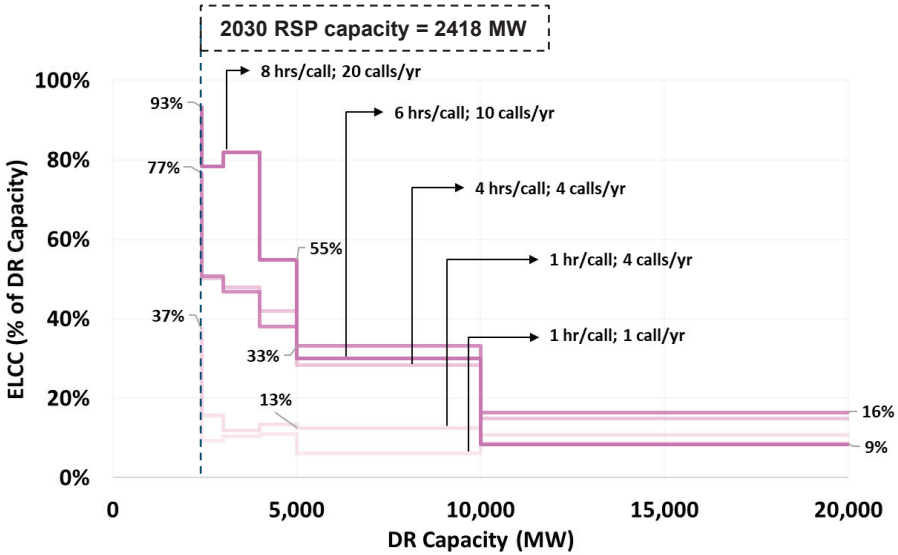
+ **Average ELCC = Total Effective Capacity / Total Installed Capacity**
+ **Incremental ELCC = Δ Effective Capacity / Δ Installed Capacity**
+ **ELCC generally decreases as DR capacity on the system increases:**
  - Similarity in hours of operation and characteristics limits the incremental value that more of the exact same resource type can add to the system.
  - Degradation gets more severe as call constraints become more stringent.

DR ELCC Performance at Increasing Penetrations (2030)

Average Last-in ELCC



Incremental Last-in ELCC



+ **ELCC generally decreases as DR capacity on the system increases:**
  - Similarity in hours of operation and characteristics limits the incremental value that more of the exact same resource type can add to the system.
  - For a given DR capacity on the system, ELCC in 2030 is lower than that in 2019 owing to saturation of energy-limited resources on the system in 2030, particularly storage.

CPUC Role in RA & ELCC Implementation

+ **The CPUC has been a leader in North America through the incorporation of intermittent and energy-limited resources into RA frameworks**
  - One of the first to adopt and implement **ELCC** framework to value wind and solar
  - Currently the only jurisdiction that recognizes and accounts for **interactive effects** of resources through allocation of a "diversity benefit" to wind and solar
+ **The CPUC has recognized that the concept of "interactive effects" applies not only to renewables but to storage and other resources, but has not yet established an approach for allocation that incorporates them all**

Steps 5 and 6 - Different Diversity Allocations

The tables below show results from allocating storage diversity to wind or solar resources

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
R. 14-10-010 Previously Adopted Values	Wind	11%	17%	18%	31%	31%	48%	30%	27%	27%	9%	8%	15%
CPUC proposed values - Diversity to Solar	Wind	14%	12%	28%	25%	25%	33%	23%	21%	15%	8%	12%	13%
Split storage diversity btwn wind/solar	Wind	13%	11%	31%	30%	28%	33%	22%	20%	15%	8%	11%	13%
Allocate storage diversity to wind	Wind	13%	9%	35%	36%	31%	34%	22%	20%	15%	7%	11%	12%

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
R. 14-10-010 Previously Adopted Values	Solar	0%	2%	10%	33%	31%	45%	42%	41%	33%	29%	4%	0%
CPUC proposed values - Diversity to Solar	Solar	4%	3%	18%	15%	16%	31%	39%	27%	14%	2%	2%	0%
Split storage diversity btwn wind/solar	Solar	5%	4%	16%	12%	15%	31%	39%	28%	14%	2%	2%	1%
Allocate storage diversity to wind	Solar	5%	5%	13%	8%	12%	30%	39%	29%	14%	3%	3%	1%

+ **Establishing a more generalized, durable framework for ELCC (capable of accounting for renewables, storage, and DR) will require a reexamination of the methods used to allocate ELCC and the "diversity benefit"**
+ **This section examines alternative options for allocating ELCC among resources that could improve upon existing methods currently in use**

Allocating ELCC

- **Allocating Portfolio ELCC is necessary with a centralized or bilateral capacity market framework where individual resources must be assigned a capacity contribution for compensation purposes**
  - Directly impacts billions of dollars of market clearing transactions within California and other organized capacity markets
- **Allocating Portfolio ELCC can impact planning and procurement in California to the extent that entities procure based on the economic signal they receive in the RA program**
  - An allocation exercise is not necessary in vertically integrated jurisdictions or in systems with a centralized procurement process
- **There are an infinite number of methods to allocate Portfolio ELCC to individual resources and no single correct or scientific method, similar to rate design**

Sample ELCC Allocation Method Options

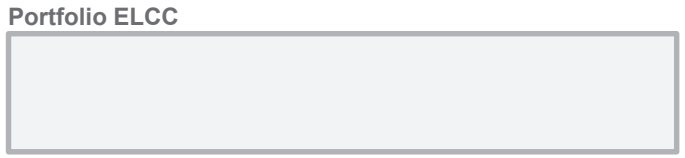
1	2	3	4	5
Allocate proportionally to First-In ELCC	Allocate proportionally to Last-In ELCC	Allocate adjustment to First-In ELCC proportionally to differences between First-in and Last-In ELCC	Vintaging approach where each resource permanently receives Last-In ELCC at the time it was constructed	More

Framework to Incorporate DR ELCC Into CPUC RA Framework

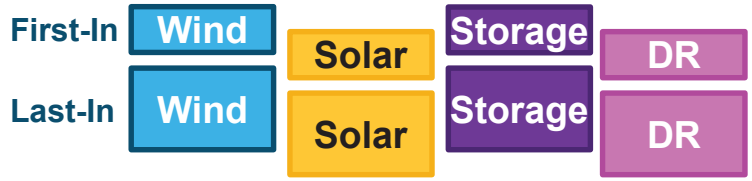
- **This section presents a framework as one option for attributing capacity value to DR *within the current resource adequacy framework* administered by the CPUC**
- **This framework relies on several key principles:**
  1) **Reliability:** The ELCC allocated to each project/program should sum to the portfolio ELCC for all resources
  2) **Fairness:** ELCC calculations should be technology neutral, properly reward resources for the capacity characteristics they provide, and not unduly differentiate among similar resources
  3) **Efficiency:** ELCC values should send accurate signals to encourage an economically efficient outcome to maximize societal resources
  4) **Customer Acceptability:** ELCC calculations should be transparent, tractable understandable, and implementable

Overview of Framework

1. **Calculate portfolio ELCC**

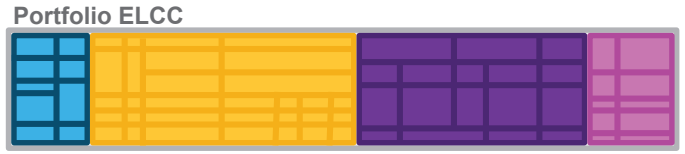


2. **Calculate "first-in" and "last-in" ELCC for each resource category**



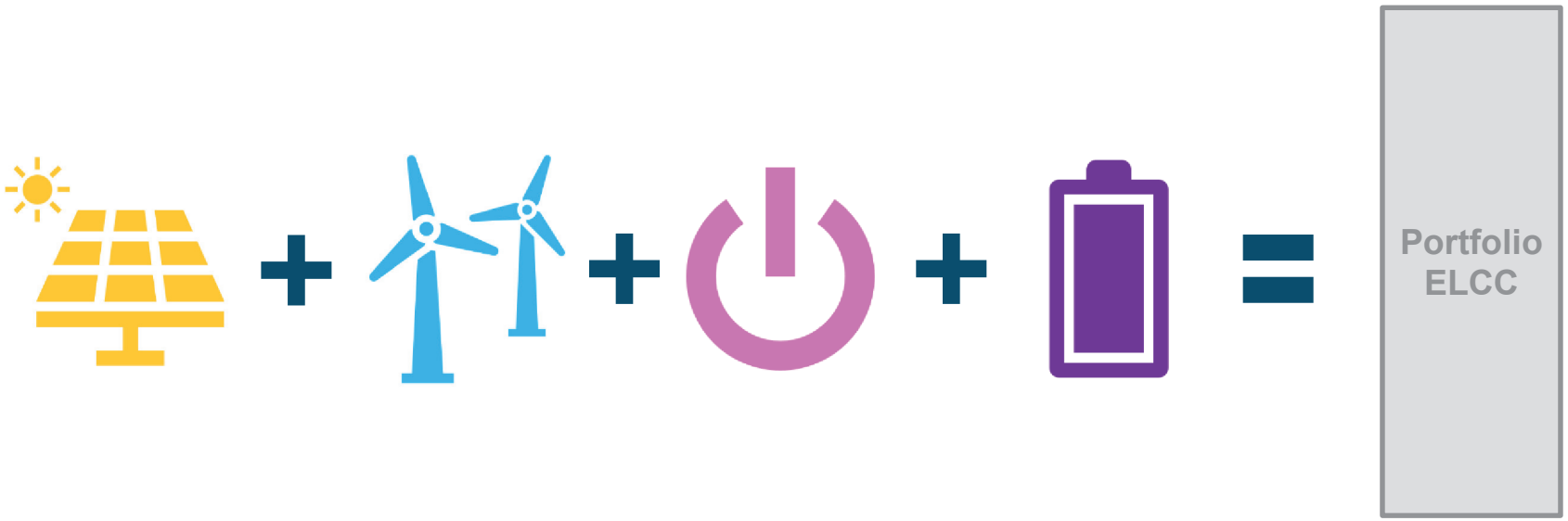
3. **Allocate portfolio ELCC to each resource category**

4. **Allocate resource category ELCC to each project/program using tractable heuristic**



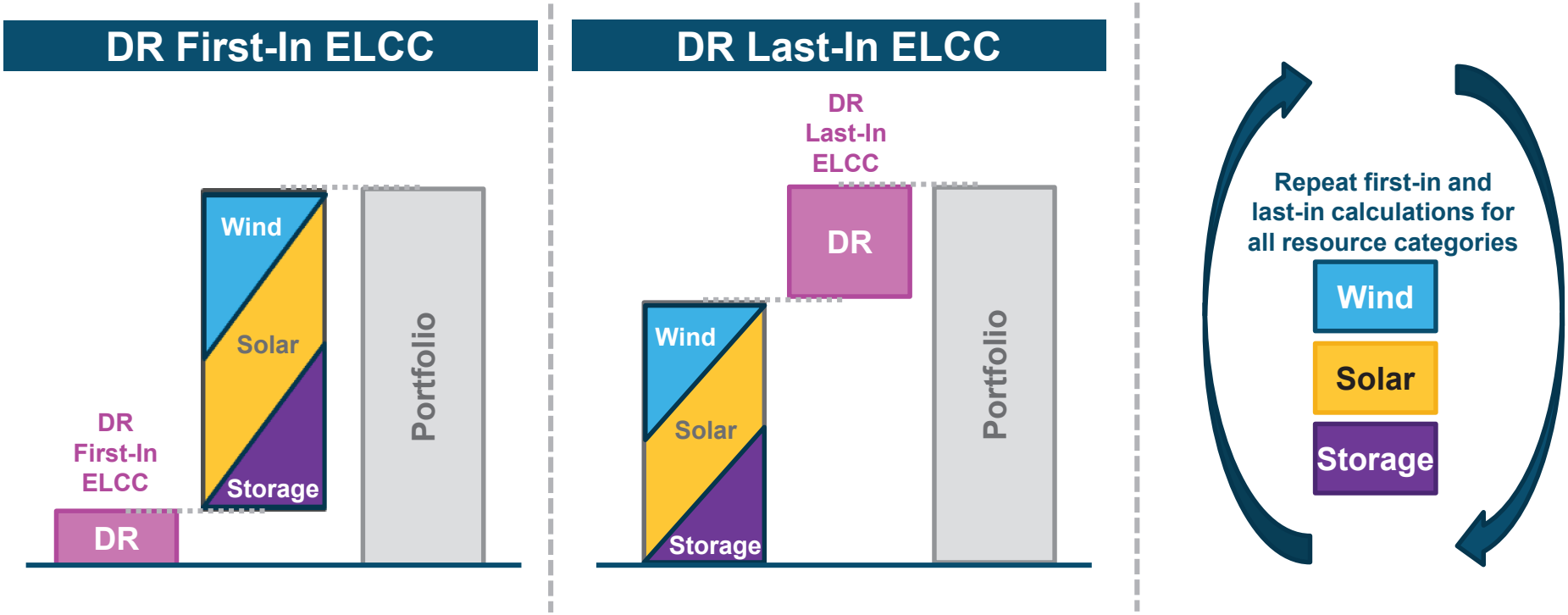
1) Calculate Portfolio ELCC

- **The first step should calculate the portfolio ELCC of all variable and energy-limited resources**
  - Wind
  - Solar
  - Storage
  - Demand Response



2) Calculation First-In and Last-In Resource Category ELCCs

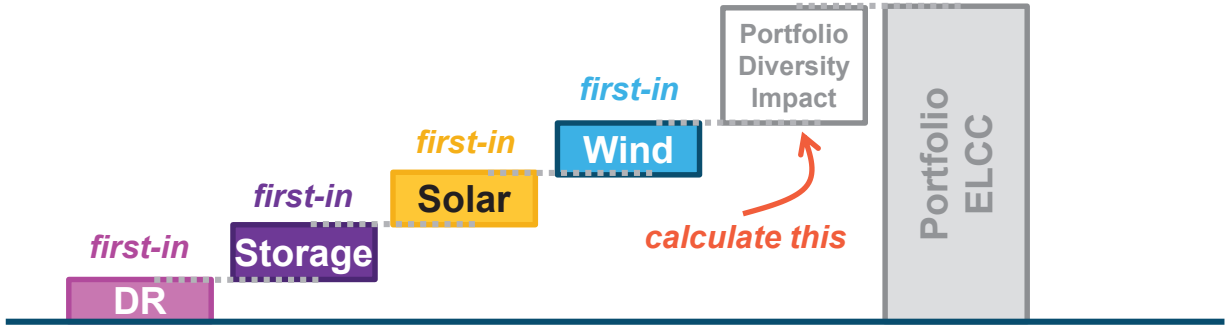
+ The second step calculates the "first-in" and "last-in" ELCC for each resource category as a necessary input for allocation of the portfolio ELCC



3) Allocate Portfolio ELCC to Each Resource Category

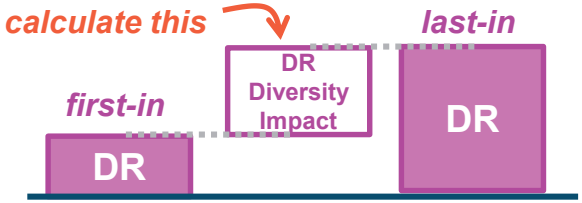
Calculate diversity impact as the difference between portfolio ELCC and sum of first-in ELCCs

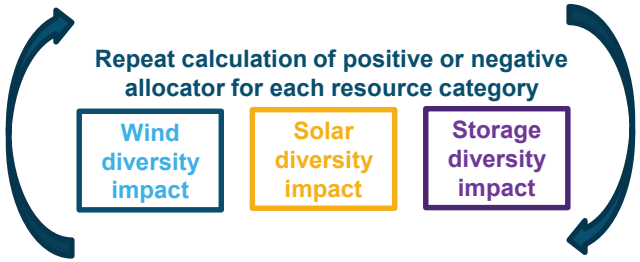
1



Calculate diversity impact for each resource category

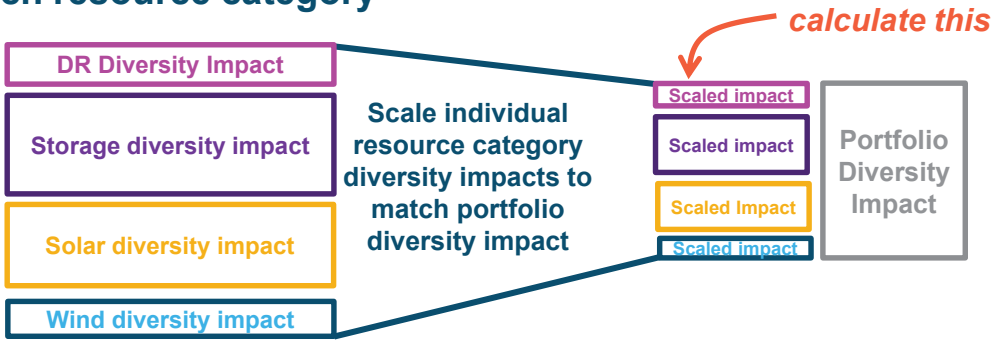
2

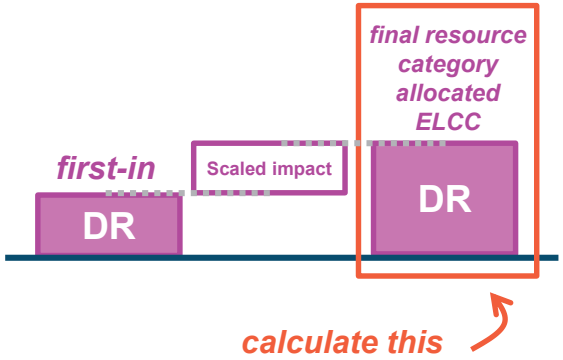




Allocate diversity impact in proportion to the difference between first-in and last-in ELCC for each resource category

3

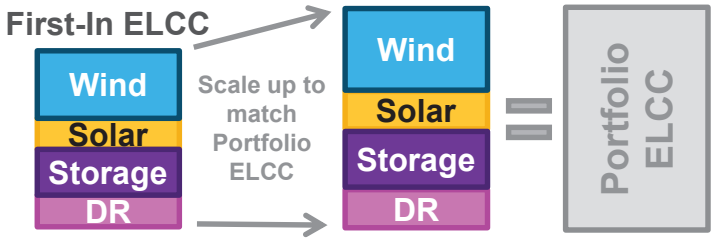




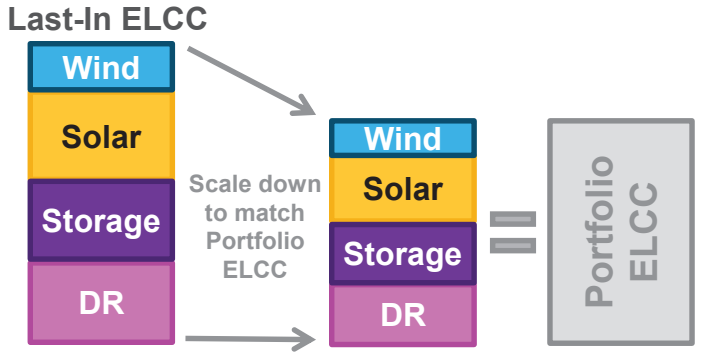
Benefits of this Approach

+ There are several options to allocate Portfolio ELCC to each technology category, two examples of which are shown below

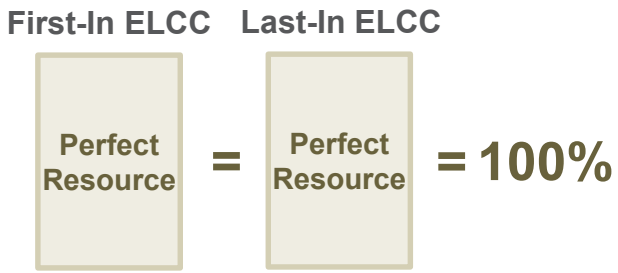
First-In ELCC Allocation Option



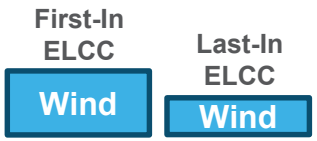
Last-In ELCC Allocation Option



+ **Both of these options can lead to final ELCC allocations that fall outside the bounds of the first-in or last-in ELCC**
  - For example, in the case of a "perfect" resource (e.g. ultra-long duration storage, always available DR, baseload renewables, etc.), this should be counted at 100% ELCC and should not be unduly scaled up or down based on the synergistic or antagonistic impacts of other resource interactions
  - Scaling the first-in or last-in ELCC in any way would result in an ELCC of either >100% or <100% for this perfect resource



+ **The method presented in this deck scales resources based on the difference of their first-in and last-in ELCC in order to reflect their synergistic or antagonistic contributions to Portfolio ELCC**



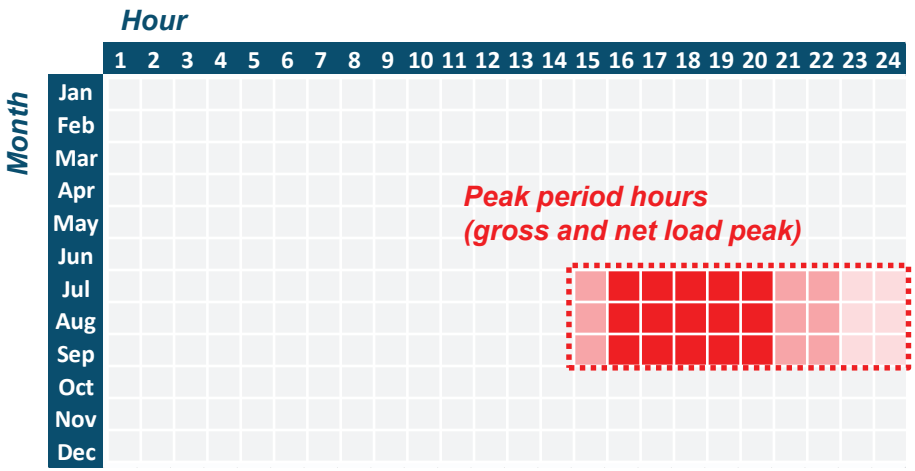
Negative diversity impact leads to first-in ELCC being scaled up to match Portfolio ELCC

Positive diversity impact leads to first-in ELCC being scaled down to match Portfolio ELCC

No diversity impact leads to no scaling of first-in ELCC to match Portfolio ELCC

4) Allocate Resource Category ELCC to Individual Resource/Programs Using Heuristics

- **Each DR program submits the following information**
  - Expected output during peak period hours
  - Maximum number of calls per year
  - Maximum duration of call
- **Step 1) Calculate average MW availability during peak period hours (gross and net load)**
- **Step 2) Multiple MW availability from step (1) by lookup table de-rating factor to account for call and duration limitations**
  - DR category ELCC to individual program ELCC using first-in and last-in ELCC would work similarly to the allocation process of portfolio ELCC to resource category ELCC



First-In ELCC

Max call duration (hrs)	ELCC (% of nameplate)	Max annual calls						
		1	2	4	5	10	15	20
	1	41%	43%	43%	43%	43%	43%	43%
	2	60%	65%	65%	65%	65%	65%	65%
	4	72%	91%	95%	95%	95%	95%	95%
	6	73%	92%	98%	98%	98%	98%	98%
	8	73%	92%	98%	98%	98%	98%	98%

Last-In ELCC

Max call duration (hrs)	ELCC (% of nameplate)	Max annual calls						
		1	2	4	5	10	15	20
	1	35%	37%	37%	37%	37%	37%	37%
	2	44%	49%	49%	49%	49%	49%	49%
	4	52%	65%	69%	69%	69%	69%	69%
	6	56%	77%	77%	77%	77%	77%	77%
	8	75%	91%	93%	93%	93%	93%	93%

Questions

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Thank You

Arne Olson (arne@ethree.com)

Zach Ming, (zachary.ming@ethree.com)

Vignesh Venugopal (vignesh.venugopal@ethree.com)

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Updated Demand Response ELCC Study

CAISO

December 2020

Zach Ming, Director
Vignesh Venugopal, Consultant

Overview of DR ELCC Study Update

+ The DR ELCC study has been updated to reflect two primary changes

1) SCE BIP Bid Values
   - The original DR bid data submitted to E3 from SCE reflected the actual BIP bid values but not the full capability of these resources
   - Due to discrete dispatch limitations and registration restrictions, SCE had been underbidding the full capability of its DR resources into the CAISO market
   - SCE has now modified its bidding procedures to reflect the full capability of these resources and has retroactively modified 2019 bid values to reflect its new bidding strategy

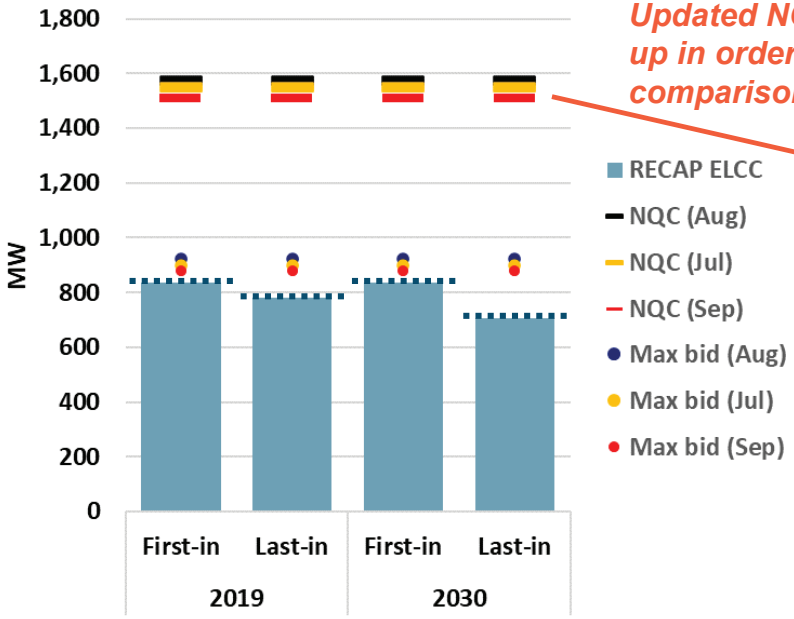
2) T&D Loss and PRM Gross Up
   - DR ELCC values are now compared to the DR NQC values net of T&D loss factors and PRM
   - Originally, both SCE and PG&E indicated to E3 that the demand response bid data was grossed up for T&D losses but after the May release of the study indicated it was not

Average Increase in SCE Hourly DR Bid Data

Avg Difference (MW)																								
Month/Hour (PST)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
1	127	126	125	125	130	137	142	147	148	151	158	148	146	144	140	137	127	125	125	124	124	141	143	139
2	122	121	121	121	125	132	137	140	140	140	143	144	140	136	134	132	129	128	127	125	125	134	135	131
3	113	113	113	116	122	128	132	131	132	141	138	133	129	126	125	123	123	122	121	120	124	126	124	118
4	207	289	456	187	205	193	210	220	230	219	260	202	192	188	186	179	177	187	179	180	185	199	204	186
5	137	137	134	137	144	150	153	157	152	153	157	156	149	148	145	140	133	142	141	145	147	140	138	131
6	108	107	105	108	115	119	123	125	120	123	125	124	119	119	115	111	103	112	110	114	115	109	107	106
7	92	92	89	91	98	103	109	110	101	105	107	106	103	101	99	95	88	96	95	98	98	93	91	90
8	99	99	95	97	104	109	117	119	112	115	116	115	117	117	115	111	105	103	101	105	106	101	97	96
9	86	88	85	87	93	98	102	105	99	102	103	102	99	98	94	90	84	91	89	94	95	90	86	86
10	101	102	98	101	105	108	111	117	115	119	121	117	112	112	109	106	98	107	104	109	110	104	99	98
11	88	89	89	90	92	97	102	108	104	110	111	153	105	103	101	101	101	101	97	87	84	91	97	93
12	72	68	67	66	69	75	77	80	79	77	95	78	79	79	77	76	74	71	76	76	75	80	79	77

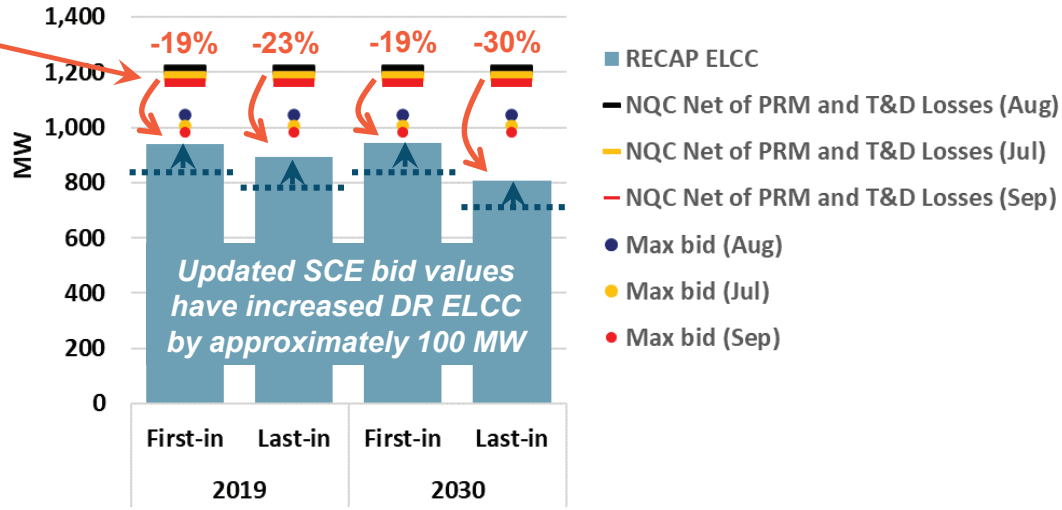
Updated November 2020 Results

Original May 2020 Results

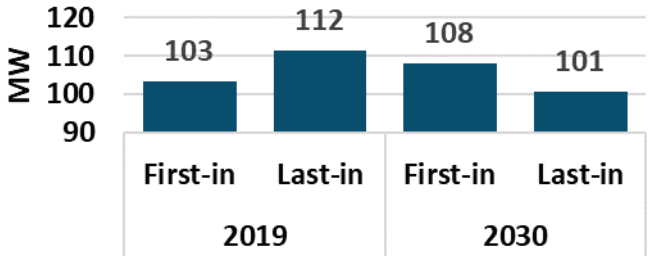


Updated NQC values remove PRM and T&D gross up in order to ensure apples-to-apples comparison with DR bids

Updated November 2020 Results



Nov – May Difference in Results



Key Finding

+ **DR ELCC is approximately 20 to 30% less than apples-to-apples NQC comparison**

Factors Affecting Gap Between NQC* and ELCC

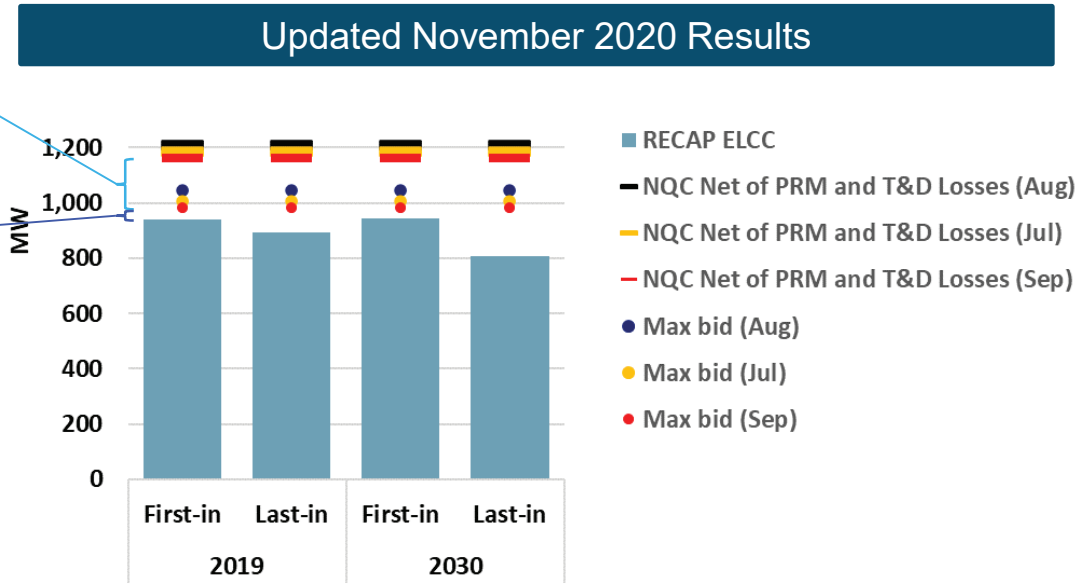
+ The gap between NQC* and ELCC is driven by two primary factors

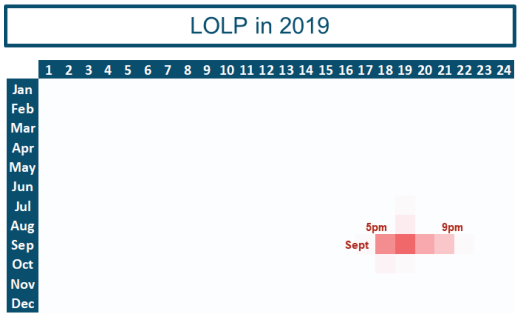
- NQC* implies NQC net of T&D losses and PRM

