

**DOCKETED**

<b>Docket Number:</b>	21-DR-01
<b>Project Title:</b>	Supply Side Demand Response
<b>TN #:</b>	241126
<b>Document Title:</b>	Presentation - CLECA Demand Response Counting Method Using LIP Informed by LOLE
<b>Description:</b>	N/A
<b>Filer:</b>	Courtney Wagner
<b>Organization:</b>	Barkovich & Yap, Inc.
<b>Submitter Role:</b>	Public
<b>Submission Date:</b>	1/10/2022 3:23:56 PM
<b>Docketed Date:</b>	1/10/2022

# Demand Response Counting Method Using LIP Informed by LOLE

---

PAUL NELSON (paul at barkovichandyap.com)

BARKOVICH & YAP, INC.

CONSULTANTS TO THE CALIFORNIA LARGE ENERGY CONSUMERS ASSOCIATION (CLECA)

# Who is CLECA

---

- ❖ An organization of large high load factor customers located in CA who all participate in the Base Interruptible Program (BIP)
- ❖ BIP was used to maintain grid reliability seven times in 2020 and once in 2021
- ❖ In 2020, BIP was 845 MW (Sep) which represented 75% of event-based demand response
- ❖ CLECA members represent a significant portion of the statewide BIP participation and have responded when necessary to reduce load by shutting down their manufacturing processes
- ❖ Supports accurate measurement of load reduction and removal of non-performing customers from BIP to maintain a gold standard reputation

# LIP informed by LOLE (LIP + LOLE)

---

- ❖ Loss of load expectation (LOLE) results can be applied to the load impact protocol hourly results to align with the time periods when additional resources would improve reliability
  - i.e., load reduction from 6-7pm (HE19) has more value than at 3-4pm (HE16)
- ❖ LOLE results incorporate various weather scenarios, resource availability, and interactive and saturation effects of the mix of resources on the system
- ❖ LIP informed by LOLE would avoid the need to perform hourly reliability modeling for every DR program, which is costly and time-consuming
- ❖ For Jun-Sep, the qualifying capacity of DR is calculated by using the hourly relative LOLE to weight the hourly load impact for each DR program in the LIP worksheets; for other months the existing LIP results can be used

# We used the CAISO/E3 LOLE results From July 2021 DR ELCC study

## ❖ CAISO LOLE Study

- Provided 24 hours for each month
- No differences for weekday or weekend

Month	HE13	HE14	HE15	HE16	HE17	HE18	HE19	HE20	HE21	HE22	HE23	Grand Total
1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.7%	0.0%	0.0%	0.0%	3.3%
9	0.0%	0.0%	0.0%	0.0%	1.4%	25.2%	39.5%	21.8%	7.5%	1.4%	0.0%	96.7%
10	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
11	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
12	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
<b>Grand Total</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>1.4%</b>	<b>25.2%</b>	<b>42.1%</b>	<b>22.5%</b>	<b>7.5%</b>	<b>1.4%</b>	<b>0.0%</b>	<b>100.0%</b>

➤ Process: Use the hourly relative LOLE as weights for the hourly load impacts; here HE17-21

➤ Since annual peaks can occur from Jun-Sep, apply the same total hourly (grand total line) LOLE weights to the monthly LIP results for Jun-Sep

# Comparison of LIP vs LIP+LOLE

- ❖ Each hour's DR load reduction is weighed by its relative LOLE value
- ❖ A/C cycling (SDP) load impact drops over time, but the higher value at the beginning of the event results combined with low LOLE results in a lower value than simple average

		SCE-BIP		SCE-SDP-Commerical	
		Load Impact		Load Impact	
HE	LOLE	MW		MW	
16	0.0%	0		0	
17	1.4%	494		28.95	
18	25.2%	498		23.72	
19	42.1%	494		18.78	
20	22.5%	495		14.90	
21	7.5%	497		12.61	
22	1.4%	506		-2.81	
23	0.0%	164		-1.21	
	100.0%				
		LIP Avg of HE17-21	LIP weighted by LOLE HE17-22	LIP-Avg HE17-21	LIP weighted by LOLE HE17-21
		496	496	19.79	18.58
SCE ExAnte LIP for PY2020 with 2021					
Impacts for September call, 1 in 2 weather year					
BIP HE22 adjusted to show full load reduction for 6 hour event					
NOTE:If SDP can be called for 6 hours, then profile needs revision.					

# Key Assumptions and Pro/Cons

---

- ❖ LOLE occurs during the hottest week of the month, which aligns with the LIP of a 1 in 2 monthly peak
  - If LOLE occurs in cooler weeks, then need to align it with hourly DR impacts associated with cooler weeks; affects only weather-sensitive DR programs
    - CAUTION: If DR's capacity value is significantly reduced, it can lead to over procurement for the peak
- ❖ Pros:
  - Measures value of a DR program's contribution during a LOLE event across hours
  - Reduces modeling complexity and reduces cost
    - ✓ Eliminates developing load impact profiles for every weather scenario
    - ✓ Eliminates running computationally-intensive effective load carrying capacity (ELCC) for every DR program
- ❖ Cons
  - Is not as precise as estimating a DR program's ability to avoid loss of load based upon every weather year scenario modeled
  - Based upon CAISO opposition to ELCC heatmap, unlikely to qualify for RAAIM exemption

# How does LIP+LOLE differ from ELCC Heat Map?

- ❖ The ELCC heat map uses a table of duration and call frequency to determine a derate factor

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%

- ❖ The problem is the value in terms of improved reliability of a 2-hour DR program from 4-6 pm is different than from 6-8 pm; ELCC heat map approach does not take this into account
- ❖ The LIP+ELCC solves this problem as hourly impacts are weighted by hourly LOLE values
- ❖ CAISO's July 2021 ELCC study showed only 2 events per year, so frequency limits do not appear to be a problem



# Background on Effective Load Carrying Capability

---

- ❖ ELCC requires first estimating a system's LOLE
  - The LOLE will identify those hours with the greatest need for incremental capacity
- ❖ ELCC is a measure of the ability to change the reference LOLE compared to a reference resource (E3 and CPUC uses a perfect resource)
  - Solar can provide 100 MW to serve load at noon but contributes much less during the evening when the LOLE hours occur
- ❖ ELCC has traditionally been an annual value
  - Monthly ELCC requires LOLE to occur in every month, which has been achieved by artificially removing resources from the system or artificially increasing load; distorts the purpose to identify periods of highest reliability need
- ❖ Average vs Incremental ELCC controversy in Resource Adequacy
  - Current system cannot serve load without existing solar (average), yet additional solar does not improve reliability because LOLE is in the late afternoon/evening