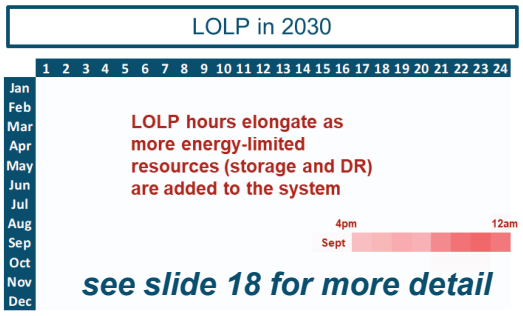
1 Maximum aggregate bids are lower than NQC* in all hours

2 ELCC is lower than maximum aggregate bid because resources do not produce at this level in all loss of load hours

- As more storage is added to the system, it flattens the peak which **elongates** the period of loss of load hours beyond 4-9pm which further decreases the "Last-In ELCC" of DR
- This issue is expected to grow in the future as evidenced by declining Last-In ELCC in 2030





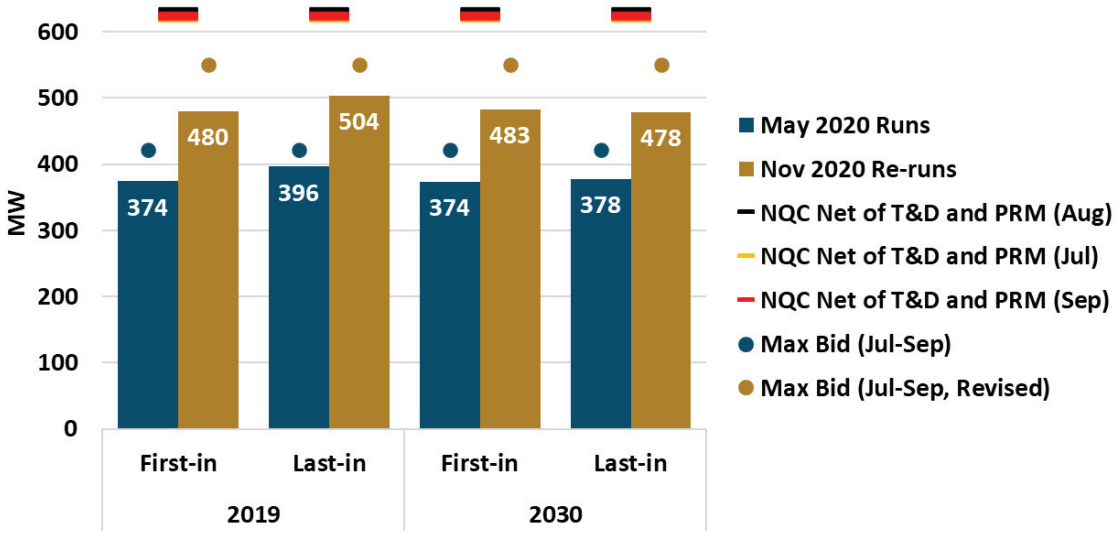


see slide 18 for more detail

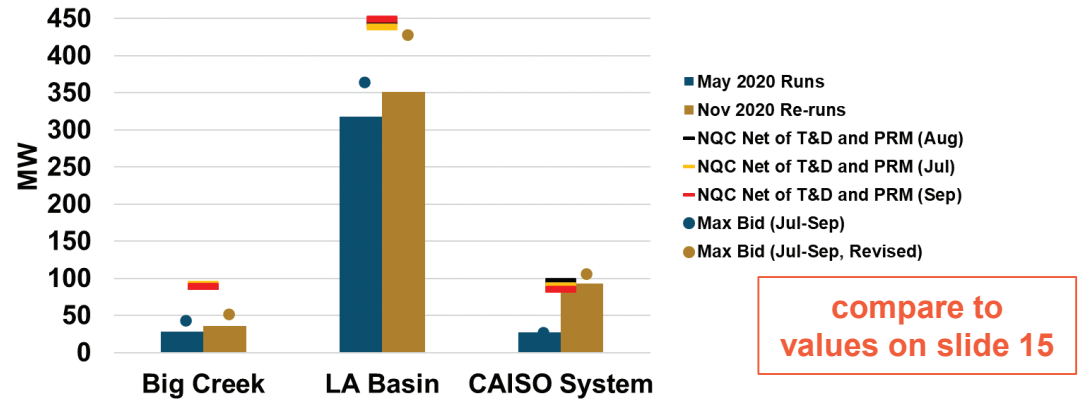
SCE-Specific Updated Results

- The update in the overall DR ELCC results are driven by updated bid data from the SCE BIP program
- SCE BIP ELCC has increased by approximately 100 MW across all cases
- First-in ELCC for BIP program in each LCA has increased

SCE BIP ELCC



First-In ELCC for SCE BIP Programs by LCA

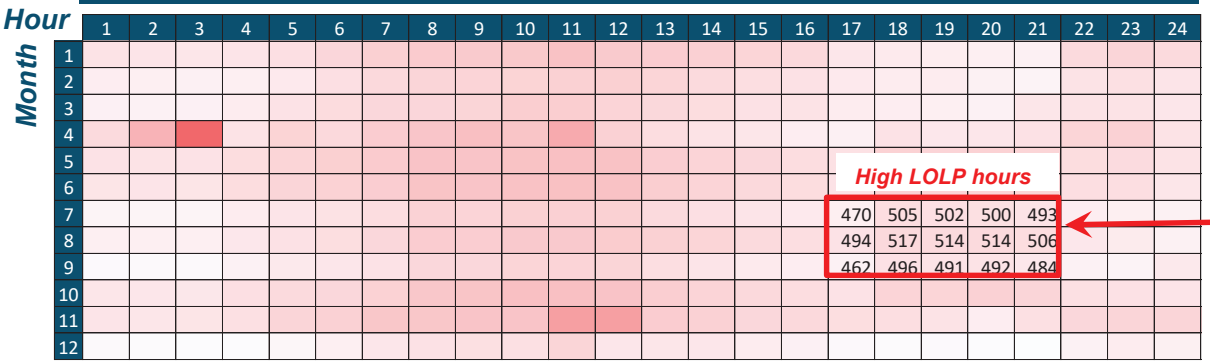


compare to values on slide 15

Comparing SCE BIP NQC to Nominations

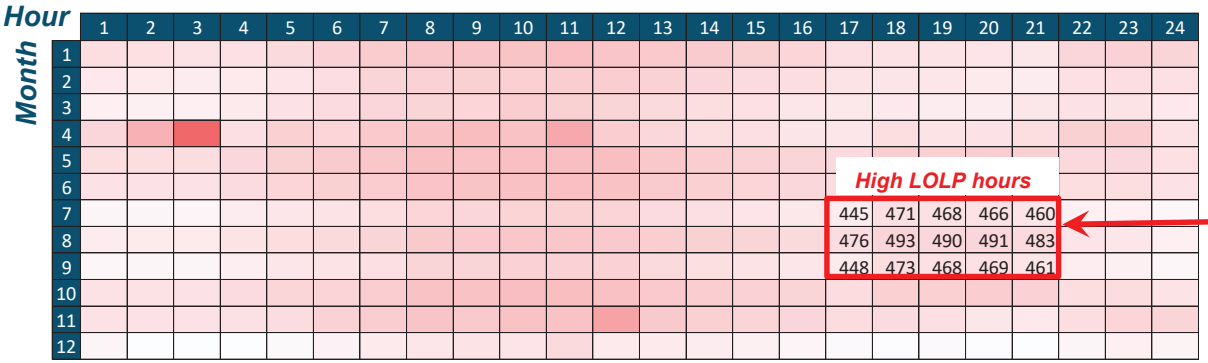
- The primary reason SCE BIP ELCC values are lower than NQC values (adjusted for T&D and PRM factors) is due to nomination values that are lower than the NQC values
- September SCE BIP NQC (net of T&D and PRM) is 624 MW

Maximum Nomination MW (2019 SCE BIP)



Maximum SCE BIP nomination during high LOLP hours is 517 MW

Average Nomination MW (2019 SCE BIP)



Average SCE BIP nomination during high LOLP hours is 471 MW

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Assessment of 2020 DR Bids

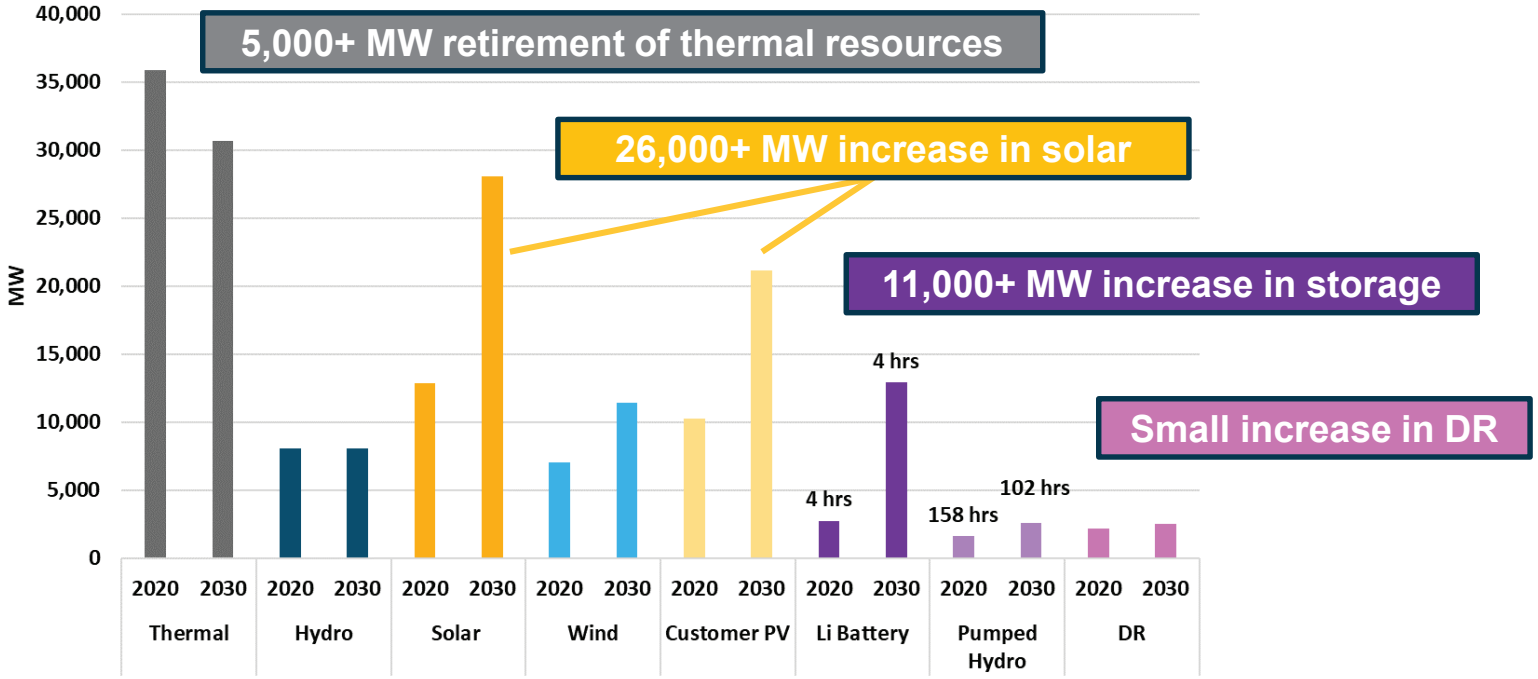
CAISO
June 2021

Zach Ming, Director
Vignesh Venugopal, Consultant

CAISO System Modelled in 2020 and 2030

+ E3 analyzed the value of DR to the CAISO system in 2020 and 2030 based on the IRP portfolio for the 2021-2022 Transmission Planning Process[1]

2020 and 2030 CAISO Resource Portfolio

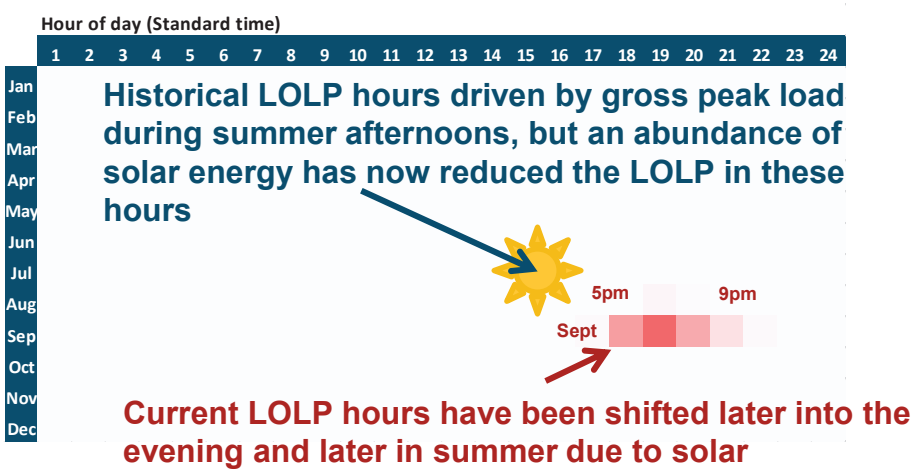


[1] IRP Inputs to 2021-22 TPP

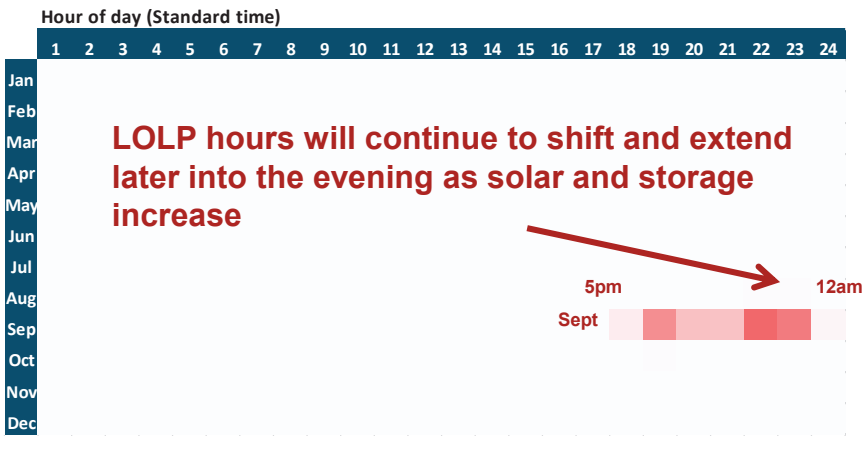
Time Window Availability Needs for DR in 2020 & 2030

- Month/hour (12x24) loss of load probability heat maps provide a quick overview of "high risk" hours
- Key findings from this project are showing elongation of the peak period by 2030

LOLP in 2020

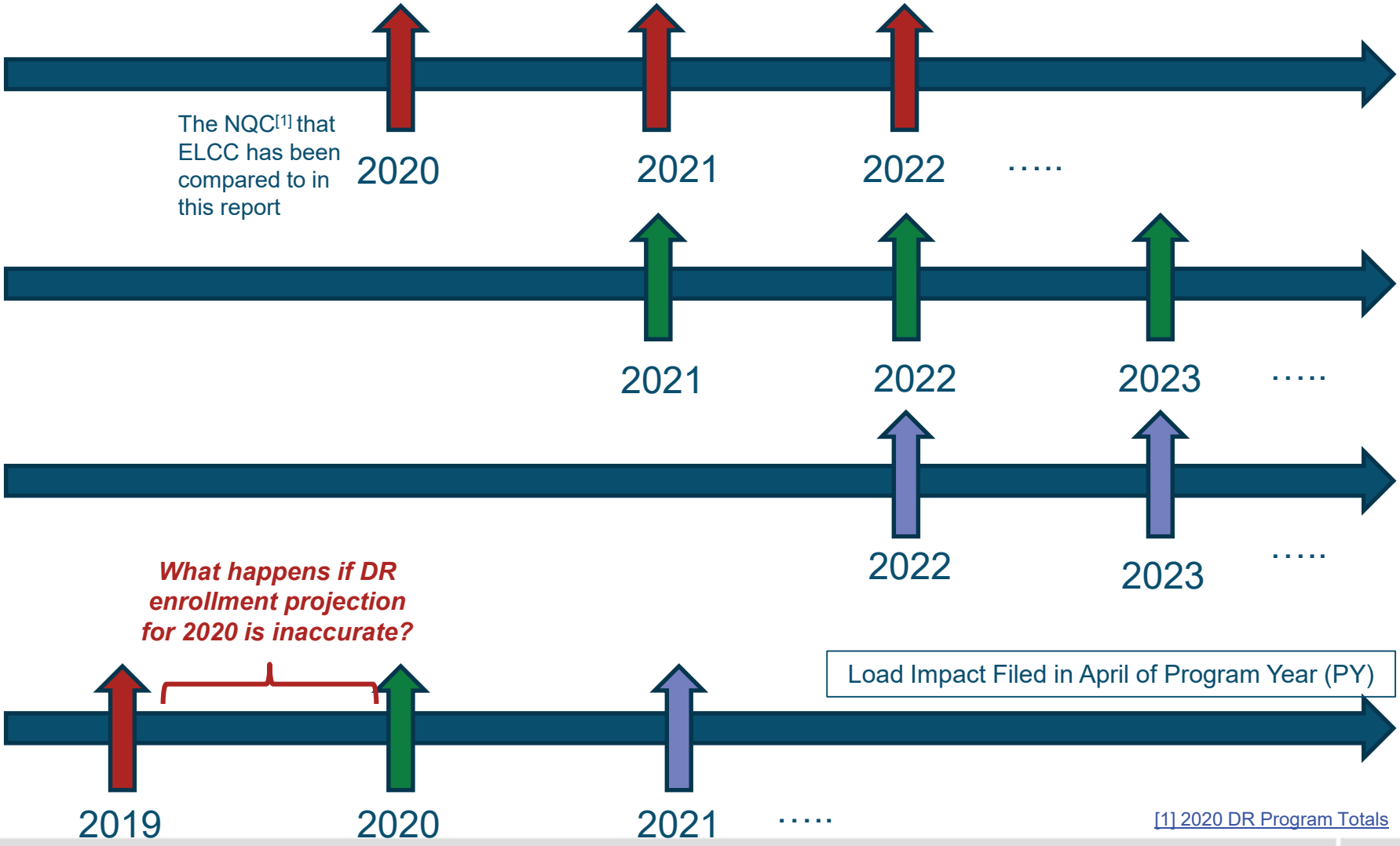


LOLP in 2030



LIP Filing and NQC Calculation Timeline

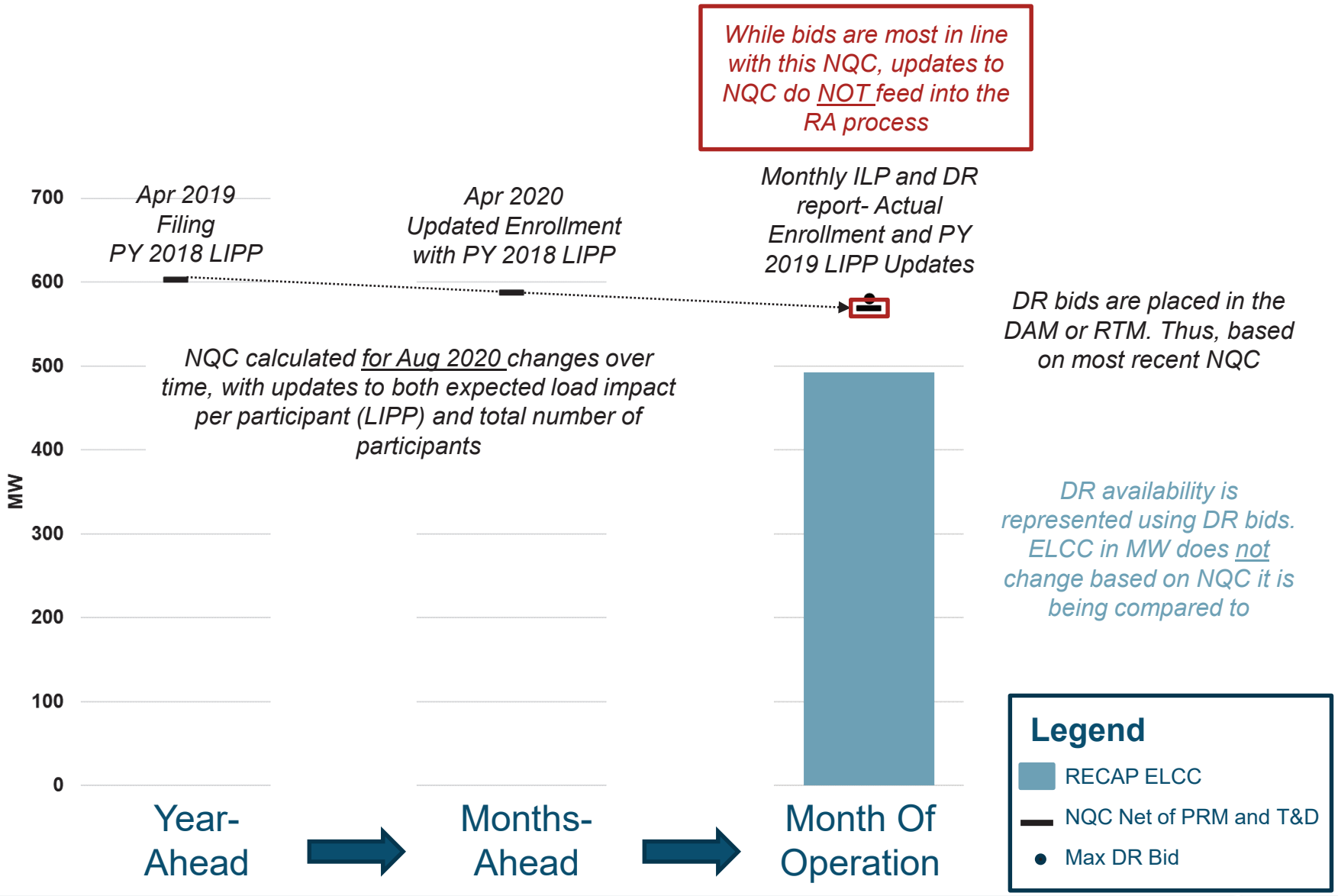
NQC Calculated For Future Years. Based on- (1) DR Performance in Year Prior to PY and (2) DR Enrollment Projections



Load Impact Filed in April of Program Year (PY)

[1] 2020 DR Program Totals

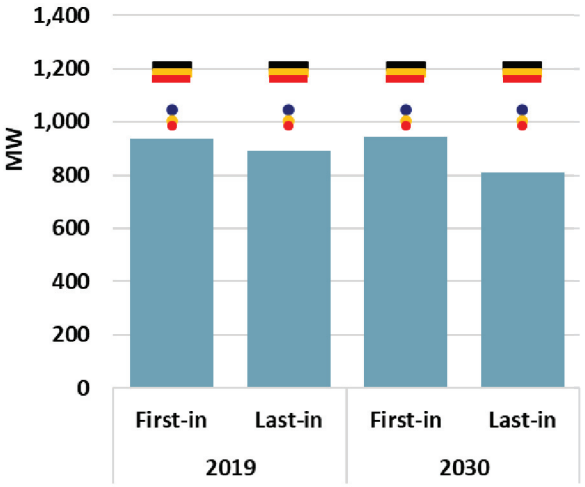
Change in NQC Leading Up to Real-Time
SCE BIP In August For Example



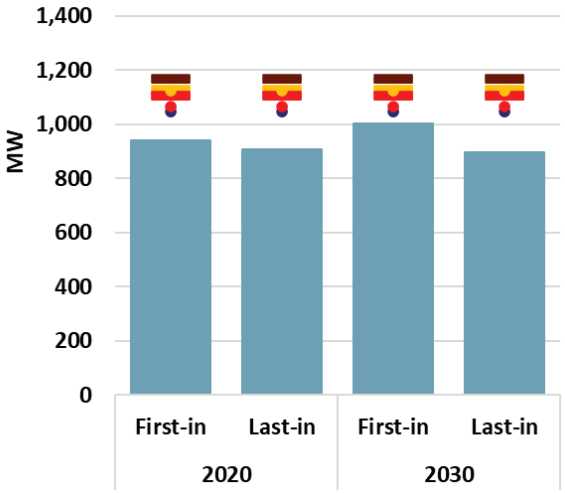
Aggregate ELCC Results

While we remove PRM and T&D gross-up from the NQC to ensure a fair comparison with DR bids submitted, the NQC attributed to DR in the Resource Adequacy process is grossed up for both

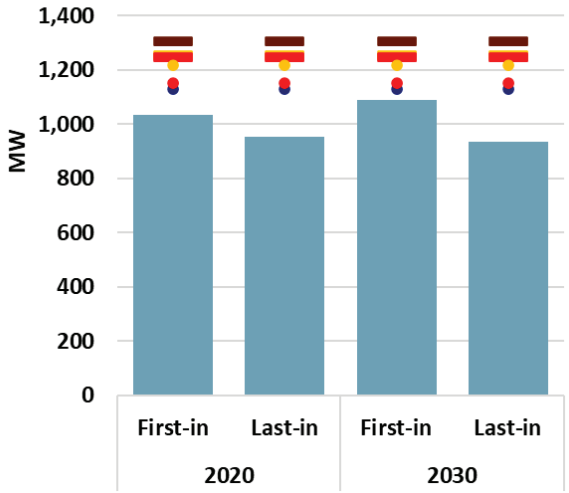
2019-PG&E and SCE



2020-PG&E and SCE



2020-With Additional SCE Programs and SDG&E



Legend

- RECAP ELCC
- NQC Net of PRM and T&D (Aug)
- NQC Net of PRM and T&D (Jul)
- NQC Net of PRM and T&D (Sep)
- Max DR Bid (Aug)
- Max DR Bid (Jul)
- Max DR Bid (Sep)

- *DR bids in the summer increased by ~60 MW on avg*
- *ELCCs increase by 4-90 MW*
- *NQCs reduced by ~50 MW*

- *Inclusion of SCE's SEP and LCR and SDG&E's CBP, BIP and AC programs*
- *First-in ELCC increases by ~90 MW, Last-in by ~45 MW*

Difference In NQC and Bids from 2019 to 2020

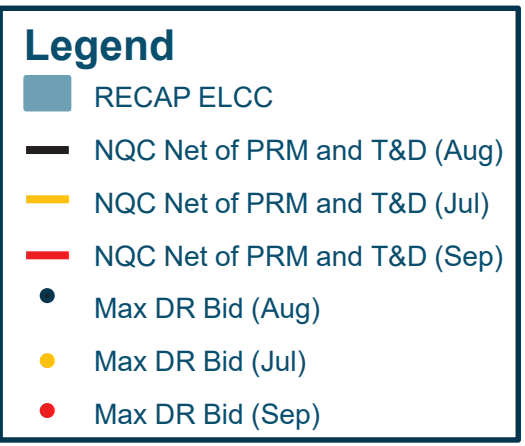
IoU	Program	LCA	NQC before T&D and PRM			Max Bid		
			Jul	Aug	Sep	Jul	Aug	Sep
PG&E	BIP	All LCAs						
	CBP	Bay Area						
	CBP	CAISO System						
	CBP	Greater Fresno						
	CBP	Humboldt						
	CBP	Kern						
	CBP	North Coast						
	CBP	Sierra						
	CBP	Stockton						
	SAC	Bay Area						
	SAC	CAISO System						
	SAC	Greater Fresno						
	SAC	Kern						
	SAC	North Coast						
	SAC	Sierra						
	SAC	Stockton						
SCE	API	Big Creek						
	API	CAISO System						
	API	LA Basin						
	BIP	Big Creek						
	BIP	CAISO System						
	BIP	LA Basin						
	CBP	Big Creek						
	CBP	CAISO System						
	CBP	LA Basin						
	SDP	Big Creek						
	SDP	CAISO System						
	SDP	LA Basin						

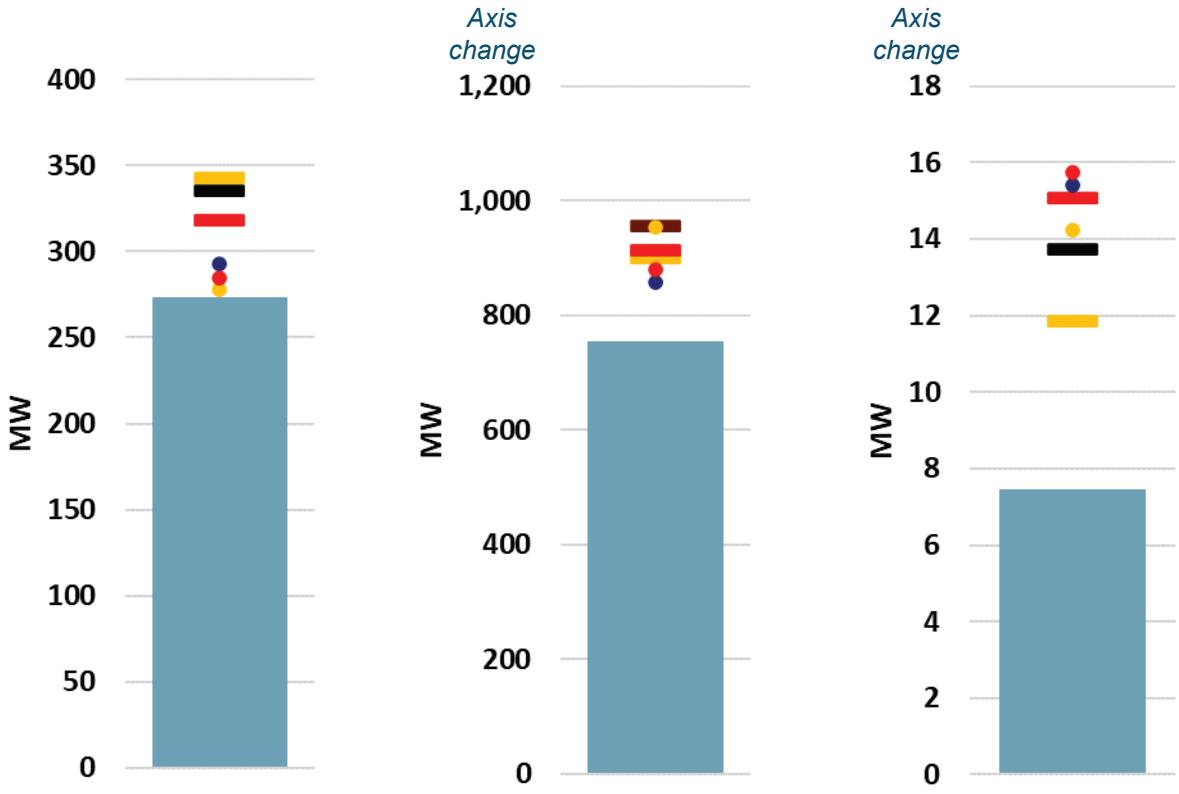
Increase

No Change

Decrease

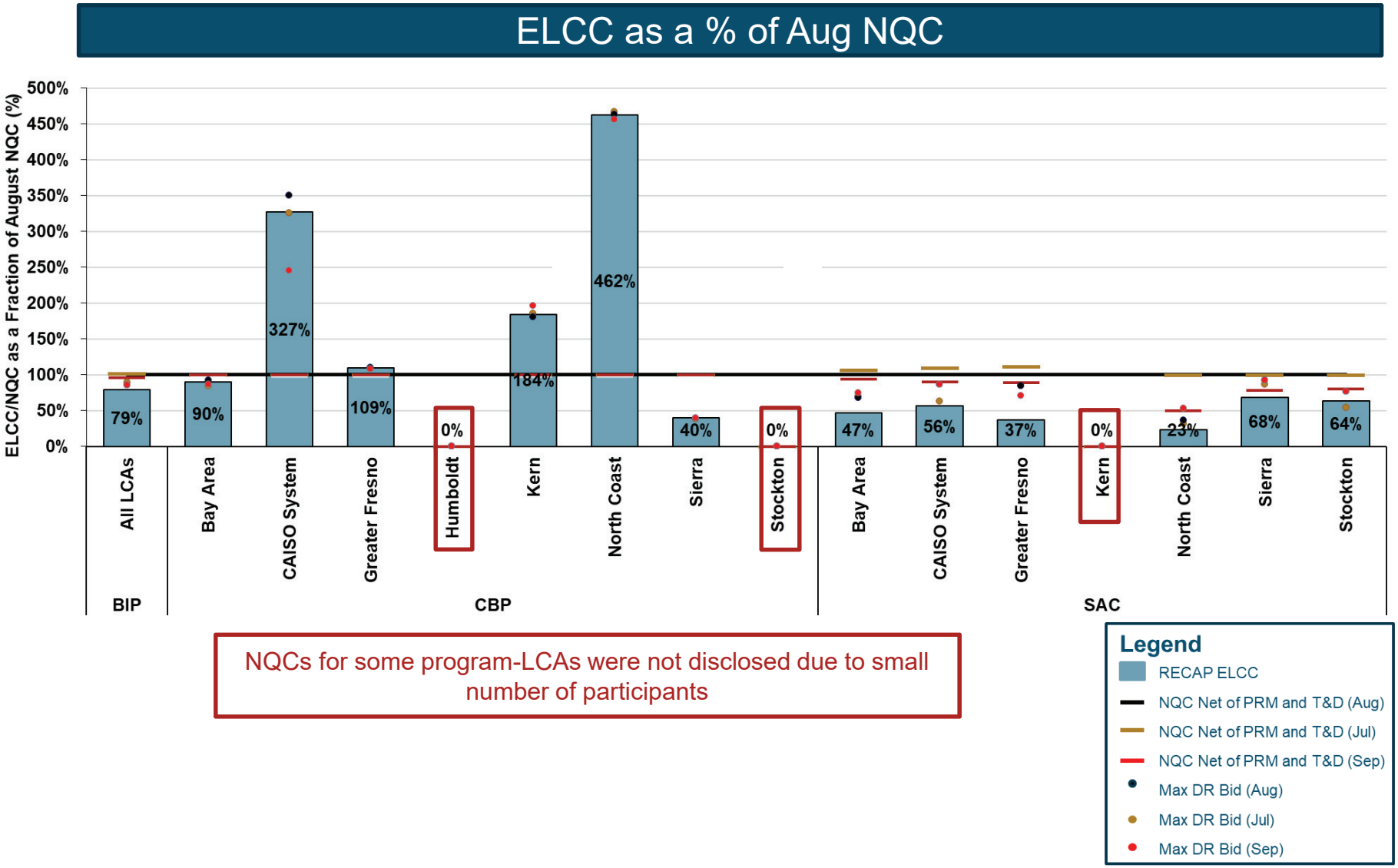
First-in ELCC Based on 2020 DR Bids





ELCC as a % of NQC Net of PRM and T&D	PG&E	SCE	SDG&E
July	80%	84%	63%
Aug	82%	79%	54%
Sep	86%	83%	49%

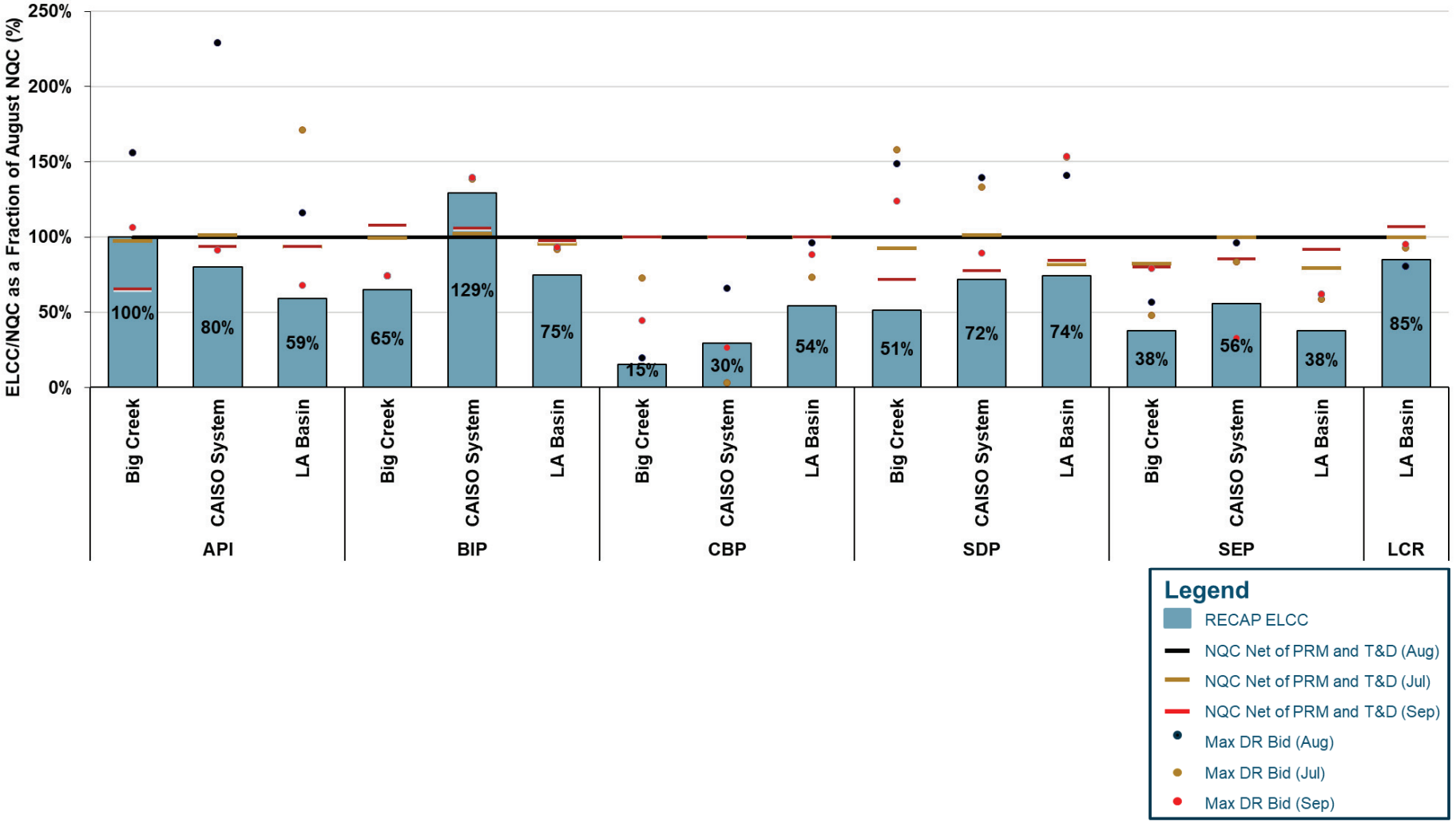
First-in ELCC Based on 2020 DR Bids PG&E Programs



NQCs for some program-LCAs were not disclosed due to small number of participants

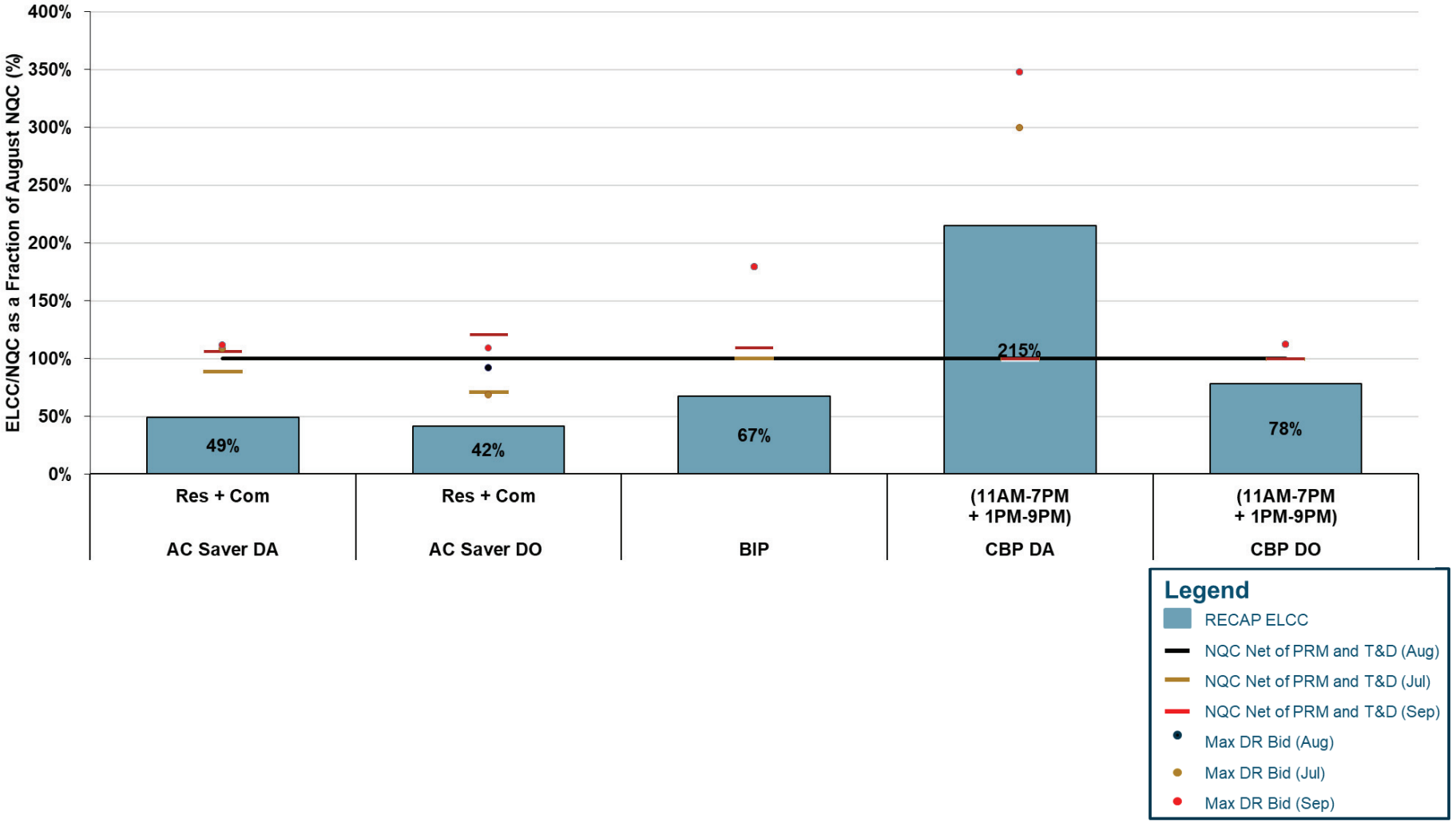
First-in ELCC Based on 2020 DR Bids SCE Programs

ELCC as a % of Aug NQC



First-in ELCC Based on 2020 DR Bids SDG&E Programs

ELCC as a % of Aug NQC



Energy+Environmental Economics

Appendix

NQCs as a Basis for Comparison with ELCCs

- NQCs are calculated using load impacts (LI) , i.e. load reductions expected during peak conditions, calculated in line with the Load Impact Protocols.
- Load impacts are grossed up for transmission and distribution losses, as also the 15% PRM, owing to demand response being a demand reduction measure.

$$NQC = LI * 1.15\,(PRM) * T\&D\ loss\ factor$$ [1]

- Load impacts for the year 2019 are referenced from the CPUC's RA Compliance documents[2]
- Load impacts were defined on an LCA level from 1 pm to 6 pm, Apr to Oct, and from 4 pm to 9 pm in the rest of the year, both with and without line losses
- The timing has since been revised to 4 pm to 9 pm year-round[3]

[1] CPUC 2019 RA Guide
[2] CPUC 2019 IoU DR Program Totals
[3] CPUC 2020 IOU LIP Workshop

Key Question: What Call and Duration Characteristics are Needed to Maximize DR ELCC?

- **E3 tested how two primary constraints impact the ELCC of demand response resources**
  - Max # of calls per year
    - How many times can a system operator dispatch a demand response resource?
  - Max duration of each call
    - How long does the demand response resource respond when called by the system operator?
- **Key Assumptions:**
  - DR portfolio is divided into 100 MW units, each of which can be dispatched independently of the other
    - In other words, 2-hour-100 MW units can be dispatched in sequence to avoid an unserved energy event 100 MW deep and 4 hours long
  - Each 100 MW unit is available 24/7, at full capacity of 100 MW, subject to call constraints defined above to establish a clear baseline for ELCC %'s
  - Pure Shed DR; No shifting of load; No snap-backs

Average ELCC as a function of DR Capacity on the System

First-in ELCC

2019

ELCC (% of DR capacity)

DR capacity (MW)	Call constraints: 1 hour/call 1 call/year	1 hour/call 4 calls/year	4 hours/call 1 call/year	4 hours/call 4 calls/year	4 hours/call 20 calls/year	6 hours/call 10 calls/year	8 hours/call 4 calls/year	8 hours/call 20 calls/year
2,195	46%	51%	70%	94%	95%	95%	94%	95%
3,000	40%	47%	61%	92%	94%	96%	93%	96%
4,000	36%	42%	52%	78%	80%	86%	80%	86%
5,000	32%	39%	46%	73%	75%	83%	74%	84%
10,000	21%	30%	31%	51%	60%	65%	53%	70%
20,000	14%	21%	20%	33%	46%	44%	35%	52%

2030

ELCC (% of DR capacity)

DR capacity (MW)	Call constraints: 1 hour/call 1 call/year	1 hour/call 4 calls/year	4 hours/call 1 call/year	4 hours/call 4 calls/year	4 hours/call 20 calls/year	6 hours/call 10 calls/year	8 hours/call 4 calls/year	8 hours/call 20 calls/year
2,195	41%	43%	72%	95%	95%	98%	98%	98%
3,000	38%	40%	66%	92%	93%	98%	97%	98%
4,000	35%	37%	56%	83%	88%	91%	85%	91%
5,000	32%	35%	50%	74%	80%	86%	77%	88%
10,000	23%	30%	33%	52%	62%	67%	55%	71%
20,000	15%	22%	22%	35%	47%	46%	37%	53%

Last-in ELCC

2019

ELCC (% of DR capacity)

DR capacity (MW)	Call constraints: 1 hour/call 1 call/year	1 hour/call 4 calls/year	4 hours/call 1 call/year	4 hours/call 4 calls/year	4 hours/call 20 calls/year	6 hours/call 10 calls/year	8 hours/call 4 calls/year	8 hours/call 20 calls/year
2,195	59%	73%	77%	100%	100%	100%	100%	100%
3,000	52%	65%	67%	99%	100%	100%	99%	100%
4,000	44%	57%	63%	93%	98%	98%	93%	98%
5,000	39%	52%	59%	87%	94%	94%	88%	94%
10,000	27%	39%	38%	61%	75%	75%	61%	80%
20,000	19%	28%	25%	39%	53%	50%	40%	57%

2030

ELCC (% of DR capacity)

DR capacity (MW)	Call constraints: 1 hour/call 1 call/year	1 hour/call 4 calls/year	4 hours/call 1 call/year	4 hours/call 4 calls/year	4 hours/call 20 calls/year	6 hours/call 10 calls/year	8 hours/call 4 calls/year	8 hours/call 20 calls/year
2,195	35%	37%	52%	69%	69%	77%	93%	93%
3,000	30%	33%	48%	65%	65%	72%	90%	90%
4,000	25%	28%	43%	61%	61%	65%	88%	88%
5,000	22%	25%	41%	57%	57%	60%	80%	82%
10,000	14%	19%	30%	43%	43%	47%	54%	56%
20,000	11%	15%	22%	29%	30%	31%	32%	32%

Incremental ELCC as a function of DR Capacity on the System

First-in ELCC

2019

ELCC (% of DR capacity) / DR capacity (MW)	1 hour/call 1 call/year	1 hour/call 4 calls/year	4 hours/call 1 call/year	4 hours/call 4 calls/year	4 hours/call 20 calls/year	6 hours/call 10 calls/year	8 hours/call 4 calls/year	8 hours/call 20 calls/year
2,195	46%	51%	70%	94%	95%	95%	94%	95%
3,000	25%	36%	37%	86%	93%	99%	90%	99%
4,000	22%	29%	26%	34%	39%	57%	40%	58%
5,000	15%	23%	22%	52%	56%	69%	51%	73%
10,000	11%	22%	16%	30%	45%	47%	32%	57%
20,000	7%	11%	10%	16%	31%	23%	17%	33%

2030

ELCC (% of DR capacity) / DR capacity (MW)	1 hour/call 1 call/year	1 hour/call 4 calls/year	4 hours/call 1 call/year	4 hours/call 4 calls/year	4 hours/call 20 calls/year	6 hours/call 10 calls/year	8 hours/call 4 calls/year	8 hours/call 20 calls/year
2,195	41%	43%	72%	95%	95%	98%	98%	98%
3,000	26%	28%	42%	81%	84%	96%	94%	96%
4,000	25%	28%	25%	53%	71%	72%	48%	72%
5,000	19%	25%	24%	39%	48%	65%	45%	76%
10,000	15%	26%	17%	31%	45%	49%	33%	53%
20,000	8%	13%	11%	17%	32%	25%	19%	36%

Last-in ELCC

2019

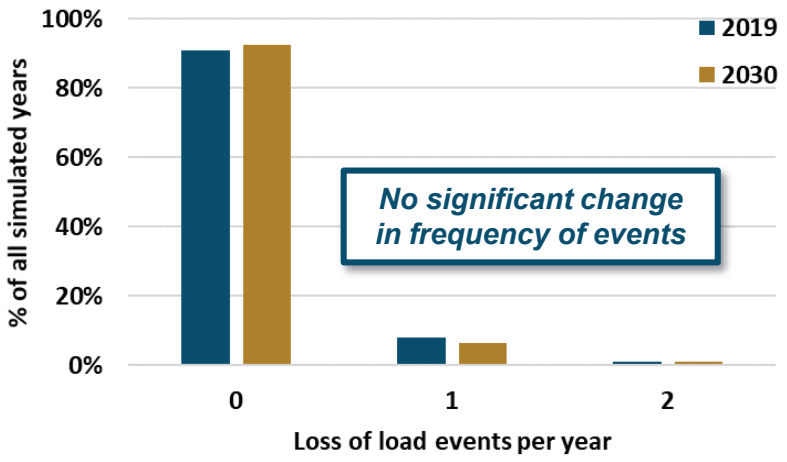
ELCC (% of DR capacity) / DR capacity (MW)	1 hour/call 1 call/year	1 hour/call 4 calls/year	4 hours/call 1 call/year	4 hours/call 4 calls/year	4 hours/call 20 calls/year	6 hours/call 10 calls/year	8 hours/call 4 calls/year	8 hours/call 20 calls/year
2,195	59%	73%	77%	100%	100%	100%	100%	100%
3,000	33%	42%	37%	96%	100%	100%	96%	100%
4,000	22%	34%	53%	77%	92%	92%	77%	92%
5,000	16%	31%	40%	62%	77%	78%	67%	78%
10,000	14%	26%	18%	35%	56%	56%	34%	66%
20,000	11%	18%	12%	18%	30%	25%	18%	34%

2030

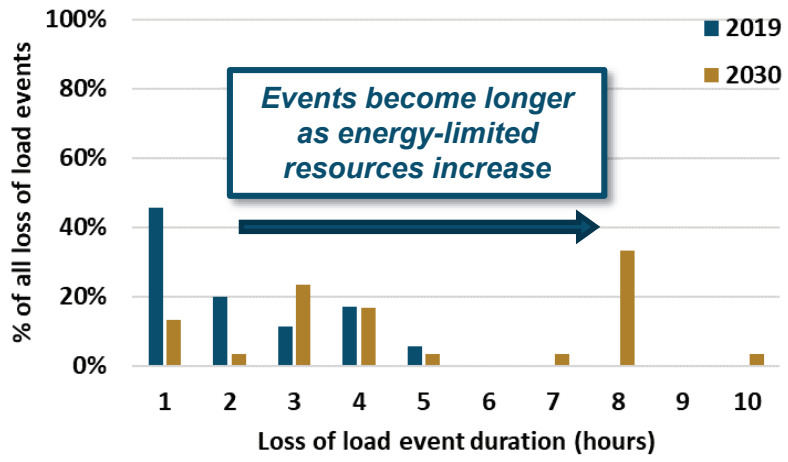
ELCC (% of DR capacity) / DR capacity (MW)	1 hour/call 1 call/year	1 hour/call 4 calls/year	4 hours/call 1 call/year	4 hours/call 4 calls/year	4 hours/call 20 calls/year	6 hours/call 10 calls/year	8 hours/call 4 calls/year	8 hours/call 20 calls/year
2,195	35%	37%	52%	69%	69%	77%	93%	93%
3,000	9%	16%	29%	50%	50%	51%	78%	78%
4,000	10%	12%	29%	48%	48%	47%	82%	82%
5,000	11%	13%	34%	42%	42%	38%	46%	55%
10,000	6%	13%	20%	28%	28%	33%	29%	30%
20,000	9%	11%	13%	15%	18%	16%	9%	8%

2019 vs 2030 Loss of Load Events

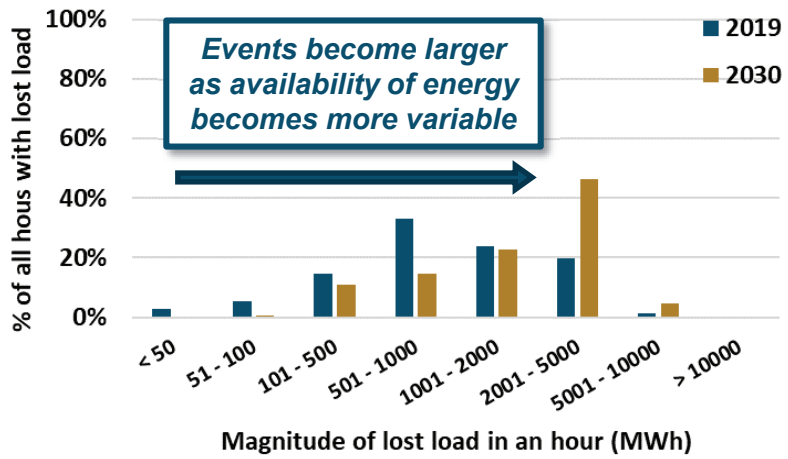
Frequency of Event Occurrence



Distribution of Event Duration



Distribution of Event Magnitude



Overview of Data

- **The 2019 PG&E and SCE DR ELCC results focus on "event-based" DR programs, as opposed to passive measures like dynamic pricing applicable throughout a season/year**
  - Does not consider SDG&E or Demand Response Auction Mechanism (DRAM) resources which are a significant portion of the data DR portfolio, due to data limitations
- **Data sources for RECAP ELCC calculations**
  1. Hourly PG&E DR bid data for 2019
     - BIP, CBP, and SAC
     - PSPS outage logs were provided by PG&E and used by E3 to identify and then fill gaps in DR bid data
  2. Hourly SCE DR bid data for 2019
     - API, BIP, CBP, and SDP

Data Benchmarking

+ E3 used utility data directly from PG&E and SCE for two reasons

- CAISO does not have data by utility program
- Wanted to ensure results were not predicated on CAISO data

+ E3 benchmarked utility data to CAISO data to ensure the veracity of the data

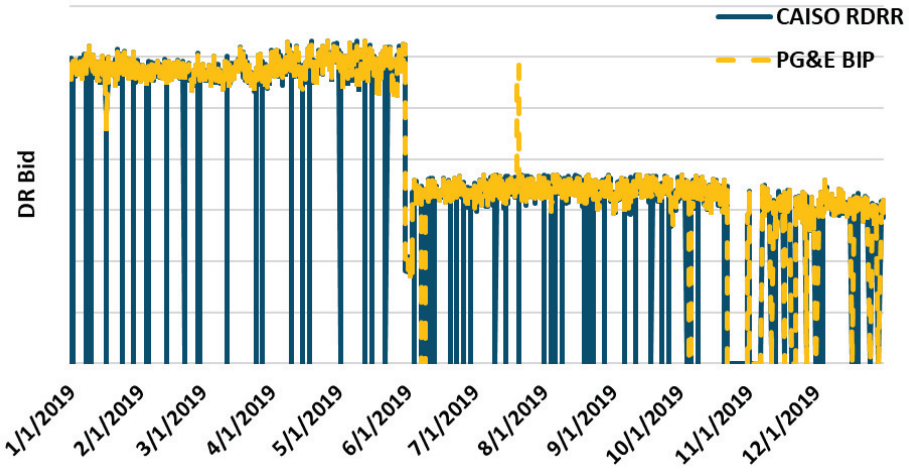
- Data generally benchmarked well
- A few inconsistencies were spotted in the RDRR data:
  - In ~1.3% of hours in the year, DR bids present in PG&E's data are missing in CAISO's data. Technical glitches in transmitting/recording systems may explain this.
  - DR bids in SCE data were slightly lower than bids recorded in CAISO data across significant portions of the year.

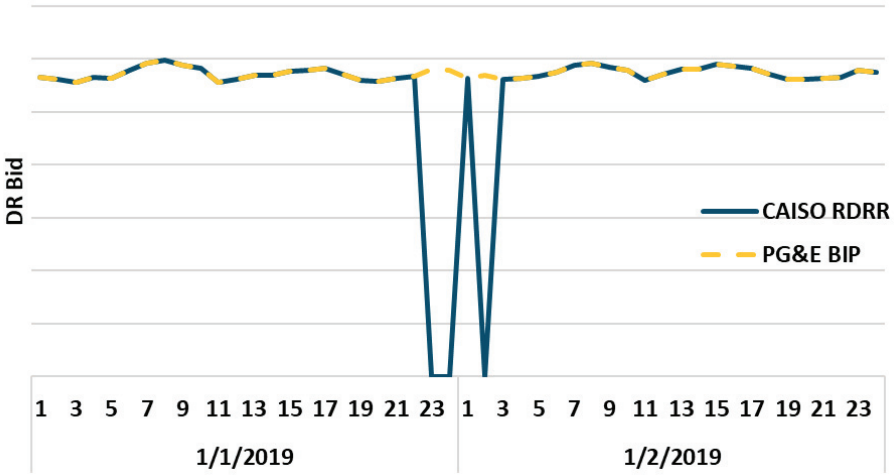
    Underlying reason is currently not known.

Benchmarking of 2019 Bid Data from PG&E and CAISO

- **PDR data from the two sources are identical**
- **There are a few hours (114 out of 8760) where RDRR data is inconsistent:**
  - Several instances across each of the 24 hours of the day
  - These are hours where data is missing in the CAISO dataset
  - Unclear if a bid was not placed, or if it was placed but not recorded due to technical glitches

Example comparison for one of the subLAPs over the entire year and a couple of days in specific

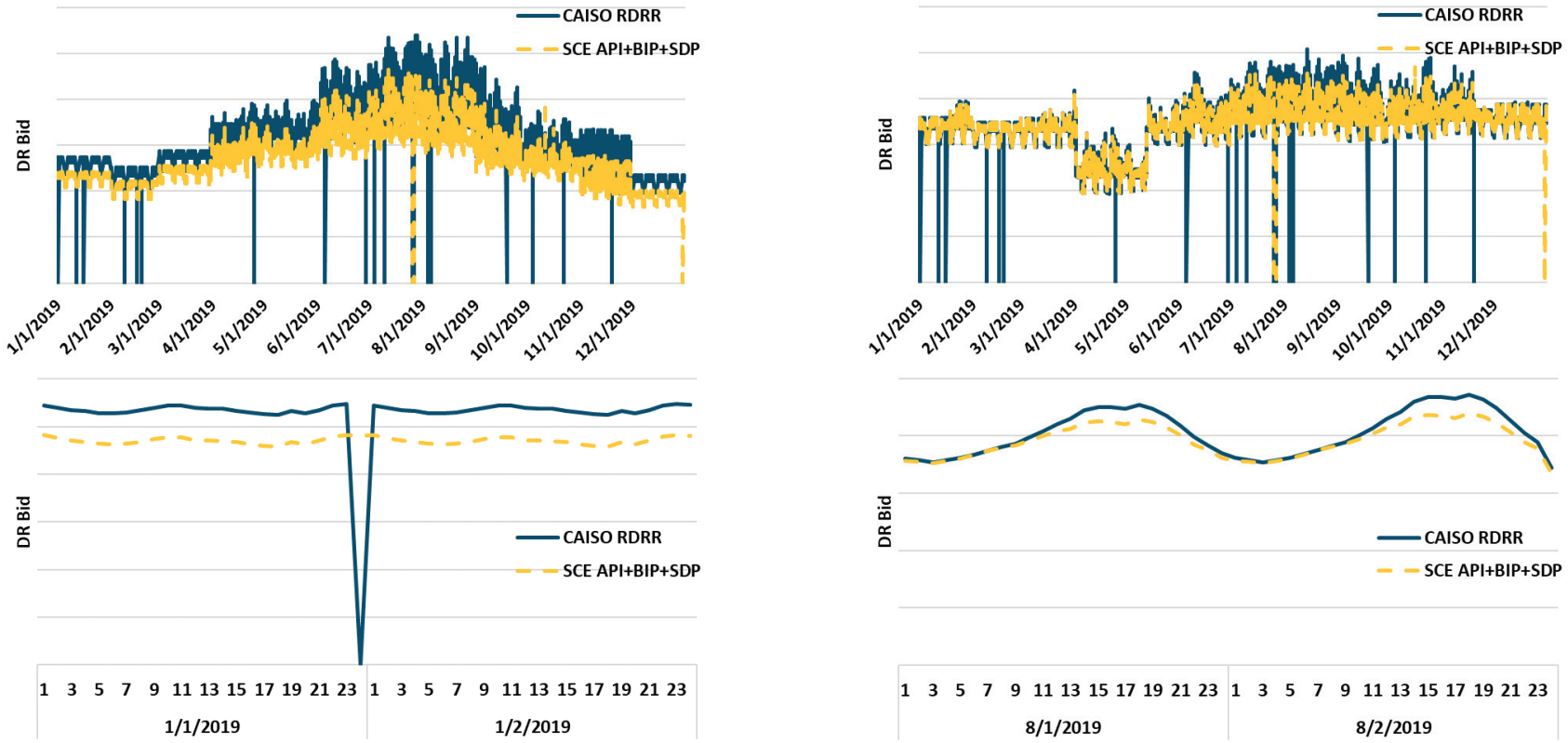




Benchmarking of 2019 Bid Data from SCE and CAISO data

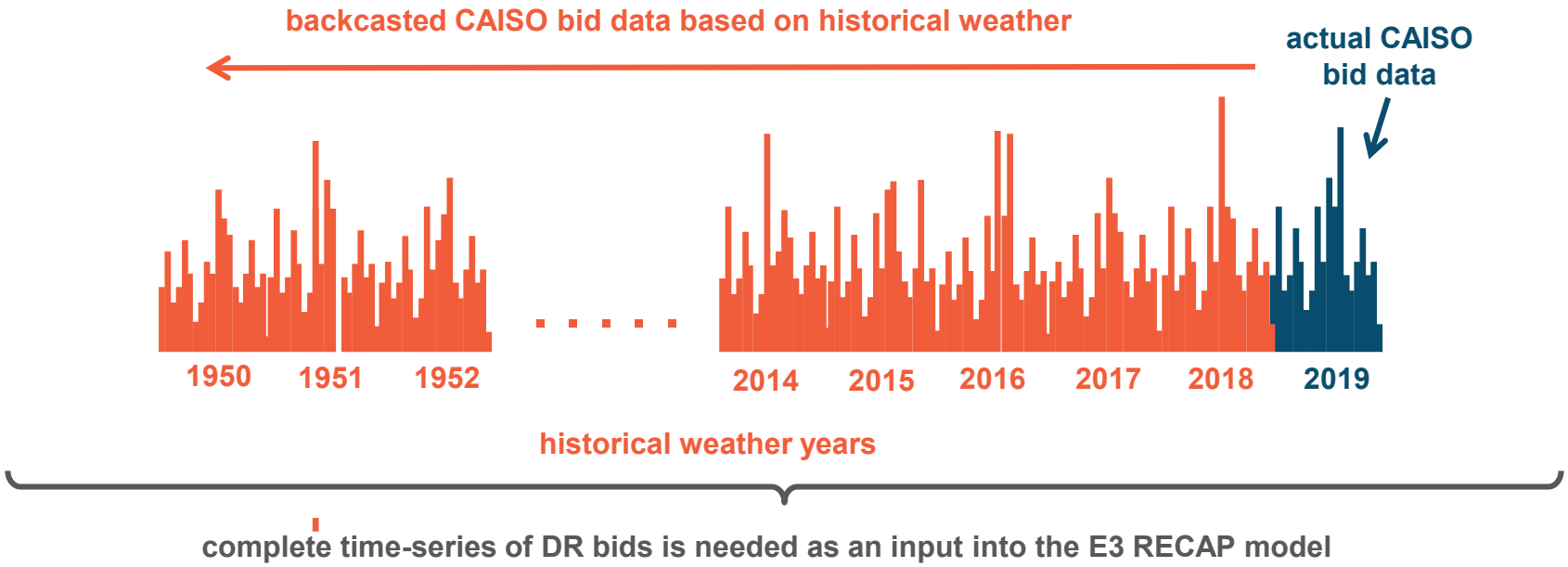
- PDR data from the two sources are identical
- Inconsistencies exist in RDRR data – unclear if the difference is systematic and attributable to a single factor, like treatment of line-losses

Example comparisons for 2 subLAPs- across the entire year and across a couple of days in specific



Extrapolation of DR Bid Data

- In order to calculate the ELCC of a DR program or portfolio, RECAP must predict how these programs will perform over many different conditions and weather years
- Therefore, E3 must extend actual 2019 data over the entire historical temperature record as a data requirement for the E3 RECAP model



- In response to stakeholder feedback from the May 3 CAISO ESDER meeting, E3 modified the backcasting approach to include temperature for temperature-dependent air conditioner DR programs
  - More details on this process and methodology can be found in the appendix

Process of Extrapolating Actual DR Bid Data to Entire Weather Record

Get daily max, min and average temperature data (1950-2019) from NOAA for every climate zone that DR program bids come from

↓

Use weather-informed day-matching to match every day from Jan 1, 1950 - Dec 31, 2018 to the "most similar" day from Jan 1, 2019 – Dec 31, 2019

↓

Use day-matching results to extrapolate hourly DR bids from just 2019 to 1950-2019

↓

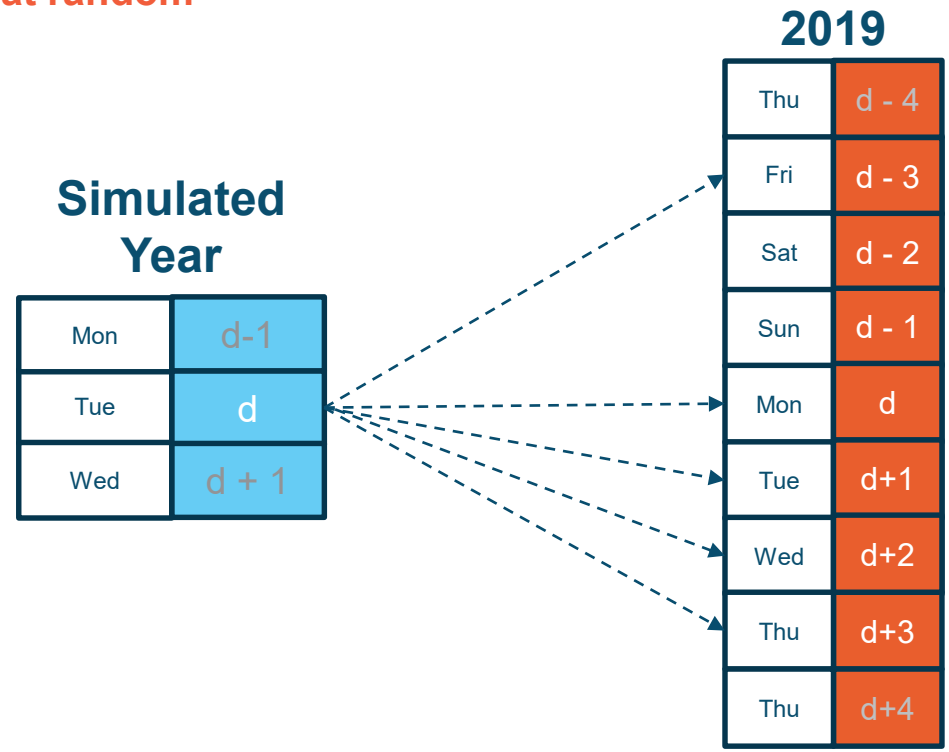
Aggregate extrapolated DR bids by program-LCA to allow for comparison with respective NQCs

↓

Each aggregated shape dictates the hourly availability of the corresponding DR program-LCA combination in RECAP

Simple Day-Matching Algorithm for CBP, BIP and API DR Programs

- As in the previous phase of this project, E3 used a simple day-matching approach for CBP, BIP and API programs
- DR bid forecasts for these programs were not as strong a function of the temperature as Smart AC
- For an individual DR program and a particular day, 'd' in a simulated year, pick one day out of +/- 3 calendar days, 'd+3' to 'd-3' of the same type (workday/holiday) from the actual 2019 data at random

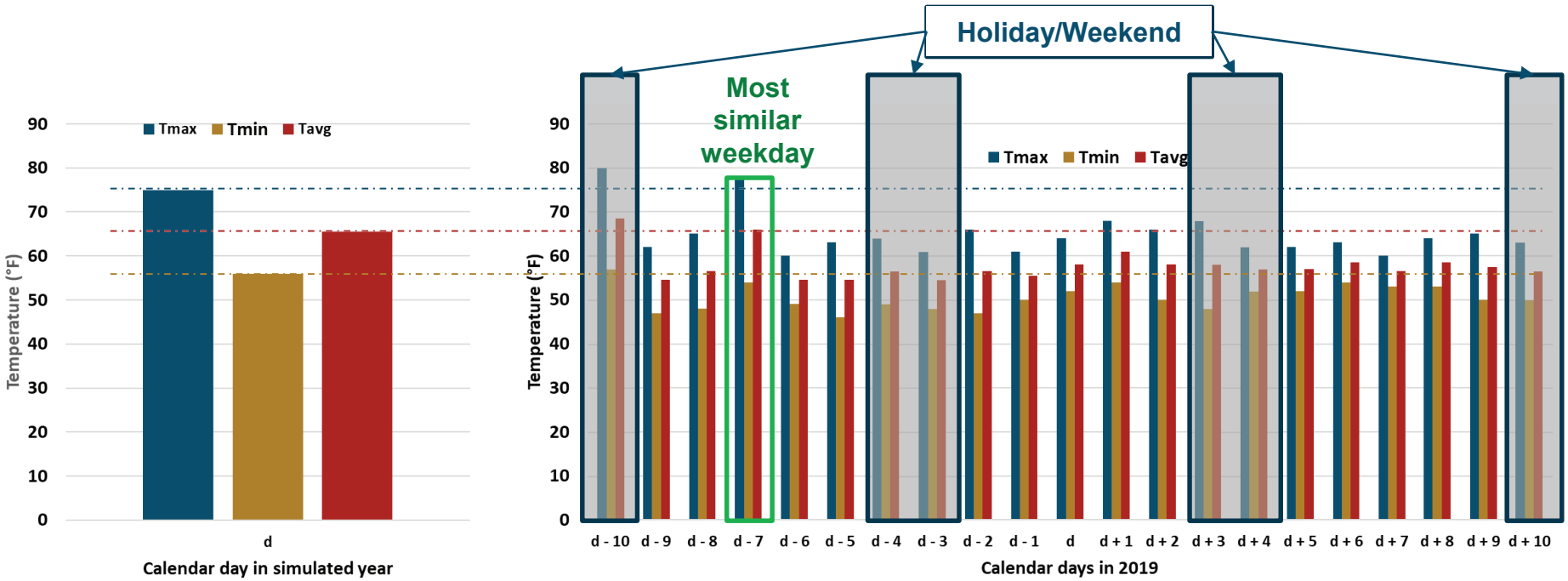


Weather-informed Day-Matching Algorithm for AC cycling DR Programs

- Inclusion of weather for air conditioner DR is in direct feedback to stakeholder comments from the May 3, 2020 CAISO ESDER meeting
- For an individual DR program and a particular day in a simulated year, pick one day out of +/- 10 calendar days of the same type (workday/holiday) from actual 2019 data with the closest T_{max}, T_{min} and T_{avg}
- Applied to PG&E's Smart AC program and SCE's Summer Discount Plan program data to account for influence of temperature on DR availability

Example weekday in simulated year

Candidate (2019) days for matching

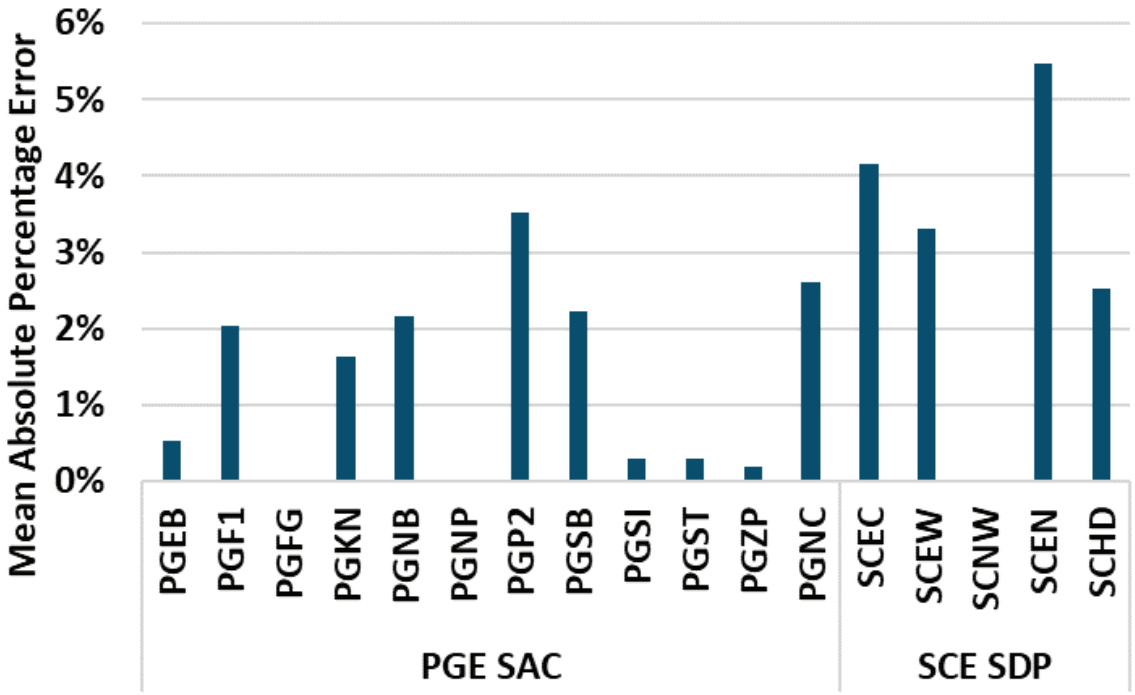


Comparison of day matched and real values

- The Mean Absolute Percentage Error (MAPE) is defined as:

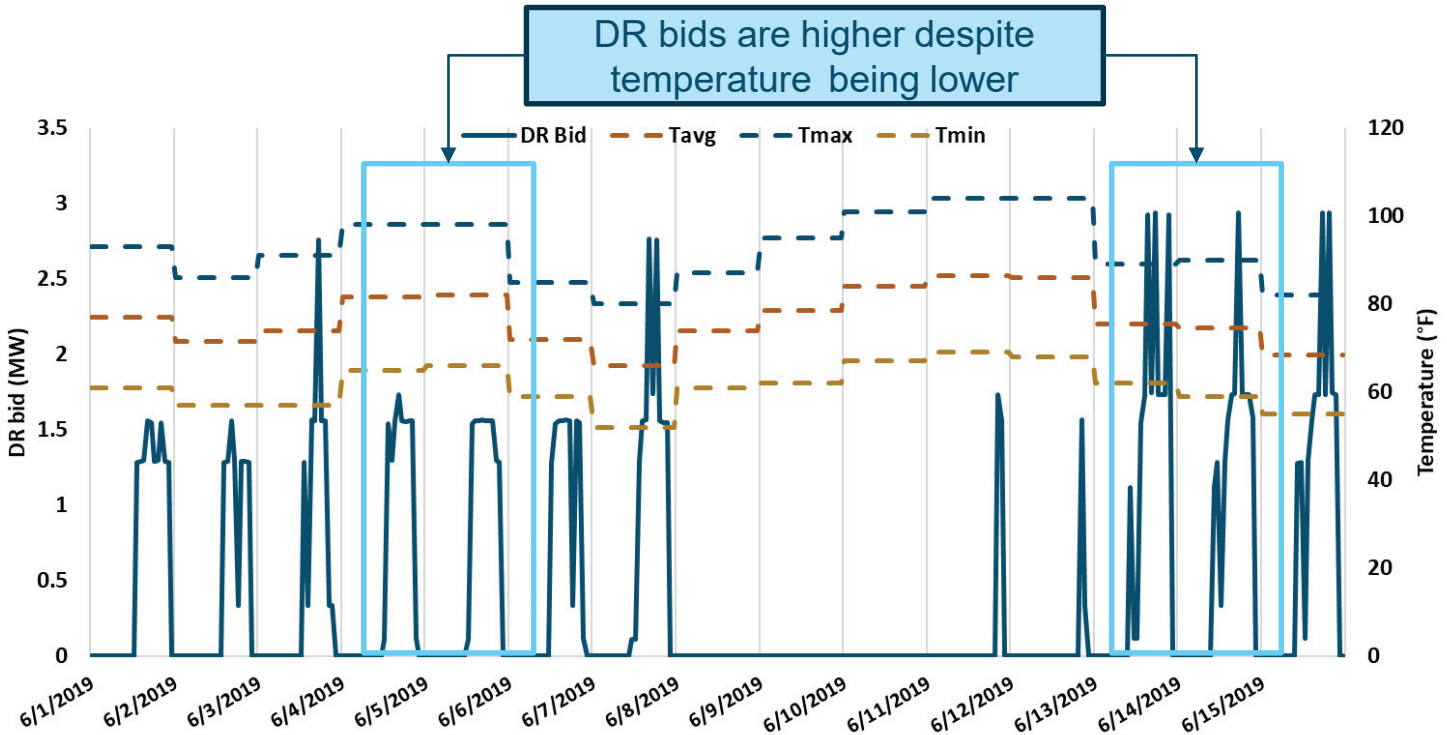
$$\frac{\text{Abs(Day–matched value – Actual Value) x 100}}{\text{Actual Value}}$$

- MAPE is calculated and shown below for July-September, 4 pm to 10 pm



Why Day Matching and not Regression?

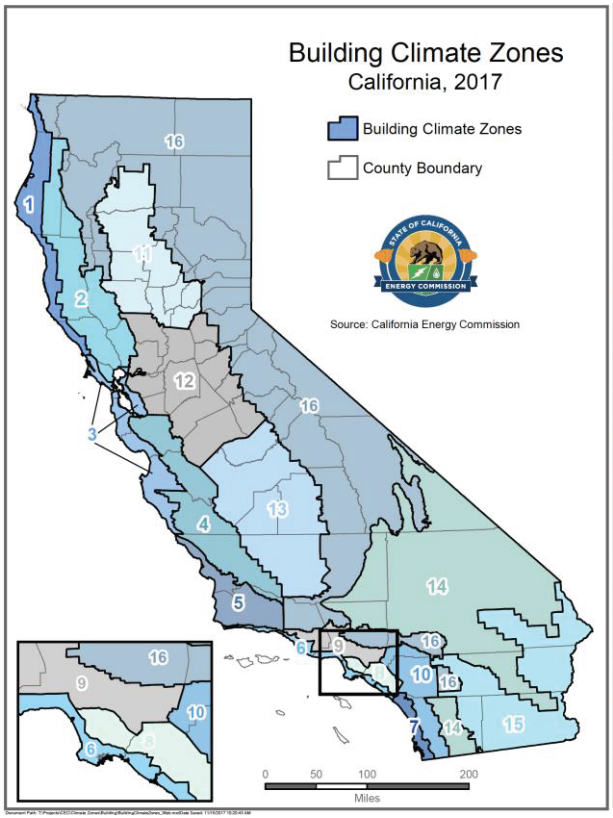
- **Regression based on temperature, month and day-type couldn't explain movement in DR bids. Potential reasons could be:**
  - Mismatch in temperature data used by E3 and IoUs.
  - Not accounting for other explanatory variables that IoUs use in their forecasts.
- **Absence of reliable hourly temperature records going back to 1950 meant only regression for daily DR bids was doable.**

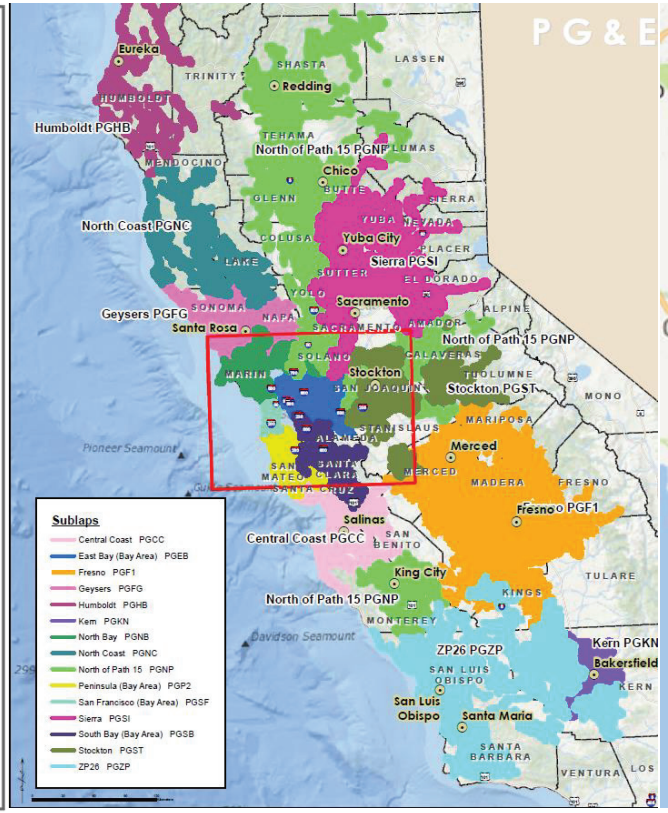


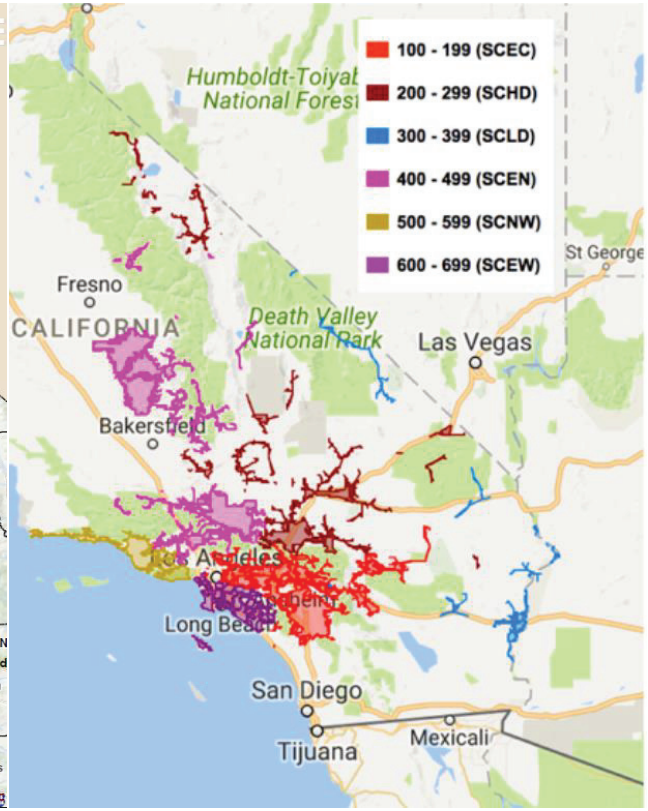
Assumptions on DR Program Characteristics

Utility	DR Program	Event Duration (hours/call)	Max. Events per Month	Max. Events per Year
PG&E	BIP	6	10	
	CBP	6	5	
	SAC	6		17
SCE	API	6		25
	BIP	6	10	
	CBP	6	5	
	SDP	6		30
	SEP	4		45
	LCR	4	20	
SDG&E	AC Saver	4		25
	CBP	4	6	
	BIP	4	10	

Climate zones and sub-LAPs for reference







Sub-LAPs vs. Local Capacity Areas

Sub-LAP	Sub-LAP (long form)	Local Capacity Area
PGCC	PG&E Central Coast	Bay Area
PGEB	PG&E East Bay	Bay Area
PGF1	PG&E Fresno	Greater Fresno
PGFG	PG&E Fulton-Geysers	North Coast/North Bay
PGHB	PG&E Humboldt	Humboldt
PGKN	PG&E Kern	Kern
PGNB	PG&E North Bay	North Coast/North Bay
PGNC	PG&E North Coast	North Coast/North Bay
PGNP	PG&E North of Path 15 - non local	CAISO System
PGP2	PG&E Peninsula	Bay Area
PGSB	PG&E South Bay	Bay Area
PGSF	PG&E San Francisco	Bay Area
PGSI	PG&E Sierra	Sierra
PGST	PG&E Stockton	Stockton
PGZP	PG&E ZP26 (between Path 15 and 26) -non local	CAISO System
SCEC	SCE Central	LA Basin
SCEN	SCE North (Big Creek)	Big Creek/Ventura
SCEW	SCE West	LA Basin
SCHD	SCE High Desert	CAISO System
SCLD	SCE Low Desert	CAISO System
SCNW	SCE North-West (Ventura)	Big Creek/Ventura
SDG1	SDG&E	San Diego/Imperial Valley
VEA	VEA	CAISO System

ATTACHMENT B

Refreshed ELCC Study Results Table by Program and by IOU by Month –
Megawatt Values and Percentages

Attachment B: Refreshed ELCC Study Results Table by Program and by IOU by Month – Megawatt Values and Percentages
Link: http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=2D59FEB8-0CE6-4914-8080-4AE0C7C1E309

Attachment B
Source: E3

Disclaimer: NQC numbers used are based on April 2019 LIP filing.
Alternative baselines are discussed in Attachment A page 48.

IOU	Program	Local Capacity Area (LCA)	ELCC, First-in 2020 (MW)	2020 NQC June (MW)	2020 NQC July (MW)	2020 NQC August (MW)	2020 NQC September (MW)	ELCC as % of NQC June 2020	ELCC as % of NQC July 2020	ELCC as % of NQC August 2020	ELCC as % of NQC September 2020	E3 Notes
All IOUs	All programs	All LCAs	1035.85	1249.42	1255.94	1306.25	1247.82	83%	82%	79%	83%	The Aggregate ELCC for all IOUs could be slightly different than sum of each IOU's ELCC. This is owing to interaction between the different IOUs' programs being captured in the former but not the latter
PG&E	All programs	All LCAs	273.39	348.84	342.43	335.40	317.91	78%	80%	82%	86%	The Aggregate ELCC could be slightly different than sum of each program's ELCC. This is owing to interaction between programs being captured in the aggregate number but not the program specific number
	BIP	All LCAs	200.80	265.98	257.10	253.30	241.80	75%	78%	79%	83%	
	CBP	Bay Area	9.03	10.00	10.00	10.00	10.00	90%	90%	90%	90%	
		CAISO System	9.81	3.00	3.00	3.00	3.00	327%	327%	327%	327%	
		Greater Fresno	9.83	9.00	9.00	9.00	9.00	109%	109%	109%	109%	
		Humboldt	1.10	0.00	0.00	0.00	0.00	0%	0%	0%	0%	NQC not disclosed to E3 due to small number of participants
		Kern	5.53	3.00	3.00	3.00	3.00	184%	184%	184%	184%	
		North Coast	4.62	1.00	1.00	1.00	1.00	462%	462%	462%	462%	
		Sierra	1.98	5.00	5.00	5.00	5.00	40%	40%	40%	40%	
		Stockton	1.39	0.00	0.00	0.00	0.00	0%	0%	0%	0%	NQC not disclosed to E3 due to small number of participants
	SAC	Bay Area	7.47	16.00	17.00	16.00	15.00	47%	44%	47%	50%	
		CAISO System	5.62	10.00	11.00	10.00	9.00	56%	51%	56%	62%	
		Greater Fresno	3.34	10.00	10.00	9.00	8.00	33%	33%	37%	42%	
		Kern	2.54	0.00	0.00	0.00	0.00	0%	0%	0%	0%	NQC not disclosed to E3 due to small number of participants
		North Coast	0.46	2.00	2.00	2.00	1.00	23%	23%	23%	46%	
		Sierra	6.16	9.00	9.00	9.00	7.00	68%	68%	68%	88%	
		Stockton	3.19	5.00	5.00	5.00	4.00	64%	64%	64%	80%	
SCE	All programs	All LCAs	754.52	892.10	901.65	957.11	914.83	85%	84%	79%	83%	The Aggregate ELCC could be slightly different than sum of each program's ELCC. This is owing to interaction between programs being captured in the aggregate number but not the program specific number
	API	Big Creek	29.52	30.07	28.87	29.57	19.29	98%	102%	100%	153%	
		CAISO System	2.10	2.61	2.66	2.62	2.45	80%	79%	80%	85%	
		LA Basin	3.82	5.22	6.03	6.44	6.03	73%	63%	59%	63%	
	BIP	Big Creek	44.86	71.12	68.63	68.87	74.42	63%	65%	65%	60%	
		CAISO System	118.71	101.88	94.16	91.75	97.34	117%	126%	129%	122%	
		LA Basin	329.20	438.99	421.92	441.58	431.19	75%	78%	75%	76%	
	CBP	Big Creek	0.39	Redacted	Redacted	Redacted	Redacted	15%	15%	15%	15%	
		CAISO System	0.20	Redacted	Redacted	Redacted	Redacted	30%	30%	30%	30%	
		LA Basin	4.57	Redacted	Redacted	Redacted	Redacted	54%	54%	54%	54%	
	SDP	Big Creek	12.95	18.66	24.40	26.12	18.60	69%	55%	51%	72%	
		CAISO System	9.24	8.37	11.83	11.64	8.96	110%	71%	72%	93%	
		LA Basin	106.20	90.68	117.21	143.11	121.13	117%	91%	74%	88%	
	SEP	Big Creek	2.95	5.97	6.47	7.84	6.28	49%	46%	38%	47%	
		CAISO System	0.56	0.94	1.01	1.01	0.86	60%	56%	56%	65%	
		LA Basin	15.01	29.68	31.85	39.97	36.68	51%	47%	38%	41%	
	LCR	LA Basin	63.82	75.00	75.00	75.00	80.00	85%	85%	85%	80%	
SDGE	All programs	SDGE	7.46	8.472	11.858	13.737	15.088	88%	63%	54%	49%	The Aggregate ELCC could be slightly different than sum of each program's ELCC. This is owing to interaction between programs being captured in the aggregate number but not the program specific number
	AC Saver DA	SDGE	2.58	3.93	4.67	5.25	5.58	66%	55%	49%	46%	
	AC Saver DO	SDGE	1.90	0.60	3.25	4.56	5.49	314%	58%	42%	35%	
	BIP	SDGE	0.68	1.01	1.01	1.01	1.10	67%	67%	67%	62%	
	CBP DA	SDGE	0.40	0.19	0.19	0.19	0.19	215%	215%	215%	215%	
	CBP DO	SDGE	2.15	2.74	2.74	2.74	2.74	78%	78%	78%	78%	

ATTACHMENT C

Summary of Key Differences Between the proposed ELCC method and LIP Inputs and Calculations

Attachment C: Key Differences Between ELCC and LIP Inputs and Calculations for the ELCC Refresh Study and the 2020 Resource Adequacy Program

	ELCC	LIP
	Inputs	
1	2020 bid data from IOU demand response (DR) resources to develop the 2020 ELCC values	Program Year 2018 meter data and DR program enrollment status from enrolled and un-enrolled DR program customers for entire program year. Used as inputs into the April 1st 2019 ex-ante assessment to develop the 2020 LIP values
2	Data is from each resource bid into the market and therefore has program- and local capacity area (LCA)-level granularity	Data can be broken down to program- and LCA-level granularity. Also broken down to sub-lap-level for certain supply-side DR programs
3	Analyzed over 68 weather years	Static assessment for system peaking conditions under 1-in-2 weather year at utility and CAISO system levels (only 1-in-2 weather year is used for the resource adequacy program but DR is also evaluated under 1-in-10 conditions)
4	CAISO system resource portfolios in 2020 and 2030 based on the Integrated Resource Plan (IRP) portfolio for the 2021-2022 Transmission Planning Process	DR enrollment projections; weather data and historical performance; other (program-dependent regression variables, such as month, weekday, or weekend)
	Calculations	
5	Assesses contribution to reliability (impact on loss of load expectation or LOLE) across all 8760 hours of the year	Assesses load impacts from hours 1-24 for all event days for ex-post. Determines qualifying capacity (QC) from load impacts across resource adequacy assessment hours for typical event day or monthly peak day for all months under utility 1-in-2 weather scenario in ex-ante. Forecasts under utility 1-in-10 and CAISO 1-in-2 and CAISO 1-in-10 weather scenarios are also evaluated under ex-ante methodologies.

	ELCC	LIP
6	Uses LOLE analysis (all analyses conducted using E3's RECAP model)	Multiple consultants use statistical analyses to compare sample groups with control groups or develop individual regressions
7	Probabilistic model simulating 680 weather demand scenarios (10 simulations per weather year)	Regression model with 1-in-2 and 1-in-10 monthly peak weather demand scenarios (although only point estimates are used for resource adequacy planning)
8	Analysis at any level of DR aggregation (across DR technology types)	Analysis at program level or DR portfolio level (portfolio level analysis submitted in resource adequacy program)
9	Single, uniform model applicable to all resource types	Unique model per resource type with explanatory variables specifically applicable to the resource
10	Assesses and incorporates interactive effects with other programs and other energy-limited resources	Assesses each program independently, considers interactive effects with other programs; does not consider interactive effects with other energy-limited resources
11	Uses bids as a proxy for actual performance (although also capable of taking actual performance as input), can scale for enrollment change	Ex-post evaluation assesses actual event performance; ex-ante evaluation considers change in future customer responsiveness and expected change in enrollment and enrollment mix and models for 1-in-2 and 1-in-10 peak weather for each month
12	Output is MW contribution to system portfolio without decrease in reliability (equivalent MW of 'perfect capacity')	Output is extrapolated (ex-ante) load impacts using ex-post impact per customer, enrollment projections, and represents 1-in-2 and 1-in-10 peak conditions for each month

	ELCC	LIP

13	• Ex-post value for entire year
	  o *2020 ELCC can be converted to 2022 ex-ante through comparison with LIP-informed NQC*
	• Unique MW value per program per LCA per year;
	  o or aggregate MW value per IOU per year;
	  o or aggregate system-wide MW value per year
		• Ex-post values (for days and hours DR resources were called) and ex-ante values
		• Ex-ante values are hourly impacts for each monthly system peak day or typical event day for utility 1-in-2 and 1-in-10, as well as CAISO 1-in-2 and 1-in-10, peak conditions
		Unique MW value per program per LCA per month. Also provided at sub-lap level for certain demand response programs

14	Bid data from months with highest system risk (August through September) will be most impactful on the result	Output is hourly impacts of each monthly system peak day (resource adequacy program averages the hourly impacts over 4-9 pm with equal weights)

ATTACHMENT D

Workshop Report Summarizing Parties' Comments and Attaching Party Comments

Attachment D consists of:

I. Workshop Summary
II. Summary of Party Comments
III. Party Comments

I. Workshop Summary

The CAISO and E3 presented the refreshed ELCC study at a workshop on June 24. The content of the presentation is summarized in Attachment A and the workshop recording is available on the CAISO website.[1] For reference to slide numbers, see the consolidated presentation used for the June 24 workshop on the CAISO website.[2] Stakeholders were given the opportunity to provide comments and ask questions during the workshop. The CAISO provides a summary of those comments and questions, along with any pertinent responses below.

- **Paul (CLECA)** provided the follow questions and comments:
    - Were the initial results posted on the CAISO website for review?
    - Is the presentation considered the documentation outlined in [requirement 2 of the filing]?
        - **Response:** Yes.
    - Where in the presentation is [requirement 3 of the filing]?
        - **Response:** It will be an additional attachment.
    - Slide 6 says the week of June 14 initial results were reviewed and feedback provided. I did not see an announcement on initial results being posted.
    - Slide 15: How much perfect capacity was added or removed in the calibration?
    - So is the presentation today, the initial results [,] or [the] final results?
        - **Response**: Final results.
    - How are bids determined?
        - **Response**: That's determined by the IOUs, all CAISO sees is the bids. We assume that the bids are the capability of the resource.
    - Is there guidance in the CAISO tariff of what the Pmax is for DR?
        - **Response**: It's what the utility submits.

[1] https://youtu.be/gwTrLBxj5t8'
[2] http://www.caiso.com/Documents/Presentation-ELCCStudyResults-DemandResponseResources-Jun24-2021.pdf

  - If a program [wants] to maximize their ELCC value, what information is provided to them to change their design? If they get that information and change behavior is there any guarantee their ELCC would change? [Requested that source data behind LOLP heat map be made public.]
    - **Response**: At a high level, the best way to increase ELCC is to bid higher, particularly is high LOLP hours. [E3 transmitted the requested data to CAISO and it was posted to the CAISO website.[3]]
  - Some of the ELCC reduction could be caused by a decrease in load due to enrollment changes.
- **Josh Bode (Demand Side Analytics)** provided the follow questions and comments:
  - Slide 19: Solar and wind are effectively [intermittent] base resources. Does it make any sense to include them in the [first-in and last-in] analysis? [Shouldn't] the [first-in and last-in] approach be applied just to battery storage and DR?
  - Slide 26: Clarifying question: Are the dots showing the average for the whole month? Or for the more extreme days when resources where needed? [E.g.] 1-in-2 or 1-in-10 conditions?
  - If there is a shift to the ELCC, would the [de-rates] for duration, availability, etc. in the E3/CPUC DR cost-effectiveness tool go away?
  - Not a question. But the bids factor in uncertainty in the ability to deliver the reduction. They are conservative. Folks are [de-rating] the capability for risk.
- **Luke Tougas (CEDMC)** provided the follow questions and comments:
  - Regarding the statement by E3 that ELCC is becoming an industry-standard practice (PJM, MISO, etc.); does this apply to intermittent resources only or DR as well?
  - [In response to a statement by E3 that ELCC is becoming an industry-standard practice:] The transition remains to be seen.
  - DR is a preferred resource, shouldn't be treated as last to the party.
- **Chris Devon (CES)** provided the follow questions and comments:
  - Slide 26: Are the NQC levels for DR [showing] the Supply Showing levels of

[3] http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=2D59FEB8-0CE6-4914-8080-4AE0C7C1E309

NQC or are they the total NQC?

- **Response**: These are credited NQC numbers determined once annually.

- **Leslie Willoughby (SDGE)** provided the follow questions and comments:
  - Is there any analysis of what DR was [received]? If more DR was provided than what was bid, [is] that recognized?
    - **Response**: No
  - Do you feel that there are also potential discrepancies using the 1 in 2 peak weather condition RA values for a 1 in 10 LOLE?
    - **Response**: Values are based on weather that actually occurred. Yes, it would be more accurate to include synthetic bids, but 2020 was a good stress-test year given its extreme weather.
  - I [feel] it is not reasonable to measure the daily bids to a 1 in 2 peak condition
  - RA is established for a 1 in 2 peak condition - as established by the CPUC. Daily bids are not going to equal a 1in 2 peak condition
- **Naor Deleanu (Olivine, Inc.)** provided the follow questions and comments:
  - How does the ELCC compare to what the LIP value would have been using actual rather than forecasted enrollment numbers?
    - **Response**: The discrepancy is not driven by enrollment forecasting issues
- **Gil Wong (PG&E)** provided the follow questions and comments:
  - Can you discuss how the ELCC results should be applied to LIP for RA 2022? Does E3/CAISO propose applying the [de-rate] factors to the 2022 ex-ante impacts, which already account for the 2020 underperformance relative to the NQC?
- **Alan Wong (SCE)** provided the follow questions and comments:
  - Could also be that there is less available load later in evening
- **Stefanie Wayland (Grounded Analytics)** provided the follow questions and comments:
  - How have you valued DR in the face of climate change? Do the models include a range of best estimates of temperature and conditions (drought, etc.) in the future?
  - Can you provide references to how ELCC is calculated? This would include data required and models.

II. Summary of Party Comments

The following is a summary of party comments submitted on June 28, 2021. Full comments are provided in below.

SCE, SDG&E, and CalCCA raise issue with ELCC values being assessed across all hours and days of the year given that some programs aren't available on weekends or outside of the availability hours defined by the resource adequacy program.[4] The parties recommend that ELCC results be revised to ensure that the values are not impacted by bid data during these days and hours.

Parties also comment on outdated enrollment numbers between LIP filings and month-ahead demand response (DR) reports and state that this issue should be examined.[5] For the 2022 resource adequacy compliance year, SCE recommends using the 2020 Interruptible Load Program and DR Report Ex-ante values to determine ELCC de-rates instead of the credited 2020 NQC values, and contrasts the resulting de-rates.[6] CalCCA adds that it is appropriate to compare ELCC to NQC values nets of adders but that the Commission should apply the adders retained in D.21-06-029 to the ELCC informed capacity values.[7]

PG&E raises concerns that the ELCC results by program are noisy and recommends further analysis.[8] PG&E and CLECA also raise concerns that an ELCC informed de-rate will double penalize underperformance given that LIP ex-ante load impacts already consider historical performance.[9] CLECA adds that the ELCC study does not adequately consider enrollment changes, particularly given the irregularities of 2020.[10] SDG&E and CLECA also

[4] SCE's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 3; SDG&E's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2; CalCCA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2.
[5] SCE's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2; CLECA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 6 footnote; CalCCA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2.
[6] SCE's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 1.
[7] CalCCA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 1.
[8] PG&E's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2.
[9] PG&E's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2; CLECA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 7.
[10] CLECA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 3.

raise concerns that the value of demand response is already being reduced by the removing of the 6% operating reserves component of the planning reserve margin (PRM) adder.[11] PG&E and CLECA recommend applying a 5% de-rate for 2022, citing the heat map on page 58 of Attachment A.[12]

CLECA and CECMC contend that CAISO did not meet the requirements of the Assigned Commissioner's Ruling that there be 10 days' notice of comments[13] and that a summary of key differences between LIP and ELCC be provided.[14] The parties also raise concerns that there was insufficient documentation and information given on the proposed use of the study, ELCC methodology, and validation of LOLE results.[15]

SDG&E raises concerns that ELCC is an incompatible comparison to the credited resource adequacy values given that the resource adequacy value is based on a 1 in 2 weather forecast for peak monthly conditions and would therefore correspond to one bid per month of this value, whereas ELCC considers all bids over the year.[16] SDG&E also raises concerns with the ELCC model and stakeholder process, namely that: 1) the ELCC model is not public and transparent, 2) First-in and Last-in tables are not updated in the refreshed study, 3) E3 did not update the results as requested by SDG&E, 4) the CAISO-led workshop was controlled and not transparent, and 5) the ELCC refresh with 2020 data was rushed.[17] SDG&E recommends that LIP ex-ante values be used for 2022 resource adequacy and that demand response be excluded from RAAIM for 2022.[18]

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[11] CLECA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 4; SDG&E's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2.
[12] PG&E's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2; CLECA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 8.
[13] CEDMC's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2.
[14] CLECA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 5.
[15] CLECA's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, pp. 3-6; CECMC's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2.
[16] SDG&E's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 2.
[17] SDG&E's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 4.
[18] SDG&E's Comments on Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, page 5.

III. Party Comments

Party comments can be accessed on the CAISO website.

Link: http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=19CB4F49-2CB5-47A8-B646-912C3FE8E448

1. CalCCA's Comments
2. CEDMC's Comments
3. CLECA's Comments
4. PG&E's Comments
5. SCE's Comments
6. SDG&E's Comments
7. CAISO's Comments

California ISO

Stakeholder Comments Template

Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources

This template has been created for submission of stakeholder comments on the updated ELCC study results for DR resources, which was published on June 18, 2021 The Stakeholder meeting presentation and other information related to the discussion, may be found on the initiative webpage at: http://www.caiso.com/informed/Pages/MeetingsEvents/MiscellaneousStakeholderMeetings/Default.aspx.

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on **June 28, 2021.**

Submitted by	Organization	Date Submitted
Lauren Carr lauren@cal-cca.org	*CALIFORNIA COMMUNITY CHOICE ASSOCIATION (CalCCA)*	*6/28/21*

Please provide your organization's comments on the following issues and questions.

1. ELCC Updated Study Results

Please provide your organization's feedback on the updated ELCC study results for DR resources.

CalCCA appreciates the opportunity to review and submit comments on the ELCC study results presented at the June 24 working group. These results compare investor-owned utility (IOU) demand response ELCC values derived from 2020 bids to their 2020 Net Qualifying Capacity Values (NQC) net of the PRM and T&D adders. This is an appropriate comparison, given CalCCA's understanding that neither the Planning Reserve Margin (PRM) nor the transmission and distribution (T&D) line loss adders are reflected in the values bid into the market and used as the demand response profiles input into the ELCC model.[1] However, if ELCC values are adopted by the California Public Utilities Commission (the Commission) for the 2022 resource adequacy year, the Commission should apply the forced outage and load forecast portions of the PRM adder and the T&D adder retained in D.21-06-029 to the capacity value.

[1] ESDER 4 Final Proposal at 40.

CalCCA cautions the CAISO and the Commission against over penalizing demand response's capacity value for use-limitations given the current Maximum Cumulative Capacity (MCC) bucket structure. The MCC buckets currently cap an load-serving entity's (LSE) portion of their resource adequacy (RA) portfolio that can be met by demand response at 8.3 percent. The purpose of the MCC buckets is to ensure LSEs do not over-rely on use-limited resources. Resources available for fewer hours are capped and this cap has historically been based on the load duration curve to ensure that the amount of use-limited resources being relied upon does not create a circumstance in which lower loads that occur over more hours cannot be met. The percentage cap for DR is set based on the load duration curve and expected DR availability.

Given the MCC buckets already limit the amount of DR in an LSE's RA portfolio, it is important to ensure that the ELCC study does not discount DR due to a loss of load event that is beyond the maximum dispatch and hour limit of the program, as doing so could result in double penalizing demand response. While CAISO is concerned about the saturation effects of demand response and similarly situated use-limited resources[2], the MCC buckets will likely limit significant saturation effects in the near term. Given the MCC buckets already limit the amount of DR in an LSE's RA portfolio, the CAISO and the Commission must ensure DR is not derated for use-limitations that are already accounted for in the MCC bucket cap. Reducing DR's ELCC value due to loss of load events occurring when DR is not required to available could result in double penalizing demand response, first by limiting the amount of DR they can sell and second by reducing their capacity value by evaluating its availability during times it was not required to be available. If ELCC values are adopted for demand response, the CAISO and the Commission must ensure the interactions between the MCC buckets and the ELCC do not innapropriately limit the value DR programs can provide.

Additional comments

Please offer any additional feedback your organization would like to provide on the updated study results and meeting discussion.

This excersize illuminated a shortcoming of the existing process of establishing the capacity value of DR that should be remedied regardless of the capacity valuation methodology ultimately adopted. Currently, capacity values for demand response are established the year prior to the RA compliance year based on performance two years prior to the RA compliance year and enrollment forecasts. If actulal enrollment during the month differs from the forecast, it appears the credit DR receives is not adjusted to reflect this difference. This creates two potential challenges. If the enrollment forecast is too high, it could create a reliability issue in which the RA program assumes more DR is available than actually exists. Alternatively, if the enrollment forecast is too low, the additional benefit from more demand response is not fully accounted for in the RA program. The CAISO and the Commission should develop a process to allow the capacity value to be adjusted upward or downward to reflect actual monthly enrollment.

[2] Resource Adequacy Availability Assessment Mechanism (RAAIM) Exemption Option Final Proposal at 2.

California ISO

Stakeholder Comments Template

Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources

This template has been created for submission of stakeholder comments on the updated ELCC study results for DR resources, which was published on June 18, 2021 The Stakeholder meeting presentation and other information related to the discussion, may be found on the initiative webpage at: http://www.caiso.com/informed/Pages/MeetingsEvents/MiscellaneousStakeholderMeetings/Default.aspx.

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on **June 28, 2021.**

Submitted by	Organization	Date Submitted
Luke Tougas *510.326.1931*	*California Efficiency + Demand Management Council*	*June 28, 2021*

Please provide your organization's comments on the following issues and questions.

The California Efficiency + Demand Management Council (Council) appreciates this opportunity to provide these brief comments on the June 24, 2021 Effective Load Carrying Capability (ELCC) Study Results and Working Group. This working group was convened following the California Public Utilities Commission's (Commission) June 3 Assigned Commissioner's Ruling (June 3 ACR) in Rulemaking (R.) 19-11-009 that directed a workshop to review the CAISO's updated Effective Load Carrying Capability (ELCC) analysis. The CAISO and IOUs would then submit the following to the Commission by July 1 in order for the Commission to consider reflecting the updated study results in the IOUs' demand response (DR) Net Qualifying Capacity (NQC) values:

- Refreshed study results based upon 2020 bid data from Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), as well as from San Diego Gas & Electric Company (SDG&E);
- Thorough documentation of study methodology and assumptions, and explanation of how data from Load Impact Protocol (LIP) filings, if any, were utilized in or informed the study, as well as updated runs of the study (as needed);

- A summary of the key differences between LIP inputs and calculations versus the proposed ELCC method; and
- A workshop report that summarizes parties' comments on the study methodology and results, and attaches parties' comments. CAISO and/or an IOU shall provide parties (via the service list in this proceeding): (1) a minimum 7 days' notice of any workshop, and (2) a minimum of 10 days' notice to provide written comments to CAISO and the IOUs on the study results.

1. ELCC Updated Study Results

A. The CAISO did not comply with the process specified in the June 3 ACR.

The CAISO has not complied with the timeline that was specified in the June 3 ACR which specifically states that parties shall be provided a minimum of 10 days' notice to provide written comments on the updated ELCC study results.[1] The CAISO held its workshop on June 24 but required stakeholder comments by June 28. This allowed for only four days to develop comments (half of which fell on a weekend) rather than the ten days specified in the June 3 ACR. It appears that the CAISO may have interpreted this ten-day window to begin once the workshop slides were distributed among stakeholder on June 17. If so, this is an incorrect assumption not supported by the June 3 ACR because it has always been both Commission and CAISO practice to "start the clock" on comments only after a workshop or stakeholder meeting. Furthermore, the workshop slides, which bear noting were subsequently revised the day prior to the workshop, are so vague as to have little meaning absent the critical context that could only have been provided by a presentation of the slides by the E3 consultants who performed the updated study. Consistent with the directions in the June 3 ACR, the CAISO should have provided parties with ten days <u>following</u> the workshop to develop comments on the updated analysis. Based on the June 24 workshop date, parties should have been given until July 5 to comment; therefore, they were deprived of seven days to inform the Commission with their feedback.[2]

B. It is unclear exactly what the CAISO proposes in its updated analysis.

Even with the benefit of E3's June 24 presentation, it is still unclear exactly how the CAISO proposes its ELCC methodology be applied and how it would impact IOU DR NQC values. For instance, at the workshop, E3 discussed the pros and cons of treating DR as a "first-in" or "last-in" resource in the ELCC analysis, provided some vague assumptions about how DR is assumed to dispatch in 2030, and provided no recommended approach on exactly how the ELCC methodology should be applied to the IOU DR programs. During the workshop, the CAISO stated that it is up to the Energy Division to decide how to use the CAISO's analysis, yet it would seem reasonable to submit a transparent proposal so that parties can have a clear understanding of the

[1] *Assigned Commissioner's Ruling on Submission of Refreshed Effective Load Carrying Capability Study Results*, R.19-11-009, June 3, 2021, at p. 3.
[2] Ten days after the June 24 workshop equates to July 4.

impact on IOU DR NQC values. It is possible that the heat maps of incremental and average ELCC to reflect the 2020 DR bids in Slides 35 and 36 of the presentation can be useful in this regard because they can act as a clear visual indicator of the reliability value, from the LOLE perspective, of DR based on its call constraints. Unfortunately, these slides were not updated to include the IOUs' 2020 bids.

The CAISO could have eliminated a great deal of the ambiguity surrounding its ELCC methodology if it had provided parties with a written paper consisting of a complete narrative that clearly explained its methodology and how it would interact with the DR Load Impact Protocol (LIP)-based NQC values. Absent that, it is difficult to provide any substantive feedback on the June 24 workshop.

California ISO

Stakeholder Comments Template

Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources

This template has been created for submission of stakeholder comments on the updated ELCC study results for DR resources, which was published on June 18, 2021. The Stakeholder meeting presentation and other information related to the discussion, may be found on the initiative webpage at: http://www.caiso.com/informed/Pages/MeetingsEvents/MiscellaneousStakeholderMeetings/Default.aspx.

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on **June 28, 2021**.

Submitted by	Organization	Date Submitted
Paul Nelson *paul@barkovichandyap.com* *(213) 444-9349*	*California Large Energy Consumers Association*	*June 28, 2021*

Please provide your organization's comments on the following issues and questions.

1. ELCC Updated Study Results

Please provide your organization's feedback on the updated ELCC study results for DR resources.

On June 24, 2021, the Commission did not adopt the replacement of the Load Impact Protocols (LIP) with Effective Load Carrying Capability (ELCC) for determining qualifying capacity (QC) for demand response (DR). Instead, the Commission established a working group process with the California Energy Commission (CEC) to review methodologies, including ELCC, for determining qualifying capacity for DR beginning with the 2023 Resource Adequacy (RA) compliance year.[1] In addition, the Commission concluded the following regarding the use of ELCC for DR:

[1] CPUC D.21-06-029 at 35-36.

> We find that ELCC has not at this point been proven to be superior to LIPs or any other methodology at this time for DR. Further, the Commission cannot adopt a study or methodology that has not been thoroughly reviewed."[2]

On June 3, 2021, Commission President Batjer issued a Ruling that outlined a process for the Commission to consider using the CAISO's updated ELCC study, performed by the consulting firm E3, instead of the currently-adopted Load Impact Protocols (LIP) for determining qualifying capacity for utility DR programs, for only the 2022 RA compliance year. The Commissioner's Ruling specified the following requirements for the Commission to consider ELCC to be utilized for 2022:

> If the CAISO and the IOUs complete the refreshed ELCC study results, the study results should be served via the service list in this proceeding. Parties should be given an opportunity to participate in a workshop on the study results and to provide written comments on the study results. CAISO and the IOUS should then submit a report to the Commission with a summary of the workshop and parties' comments (as well as attached parties' comments).
>
> As such, a compliant filing or submission to the Commission shall include the following:
>
> (1) Refreshed study results based upon 2020 bid data from PG&E, SCE, as well as from San Diego Gas & Electric Company (SDG&E);
>
> (2) Thorough documentation of study methodology and assumptions, and explanation of how data from Load Impact Protocol (LIP) filings, if any, were utilized in or informed the study, as well as updated runs of the study (as needed);
>
> (3) To facilitate expedited party analysis and input, a summary of the key differences between LIP inputs and calculations versus the proposed ELCC method;
>
> (4) A workshop report that summarizes parties' comments on the study methodology and results and attaches parties' comments. CAISO and/or an IOU shall provide parties (via the service list in this proceeding): (1) a minimum 7 days' notice of any workshop, and (2) a minimum of 10 days' notice to provide written comments to CAISO and the IOUs on the study results. Any workshop or related stakeholder process shall be run by CAISO and/or the IOUs in consultation with Energy Division.
>
> If a compliant filing is submitted or filed with the Commission by July 1, 2021, the Commission will consider the study results.

[2] CPUC D.21-06-029 at 37.

On June 18, 2021, the CAISO posted on its website a presentation entitled "Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources". (CAISO DR ELCC Study.) On June 24, 2021, the CAISO posted a revised version of the presentation that was used for the workshop held on the same day. The CAISO has not met the requirements outlined in the Commissioner Ruling, because the documents provided in response to items 2 and 3 in the Ruling are inadequate for the Commission to make a determination of the cost impacts to replace DR capacity, which may be unnecessary, by using the ELCC results from the CAISO study. Furthermore, the presentation makes no explicit recommendations as to how the results of the presentation would be used to "adjust" the qualifying capacity of DR for the 2022 RA compliance year. If such a recommendation were to be made in the July 1 submission to the Commission, there would be no opportunity for parties to respond to that recommendation.

CLECA is concerned that CAISO scheduled only 2 hours for the workshop on a study that, if implemented as envisioned by the CAISO, could require 20% of DR capacity to be replaced by less preferred resources. The lack of adequate time for the workshop resulted in parties having remaining questions that went unanswered.

The CAISO's presentation of work by the consulting firm E3 does highlight one significant problem in the current RA process. There is long delay between when the qualifying capacity of DR is determined by the Commission through the use of the LIP based on DR performance in a previous year (i.e., April 1, 2021 LIP was based on performance in 2020), and its use in annual and monthly RA filings (in this case for RA compliance year 2022). As a result of the delay, any customer departures or additions to DR programs are not reflected in the qualifying capacity for the RA showings. (It should be noted this problem would exist whether using LIP or ELCC to determine qualifying capacity.) It is unclear if the misalignment creates a reliability problem because it depends on the underlying cause of customer departure from, or additional customer participation in, DR programs. DR is a special case when it is treated as a supply-side resource because the DR provides its own capacity during peak conditions. If load and its associated DR departs from the system entirely, the

misalignment does not create a reliability problem. because the load that needs to be served will be lower. In other words, the difference between the net qualifying capacity and DR bid is less than the reduction in load caused by the customer departure from the system. However, if the customer departs from the DR program, but its load remains on the system, then that does create a reliability problem. This calls for the ability to update the qualifying capacity of DR regularly so that load serving entities (LSEs) can make appropriate adjustments to RA procurement; this is another reason to allow LSEs to adjust bids based on the amount of DR they think they have in addition to weather variation.

CAISO's conclusion that there is a reliability problem due to the difference between net qualifying capacity and bid amounts is based on the assumption that the DR does not exist but the load from the customer remains. Unfortunately, due to the unique nature of 2020, CAISO's assumption may not be correct.

The year 2020 was particularly problematic for businesses participating in DR, and the ability for IOUs to determine the quantity to bid into the CAISO markets. The impact of COVID-19 on businesses often led them to reduce their loads due to shutdowns, reduce hours, or go out of business. The LIP results posted in April 2021 reflect the impacts of such adjustments in load.[3] It is unclear if the observation that bids in 2020 were lower than the qualifying capacity will continue in 2022 for two reasons. First, the Reliability OIR adopted program changes, such as increased incentives, which could encourage more customer DR enrollment in 2021-2022, compared to the forecast used by the LIP. Second, the LIP incorporates historical performance in establishing the updated values. Applying a second derate based upon the same historical data would lead to a double penalty.

Another factor that the Commission should consider regarding temporarily adopting ELCC for DR QC for 2022, is the fact it has already adopted increased procurement requirements to achieve an effective 17.5% planning reserve margin, which provides additional cushion. In addition, and most importantly, the Commission

[3] 2020 Load Impact Evaluation of California Statewide base Interruptible Program (BIP) for Non-Residential Customers, Christensen Associates, April 1, 2021 at 34-38.

has already reduced DR qualifying capacity by 6% due to the removal of the operating reserve from the planning reserve margin.[4] Therefore, should the Commission adopt any derate based upon the DR ELCC study, the 6% reduction to DR already ordered should be considered.

In CLECA's opinion, the CAISO DR ELCC study's results have not been properly validated. However, should the Commission decide that it is still appropriate to utilize the recent CAISO ELCC study to adjust the qualifying capacity for DR for 2022, it should utilize the 95% ELCC result from average ELCC as a function of DR capacity.[5] If the Commission adopts a 95% ELCC, the total reduction to future qualifying capacity of DR for 2022 will be 11% compared to the current approach, because of the reduction of the planning reserve margin adder by 6 percent.

1. CAISO's Presentation Does not Meet the Standard of Thorough Documentation, nor Did It Meet All The Requirements in the Ruling

The purpose of a presentation is to summarize information, it is not to document all the inputs, assumptions, and steps taken to validate the results of a technical study. Missing from CAISO's documents is any information on what steps were taken to validate the results, or sufficiently detailed information so that parties can independently validate the results. An ELCC study is dependent on the distribution of loss of load expectation (LOLE), yet no detailed information on the monthly, weekday/weekend, and hourly distribution of LOLE was provided. This is commonly shown graphically as a heatmap with different colors showing magnitude, and with a supporting worksheet of numerical details. The only heatmap provided in CAISO's presentation was for September, comparing the duration of LOLE in 2020 and 2030. At the workshop, the presenter from E3 said LOLE did exist in other months in the study. A proper validation would include a comparison of an LOLE heatmap to a similar heatmap of DR bids. This would help to understand when DR was not able to avoid LOLE; no such information has been provided. This type of

[4] CPUC D.21-06-029 at 41.
[5] See CAISO DR ELCC Study presentation, June 24, 2021, at 35. This is assuming all the utility DR programs are available at least 4 hours per call and have 4 calls per year.

detailed information could also assist in developing DR programs to address periods of LOLE concern.

The Base Interruptible Program (BIP) for Southern California Edison consists of high load factor customers, and the program is available to be called for 6 hours per event, 24 hours per day, and up to 10 events per month. Slide 37 of the June 24, 2021, version of the presentation indicates that for 2019 there were no more than two events per year, and a loss of load event did not exceed five hours. Therefore, based upon this information, BIP should be able to avoid all the LOLE hours. However, the E3 results for CAISO for SCE's BIP on Slide 30 show derates of 20-35%. There is insufficient data to determine if the ELCC results are being caused by changes in customer enrollment between the determination of qualifying capacity and the bids, or if the load pattern for BIP participants does not align with the LOLE hours. If the cause is due to changes in customer enrollment, the reason for the departure must be examined for a program that consists of many customers with loads exceeding 10 MW. The departure of a single customer from the system with a load of 50 MW could significantly impact the ELCC results; yet there is no evidence in the next compliance year (which will incorporate the loss of 50 MW) that another 50 MW would depart. A weakness of CAISO's approach is an over-reliance on historical customer enrollment instead of customer performance. In contrast, the LIP uses historical performance to make adjustments to load reductions per customer, which are then applied to estimated customer enrollment for the compliance year.[6]

CAISO's DR ELCC Study does not meet the requirements of item 3: "a summary of the key differences between LIP inputs and calculations versus the proposed ELCC method." There is no comparison of qualifying capacity for each DR program based upon LIP and ELCC, nor an explanation of the key differences to explain the different results. Instead, utility bids are compared to proposed ELCC results. It is not exactly clear how the DR ELCC Study would be applied by the Commission. When asked for more clarity on this issue at the workshop, the CAISO responded it did not have a specific proposal, but the study was to inform the

[6] The utilities should investigate if their forecasts of customer enrollment are being too optimistic.

Commission when establishing DR qualifying capacity. Without more detailed information the Commission cannot evaluate the cost versus benefit impact to customers of having to replace possibly 20% of DR with less preferred resources. This 20% figure is based on Slides 26 and 28 in the presentation, although there was no explicit recommendation for such a derate.

2. Applying CAISO's ELCC Results to the Load Impact Protocols Results in a Double Penalty

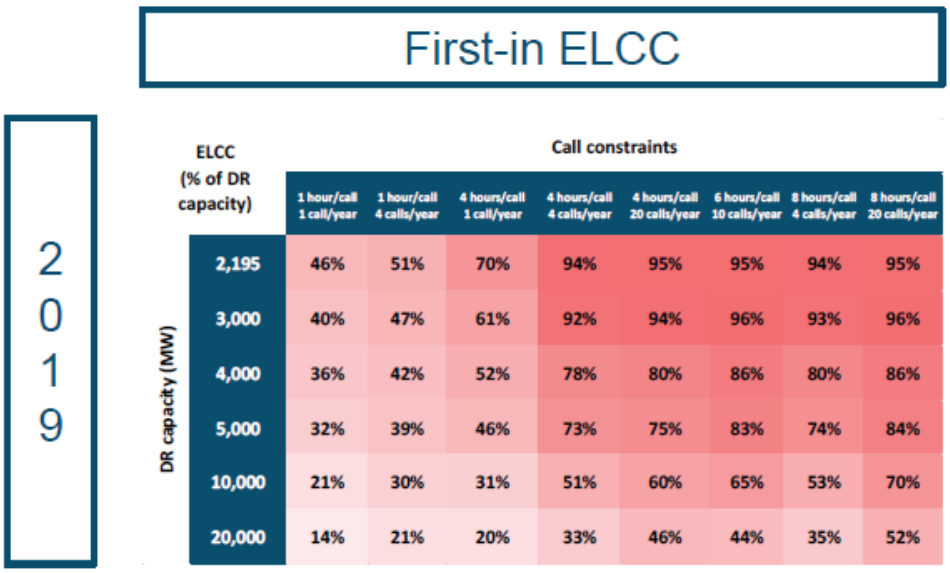
The recent LIP study utilized 2020 data to develop load impacts for use in 2021, which incorporates the observed customer performance. To the extent a customer failed to reduce load, it is included in the analysis. Also included in the LIP results is customer departure from reliability DR resources (RDRR) due to customer fatigue caused by frequent DR events in 2020. The ELCC results include in the derate the impact of customer departure that occurred between 2019 LIP results and 2020. Meanwhile, the Commission in the Reliability OIR ordered changes to some programs. For example, the incentives for BIP were increased, and enrollment during any month is allowed; both could increase customer enrollment that may not be reflected in the LIP. In this situation, the adopted qualifying capacity based upon LIP may undercount actual customer enrollment. Therefore, applying a derate based upon misalignment of customer enrolment reflected in the CAISO DR ELCC from 2020 observations study may unfairly doubly penalize DR.

3. Average ELCC as a Function of DR Capacity on the System

The CAISO DR ELCC Study in the appendix presented the results of average ELCC as a function of DR capacity on the system.[7] These results are based upon program design of hours per call, and calls per year limitations. For 2019, for total DR capacity of 2,195 MW, for a program of at least 4 hours per call and at least 4 calls per year, the ELCC would be at 94% or higher. It is unclear why 2,195 MW was selected

[7] CAISO DR ELCC Study, June 24, 2021 version at 35.

as the bookend, as it exceeds by about 1,000 MW the amount of current utility DR. Therefore, if saturation is a concern, the 94% value understates the ELCC, because actual DR is 1,000 MW less than 2,195 MW. There is also an anomaly in the results, because a program with 8 hours per call and 4 calls per year has a lower ELCC than programs with more limited hours but more events. The data on Slide 37 for 2019 indicate there are only 2 loss of load events per year, up to 5 hours in duration. (See excerpt from CAISO's presentation, Slide 35, below.) Therefore, the 6-hour and 8-hour programs with at least 2 calls per year should have the same ELCC; there is no explanation of this anomaly.



First-in ELCC

2019

DR capacity (MW)	ELCC (% of DR capacity)	Call constraints: 1 hour/call 1 call/year	1 hour/call 4 calls/year	4 hours/call 1 call/year	4 hours/call 4 calls/year	4 hours/call 20 calls/year	6 hours/call 10 calls/year	8 hours/call 4 calls/year	8 hours/call 20 calls/year
2,195		46%	51%	70%	94%	95%	95%	94%	95%
3,000		40%	47%	61%	92%	94%	96%	93%	96%
4,000		36%	42%	52%	78%	80%	86%	80%	86%
5,000		32%	39%	46%	73%	75%	83%	74%	84%
10,000		21%	30%	31%	51%	60%	65%	53%	70%
20,000		14%	21%	20%	33%	46%	44%	35%	52%

Despite the problems in the CAISO ELCC study, should the Commission decide that is appropriate to utilize the recent CAISO ELCC study to adjust the qualifying capacity for DR, it should utilize the 95% ELCC result from average ELCC as a function of DR capacity, as shown on Slide 35.[8]

[8] This is assuming all the utility DR programs are available at least 5 hours per call, and have at least 4 calls per year.

4. A Last-In ELCC Contradicts the Commission's Preference for Demand Response

The concept of the first-in and last-in for DR in the CAISO/E3 study is inconsistent with the Commission's preference for energy efficiency and demand response over other, even renewable, resources. If CAISO is concerned about saturation, the Commission has already recognized the concern of over-relying on too much DR, as it set limits on how much DR can be used in RA showings through the maximum cumulative capacity buckets. Therefore, counting DR as if it was introduced after other resources would tend to lower ELCC values. This would discourage DR, which is a preferred resource. Therefore, the Commission should not use the last-in results in determining qualifying capacity for DR.

California ISO

Pacific Gas & Electric Company's Comments

Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources

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Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on **June 28, 2021.**

Submitted by	Organization	Date Submitted
Gil Wong, (415) 973-2748	*PG&E*	*June 28, 2021*

Please provide your organization's comments on the following issues and questions.

1. ELCC Updated Study Results

Pacific Gas and Electric Company's (PG&E) comments on the Refreshed Effective Load Carrying Capacity (ELCC) Study Results from Energy + Environmental Economics (E3) and the ELCC working group meeting on June 24, 2021 hosted by the California Independent System Operator (CAISO) and E3 are set forth below. PG&E generally supports the premise that demand response's (DR) counting methodology should consider DR's variable nature, but would like to call out certain issues with the refreshed ELCC results which were completed under a highly compressed timeline, so that the California Public Utilities Commission (CPUC) can make an informed decision for resource adequacy (RA) 2022.

PG&E identifies two notable issues with the refreshed ELCC results, as follows:

a. The Refreshed ELCC Results Are Noisy And May Be Indicative of the Net Qualifying Capacity (NQC) Not Properly Defined

Slide 29 of E3's presentation indicates the ELCC values can be above 100% for PG&E's Capacity Bidding Program for certain Local Capacity Areas (LCA). In fact, the

counter-intuitive results are not unique to PG&E as SCE and SDG&E also has ELCC values above 100% on slides 30 and 31. An above-100% ELCC means that the resource is able to provide more capacity than its capacity. This is inconsistent with ELCC as a derating mechanism. It is unclear how a variable resource can be more "useful" than a perfect generator, and an above-100% ELCC would credit the resource above its capacity. The counter-intuitive results are hard to apply and can be indicative of one fundamental issue—the DR capacity may not be defined properly in the refreshed ELCC refresh study. Further analysis and explanation are needed.

b. Applying the Refreshed ELCC Results Based on Poorly-defined Capacity May Double-Penalize Underperformance

The refreshed analysis stops short of presenting a plan how the results can be applied to RA 2022. And some open questions remain, such as "what derate factors should be used?" and "what data in the DR load impact filing should the derate factors be applied to?" As the CPUC considers the refreshed analysis for RA 2022, PG&E emphasizes that DR's 2022 ex-ante load impacts have already taken historical performance into account.i 2020 performance was lower than the prior forecast, the ex-ante impacts for future years would factor in the underperformance and adjust the forecast downward. Consider the following example. Suppose the 2020 NQC was 100 MW and the DR bids were around 90 MW, resulting in a (hypothetical) ELCC value of 90%. Assuming no enrollment change, the ex-ante impacts for 2022 would forecast 90 MW. It would seem excessive to apply another 90% on the 90 MW ex ante impacts to calculate the NQC, because it would double-adjust for the same underperformance. Applying another 90% on the 90 MW implies DR performance will continue to fall below the ex ante impacts, such that a derate is needed in determining the NQC. This assumption that DR will consistently underperform relative to the NQC is unwarranted. PG&E cautions against double-penalizing underperformance, and recommends this issue be explicitly addressed in the permanent counting methodology.

PG&E's Recommendation: Based on the Original ELCC Analysis, Applying a 5% Derate to the 2022 Ex Ante Impacts to Determine the 2022 NQC for DR

Considering the issues discussed above, the refreshed ELCC results based on 2020 bids are not readily applicable to the 2022 ex-ante load impacts for RA 2022. In the absence of solid results from the refreshed analysis, results from the original ELCC analysis can be informative. Slide 35 of the E3 presentation includes a few heat maps showing average ELCC as a function of DR capacity, DR event duration and frequency. Given the size of DR capacity available statewide today (< 2,195 MW), the first-in ELCC is around 95% for DR resources capable of calling 4 to 20 events per year, with 4 hours per event. For the same portfolio size, event duration and frequency, the ELCC value hardly changes between 2019 and 2030. Therefore, PG&E concludes that a reasonable NQC for RA 2022 can be derived by applying a 95% ELCC (i.e., a 5% derate) to the 2022 ex-ante impacts of DR.

PG&E appreciates the opportunity to provide comments.

Southern California Edison Comments
Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources

Submitted by	Organization	Date Submitted
Brian Rothstein *BRIAN.ROTHSTEIN@SCE.COM*	*SCE*	*6/28/21*

On June 3, an Assigned Commissioner's Ruling (ACR) on effective load carrying capability (ELCC) study results was issued in the Resource Adequacy (RA) proceeding. The ACR provides guidance for submission of the refreshed ELCC study results prepared by Energy + Environmental Economics (E3) using 2020 DR data from the investor-owned utilities (IOUs) to determine qualifying capacity (QC) of IOU DR resources for the 2022 RA compliance year. With updated ELCC study data approved by the California Public Utilities Commission (Commission), a QC counting methodology (acceptable to the CAISO) could be implemented to provide Variable Energy Resource status and a Resource Adequacy Availability Incentive Mechanism exemption to DR resources. On June 24, CAISO hosted a workshop with E3 and parties to discuss results of the refreshed ELCC data.

ELCC Updated Study Results

SCE appreciates the collaboration with E3 and the CAISO to review the results of the study to get a better understanding of the model; however, given the short timeframe of the study, SCE has a couple areas of concern. Specifically, there are two issues with the net qualifying capacity (NQC) used to calculate the ELCC %.

1. Use the most updated enrollment and average load impact per customer impacts

For the 2022 RA compliance year, SCE recommends that the Commission use Ex Ante MW from the 2020 Interruptible Load Programs (ILP) and DR Report[1] to calculate the DR portfolio ELCC %. As noted in E3's ELCC presentation, the ELCC study refresh used Commission staff's 2020 DR RA NQC values, as determined by the Load Impact Protocol (LIP) process in program year 2018, to calculate each IOU's portfolio ELCC %.[2]
Using the 2020 ILP report Ex Ante values provides two major benefits over the 2020 DR RA NQC values used in the ELCC study: (1) they reflect the actual, not forecasted,

[1] R1309011-SCE Monthly ILP and DR Report 202012-Public, Appendix A-1, Table I-1. https://edisonintl.sharepoint.com/:b:/t/Public/regpublic/ER4ku5rhSmRJq3bpMr5MwggBRCf3guicmvNCro1IBuvgPQ

[2] Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources, slide 48. http://www.caiso.com/Documents/Presentation-E3-CAISODemandResponseELCCStudyUpdate-Jun172021.pdf

enrollment of each DR program in 2020; and (2) they reflect the updated average load impact per customer from the most recent April 1st filing.

The table below provides an August 2020 example on how an inflated NQC misrepresents the capability of SCE's DR portfolio when 2020 actual bids are used as inputs to the ELCC study. E3's method to calculate ELCC % results in 79%, but this is not an apples-to-apples comparison because the 942 MW NQC is based on outdated enrollment forecasts from nearly two years ago. SCE's method to use the ILP report to calculate ELCC % results in 86%, which appropriately applies the 869 MW NQC based on the actual 2020 program enrollment.

Method to Calculate ELCC %	RECAP ELCC MW	August 2020 NQC	August 2020 Enrollment	August ELCC as a % of NQC
E3's Recommendation (program year 2018 LIP)	745	942	278,725	79%
SCE's Recommendation (ILP report ex-ante values)		869	252,431	86%

Based on SCE's calculations, using this updated information will reduce SCE's overall DR portfolio's July-September ELCC % by approximately 5%[3] compared to using the 2020 DR RA NQC values, as it will appropriately allocate enrollment and average load impact per customer information in the 2020 DR RA NQC values.

SCE would also like to use this opportunity to point out that starting in 2021, SCE has been providing bi-annual QC updates to Energy Division – once in April and once in July – to update load impacts that were previously submitted to determine QC of SCE's DR energy resources.[4] The 2021 DR QC value is based on average load impacts per customer (MW/customer) from PY 2019.[5] This process is conducted twice a year to ensure that all 2021 DR QC monthly values reflect current enrollment forecasts.

Given SCE's understanding of E3's model, SCE concludes that updates of DR QC bi-annually and use of average load impact per customer (MW/customer) from the most recent program year, should reconcile discrepancies between DR QC and reliability contributions for the most recent program year.

[3] This 5% was calculated by dividing the June-September 2020 ILP ex-value values by Commission staff's 2020 DR RA NQC values.
[4] California Public Utilities Commission (CPUC). Table 1: Schedule for Obtaining Demand Response Qualifying Capacity Through the Load Impact Protocols (LIP). "Guide to CPUC's Load Impact Protocols (LIP) Process." Page 5-6. February 10, 2021.
[5] To update the 2021 DR QC, in compliance with Energy Division's interpretation of Decision (D.) 20-06-021, the monthly average load impact per customer (MW/customer) from PY 2019 is multiplied by actual monthly customer enrollments in 2021, up until the most current month (i.e., June). For months for which actual monthly enrollments are not yet available, the monthly average load impact per customer from PY 2019 is multiplied by enrollment forecasts from PY 2020.

2. Address misalignment of day types and hours used to assess contribution of supply-side DR energy resources in meeting system reliability

The ELCC results are predicated on 2020 bid data for all hours of the year, including weekends and holidays. With the exception of weekend event days, reference loads and load impacts on weekends or holidays are typically lower than those on weekdays. Study results that consider or encompass contributions of supply-side DR energy resources in meeting weekend reliability needs would necessarily render lower ELCC values (higher derate of QC) than those that only consider contributions of supply-side DR resources during the Commission's Availability Assessment Hours (AAH) of monthly peak days or typical event days.

DR QC, on the other hand, is based upon equally-weighted average Ex Ante load impacts (MW) across the AAH (hour ending (HE) 17 – 21) for either the system peak load day of the forecasted month or the typical event day (i.e., August day) of the forecasted year, as stipulated by the *DR Load Impact Evaluation Protocols*.[6]

Before ELCC values that are aggregated by supply-side DR energy resource and region could be applied to the 2022 DR RA QC calculation, there is a number of discrepancies that must be reconciled. One way to do so would be to calculate ELCC values to encompass contributions of DR resource to system reliability only during AAH. This modification would likely result in increases to ELCC values or a lower derate of QC from the current study. An alternative would be to report load impacts during AAH by day type (i.e., weekday versus weekend) during load impact evaluation per LIP for the most recent program year, and then apply the appropriate ELCC factors to adjust the QC (i.e., contributions of DR energy resources in meeting reliability needs during weekday separated from contributions of resources during weekend AAH).

[6] California Public Utilities Commission (CPUC) – Energy Division (ED). Protocol 22. 6. Ex Ante Estimation. "Attachment A: Load Impact Estimation for Demand Response: Protocols and Regulatory Guidance." Page 96 – 98. April 2008.

California ISO

Stakeholder Comments Template

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Submitted by	Organization	Date Submitted
Leslie Willoughby *Pamela Mills*	*SDG&E*	*June 28, 2021*

Please provide your organization's comments on the following issues and questions.

1. ELCC Updated Study Results

Please provide your organization's feedback on the updated ELCC study results for DR resources.

On Thursday June 24th, CAISO held a workshop, where they presented results of the Effective Load Carrying Capability (ELCC) update using 2020 bid data for all three Investor-Owned Utilities (IOUs). SDG&E had not been a participant in the 2019 ELCC model run but was, however, asked to participate in the 2020 refresh. SDG&E supplied its 2020 bid data to E3, the CAISO's consultant that is providing its ELCC expertise. The following comments are related to the inputs and assumptions that are being used in the ELCC modeling.

1) ELCC should not use all hours of the year to value DR

SDG&E disagrees with the CAISO's assertion that the ELCC methodology more accurately captures the value of DR resources by accounting for their use and energy limitation and variable output nature. The current ELCC method models all hours of the year instead of focusing on the highest load hours, the Resource Adequacy (RA) Assessment Hours which the DR programs are designed to serve. Further, evaluating DR resources with the ELCC model during hours outside of the highest load hours will automatically reduce the Qualifying Capacity ("QC") value of these resources because such resources are not designed to be 24x7 resources. SDG&E's Base Interruptible Program (BIP) is the only DR program that SDG&E has that is available 24x7. The approach of utilizing all hours of the year harms SDG&E's entire portfolio value as its BIP is tiny compared to SCE and PG&E's BIP.

2) Comparing daily bids to RA credits is not appropriate given the current RA Construct

CAISO's ELCC methodology measures how SDG&E's daily bids compare with the RA value credited. The methodology does not consider actual performance. Ex Ante values, which are the basis for RA awards, are based on a 1 in 2 weather forecast for peak monthly conditions. CAISO utilizes all daily bid data and derates the DR resource if it is not equal to the RA value. Theoretically, the RA value would equal one daily bid during the month as there is one peak in each month – which would represent a 1 in 2 maximum peak weather condition for the month. It is inappropriate and wrong to expect every bid to be equal to the 1 in 2 peak value for every hour of the day for the entire month. As a result there is a significant difference between SDG&E's bids for 2020, and the RA value that the DR portfolio ought to be credited. That, along with other faulty assumptions, inappropriately derates SDG&E's variable DR values. During the workshop on 6/24, PG&E proposed to re-run the ELCC model using LI protocols profiles. However, because the schedule is so compressed there is no time/budget to re-run the model.

3) The Current ELCC methodology double penalizes the IOUs' demand response resources

The CPUC has already reduced DR by 6% due the removal of the operating reserve in the Planning Reserve Margin (PRM). Any additional derates within the 2020 ELCC should not be taken. Additionally,

the IOU's cost effectiveness calculations use the RA that is allocated to the IOUs based on the LIPs. There are additional de-rate factors in the cost effectiveness calculations. If RA starts using the ELCC values, then there will need to be an update to cost-effectiveness so that DR resources are not de-rated twice.

4) There should be no RAAIM penalties for 2022

SDG&E notes that it is already producing its ex ante estimates for 2022 in accordance with current RA processes. It would be unfair to penalize SDG&E for its compliance prior to the RA process being changed or revamped. CAISO ELCC's proposal states on page 9 "CAISO believes that is appropriate to exempt DR RA resources from RAAIM if their QC value is established using an ELCC methodology that's considers DR's contribution reliability and saturation effects".[1]

Further, SDG&E submits that DR should be treated as a variable resource with a Resource Adequacy Availability Incentive Mechanism ("RAAIM") exemption. As the ED correctly points out, the California Independent System Operator ("CAISO") can allow variable resources such as wind and solar to be exempted from RAAIM penalties and has done so previously: CAISO implemented RAAIM in November 2016, and . . . the CPUC subsequently adopted ELCC for solar/wind in 2017 for 2018 implementation; thus, solar/wind variable resources were exempted from RAAIM prior to the implementation of ELCC.

As mentioned in previous comments, the CPUC's ED stated that these variable resources were similarly exempt under CAISO's previous market construct. The Standard Capacity Product and Northern California Power Agency (NCPA) overrode ELCC values for higher deemed values without jeopardizing their exemption from RAAIM and thereby providing variable treatment in the operational space."[2] Thus, use of an ELCC methodology for planning purposes does not require that CAISO implement variable DR under an operational resource model. Accordingly, SDG&E recommends that the CAISO follow a similar approach

[1] Resource Adequacy Availability Assessment Mechanism (RAAIM) Exemption Option for Variable-Output Demand Response Valued Under an Effective Load Carrying Capability (ELCC) or Similar Methodology p.9. June 10th, 2021
[2] Energy Division Demand Response Proposals for Proceeding R.19-11-009 p. 5-6 April 19th, 2021

with the IOUs' DR – i.e., it should be considered variable and not subject to RAAIM penalties, even if the IOUs do not adopt ELCC for valuing DR within a specific timeframe.

5) CAISO's ELCC model reporting and workshop

SDG&E wants to note that in addition to comments it has about the ELCC model methodology, that it also has reservations in general that make SDG&E's team uncomfortable in the final 2020 update results. The following is also problematic for SDG&E:

a) The ELCC model is not public and transparent. E3's ELCC report only provides a high-level overview of the results. SDG&E asked E3 several times for the details behind the ELCC calculation and no response was provided.

b) First-In and Last-In tables in prior versions of the CAISO's ELCC report are not updated in the 6/24/21 report. Tables look similar, but values are different on each axis and SDG&E cannot compare the update with respect to that table and the addition of SDG&E's data as it doesn't appear to SDG&E that the table reflects the updated data.

c) SDG&E emailed E3 about SDG&E's ELCC results. SDG&E was concerned the bid data used does not accurately reflect the actual values. During the email conversation, E3 found that they needed to recalculate SDG&E's results. However, SDG&E received an updated version of the report on 6/24 and it appears that there were no changes to the results.

d) SDG&E felt that the CAISO workshop was heavily controlled, and participants could not see other participants comments, and not all questions that put forth in the chat were addressed by the CAISO or E3. Since the workshop was not a fully transparent process, additional issues and/or discussions were not identified.

e) The ELCC 2020 update was rushed, SDG&E had questions, which led to corrections, and several versions of the PowerPoint were made. In some cases certain pages of the slide deck were not replicated when the corrections were made.

SDG&E believes that its DR resources can be dispatched consistent with the RA assessment hours that the CPUC establishes in conformance with SDG&E's DR program designs. SDG&E would like to develop a more reasonable methodology for establishing its variable DR's RA that better reflects conditions on which bids are made, how DR performs, RA hours that are deemed most important (i.e., recognizing DR as a use-limited resource), and not being penalized twice.

Therefore, for all the reason identified in the paragraphs above, SDG&E recommends that the CPUC adopt the LIP ex ante values for 2022 RA and that DR be excluded from RAAIM for 2022. SDG&E has committed to work with CPUC, CAISO, CEC, PG&E, SCE and other stakeholders to improve the current RA/QC methodologies. SDG&E recommends focusing on establishing a reasonable ELCC methodology that works for all variable DR in 2023 and beyond. This can be achieved by the working group that the CPUC has established that is being run by the CEC. This working group's goal is to develop a more permanent QC methodology for DR, including exploring an alternative ELCC methodology to evaluate DR QC based only on an appropriate percentage (e.g., top 20 percent of hours of each month).

Additional comments

Please offer any additional feedback your organization would like to provide on the updated study results and meeting discussion.

California ISO

Stakeholder Comments Template

Effective Load Carrying Capability (ELCC) Study Results for Demand Response (DR) Resources

This template has been created for submission of stakeholder comments on the updated ELCC study results for DR resources, which was published on June 18, 2021 The Stakeholder meeting presentation and other information related to the discussion, may be found on the initiative webpage at: http://www.caiso.com/informed/Pages/MeetingsEvents/MiscellaneousStakeholderMeetings/Default.aspx.

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on **June 28, 2021.**

Submitted by	Organization	Date Submitted
Delphine Hou	*CAISO*	*June 28, 2021*

Please provide your organization's comments on the following issues and questions.

1. ELCC Updated Study Results

Please provide your organization's feedback on the updated ELCC study results for DR resources.

I. Introduction

The California Independent System Operator Corporation (CAISO) provides the following comments on the refreshed study results from Energy and Environmental Economics, Inc. (E3). The study was conducted in compliance with the California Public Utilities Commission (Commission) *Assigned Commissioner's Ruling on Submission of Refreshed Effective Load Carrying Capability Study Results* (Ruling). The Ruling requested that the CAISO, Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E) were requested to submit all compliance materials by July 1, 2021 in order to allow the Commission time to finalize investor-owned utility (IOU) qualifying capacity (QC) values. The

Ruling specifies the following conditions: (1) the effective load carrying capability (ELCC)-determined QC would only be applicable for the 2022 compliance year, and would only apply to investor-owned utility (IOU) demand response programs (not to third-party demand response); (2) potential adoption for 2022 does not indicate Commission preference for ELCC or any other QC methodology; and (3) adoption of any ELCC-determined QC for 2022 must occur in early September 2021 to allow sufficient time for final resource adequacy allocations in mid-September 2021.[1]

The refreshed study results finds that the ELCC values reflect in aggregate a derate from the QC values calculated today based on the load impact protocol (LIP) methodology. The refreshed study results also found that based on individual demand response programs, the ELCC values can reflect either a derate or uprate and vary widely across programs. The study results were presented in two different levels of aggregation: (1) by IOU by month, representing the value of each IOU's portfolio in aggregate and (2) by program by IOU by month, representing the value of each program by local capacity area. The ELCC percentages only apply to the summer months from June through September so all other months should continue to use the LIP-derived QC values for IOU demand response in the 2022 resource adequacy program. **The CAISO strongly supports the results of the study and urges the Commission to adopt them for use as described in the Ruling.** Based on the CAISO's understanding, the Commission may choose to apply the percentage derate or uprate from either level of aggregation to determine the QC value. **The CAISO recommends the Commission use aggregated derates by IOU for ease of implementation as this effort is limited to the 2022 resource adequacy year and for better accuracy. If the Commission uses the aggregate derate values by IOU by month, the IOUs should be provided the flexibility to determine how to fairly and cost-effectively allocate the derate amongst their different programs.**

II. Discussion

The CAISO provides comments recommending the Commission use the E3 Refresh Study Results for IOU demand response programs in the 2022 resource adequacy year, a discussion on the validity of the study methodology and assumptions, adherence to the expedited process as

[1] Ruling, pp. 3-4.

directed by the Ruling, and additional clarifications on the application of adders via crediting. The CAISO provides an illustrative example of how the ELCC percentages can be applied to the existing LIP-based NQC values in appendix A.

A. The Commission Should Use the E3 Refresh Study Results for IOU Demand Response Programs in the 2022 Resource Adequacy Year.

In compliance with the Ruling, the CAISO contracted with Energy and Environmental Economics, Inc. (E3) to refresh its IOU demand response ELCC study using 2020 demand response program bid data from PG&E, SCE, and SDG&E (E3 Refresh Study Results). The data provided reflect demand response ELCC values without planning reserve margin (PRM) or transmission and distribution loss adders. The PRM and adders are discussed in more detail in Section III below. The results reflect two levels of aggregation: (1) by IOU by month, representing the value of each IOU's aggregated demand response portfolio[2] and (2) by program by IOU by month, representing the value of each IOU demand response program by local capacity area (LCA).[3] To provide an example, Table A below shows the refreshed ELCC percentage derates for August 2020 by IOU. This percentage is based on the 2020 annual ELCC values calculated by IOU compared to the net qualifying capacity (NQC) values used by the Commission to set the credited IOU demand response resource adequacy amounts for 2020. The 2020 annual ELCC values are then calculated as a percentage of the summer NQC values for June through September (only August is shown below in this example). The table shows that the August 2020 ELCC values for the PG&E, SCE, and SDG&E demand response programs are 82%, 79%, and 54%, respectively, of the 2020 LIP-derived NQC values (all derates).[4]

Table A: Sample 2020 ELCC Derate Values by IOU For August 2020

	2020 ELCC as a % of NQC for 2020*
[A]	[G]
IOU	Aug
PG&E	82%
SCE	79%
SDG&E	54%

*Does not include planning reserve margin, distribution, and transmission line loss adders.

[2] Energy and Environmental Economics, Inc. (E3), "Demand Response ELCC", June 24, 2021, p. 51. (E3 Refresh Study Results.) Available at: http://www.caiso.com/Documents/E3-CAISODemandResponseELCCStudyUpdate2021-Combined-.pdf

[3] E3 Refresh Study Results, pp. 52-54.

[4] E3 Refresh Study Results, p. 51.

On the other hand, viewing the results by specific demand response program shows significant variations between programs. For example, individual PG&E demand response programs have August 2020 ELCC values ranging from 0% to 462% of 2020 LIP values.[5] ELCC values at the demand response program level reflect both derates and uprates from the existing LIP values.

The CAISO believes the Commission may apply the percentage derate or uprate to LIP values at the IOU level or the program level to determine 2022 IOU demand response QC values. However, the CAISO recommends using the IOU level aggregation. Although aggregation by program type by IOU by month provides valuable insight into performance variation across the different programs, these more granular results are affected by the inherent "noise" caused by using only one year of bidding data. Furthermore, the E3 Refresh Study Results did not have visibility into customer enrollments, or potential data misalignment issues that would need to be sorted out for a handful of programs requiring greater understanding of the development of program specific bid data. This is partially why the CAISO prefers the IOU-level aggregation over program specific derates or uprates. Additionally, the large variation in results, with some programs receiving a large derate and others a large uprate, could be difficult to implement. Furthermore, use of the aggregated derates by IOU allows the IOUs themselves to determine how to fairly and cost-effectively allocate the derate amongst their different programs.

The ELCC percentages only apply to the summer months so all other months should continue to use the LIP-derived QC values for IOU demand response in the 2022 resource adequacy program. The Commission may choose to apply the percentage derate or uprate from either level of aggregation to determine the QC value. If the Commission uses the aggregate derate values by IOU by month, the IOUs should be provided the flexibility to determine how to fairly and cost-effectively allocate the derate amongst their different programs. The CAISO recommends the Commission use aggregated derates by IOU for ease of implementation as this effort is limited to the 2022 resource adequacy year and for better accuracy.

To assist the Commission in implementation given the compressed schedule, Appendix A provides an illustrative example of how the two sets of 2020 ELCC percentages applied to the

[5] E3 Refresh Study Results, p. 52.

demand response allocation values used to develop the resource adequacy IOU credits provided to the CAISO.[6]

B. The ELCC Study Methodology and Assumptions Are Sound.

The ELCC study methodology and assumptions are thoroughly documented in the E3 analysis and have not changed since first introduced in 2020.[7] In keeping with the methodology used in prior iterations of the E3 ELCC study, data from LIP filings were not an input into the model used to generate ELCC MW values and thus were not used to determine the ELCC study results. However, the E3 Refresh Study Results use 2020 demand response NQC values, which are informed by LIP filings, to compare with the ELCC results and to calculate ELCC as a percentage of the June through September 2020 NQC values. Importantly, the ELCC analysis is based on how demand response resources were bid into the market and is not based on its performance to those bids. Therefore, this does not result in a "double penalty" (once for bids below the NQC value and another for performaning below bid amounts if awarded). To the extent that ELCC is lower than NQC, than NQC is overstating the ability of these resources and should be adjusted to reflect the actual capability represented in the bids.

As explained in the E3 Refresh Study Results, there are three approaches to measuring resource ELCC value: (1) portfolio, (2) first-in, and (3) last-in.[8] The E3 ELCC study uses the first-in methodology to determine demand response ELCC value because it measures the ability of a resource to serve load at the peak, *i.e.*, to "clip the peak." This approach is analogous to how industry participants anticipate peaking resources will be utilized.[9] The "last-in" methodology is completely unrelated from Commission preference for preferred resources such as energy efficiency, demand response, etc. "Last-in" simply refers to how these resources are dispatched and if they are optimally dispatched in conjunction with all other resources on the system. Demand response today does dispatch after natural gas. Natural gas is dispatched every day in California, whereas demand response is only dispatched for a limited number of hours per year during times when the system is constrained. This dispatch is entirely unrelated to Commission preference. These concepts should not be tied together in any way.

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[6] 2021-2023 PG&E, SCE, and SG&E Demand Response Totals. Available at: https://www.cpuc.ca.gov/General.aspx?id=6311
[7] E3 Refresh Study Results, pp. 10-15 and pp. 18-21.
[8] E3 Refresh Study Results, p. 13.
[9] E3 Refresh Study Results, p. 14.

More generally, the methodology has been thoroughly vetted and leverages E3's Renewable Energy Capacity Planning (RECAP) model. RECAP is used by many utilities and government agencies to assess generation resource adequacy for a power system based on loss-of-load probability analysis. RECAP simulates the availability of bulk power system energy and capacity to serve load under a wide range of weather conditions over thousands of years selected through Monte Carlo analysis. RECAP calculates reliability statistics including loss of load probability (LOLP), loss of load expectation (LOLE), expected unserved energy (EUE) and ELCC through time-sequential simulations of available electric resources. RECAP also calculates the planning reserve margin (PRM) that would be necessary to meet a selected reliability standard such as 1-day-in-10-years. RECAP is specifically calibrated to analyze resource adequacy challenges under high renewable penetration. RECAP estimates ELCC values for both conventional and dispatch-limited resources such as wind, solar, hydro, demand response, and energy storage. Hourly data for electric loads, wind production, solar production and hydro availability are developed for many years of historical weather data and serve as an input to RECAP. The model considers both the absolute levels of demand and supply and the correlation of wind and solar output with load and with each other to ensure that the diversity of supply resources is fully considered.

E3 relied on public vetted data or direct inputs for the refresh analysis. Specifically, the study used the Commission's integrated resource plan portfolio for the 2021-2022 Transmission Planning Process.[10] 2020 bid data was provided directly by each IOU for each program.

C. The Ruling Calls for an Expedited Process Limited to 2022 Resource Adequacy Year.

The CAISO appreciates the Commission providing an opportunity to file documentation per the Ruling. The CAISO also understands that given the short turn-around and the limited scope of the Ruling, the intent was not to revise the current E3 methodology but simply to refresh the prior study using 2020 bid data. From the CAISO's understanding, E3 had been in regular communication with all three IOUs since since December 2020 to discuss the ELCC methodology, assumptions, and results. CAISO and E3 attended meetings with and addressed data requests from the IOUs to discuss these topics on multiple occasions and answer general and specific ELCC

[10] E3 Refresh Study Results, p. 45.

methodology questions and questions related specifically to the E3 Refresh Study Results. Furthermore, the outreach process adhered to the requirements and timelines specified in the Ruling.

III. Additional Clarifications

The CAISO provides an additional clarification about the application of adders via crediting. As noted above, the values provided in the ELCC study refresh do not include any PRM gross ups or adders for distribution and transmission loss factors. Decision (D.) 21-06-029 retains a 9% PRM adder and the distribution and transmission loss factor adders. Specifically, for the transmission loss factor, D.21-06-029 directs Energy Division staff to continue to use crediting to account for this adder.[11] However, much of the impetus to use ELCC values for 2022 is to eliminate non-net-neutral crediting. If the CAISO determines PRR 1280 is no longer held in abeyance, the CAISO will no longer accept non-net-neutral credits for resource adequacy purposes. However, the Commission can reflect the 9% of the PRM and the transmission loss factor retained by D.21-06-029 in the QC value. Specifically, the Commission can add the PRM and transmission loss factors to the ELCC values established by the refresh study and set the total value as the QC value. The QC value would not be subject to the application of the resource adequacy availability incentive mechanism (RAAIM) if a waiver request is granted by the Federal Energy Regulatory Commission.

Additional comments

Please offer any additional feedback your organization would like to provide on the updated study results and meeting discussion.

The CAISO provides the following illustrative applications of the ELCC values in Appendix A.

[11] D.21-06-029, p. 43.

Appendix A: Illustrative ELCC Values for 2022 IOU Demand Response

The CAISO provides a illustrative examples of how the ELCC percentages can be applied to the existing LIP-based NQC values to assist Commission Energy Division staff. The examples are provided as pairs for each IOU showing: (1) how the ELCC percentages may be applied at the aggregated IOU level by month from June through September and (2) how the ELCC percentages may be applied at the program level by month from June through September. The CAISO used the 2020 ELCC values provided by E3 and applied them to the values the CAISO believed were used to establish the IOU demand response credits used to reduce the resource adequacy requirement. The latest vintage available are the spreadsheets posted to the Commission resource adequacy website for the 2021-2023 PG&E, SCE, and SG&E Demand Response Totals.[12] The examples below use the 2022 data set provided.

The CAISO's illustrative examples are provided in the excel workbook is posted at:
http://www.caiso.com/Pages/documentsbygroup.aspx?GroupID=19CB4F49-2CB5-47A8-B646-912C3FE8E448

Each tab of the workbook is also copied into this appendix.

Tab: "ReadMe"

Appendix A - Illustrative ELCC Values for 2022 IOU Demand Response

Table of Contents	Description
ELCC Results	Shows results of ELCC refresh, both in MW and in comparison to 2020 NQC DR Allocations for June - September.
PG&E IOU ELCC Derate	Example of IOU-level derate. Shows PG&E 2022 DR Allocations (from 2019 LIP) scaled by PG&E aggregate ELCC result.
PG&E Program ELCC Derate	Example of program-level derate. Shows PG&E 2022 DR Allocations (from 2019 LIP) scaled by program-LCA-level ELCC results using August 2020 ELCC %.
SCE IOU ELCC Derate	Example of IOU-level derate. Shows SCE 2022 DR Allocations (from 2019 LIP) scaled by SCE's aggregate ELCC result.
SCE Program ELCC Derate	Example of program-level derate. Shows SCE 2022 DR Allocations (from 2019 LIP) scaled by program-LCA-level ELCC results using August 2020 ELCC %.
SDG&E IOU ELCC Derate	Example of IOU-level derate. Shows SDG&E 2022 DR Allocations (from 2019 LIP) scaled by SDG&E aggregate ELCC result.
SDG&E Program ELCC Derate	Example of program-level derate. Shows SDG&E 2022 DR Allocations (from 2019 LIP) scaled by program-LCA-level ELCC results .

[12] Available at: https://www.cpuc.ca.gov/General.aspx?id=6311

Tab: “ELCC Results”

Source: E3

Disclaimer: NQC numbers used are based on April 2019 LIP filing. Alternative baselines are discussed in E3's "Demand Response ELCC" study results on page 48. Available at: http://www.caiso.com/Documents/E3-CAISODemandResponseELCCStudyUpdate2021-Combined-.pdf

IOU	Program	Local Capacity Area (LCA)	ELCC, First-in 2020 (MW)	2020 NQC June (MW)	2020 NQC July (MW)	2020 NQC August (MW)	2020 NQC September (MW)	ELCC as % of NQC June 2020	ELCC as % of NQC July 2020	ELCC as % of NQC August 2020	ELCC as % of NQC September 2020	E3 Notes
All IOUs	All programs	All LCAs	1035.85	1249.42	1255.94	1306.25	1247.82	83%	82%	79%	83%	The Aggregate ELCC for all IOUs could be slightly different than sum of each IOU's ELCC. This is owing to interaction between the different IOUs' programs being captured in the former but not the latter
PG&E	All programs	All LCAs	273.39	348.84	342.43	335.40	317.91	78%	80%	82%	86%	The Aggregate ELCC could be slightly different than sum of each program's ELCC. This is owing to interaction between programs being captured in the aggregate number but not the program specific number
	BIP	All LCAs	200.80	265.98	257.10	253.30	241.80	75%	78%	79%	83%	
	CBP	Bay Area	9.03	10.00	10.00	10.00	10.00	90%	90%	90%	90%	
		CAISO System	9.81	3.00	3.00	3.00	3.00	327%	327%	327%	327%	
		Greater Fresno	9.83	9.00	9.00	9.00	9.00	109%	109%	109%	109%	
		Humboldt	1.10	0.00	0.00	0.00	0.00	0%	0%	0%	0%	NQC not disclosed to E3 due to small number of participants
		Kern	5.53	3.00	3.00	3.00	3.00	184%	184%	184%	184%	
		North Coast	4.62	1.00	1.00	1.00	1.00	462%	462%	462%	462%	
		Sierra	1.98	5.00	5.00	5.00	5.00	40%	40%	40%	40%	
		Stockton	1.39	0.00	0.00	0.00	0.00	0%	0%	0%	0%	NQC not disclosed to E3 due to small number of participants
	SAC	Bay Area	7.47	16.00	17.00	16.00	15.00	47%	44%	47%	50%	
		CAISO System	5.62	10.00	11.00	10.00	9.00	56%	51%	56%	62%	
		Greater Fresno	3.34	10.00	10.00	9.00	8.00	33%	33%	37%	42%	
		Kern	2.54	0.00	0.00	0.00	0.00	0%	0%	0%	0%	NQC not disclosed to E3 due to small number of participants
		North Coast	0.46	2.00	2.00	2.00	1.00	23%	23%	23%	46%	
		Sierra	6.16	9.00	9.00	9.00	7.00	68%	68%	68%	88%	
		Stockton	3.19	5.00	5.00	5.00	4.00	64%	64%	64%	80%	
SCE	All programs	All LCAs	754.52	892.10	901.65	957.11	914.83	85%	84%	79%	83%	The Aggregate ELCC could be slightly different than sum of each program's ELCC. This is owing to interaction between programs being captured in the aggregate number but not the program specific number
	API	Big Creek	29.52	30.07	28.87	29.57	19.29	98%	102%	100%	153%	
		CAISO System	2.10	2.61	2.66	2.62	2.45	80%	79%	80%	85%	
		LA Basin	3.82	5.22	6.03	6.44	6.03	73%	63%	59%	63%	
	BIP	Big Creek	44.86	71.12	68.63	68.87	74.42	63%	65%	65%	60%	
		CAISO System	118.71	101.88	94.16	91.75	97.34	117%	126%	129%	122%	
		LA Basin	329.20	438.99	421.92	441.58	431.19	75%	78%	75%	76%	
	CBP	Big Creek	0.39	Redacted	Redacted	Redacted	Redacted	15%	15%	15%	15%	
		CAISO System	0.20	Redacted	Redacted	Redacted	Redacted	30%	30%	30%	30%	
		LA Basin	4.57	Redacted	Redacted	Redacted	Redacted	54%	54%	54%	54%	
	SDP	Big Creek	12.95	18.66	24.40	26.12	18.60	69%	55%	51%	72%	
		CAISO System	9.24	8.37	11.83	11.64	8.96	110%	71%	72%	93%	
		LA Basin	106.20	90.68	117.21	143.11	121.13	117%	91%	74%	88%	
	SEP	Big Creek	2.95	5.97	6.47	7.84	6.28	49%	46%	38%	47%	
		CAISO System	0.56	0.94	1.01	1.01	0.86	60%	56%	56%	65%	
		LA Basin	15.01	29.68	31.85	39.97	36.68	51%	47%	38%	41%	
	LCR	LA Basin	63.82	75.00	75.00	75.00	80.00	85%	85%	85%	80%	
SDGE	All programs	SDGE	7.46	8.472	11.858	13.737	15.088	88%	63%	54%	49%	The Aggregate ELCC could be slightly different than sum of each program's ELCC. This is owing to interaction between programs being captured in the aggregate number but not the program specific number
	AC Saver DA	SDGE	2.58	3.93	4.67	5.25	5.58	66%	55%	49%	46%	
	AC Saver DO	SDGE	1.90	0.60	3.25	4.56	5.49	314%	58%	42%	35%	
	BIP	SDGE	0.68	1.01	1.01	1.01	1.10	67%	67%	67%	62%	
	CBP DA	SDGE	0.40	0.19	0.19	0.19	0.19	215%	215%	215%	215%	
	CBP DO	SDGE	2.15	2.74	2.74	2.74	2.74	78%	78%	78%	78%	

Tab: “PG&E IOU ELCC Derate” (1 of 2)

DERATED BY IOU-LEVEL ELCC (CAISO edits in red)
These are the original spreadsheets from the Resource Adequacy Compliance Materials webpage on the CPUC website with all changes shown in red text.
The IOU-level ELCC values (columns C-F, linked from ELCC Results tab) are multiplied by the Total Supply-Side Resources DR allocations for the months Jun-Sep (M-P) to determine the derated portfolio totals (Q-T).
The program-level derates are to be determined by the IOU such that the program-level allocations sum to the derated total (therefore the program-level allocations are left blank).
"N/A" denotes rows not derated (derates are only applied to IOU portfolio in aggregate).

PG&E DR Allocations for 2022 Estimated According to Load Impact Protocols (LIPs) Final Reports

Average of Hourly Ex Ante Load Impacts (MW) from 4-9 PM at Portfolio Level on Monthly Peak Load Days Under 1-in-2 Weather Year Conditions, Before Adjusting for Avoided Line Losses

Instructions: Please complete the Payments and Local Capacity Area (LCA) columns below. If payment for a program is from bundled customers only, enter 0. If payment is from distribution customers, enter 1.

Note: RA benefits for Non Event Event-Based Programs/Load Modifying Resources will be reflected in the CEC load forecast adjustments.

		ELCC Derates					Original Monthly NQC Values								ELCC Adjusted Values						
Event-Based Programs/Supply-Side Programs	Payment	ELCC % of Jun 2020	ELCC % of Jul 2020	ELCC % of Aug 2020	ELCC % of Sep 2020	Local Capacity Area (LCA)	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Base Interruptible Program (BIP)	1	N/A	N/A	N/A	N/A	Greater Bay Area	9.34	8.59	9.26	9.96	10.52	10.75	10.67	10.57	10.62					10.18	9.26	9.02
		N/A	N/A	N/A	N/A	Greater Fresno Area	11.13	8.94	9.63	10.36	10.94	11.18	11.10	11.00	11.05					10.58	9.63	9.38
		N/A	N/A	N/A	N/A	Humboldt	CONFIDENTIAL															
		N/A	N/A	N/A	N/A	Kern																
		N/A	N/A	N/A	N/A	Northern Coast																
		N/A	N/A	N/A	N/A	Sierra																
		N/A	N/A	N/A	N/A	Stockton																
		N/A	N/A	N/A	N/A	Outside LCA	123.10	119.17	128.47	138.24	145.92	149.12	148.05	146.70	147.37					141.17	128.43	125.17
		N/A	N/A	N/A	N/A	**Total IOU Service Area**	**195.63**	**186.2**	**200.73**	**215.99**	**228.01**	**232.99**	**231.33**	**229.22**	**230.26**					**220.57**	**200.68**	**195.57**
Capacity Bidding Program Day Ahead (CBP DA) -- Non-Residential	1	N/A	N/A	N/A	N/A	Greater Bay Area	0.00	0.00	0.00	0.00	11.81	15.75	21.37	22.50	19.12					17.43	0.00	0.00
		N/A	N/A	N/A	N/A	Greater Fresno Area	0.00	0.00	0.00	0.00	3.99	5.32	7.23	7.61	6.47					5.89	0.00	0.00
		N/A	N/A	N/A	N/A	Humboldt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00
		N/A	N/A	N/A	N/A	Kern	0.00	0.00	0.00	0.00	0.99	1.32	1.79	1.88	1.60					1.46	0.00	0.00
		N/A	N/A	N/A	N/A	Northern Coast	0.00	0.00	0.00	0.00	0.95	1.26	1.71	1.80	1.53					1.40	0.00	0.00
		N/A	N/A	N/A	N/A	Sierra	0.00	0.00	0.00	0.00	1.19	1.59	2.16	2.27	1.93					1.76	0.00	0.00
		N/A	N/A	N/A	N/A	Stockton	0.00	0.00	0.00	0.00	1.12	1.49	2.03	2.13	1.81					1.65	0.00	0.00
		N/A	N/A	N/A	N/A	Outside LCA	0.00	0.00	0.00	0.00	0.95	1.27	1.72	1.81	1.54					1.40	0.00	0.00
		N/A	N/A	N/A	N/A	**Total IOU Service Area**	**0.00**	**0.00**	**0.00**	**0.00**	**21.00**	**28.00**	**38.00**	**40.00**	**34.00**					**31.00**	**0.00**	**0.00**
Capacity Bidding Program Day Ahead (CBP DA) -- Residential	1	N/A	N/A	N/A	N/A	Greater Bay Area	0.00	0.00	0.00	0.00	3.53	3.53	7.07	7.07	7.07					3.53	0.00	0.00
		N/A	N/A	N/A	N/A	Greater Fresno Area	0.00	0.00	0.00	0.00	1.71	1.71	3.42	3.42	3.42					1.71	0.00	0.00
		N/A	N/A	N/A	N/A	Humboldt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00
		N/A	N/A	N/A	N/A	Kern	0.00	0.00	0.00	0.00	0.67	0.67	1.34	1.34	1.34					0.67	0.00	0.00
		N/A	N/A	N/A	N/A	Northern Coast	0.00	0.00	0.00	0.00	0.32	0.32	0.64	0.64	0.64					0.32	0.00	0.00
		N/A	N/A	N/A	N/A	Sierra	0.00	0.00	0.00	0.00	1.82	1.82	3.64	3.64	3.64					1.82	0.00	0.00
		N/A	N/A	N/A	N/A	Stockton	0.00	0.00	0.00	0.00	0.89	0.89	1.79	1.79	1.79					0.89	0.00	0.00
		N/A	N/A	N/A	N/A	Outside LCA	0.00	0.00	0.00	0.00	2.05	2.05	4.10	4.10	4.10					2.05	0.00	0.00
		N/A	N/A	N/A	N/A	**Total IOU Service Area**	**0.00**	**0.00**	**0.00**	**0.00**	**11.00**	**11.00**	**22.00**	**22.00**	**22.00**					**11.00**	**0.00**	**0.00**
Air Conditioning (AC) Cycling Residential	1	N/A	N/A	N/A	N/A	Greater Bay Area	0.00	0.00	0.00	0.00	7.25	11.83	12.36	12.16	11.40					5.37	0.00	0.00
		N/A	N/A	N/A	N/A	Greater Fresno Area	0.00	0.00	0.00	0.00	4.69	6.24	6.43	5.82	5.32					2.93	0.00	0.00
		N/A	N/A	N/A	N/A	Humboldt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00
		N/A	N/A	N/A	N/A	Kern	0.00	0.00	0.00	0.00	1.93	2.45	2.44	2.29	2.12					1.45	0.00	0.00
		N/A	N/A	N/A	N/A	Northern Coast	0.00	0.00	0.00	0.00	0.59	1.26	1.26	1.10	0.92					0.45	0.00	0.00
		N/A	N/A	N/A	N/A	Sierra	0.00	0.00	0.00	0.00	3.20	6.67	6.50	6.26	4.94					1.22	0.00	0.00
		N/A	N/A	N/A	N/A	Stockton	0.00	0.00	0.00	0.00	1.69	3.25	3.37	3.01	2.36					0.62	0.00	0.00
		N/A	N/A	N/A	N/A	Outside LCA	0.00	0.00	0.00	0.00	4.98	7.19	7.49	6.87	6.02					2.74	0.00	0.00
		N/A	N/A	N/A	N/A	**Total IOU Service Area**	**0.00**	**0.00**	**0.00**	**0.00**	**24.33**	**38.89**	**39.85**	**37.52**	**33.08**					**14.78**	**0.00**	**0.00**
2022 Total Event-Based/Supply-Side Programs		N/A	N/A	N/A	N/A	Greater Bay Area	9.34	8.59	9.26	9.96	33.11	41.86	51.46	52.29	48.20					36.52	9.26	9.02
		N/A	N/A	N/A	N/A	Greater Fresno Area	11.13	8.94	9.63	10.36	21.33	24.45	28.18	27.85	26.26					21.12	9.63	9.38
		N/A	N/A	N/A	N/A	Humboldt	CONFIDENTIAL															
		N/A	N/A	N/A	N/A	Kern																
		N/A	N/A	N/A	N/A	Northern Coast																
		N/A	N/A	N/A	N/A	Sierra																
		N/A	N/A	N/A	N/A	Stockton																
		N/A	N/A	N/A	N/A	Outside LCA	123.10	119.17	128.47	138.24	153.90	159.63	161.37	159.48	159.03					147.36	128.43	125.17
		78%	80%	82%	86%	**Total IOU Service Area**	**195.63**	**186.20**	**200.73**	**215.99**	**284.34**	**310.88**	**331.18**	**328.74**	**319.34**	**243.64**	**264.40**	**267.96**	**274.62**	**277.35**	**200.68**	**195.57**

Tab: “PG&E IOU ELCC Derate” (2 of 2)

Non Event-Based Programs/Demand-Side Programs							Jan-22	Feb-22	Mar-22	Apr-22	May-22					Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Critical Peak Pricing (CPP) -- Residential ("SmartRate")	0					Greater Bay Area	0.22	0.22	0.22	0.33	0.48					0.63	0.73	0.67	0.67	0.40	0.22	0.22
						Greater Fresno Area	0.25	0.25	0.25	1.11	1.34					1.71	1.79	1.70	1.57	1.05	0.25	0.25
						Humboldt	0.00	0.00	0.00	0.00	0.01					0.01	0.01	0.01	0.01	0.00	0.00	0.00
						Kern	0.12	0.12	0.12	0.49	0.52					0.68	0.68	0.64	0.61	0.43	0.12	0.12
						Northern Coast	0.07	0.07	0.07	0.08	0.15					0.19	0.21	0.20	0.19	0.11	0.07	0.07
						Sierra	0.36	0.36	0.36	0.46	0.66					0.92	0.98	0.90	0.82	0.39	0.36	0.36
						Stockton	0.22	0.22	0.22	0.33	0.53					0.71	0.78	0.71	0.67	0.35	0.22	0.22
						Outside LCA	0.50	0.50	0.50	0.79	1.15					1.56	1.66	1.54	1.42	0.74	0.50	0.50
						Total IOU Service Area	**1.74**	**1.74**	**1.74**	**3.60**	**4.85**					**6.43**	**6.83**	**6.37**	**5.96**	**3.48**	**1.74**	**1.74**
Critical Peak Pricing (CPP) -- Non-Residential ("Peak Day Pricing")	0					Greater Bay Area	1.38	1.38	1.39	1.39	2.92					2.71	2.63	2.66	2.67	3.13	1.40	1.40
						Greater Fresno Area	0.74	0.74	0.77	0.77	1.87					1.17	1.00	1.30	1.48	2.37	0.72	0.72
						Humboldt	0.01	0.01	0.01	0.01	0.02					0.02	0.02	0.02	0.02	0.02	0.01	0.01
						Kern	0.45	0.45	0.47	0.47	1.02					0.85	0.83	0.88	0.90	1.10	0.45	0.45
						Northern Coast	0.15	0.15	0.15	0.15	0.31					0.29	0.28	0.28	0.29	0.34	0.15	0.15
						Sierra	0.12	0.12	0.12	0.12	0.33					0.15	-0.19	0.18	0.28	0.66	0.11	0.11
						Stockton	0.11	0.11	0.11	0.11	0.37					0.10	-0.09	0.12	0.32	0.54	0.10	0.10
						Outside LCA	1.75	1.75	1.80	1.80	3.96					3.16	2.81	3.17	3.49	5.02	1.76	1.76
						Total IOU Service Area	**4.71**	**4.71**	**4.81**	**4.81**	**10.80**					**8.45**	**7.29**	**8.61**	**9.45**	**13.19**	**4.69**	**4.69**
Time of Use (TOU) Residential | Incremental	1					Greater Bay Area	21.90	20.64	19.97	15.57	19.36					39.53	40.17	39.99	41.09	20.59	20.73	24.31
						Greater Fresno Area	1.96	1.83	1.73	1.64	3.59					9.76	10.40	9.85	8.83	3.07	1.90	2.29
						Humboldt	0.07	0.06	0.07	0.06	0.06					0.29	0.29	0.30	0.30	0.06	0.07	0.07
						Kern	0.55	0.52	0.49	0.52	1.13					3.16	3.29	3.25	2.87	0.99	0.56	0.67
						Northern Coast	4.32	4.03	3.92	3.05	3.49					7.03	7.22	6.87	6.95	3.59	4.21	4.84
						Sierra	2.78	2.73	2.68	1.92	3.58					10.27	10.46	10.29	9.37	2.99	2.79	3.28
						Stockton	0.81	0.78	0.77	0.61	1.19					3.08	3.24	3.02	2.80	1.08	0.80	0.96
						Outside LCA	2.11	2.04	2.00	1.73	2.11					6.67	7.43	7.12	6.82	2.12	2.13	2.49
						Total IOU Service Area	**34.51**	**32.63**	**31.64**	**25.11**	**34.51**					**79.78**	**82.50**	**80.68**	**79.03**	**34.49**	**33.17**	**38.90**
Time of Use (TOU) Non-Residential | Incremental	1					Greater Bay Area	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Greater Fresno Area	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Humboldt	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Kern	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Northern Coast	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Sierra	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Stockton	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Outside LCA	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Total IOU Service Area	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**					**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
2022 Total Non Event-Based/Load-Modifying Programs w/out Embedded Values						Greater Bay Area	23.50	22.24	21.58	17.29	22.75					42.88	43.53	43.32	44.43	24.13	22.35	25.93
						Greater Fresno Area	2.96	2.83	2.75	3.52	6.81					12.64	13.19	12.85	11.89	6.49	2.87	3.26
						Humboldt	0.08	0.08	0.08	0.07	0.08					0.32	0.31	0.32	0.32	0.09	0.08	0.08
						Kern	1.12	1.08	1.08	1.47	2.68					4.70	4.79	4.77	4.37	2.52	1.12	1.23
						Northern Coast	4.54	4.25	4.15	3.29	3.95					7.51	7.71	7.36	7.44	4.04	4.43	5.06
						Sierra	3.26	3.21	3.16	2.50	4.56					11.34	11.26	11.37	10.47	4.04	3.26	3.76
						Stockton	1.15	1.12	1.11	1.06	2.10					3.89	3.94	3.85	3.78	1.96	1.12	1.28
						Outside LCA	4.36	4.29	4.30	4.32	7.22					11.39	11.90	11.82	11.73	7.88	4.38	4.74
						Total IOU Service Area	**40.97**	**39.09**	**38.20**	**33.52**	**50.15**					**94.67**	**96.62**	**95.66**	**94.44**	**51.15**	**39.61**	**45.34**
2022 Total Event and Non Event-Based Programs/Load Supply-Side and Load Modifying Programs							**236.60**	**225.29**	**238.93**	**249.51**	**334.49**					**338.30**	**361.02**	**363.62**	**369.06**	**328.50**	**240.29**	**240.91**

Note: the above row had a summation error in the original file from the PUC website (it summed only the Greater Bay Area supply side value rather than all LCA supply side values). The CAISO corrected this error.

Tab: “PG&E Program ELCC Derate” (1 of 2)

DERATED BY PROGRAM-LEVEL ELCC (CAISO edits in red)
These are the original spreadsheets from the Resource Adequacy Compliance Materials webpage on the CPUC website with all changes shown in red text.
The Program-level ELCC values (columns C-F, linked from ELCC Results tab) are multiplied by the program-level DR allocations for the months Jun-Sep (columnns M-P) to determine derated values (columns Q-T). The updated totals are also shown.
"N/A" denotes rows not derated (derates are only applied to LCA-level programs with corresponding ELCC results).

PG&E DR Allocations for 2022 Estimated According to Load Impact Protocols (LIPs) Final Reports

Average of Hourly Ex Ante Load Impacts (MW) from 4-9 PM at Portfolio Level on Monthly Peak Load Days Under 1-in-2 Weather Year Conditions, Before Adjusting for Avoided Line Losses

Instructions: Please complete the Payments and Local Capacity Area (LCA) columns below. If payment for a program is from bundled customers only, enter 0. If payment is from distribution customers, enter 1.

Note: RA benefits for Non Event Event-Based Programs/Load Modifying Resources will be reflected in the CEC load forecast adjustments.

		ELCC Derates					Original Monthly NQC Values								ELCC Adjusted Values						
Event-Based Programs/Supply-Side Programs	Payment	ELCC % of Jun 2020	ELCC % of Jul 2020	ELCC % of Aug 2020	ELCC % of Sep 2020	Local Capacity Area (LCA)	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Base Interruptible Program (BIP) (Note: PG&E BIP ELCC was valued for all LCAs in aggregate due to confidential information)	1	75%	78%	79%	83%	Greater Bay Area	9.34	8.59	9.26	9.96	10.52	10.75	10.67	10.57	10.62	8.12	8.33	8.38	8.82	10.18	9.26	9.02
		75%	78%	79%	83%	Greater Fresno Area	11.13	8.94	9.63	10.36	10.94	11.18	11.10	11.00	11.05	8.44	8.67	8.72	9.18	10.58	9.63	9.38
		75%	78%	79%	83%	Humboldt	CONFIDENTIAL															
		75%	78%	79%	83%	Kern																
		75%	78%	79%	83%	Northern Coast																
		75%	78%	79%	83%	Sierra																
		75%	78%	79%	83%	Stockton																
		75%	78%	79%	83%	Outside LCA	123.10	119.17	128.47	138.24	145.92	149.12	148.05	146.70	147.37	112.58	115.64	116.28	122.39	141.17	128.43	125.17
		75%	78%	79%	83%	Total IOU Service Area	**195.63**	**186.2**	**200.73**	**215.99**	**228.01**	**232.99**	**231.33**	**229.22**	**230.26**	175.89	180.69	181.69	191.23	**220.57**	**200.68**	**195.57**
Capacity Bidding Program Day Ahead (CBP DA) -- Non-Residential	1	90%	90%	90%	90%	Greater Bay Area	0.00	0.00	0.00	0.00	11.81	15.75	21.37	22.50	19.12	14.22	19.30	20.31	17.27	17.43	0.00	0.00
		109%	109%	109%	109%	Greater Fresno Area	0.00	0.00	0.00	0.00	3.99	5.32	7.23	7.61	6.47	5.81	7.89	8.31	7.06	5.89	0.00	0.00
		N/A	N/A	N/A	N/A	Humboldt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		184%	184%	184%	184%	Kern	0.00	0.00	0.00	0.00	0.99	1.32	1.79	1.88	1.60	2.43	3.29	3.47	2.95	1.46	0.00	0.00
		462%	462%	462%	462%	Northern Coast	0.00	0.00	0.00	0.00	0.95	1.26	1.71	1.80	1.53	5.83	7.92	8.33	7.08	1.40	0.00	0.00
		40%	40%	40%	40%	Sierra	0.00	0.00	0.00	0.00	1.19	1.59	2.16	2.27	1.93	0.63	0.85	0.90	0.76	1.76	0.00	0.00
		N/A	N/A	N/A	N/A	Stockton	0.00	0.00	0.00	0.00	1.12	1.49	2.03	2.13	1.81	1.49	2.03	2.13	1.81	1.65	0.00	0.00
		327%	327%	327%	327%	Outside LCA	0.00	0.00	0.00	0.00	0.95	1.27	1.72	1.81	1.54	4.14	5.62	5.92	5.03	1.40	0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	**0.00**	**0.00**	**0.00**	**0.00**	**21.00**	**28.00**	**38.00**	**40.00**	**34.00**	**34.56**	**46.90**	**49.37**	**41.96**	**31.00**	**0.00**	**0.00**
Capacity Bidding Program Day Ahead (CBP DA) -- Residential	1	90%	90%	90%	90%	Greater Bay Area	0.00	0.00	0.00	0.00	3.53	3.53	7.07	7.07	7.07	3.19	6.38	6.38	6.38	3.53	0.00	0.00
		109%	109%	109%	109%	Greater Fresno Area	0.00	0.00	0.00	0.00	1.71	1.71	3.42	3.42	3.42	1.87	3.74	3.74	3.74	1.71	0.00	0.00
		N/A	N/A	N/A	N/A	Humboldt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		184%	184%	184%	184%	Kern	0.00	0.00	0.00	0.00	0.67	0.67	1.34	1.34	1.34	1.24	2.47	2.47	2.47	0.67	0.00	0.00
		462%	462%	462%	462%	Northern Coast	0.00	0.00	0.00	0.00	0.32	0.32	0.64	0.64	0.64	1.47	2.94	2.94	2.94	0.32	0.00	0.00
		40%	40%	40%	40%	Sierra	0.00	0.00	0.00	0.00	1.82	1.82	3.64	3.64	3.64	0.72	1.44	1.44	1.44	1.82	0.00	0.00
		N/A	N/A	N/A	N/A	Stockton	0.00	0.00	0.00	0.00	0.89	0.89	1.79	1.79	1.79	0.89	1.79	1.79	1.79	0.89	0.00	0.00
		327%	327%	327%	327%	Outside LCA	0.00	0.00	0.00	0.00	2.05	2.05	4.10	4.10	4.10	6.71	13.43	13.43	13.43	2.05	0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	**0.00**	**0.00**	**0.00**	**0.00**	**11.00**	**11.00**	**22.00**	**22.00**	**22.00**	**16.09**	**32.19**	**32.19**	**32.19**	**11.00**	**0.00**	**0.00**
Air Conditioning (AC) Cycling Residential	1	47%	44%	47%	50%	Greater Bay Area	0.00	0.00	0.00	0.00	7.25	11.83	12.36	12.16	11.40	5.52	5.43	5.68	5.68	5.37	0.00	0.00
		33%	33%	37%	42%	Greater Fresno Area	0.00	0.00	0.00	0.00	4.69	6.24	6.43	5.82	5.32	2.08	2.15	2.16	2.22	2.93	0.00	0.00
		N/A	N/A	N/A	N/A	Humboldt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		N/A	N/A	N/A	N/A	Kern	0.00	0.00	0.00	0.00	1.93	2.45	2.44	2.29	2.12	2.45	2.44	2.29	2.12	1.45	0.00	0.00
		23%	23%	23%	46%	Northern Coast	0.00	0.00	0.00	0.00	0.59	1.26	1.26	1.10	0.92	0.29	0.29	0.25	0.42	0.45	0.00	0.00
		68%	68%	68%	88%	Sierra	0.00	0.00	0.00	0.00	3.20	6.67	6.50	6.26	4.94	4.56	4.45	4.28	4.34	1.22	0.00	0.00
		64%	64%	64%	80%	Stockton	0.00	0.00	0.00	0.00	1.69	3.25	3.37	3.01	2.36	2.08	2.15	1.92	1.88	0.62	0.00	0.00
		56%	51%	56%	62%	Outside LCA	0.00	0.00	0.00	0.00	4.98	7.19	7.49	6.87	6.02	4.04	3.83	3.86	3.76	2.74	0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	**0.00**	**0.00**	**0.00**	**0.00**	**24.33**	**38.89**	**39.85**	**37.52**	**33.08**	**21.02**	**20.73**	**20.45**	**20.42**	**14.78**	**0.00**	**0.00**
2022 Total Event-Based/Supply-Side Programs		N/A	N/A	N/A	N/A	Greater Bay Area	9.34	8.59	9.26	9.96	33.11	41.86	51.46	52.29	48.20	31.05	39.44	40.75	38.14	36.52	9.26	9.02
		N/A	N/A	N/A	N/A	Greater Fresno Area	11.13	8.94	9.63	10.36	21.33	24.45	28.18	27.85	26.26	18.20	22.44	22.92	22.19	21.12	9.63	9.38
		N/A	N/A	N/A	N/A	Humboldt	CONFIDENTIAL															
		N/A	N/A	N/A	N/A	Kern																
		N/A	N/A	N/A	N/A	Northern Coast																
		N/A	N/A	N/A	N/A	Sierra																
		N/A	N/A	N/A	N/A	Stockton																
		N/A	N/A	N/A	N/A	Outside LCA	123.10	119.17	128.47	138.24	153.90	159.63	161.37	159.48	159.03	127.47	138.51	139.48	144.60	147.36	128.43	125.17
		N/A	N/A	N/A	N/A	Total IOU Service Area	**195.63**	**186.20**	**200.73**	**215.99**	**284.34**	**310.88**	**331.18**	**328.74**	**319.34**	**247.56**	**280.50**	**283.69**	**285.80**	**277.35**	**200.68**	**195.57**

Tab: “PG&E Program ELCC Derate” (2 of 2)

Non Event-Based Programs/Demand-Side Programs							Jan-22	Feb-22	Mar-22	Apr-22	May-22					Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Critical Peak Pricing (CPP) -- Residential ("SmartRate")	0					Greater Bay Area	0.22	0.22	0.22	0.33	0.48					0.63	0.73	0.67	0.67	0.40	0.22	0.22
						Greater Fresno Area	0.25	0.25	0.25	1.11	1.34					1.71	1.79	1.70	1.57	1.05	0.25	0.25
						Humboldt	0.00	0.00	0.00	0.00	0.01					0.01	0.01	0.01	0.01	0.00	0.00	0.00
						Kern	0.12	0.12	0.12	0.49	0.52					0.68	0.68	0.64	0.61	0.43	0.12	0.12
						Northern Coast	0.07	0.07	0.07	0.08	0.15					0.19	0.21	0.20	0.19	0.11	0.07	0.07
						Sierra	0.36	0.36	0.36	0.46	0.66					0.92	0.98	0.90	0.82	0.39	0.36	0.36
						Stockton	0.22	0.22	0.22	0.33	0.53					0.71	0.78	0.71	0.67	0.35	0.22	0.22
						Outside LCA	0.50	0.50	0.50	0.79	1.15					1.56	1.66	1.54	1.42	0.74	0.50	0.50
						Total IOU Service Area	**1.74**	**1.74**	**1.74**	**3.60**	**4.85**					**6.43**	**6.83**	**6.37**	**5.96**	**3.48**	**1.74**	**1.74**
Critical Peak Pricing (CPP) -- Non-Residential ("Peak Day Pricing")	0					Greater Bay Area	1.38	1.38	1.39	1.39	2.92					2.71	2.63	2.66	2.67	3.13	1.40	1.40
						Greater Fresno Area	0.74	0.74	0.77	0.77	1.87					1.17	1.00	1.30	1.48	2.37	0.72	0.72
						Humboldt	0.01	0.01	0.01	0.01	0.02					0.02	0.02	0.02	0.02	0.02	0.01	0.01
						Kern	0.45	0.45	0.47	0.47	1.02					0.85	0.83	0.88	0.90	1.10	0.45	0.45
						Northern Coast	0.15	0.15	0.15	0.15	0.31					0.29	0.28	0.28	0.29	0.34	0.15	0.15
						Sierra	0.12	0.12	0.12	0.12	0.33					0.15	-0.19	0.18	0.28	0.66	0.11	0.11
						Stockton	0.11	0.11	0.11	0.11	0.37					0.10	-0.09	0.12	0.32	0.54	0.10	0.10
						Outside LCA	1.75	1.75	1.80	1.80	3.96					3.16	2.81	3.17	3.49	5.02	1.76	1.76
						Total IOU Service Area	**4.71**	**4.71**	**4.81**	**4.81**	**10.80**					**8.45**	**7.29**	**8.61**	**9.45**	**13.19**	**4.69**	**4.69**
Time of Use (TOU) Residential | Incremental	1					Greater Bay Area	21.90	20.64	19.97	15.57	19.36					39.53	40.17	39.99	41.09	20.59	20.73	24.31
						Greater Fresno Area	1.96	1.83	1.73	1.64	3.59					9.76	10.40	9.85	8.83	3.07	1.90	2.29
						Humboldt	0.07	0.06	0.07	0.06	0.06					0.29	0.29	0.30	0.30	0.06	0.07	0.07
						Kern	0.55	0.52	0.49	0.52	1.13					3.16	3.29	3.25	2.87	0.99	0.56	0.67
						Northern Coast	4.32	4.03	3.92	3.05	3.49					7.03	7.22	6.87	6.95	3.59	4.21	4.84
						Sierra	2.78	2.73	2.68	1.92	3.58					10.27	10.46	10.29	9.37	2.99	2.79	3.28
						Stockton	0.81	0.78	0.77	0.61	1.19					3.08	3.24	3.02	2.80	1.08	0.80	0.96
						Outside LCA	2.11	2.04	2.00	1.73	2.11					6.67	7.43	7.12	6.82	2.12	2.13	2.49
						Total IOU Service Area	**34.51**	**32.63**	**31.64**	**25.11**	**34.51**					**79.78**	**82.50**	**80.68**	**79.03**	**34.49**	**33.17**	**38.90**
Time of Use (TOU) Non-Residential | Incremental	1					Greater Bay Area	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Greater Fresno Area	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Humboldt	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Kern	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Northern Coast	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Sierra	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Stockton	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Outside LCA	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Total IOU Service Area	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**					**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
2022 Total Non Event-Based/Load-Modifying Programs w/out Embedded Values						Greater Bay Area	23.50	22.24	21.58	17.29	22.75					42.88	43.53	43.32	44.43	24.13	22.35	25.93
						Greater Fresno Area	2.96	2.83	2.75	3.52	6.81					12.64	13.19	12.85	11.89	6.49	2.87	3.26
						Humboldt	0.08	0.08	0.08	0.07	0.08					0.32	0.31	0.32	0.32	0.09	0.08	0.08
						Kern	1.12	1.08	1.08	1.47	2.68					4.70	4.79	4.77	4.37	2.52	1.12	1.23
						Northern Coast	4.54	4.25	4.15	3.29	3.95					7.51	7.71	7.36	7.44	4.04	4.43	5.06
						Sierra	3.26	3.21	3.16	2.50	4.56					11.34	11.26	11.37	10.47	4.04	3.26	3.76
						Stockton	1.15	1.12	1.11	1.06	2.10					3.89	3.94	3.85	3.78	1.96	1.12	1.28
						Outside LCA	4.36	4.29	4.30	4.32	7.22					11.39	11.90	11.82	11.73	7.88	4.38	4.74
						Total IOU Service Area	**40.97**	**39.09**	**38.20**	**33.52**	**50.15**					**94.67**	**96.62**	**95.66**	**94.44**	**51.15**	**39.61**	**45.34**
2022 Total Event and Non Event-Based Programs/Load Supply-Side and Load Modifying Programs							**236.60**	**225.29**	**238.93**	**249.51**	**334.49**					**342.23**	**377.12**	**379.34**	**380.24**	**328.50**	**240.29**	**240.91**

Note: the above row had a summation error in the original file from the PUC website (it summed only the Greater Bay Area supply side value rather than all LCA supply side values). The CAISO corrected this error.

Tab: “SCE IOU ELCC Derate”

DERATED BY IOU-LEVEL ELCC (CAISO edits in red)
These are the original spreadsheets from the Resource Adequacy Compliance Materials webpage on the CPUC website with all changes shown in red text.
The IOU-level ELCC values (columns C-F, linked from ELCC Results tab) are multiplied by the Total Supply-Side Resources DR allocations for the months Jun-Sep (M-P) to determine the derated portfolio totals (Q-T).
The program-level derates are to be determined by the IOU such that the program-level allocations sum to the derated total (therefore the program-level allocations are left blank).
"N/A" denotes rows not derated (derates are only applied to IOU portfolio in aggregate).

SCE DR for 2022 Estimated According to Load Impact Protocols (LIPs) Final Reports

Average of Hourly Ex Ante Load Impacts (MW) from 4-9 PM at Portfolio Level on Monthly Peak Load Days Under 1-in-2 Weather Year Conditions, Before Adjusting for Avoided Line Losses

Instructions: Please complete the Payments and Local Capacity Area (LCA) columns below. If payment for a program is from bundled customers only, enter 0. If payment is from distribution customers, enter 1.

Note: RA benefits for Non Event Event-Based Programs/Load Modifying Resources will be reflected in the CEC load forecast adjustments.

		ELCC Derates					Original Monthly NQC Values					ELCC Adjusted Values						
Event-Based Programs/Supply-Side Resources	Payments	ELCC % of Jun 2020	ELCC % of Jul 2020	ELCC % of Aug 2020	ELCC % of Sep 2020	Local Capacity Area (LCA)	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Base Interruptible Program (BIP) 15 min	1	N/A	N/A	N/A	N/A	LA Basin	CONFIDENTIAL											
		N/A	N/A	N/A	N/A	Big Creek/Ventura												
		N/A	N/A	N/A	N/A	Outside LCA	44.15	49.66	50.34	56.12	58.42	55.63	59.06	54.05	58.46					63.49	63.47	52.24
		N/A	N/A	N/A	N/A	Total IOU Service Area	144.60	156.50	144.70	156.70	164.80	167.10	166.70	168.10	167.90					167.10	173.20	153.00
Base Interruptible Program (BIP) 30 min	1	N/A	N/A	N/A	N/A	LA Basin	313.82	339.19	315.66	317.91	304.58	312.52	298.46	309.38	308.12					306.11	318.48	292.22
		N/A	N/A	N/A	N/A	Big Creek/Ventura	CONFIDENTIAL											
		N/A	N/A	N/A	N/A	Outside LCA												
		N/A	N/A	N/A	N/A	Total IOU Service Area	373.60	397.70	372.00	388.00	373.90	382.20	359.90	375.10	378.30					368.70	376.60	354.20
Agricultural and Pumping Interruptible (API)	1	N/A	N/A	N/A	N/A	LA Basin	3.07	3.14	3.87	4.44	4.55	4.74	4.92	4.96	5.01					4.77	4.66	3.71
		N/A	N/A	N/A	N/A	Big Creek/Ventura	7.36	6.90	9.92	16.81	19.28	25.04	25.11	25.41	23.74					18.77	11.03	7.39
		N/A	N/A	N/A	N/A	Outside LCA	0.13	0.12	0.47	1.62	1.85	2.07	2.04	2.01	1.90					1.44	0.85	-0.13
		N/A	N/A	N/A	N/A	Total IOU Service Area	10.60	10.20	14.30	22.90	25.70	31.90	32.10	32.40	30.70					25.00	16.50	11.00
Capacity Bidding Program Day Of (CBP DO)	1	N/A	N/A	N/A	N/A	LA Basin	0.23	0.23	0.23	0.23	CONFIDENTIAL										0.23	0.23
		N/A	N/A	N/A	N/A	Big Creek/Ventura	0.51	0.51	0.51	0.51	0.85	0.85	0.85	0.85	0.85					0.85	0.51	0.51
		N/A	N/A	N/A	N/A	Outside LCA	0.00	0.00	0.00	0.00	CONFIDENTIAL										0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	0.70	0.70	0.70	0.70	3.80	3.80	3.80	3.80	3.80					3.80	0.70	0.70
Capacity Bidding Program Day Ahead (CBP DA)	1	N/A	N/A	N/A	N/A	LA Basin	0.00	0.00	0.00	0.00	CONFIDENTIAL										0.00	0.00
		N/A	N/A	N/A	N/A	Big Creek/Ventura	0.00	0.00	0.00	0.00	0.44	0.44	0.44	0.44	0.44					0.44	0.00	0.00
		N/A	N/A	N/A	N/A	Outside LCA	0.00	0.00	0.00	0.00	CONFIDENTIAL										0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	0.00	0.00	0.00	0.00	3.80	3.80	3.80	3.80	3.80					3.80	0.00	0.00
AC Cycling ("Summer Discount Plan") Commercial	1	N/A	N/A	N/A	N/A	LA Basin	0.00	0.00	2.08	8.70	8.86	8.40	11.62	11.97	13.15					11.19	8.33	0.00
		N/A	N/A	N/A	N/A	Big Creek/Ventura	0.00	0.00	0.26	1.98	2.21	2.66	3.30	3.35	3.30					2.62	1.70	0.00
		N/A	N/A	N/A	N/A	Outside LCA	0.00	0.00	0.00	0.63	0.83	1.07	1.38	1.14	1.13					0.63	0.32	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	0.00	0.00	2.30	11.30	11.90	12.10	16.30	16.50	17.60					14.40	10.30	0.00
AC Cycling ("Summer Discount Plan") Residential	1	N/A	N/A	N/A	N/A	LA Basin	0.00	0.00	0.00	31.22	33.62	47.21	98.93	116.22	124.22					70.32	26.05	0.00
		N/A	N/A	N/A	N/A	Big Creek/Ventura	0.00	0.00	0.00	0.25	1.54	12.23	18.02	18.36	15.46					3.95	1.19	0.00
		N/A	N/A	N/A	N/A	Outside LCA	0.00	0.00	0.00	0.00	0.49	5.41	9.10	7.43	5.87					0.00	0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	0.00	0.00	0.00	31.50	35.60	64.90	126.00	142.00	145.50					74.30	27.20	0.00
Peak Time Rebate (PTR) ("Smart Energy Program," previously "Save Power Day")	0	N/A	N/A	N/A	N/A	LA Basin	0.00	0.00	0.00	12.45	15.01	18.74	35.65	39.28	39.43					26.53	16.40	0.00
		N/A	N/A	N/A	N/A	Big Creek/Ventura	0.00	0.00	0.00	0.00	2.40	3.94	6.14	6.27	5.49					2.88	0.00	0.00
		N/A	N/A	N/A	N/A	Outside LCA	0.00	0.00	0.00	0.00	0.40	0.74	1.26	1.03	0.89					0.00	0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	0.00	0.00	0.00	12.40	17.80	23.40	43.00	46.60	46.00					29.40	16.40	0.00
LCR		N/A	N/A	N/A	N/A																	
2022 Total Event-Based Programs/Supply-Side Resources		N/A	N/A	N/A	N/A	LA Basin	377.93	407.35	383.09	437.42	437.91	465.36	519.74	555.11	564.56					489.42	439.01	355.79
		N/A	N/A	N/A	N/A	Big Creek/Ventura	80.03	81.28	75.94	91.49	105.33	126.17	131.19	134.52	122.29					99.52	90.71	80.09
		N/A	N/A	N/A	N/A	Outside LCA	71.55	76.43	75.02	94.66	94.06	97.66	100.72	98.70	106.56					97.55	91.40	83.03
		85%	84%	79%	83%	Total IOU Service Area	529.50	565.10	534.00	623.50	637.30	689.20	751.60	788.30	793.60	582.91	630.34	622.75	655.96	686.50	620.90	518.90

Non Event-Based Programs/Load Modifying Resources	Payments	Local Capacity Area (LCA)	Jan-22	Feb-22	Mar-22	Apr-22	May-22					Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Critical Peak Pricing (CPP) Medium and Small Customers	0	LA Basin	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Big Creek/Ventura	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Outside LCA	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Total IOU Service Area	0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
Critical Peak Pricing (CPP) Large Customers	0	LA Basin	7.08	7.08	7.13	7.71	7.87					7.61	7.58	7.68	7.67	8.14	7.31	7.08
		Big Creek/Ventura	CONFIDENTIAL															
		Outside LCA																
		Total IOU Service Area	8.10	8.10	8.10	8.80	9.00					8.70	8.60	8.70	8.70	9.30	8.30	8.10
Real Time Pricing (RTP)	0	LA Basin	0.11	0.07	0.25	0.30	0.26					0.65	-0.03	-0.20	-0.36	0.24	0.07	0.01
		Big Creek/Ventura	CONFIDENTIAL															
		Outside LCA																
		Total IOU Service Area	0.10	0.10	0.20	0.30	0.30					0.60	0.00	-0.20	-0.30	0.20	0.10	0.00
2022 Total Non Event-Based Programs/Load Modifying Resources		LA Basin	7.20	7.15	7.38	8.01	8.13					8.26	7.54	7.47	7.31	8.38	7.37	7.09
		Big Creek/Ventura	0.23	0.23	0.23	0.25	0.26					0.26	0.28	0.29	0.29	0.26	0.24	0.23
		Outside LCA	0.75	75.00	0.76	0.82	.83.					0.80	0.79	0.80	0.80	0.86	0.78	0.75
		Total IOU Service Area	8.20	8.20	8.30	9.10	9.30					9.30	8.60	8.50	8.40	9.50	8.40	8.10
2022 Total Event and Non Event-Based Programs			537.70	573.30	542.30	632.60	646.60					592.21	638.94	631.25	664.36	696.00	629.30	527.00

Tab: “SCE Program ELCC Derate”

DERATED BY PROGRAM-LEVEL ELCC (CAISO edits in red)
These are the original spreadsheets from the Resource Adequacy Compliance Materials webpage on the CPUC website with all changes shown in red text.
The Program-level ELCC values (columns C-F, linked from ELCC Results tab) are multiplied by the program-level DR allocations for the months Jun-Sep (columnns M-P) to determine derated values (columns Q-T). The updated totals are also shown.
"N/A" denotes rows not derated (derates are only applied to LCA-level programs with corresponding ELCC results). "?" denotes totals that cannot be summed due to lack of information (confidential data).

SCE DR for 2022 Estimated According to Load Impact Protocols (LIPs) Final Reports
Average of Hourly Ex Ante Load Impacts (MW) from 4-9 PM at Portfolio Level on Monthly Peak Load Days Under 1-in-2 Weather Year Conditions, Before Adjusting for Avoided Line Losses
Instructions: Please complete the Payments and Local Capacity Area (LCA) columns below. If payment for a program is from bundled customers only, enter 0. If payment is from distribution customers, enter 1.
Note: RA benefits for Non Event Event-Based Programs/Load Modifying Resources will be reflected in the CEC load forecast adjustments.

		ELCC Derates					Original Monthly NQC Values					ELCC Adjusted Values						
Event-Based Programs/Supply-Side Resources	Payments	ELCC % of Jun 2020	ELCC % of Jul 2020	ELCC % of Aug 2020	ELCC % of Sep 2020	Local Capacity Area (LCA)	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Base Interruptible Program (BIP) 15 min	1	75%	78%	75%	76%	LA Basin	CONFIDENTIAL															
		63%	65%	65%	60%	Big Creek/Ventura																
		117%	126%	129%	122%	Outside LCA	44.15	49.66	50.34	56.12	58.42	55.63	59.06	54.05	58.46	64.82	74.46	69.93	71.29	63.49	63.47	52.24
		N/A	N/A	N/A	N/A	Total IOU Service Area	**144.60**	**156.50**	**144.70**	**156.70**	**164.80**	**167.10**	**166.70**	**168.10**	**167.90**	?	?	?	?	**167.10**	**173.20**	**153.00**
Base Interruptible Program (BIP) 30 min	1	75%	78%	75%	76%	LA Basin	313.82	339.19	315.66	317.91	304.58	312.52	298.46	309.38	308.12	234.36	232.87	230.65	235.24	306.11	318.48	292.22
		63%	65%	65%	60%	Big Creek/Ventura	CONFIDENTIAL															
		117%	126%	129%	122%	Outside LCA																
		N/A	N/A	N/A	N/A	Total IOU Service Area	**373.60**	**397.70**	**372.00**	**388.00**	**373.90**	**382.20**	**359.90**	**375.10**	**378.30**	?	?	?	?	**368.70**	**376.60**	**354.20**
Agricultural and Pumping Interruptible (API)	1	73%	63%	59%	63%	LA Basin	3.07	3.14	3.87	4.44	4.55	4.74	4.92	4.96	5.01	3.47	3.12	2.94	3.18	4.77	4.66	3.71
		98%	102%	100%	153%	Big Creek/Ventura	7.36	6.90	9.92	16.81	19.28	25.04	25.11	25.41	23.74	24.59	25.68	25.38	36.34	18.77	11.03	7.39
		80%	79%	80%	85%	Outside LCA	0.13	0.12	0.47	1.62	1.85	2.07	2.04	2.01	1.90	1.66	1.61	1.61	1.62	1.44	0.85	-0.13
		N/A	N/A	N/A	N/A	Total IOU Service Area	**10.60**	**10.20**	**14.30**	**22.90**	**25.70**	**31.90**	**32.10**	**32.40**	**30.70**	**29.72**	**30.41**	**29.93**	**41.14**	**25.00**	**16.50**	**11.00**
Capacity Bidding Program Day Of (CBP DO)	1	54%	54%	54%	54%	LA Basin	0.23	0.23	0.23	0.23	CONFIDENTIAL										0.23	0.23
		15%	15%	15%	15%	Big Creek/Ventura	0.51	0.51	0.51	0.51	0.85	0.85	0.85	0.85	0.85	0.13	0.13	0.13	0.13	0.85	0.51	0.51
		30%	30%	30%	30%	Outside LCA	0.00	0.00	0.00	0.00	CONFIDENTIAL										0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	**0.70**	**0.70**	**0.70**	**0.70**	**3.80**	**3.80**	**3.80**	**3.80**	**3.80**	?	?	?	?	**3.80**	**0.70**	**0.70**
Capacity Bidding Program Day Ahead (CBP DA)	1	54%	54%	54%	54%	LA Basin	0.00	0.00	0.00	0.00	CONFIDENTIAL										0.00	0.00
		15%	15%	15%	15%	Big Creek/Ventura	0.00	0.00	0.00	0.00	0.44	0.44	0.44	0.44	0.44	0.07	0.07	0.07	0.07	0.44	0.00	0.00
		30%	30%	30%	30%	Outside LCA	0.00	0.00	0.00	0.00	CONFIDENTIAL										0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	**0.00**	**0.00**	**0.00**	**0.00**	**3.80**	**3.80**	**3.80**	**3.80**	**3.80**	?	?	?	?	**3.80**	**0.00**	**0.00**
AC Cycling ("Summer Discount Plan") Commercial	1	117%	91%	74%	88%	LA Basin	0.00	0.00	2.08	8.70	8.86	8.40	11.62	11.97	13.15	9.84	10.53	8.88	11.53	11.19	8.33	0.00
		69%	55%	51%	72%	Big Creek/Ventura	0.00	0.00	0.26	1.98	2.21	2.66	3.30	3.35	3.30	1.85	1.83	1.72	2.37	2.62	1.70	0.00
		110%	71%	72%	93%	Outside LCA	0.00	0.00	0.00	0.63	0.83	1.07	1.38	1.14	1.13	1.18	0.97	0.82	1.05	0.63	0.32	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	**0.00**	**0.00**	**2.30**	**11.30**	**11.90**	**12.10**	**16.30**	**16.50**	**17.60**	**12.86**	**13.33**	**11.42**	**14.94**	**14.40**	**10.30**	**0.00**
AC Cycling ("Summer Discount Plan") Residential	1	117%	91%	74%	88%	LA Basin	0.00	0.00	0.00	31.22	33.62	47.21	98.93	116.22	124.22	55.29	89.63	86.24	108.91	70.32	26.05	0.00
		69%	55%	51%	72%	Big Creek/Ventura	0.00	0.00	0.00	0.25	1.54	12.23	18.02	18.36	15.46	8.48	9.97	9.41	11.07	3.95	1.19	0.00
		110%	71%	72%	93%	Outside LCA	0.00	0.00	0.00	0.00	0.49	5.41	9.10	7.43	5.87	5.97	6.44	5.35	5.45	0.00	0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	**0.00**	**0.00**	**0.00**	**31.50**	**35.60**	**64.90**	**126.00**	**142.00**	**145.50**	**69.74**	**106.04**	**101.00**	**125.42**	**74.30**	**27.20**	**0.00**
Peak Time Rebate (PTR) ("Smart Energy Program," previously "Save Power Day")	0	51%	47%	38%	41%	LA Basin	0.00	0.00	0.00	12.45	15.01	18.74	35.65	39.28	39.43	9.48	16.80	14.75	16.13	26.53	16.40	0.00
		49%	46%	38%	47%	Big Creek/Ventura	0.00	0.00	0.00	0.00	2.40	3.94	6.14	6.27	5.49	1.94	2.80	2.36	2.57	2.88	0.00	0.00
		60%	56%	56%	65%	Outside LCA	0.00	0.00	0.00	0.00	0.40	0.74	1.26	1.03	0.89	0.44	0.70	0.57	0.58	0.00	0.00	0.00
		N/A	N/A	N/A	N/A	Total IOU Service Area	**0.00**	**0.00**	**0.00**	**12.40**	**17.80**	**23.40**	**43.00**	**46.60**	**46.00**	**11.86**	**20.30**	**17.68**	**19.29**	**29.40**	**16.40**	**0.00**
LCR		85%	85%	85%	80%																	
2022 Total Event-Based Programs/Supply-Side Resources		N/A	N/A	N/A	N/A	LA Basin	**377.93**	**407.35**	**383.09**	**437.42**	**437.91**	**465.36**	**519.74**	**555.11**	**564.56**	?	?	?	?	**489.42**	**439.01**	**355.79**
		N/A	N/A	N/A	N/A	Big Creek/Ventura	**80.03**	**81.28**	**75.94**	**91.49**	**105.33**	**126.17**	**131.19**	**134.52**	**122.29**	?	?	?	?	**99.52**	**90.71**	**80.09**
		N/A	N/A	N/A	N/A	Outside LCA	**71.55**	**76.43**	**75.02**	**94.66**	**94.06**	**97.66**	**100.72**	**98.70**	**106.56**	?	?	?	?	**97.55**	**91.40**	**83.03**
		N/A	N/A	N/A	N/A	Total IOU Service Area	**529.50**	**565.10**	**534.00**	**623.50**	**637.30**	**689.20**	**751.60**	**788.30**	**793.60**	?	?	?	?	**686.50**	**620.90**	**518.90**

Non Event-Based Programs/Load Modifying Resources	Payments	Local Capacity Area (LCA)	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Critical Peak Pricing (CPP) Medium and Small Customers	0	LA Basin	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Big Creek/Ventura	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Outside LCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Total IOU Service Area	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Critical Peak Pricing (CPP) Large Customers	0	LA Basin	7.08	7.08	7.13	7.71	7.87	7.61	7.58	7.68	7.67	8.14	7.31	7.08
		Big Creek/Ventura	CONFIDENTIAL											
		Outside LCA												
		Total IOU Service Area	**8.10**	**8.10**	**8.10**	**8.80**	**9.00**	**8.70**	**8.60**	**8.70**	**8.70**	**9.30**	**8.30**	**8.10**
Real Time Pricing (RTP)	0	LA Basin	0.11	0.07	0.25	0.30	0.26	0.65	-0.03	-0.20	-0.36	0.24	0.07	0.01
		Big Creek/Ventura	CONFIDENTIAL											
		Outside LCA												
		Total IOU Service Area	**0.10**	**0.10**	**0.20**	**0.30**	**0.30**	**0.60**	**0.00**	**-0.20**	**-0.30**	**0.20**	**0.10**	**0.00**
2022 Total Non Event-Based Programs/Load Modifying Resources		LA Basin	**7.20**	**7.15**	**7.38**	**8.01**	**8.13**	**8.26**	**7.54**	**7.47**	**7.31**	**8.38**	**7.37**	**7.09**
		Big Creek/Ventura	**0.23**	**0.23**	**0.23**	**0.25**	**0.26**	**0.26**	**0.28**	**0.29**	**0.29**	**0.26**	**0.24**	**0.23**
		Outside LCA	**0.75**	**75.00**	**0.76**	**0.82**	**.83.**	**0.80**	**0.79**	**0.80**	**0.80**	**0.86**	**0.78**	**0.75**
		Total IOU Service Area	**8.20**	**8.20**	**8.30**	**9.10**	**9.30**	**9.30**	**8.60**	**8.50**	**8.40**	**9.50**	**8.40**	**8.10**
2022 Total Event and Non Event-Based Programs			**537.70**	**573.30**	**542.30**	**632.60**	**646.60**	?	?	?	?	**696.00**	**629.30**	**527.00**

Tab: “SDG&E IOU ELCC Derate”

DERATED BY IOU-LEVEL ELCC (CAISO edits in red)
These are the original spreadsheets from the Resource Adequacy Compliance Materials webpage on the CPUC website with all changes shown in red text.
The IOU-level ELCC values (columns C-F, linked from ELCC Results tab) are multiplied by the Total Supply-Side Resources DR allocations for the months Jun-Sep (L-O) to determine the derated portfolio totals (P-S).
The program-level derates are to be determined by the IOU such that the program-level allocations sum to the derated total (therefore the program-level allocations are left blank).
"N/A" denotes rows not derated (derates are only applied to IOU portfolio in aggregate).

SDG&E DR Allocations for PY2022, Estimated According to Load Impact Protocols (LIPs) Final Reports

Average of Hourly Ex Ante Load Impacts (MW) from 4-9 PM at Portfolio Level on Monthly Peak Load Days Under 1-in-2 Weather Year Conditions, Before Adjusting for Avoided Line Losses

Instructions: Please complete the Payments and Local Capacity Area (LCA) columns below. If payment for a program is from bundled customers only, enter 1. If payment is from distribution customers, enter 1.

Note: RA benefits for Non Event Event-Based Programs/Load Modifying Resources will be reflected in the CEC load forecast adjustments.

		ELCC Derates									Original Monthly NQC Values				ELCC Adjusted Values						
Event-Based Programs/Supply-Side Resources	**Payments**	**ELCC % of Jun 2020**	**ELCC % of Jul 2020**	**ELCC % of Aug 2020**	**ELCC % of Sep 2020**	**Jan-22**	**Feb-22**	**Mar-22**	**Apr-22**	**May-22**	**Jun-22**	**Jul-22**	**Aug-22**	**Sep-22**	**Jun-22**	**Jul-22**	**Aug-22**	**Sep-22**	**Oct-22**	**Nov-22**	**Dec-22**
BIP	1	N/A	N/A	N/A	N/A	0.99	0.84	1.10	1.01	0.98	1.16	1.10	1.09	1.21					1.03	1.16	0.80
CBP Day Of	1	N/A	N/A	N/A	N/A	0.00	0.00	0.00	0.00	3.36	3.36	3.36	3.36	3.36					3.36	0.00	0.00
CBP Day Ahead	1	N/A	N/A	N/A	N/A	0.00	0.00	0.00	0.00	0.22	0.22	0.22	0.22	0.22					0.22	0.00	0.00
Air Conditioning (AC) Cycling Day Of ("AC Saver DO") -- Commercial	1	N/A	N/A	N/A	N/A	0.00	0.00	0.00	0.18	0.26	0.20	0.41	0.50	0.60					0.41	0.00	0.00
Air Conditioning (AC) Cycling Day Of ("AC Saver DO") -- Residential	1	N/A	N/A	N/A	N/A	0.00	0.00	0.00	0.00	0.23	0.02	1.02	1.54	1.88					1.01	0.00	0.00
Air Conditioning (AC) Day Ahead ("AC Saver DA") -- Commercial	1	N/A	N/A	N/A	N/A	0.00	0.00	0.00	0.38	0.55	0.51	0.88	1.10	1.25					0.78	0.15	0.00
Air Conditioning (AC) Day Ahead ("AC Saver DA") -- Residential	1	N/A	N/A	N/A	N/A	0.00	0.00	0.00	2.13	3.41	2.97	5.74	7.75	9.49					5.27	0.70	0.00
2022 Total Event Based Programs/Supply-Side Resources		**88%**	**63%**	**54%**	**49%**	**0.99**	**0.84**	**1.11**	**3.71**	**8.99**	**8.44**	**12.71**	**15.55**	**18.00**	**7.43**	**7.99**	**8.44**	**8.90**	**12.06**	**2.01**	**0.80**
Non Event-Based Programs/Load Modifying Resources	**Payments**					**Jan-22**	**Feb-22**	**Mar-22**	**Apr-22**	**May-22**					**Jun-22**	**Jul-22**	**Aug-22**	**Sep-22**	**Oct-22**	**Nov-22**	**Dec-22**
CPP-D Large	1*					2.10	2.10	2.10	2.05	2.04					2.04	4.02	3.01	3.50	2.01	2.06	2.10
CPP-D Medium	1*					0.00	0.00	0.00	0.00	0.00					0.00	0.00	-0.69	1.71	-1.08	0.00	0.00
EV-TOU 2	0					1.30	1.27	0.07	0.08	1.08					0.71	1.04	1.14	1.47	0.91	1.20	1.37
EV-TOU 5	0					4.28	4.30	2.09	2.02	3.95					5.29	6.60	6.99	8.64	6.20	4.59	5.03
TOU-1	0					1.78	0.07	-0.44	4.01	3.94					4.23	8.81	13.04	15.31	10.41	3.71	2.56
TOU-2	0					0.11	0.11	0.04	0.21	0.28					0.44	0.61	0.57	0.62	0.33	0.21	0.17
TOU and CPP Small Agricultural (w/out TD)	1*					0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOU and CPP Small Commercial (w/out TD)	1*					-0.04	-0.04	-0.04	-0.05	-0.05					-0.05	-0.06	-0.06	-0.06	-0.05	-0.04	-0.04
CPP Small, Large and Medium on TD	1					0.00	0.00	0.00	0.03	0.05					0.04	0.07	0.11	0.15	0.08	0.01	0.00
TOU and CPP Residential (Voluntary, w/out TD)	1*					0.09	0.08	0.06	0.06	0.07					0.08	0.11	0.12	0.13	0.10	0.08	0.09
TOU and CPP Grandfather Residential (Voluntary, w/TD)	1*					0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
CPP Residential on TD	1					0.03	0.02	0.03	0.03	0.03					0.03	0.04	0.04	0.04	0.03	0.03	0.03
2022 Total Non Event-Based Programs/Load Modifying Resources						**9.64**	**7.92**	**3.92**	**8.45**	**11.38**					**12.81**	**21.24**	**24.26**	**31.51**	**18.93**	**11.85**	**11.30**
2022 Total Event and Non Event-Based Programs						**10.63**	**8.76**	**5.03**	**12.16**	**20.37**					**20.24**	**29.24**	**32.71**	**40.41**	**30.99**	**13.86**	**12.11**

Payment$ - if payment for this program is from bundled customers only, enter 0, if all distribution customers, enter 1
* CPP Implementation costs recovered from all customers, and annual over- or under-collections are recovered from only bundled customers.
Load impact benefits are applied to the peak Load Forecast.

Tab: “SDG&E Program ELCC Derate”

DERATED BY PROGRAM-LEVEL ELCC (CAISO edits in red)
These are the original spreadsheets from the Resource Adequacy Compliance Materials webpage on the CPUC website with all changes shown in red text.
The Program-level ELCC values (columns C-F, linked from ELCC Results tab) are multiplied by the program-level DR allocations for the months Jun-Sep (columnns L-O) to determine derated values (columns P-S). The updated totals are also shown.
"N/A" denotes rows not derated (derates are only applied to LCA-level programs with corresponding ELCC results).

SDG&E DR Allocations for PY2022, Estimated According to Load Impact Protocols (LIPs) Final Reports

Average of Hourly Ex Ante Load Impacts (MW) from 4-9 PM at Portfolio Level on Monthly Peak Load Days Under 1-in-2 Weather Year Conditions, Before Adjusting for Avoided Line Losses

Instructions: Please complete the Payments and Local Capacity Area (LCA) columns below. If payment for a program is from bundled customers only, enter 1. If payment is from distribution customers, enter 1.

Note: RA benefits for Non Event Event-Based Programs/Load Modifying Resources will be reflected in the CEC load forecast adjustments.

		ELCC Derates									Original Monthly NQC Values				ELCC Adjusted Values						
Event-Based Programs/Supply-Side Resources	**Payments**	**ELCC % of Jun 2020**	**ELCC % of Jul 2020**	**ELCC % of Aug 2020**	**ELCC % of Sep 2020**	**Jan-22**	**Feb-22**	**Mar-22**	**Apr-22**	**May-22**	**Jun-22**	**Jul-22**	**Aug-22**	**Sep-22**	**Jun-22**	**Jul-22**	**Aug-22**	**Sep-22**	**Oct-22**	**Nov-22**	**Dec-22**
BIP	1	67%	67%	67%	62%	0.99	0.84	1.10	1.01	0.98	1.16	1.10	1.09	1.21	0.78	0.74	0.73	0.74	1.03	1.16	0.80
CBP Day Of	1	78%	78%	78%	78%	0.00	0.00	0.00	0.00	3.36	3.36	3.36	3.36	3.36	2.63	2.63	2.63	2.63	3.36	0.00	0.00
CBP Day Ahead	1	215%	215%	215%	215%	0.00	0.00	0.00	0.00	0.22	0.22	0.22	0.22	0.22	0.47	0.46	0.46	0.46	0.22	0.00	0.00
Air Conditioning (AC) Cycling Day Of ("AC Saver DO") -- Commercial	1	314%	58%	42%	35%	0.00	0.00	0.00	0.18	0.26	0.20	0.41	0.50	0.60	0.63	0.24	0.21	0.21	0.41	0.00	0.00
Air Conditioning (AC) Cycling Day Of ("AC Saver DO") -- Residential	1	314%	58%	42%	35%	0.00	0.00	0.00	0.00	0.23	0.02	1.02	1.54	1.88	0.06	0.59	0.64	0.65	1.01	0.00	0.00
Air Conditioning (AC) Day Ahead ("AC Saver DA") -- Commercial	1	66%	55%	49%	46%	0.00	0.00	0.00	0.38	0.55	0.51	0.88	1.10	1.25	0.34	0.49	0.54	0.58	0.78	0.15	0.00
Air Conditioning (AC) Day Ahead ("AC Saver DA") -- Residential	1	66%	55%	49%	46%	0.00	0.00	0.00	2.13	3.41	2.97	5.74	7.75	9.49	1.96	3.18	3.82	4.40	5.27	0.70	0.00
2022 Total Event Based Programs/Supply-Side Resources		N/A	N/A	N/A	N/A	**0.99**	**0.84**	**1.11**	**3.71**	**8.99**	**8.44**	**12.71**	**15.55**	**18.00**	**6.86**	**8.32**	**9.04**	**9.67**	**12.06**	**2.01**	**0.80**
Non Event-Based Programs/Load Modifying Resources	**Payments**					**Jan-22**	**Feb-22**	**Mar-22**	**Apr-22**	**May-22**					**Jun-22**	**Jul-22**	**Aug-22**	**Sep-22**	**Oct-22**	**Nov-22**	**Dec-22**
CPP-D Large	1*					2.10	2.10	2.10	2.05	2.04					2.04	4.02	3.01	3.50	2.01	2.06	2.10
CPP-D Medium	1*					0.00	0.00	0.00	0.00	0.00					0.00	0.00	-0.69	1.71	-1.08	0.00	0.00
EV-TOU 2	0					1.30	1.27	0.07	0.08	1.08					0.71	1.04	1.14	1.47	0.91	1.20	1.37
EV-TOU 5	0					4.28	4.30	2.09	2.02	3.95					5.29	6.60	6.99	8.64	6.20	4.59	5.03
TOU-1	0					1.78	0.07	-0.44	4.01	3.94					4.23	8.81	13.04	15.31	10.41	3.71	2.56
TOU-2	0					0.11	0.11	0.04	0.21	0.28					0.44	0.61	0.57	0.62	0.33	0.21	0.17
TOU and CPP Small Agricultural (w/out TD)	1*					0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOU and CPP Small Commercial (w/out TD)	1*					-0.04	-0.04	-0.04	-0.05	-0.05					-0.05	-0.06	-0.06	-0.06	-0.05	-0.04	-0.04
CPP Small, Large and Medium on TD	1					0.00	0.00	0.00	0.03	0.05					0.04	0.07	0.11	0.15	0.08	0.01	0.00
TOU and CPP Residential (Voluntary, w/out TD)	1*					0.09	0.08	0.06	0.06	0.07					0.08	0.11	0.12	0.13	0.10	0.08	0.09
TOU and CPP Grandfather Residential (Voluntary, w/TD)	1*					0.00	0.00	0.00	0.00	0.00					0.00	0.00	0.00	0.00	0.00	0.00	0.00
CPP Residential on TD	1					0.03	0.02	0.03	0.03	0.03					0.03	0.04	0.04	0.04	0.03	0.03	0.03
2022 Total Non Event-Based Programs/Load Modifying Resources						**9.64**	**7.92**	**3.92**	**8.45**	**11.38**					**12.81**	**21.24**	**24.26**	**31.51**	**18.93**	**11.85**	**11.30**
2022 Total Event and Non Event-Based Programs						**10.63**	**8.76**	**5.03**	**12.16**	**20.37**					**19.67**	**29.57**	**33.30**	**41.18**	**30.99**	**13.86**	**12.11**

Payment$ - if payment for this program is from bundled customers only, enter 0, if all distribution customers, enter 1
* CPP Implementation costs recovered from all customers, and annual over- or under-collections are recovered from only bundled customers.
Load impact benefits are applied to the peak Load Forecast.

ATTACHMENT E

Notice of Availability

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Refinements, and Establish Forward Resource Adequacy Procurement Obligations.	Rulemaking 19-11-009 (Filed November 7, 2019)

NOTICE OF AVAILABILITY – REFRESHED EFFECTIVE LOAD CARRYING CAPABILITY STUDY RESULTS OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION PACIFIC GAS AND ELECTRIC COMPANY (U 39 E), SOUTHERN CALIFORNIA EDISON COMPANY (U338-E), AND SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E)

Pursuant to the *Assigned Commissioner's Ruling on Submission of Refreshed Effective Load Carrying Capability Study Results*, the California Independent System Operator Corporation (CAISO), Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E)[1] hereby provide notice to the service list for Rulemaking 19-11-009 that the compliance filing providing refreshed effective load carrying capability study results is available at the following address:

http://www.caiso.com/Documents/Jul1-2021-ComplianceFilingRefreshedEffectiveLoadCarryingCapabilityStudyResults-ResourceAdequacy-R19-11-009.pdf

Respectfully submitted,

By: *<u>/s/ Jordan Pinjuv</u>*

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[1] Pursuant to Rule 1.8(d) of the California Public Utilities Commission's (Commission) Rules of Practice and Procedure, the PG&E, SCE and SDG&E have authorized the CAISO to make this filing on their behalf.

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Dated: July 1, 2021