

**Exhibit:** CC-01  
**Proceeding:** R.13-09-011  
**Judge:** Kelly A. Hymes  
**Witness:** Stephanie Wang



**OPENING TESTIMONY OF THE CLEAN COALITION  
REGARDING GOALS FOR DEMAND RESPONSE**

May 6, 2014

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1           **I.       INTRODUCTION**

2

3 Pursuant to Assigned Commissioner and Administrative Law Judge’s Ruling and Revised  
4 Scoping Memo Defining Scope and Schedule for Phase Three, Revising Schedule for  
5 Phase Two, and Providing Guidance for Testimony and Hearings, dated April 2, 2014,  
6 the Clean Coalition respectfully submits the following testimony of Stephanie Wang,  
7 Policy Director of the Clean Coalition, into the record.

8

9 First, the Clean Coalition proposes a needs-based approach for developing demand  
10 response goals. The purpose is to set goals that can be readily translated into increased  
11 reliance on demand response in procurement plans and transmission plans. This  
12 approach will allow the Commission to prioritize procurement of the types of demand  
13 response in the quantities necessary to meet a large portion of projected local and system  
14 needs, such as smoothing out the “Duck” net load curve projected by CAISO.

15

16 Second, we recommend that the Commission fully implement the Loading Order  
17 mandate to procure all “cost-effective” and “feasibly available” demand response. Since  
18 the Commission will soon release a new methodology for evaluating the cost-  
19 effectiveness of demand response, the remaining open question is how to define “feasibly  
20 available”. Our recommended framework for setting demand response goals will also  
21 reveal how much demand response will be available to meet operational needs.

22 The Clean Coalition is a California-based nonprofit organization whose mission is to  
23 accelerate the transition to renewable energy and a modern grid. The Clean Coalition  
24 drives policy innovation to remove barriers to procurement, interconnection, and  
25 realizing the full potential of integrated distributed energy resources, such as distributed  
26 generation, advanced inverters, demand response, and energy storage. The Clean  
27 Coalition also works with utilities to develop community microgrid projects that  
28 demonstrate that local renewables can provide at least 25% of the total electric energy  
29 consumed within the distribution grid, while maintaining or improving grid

1 reliability. The Clean Coalition participates in numerous proceedings in California  
2 agencies and before other state and Federal agencies throughout the United States.

3  
4 **II. DEVELOP NEEDS-BASED GOALS FOR DEMAND RESPONSE**

5  
6 The Clean Coalition proposes a needs-based approach for developing demand response  
7 goals. This approach can give procurement and transmission planners assurance that the  
8 right types and sufficient amounts of DR be available in time to meet a high percentage  
9 of projected local and system needs.

10  
11 Further, by focusing on how each type of demand response can meet operational needs,  
12 the Commission can support equal treatment of supply resource and load modifying  
13 demand response. This approach can take full advantage of and prevent bias against  
14 demand response resources that have very different performance characteristics than  
15 fossil generation. Conversely, goals developed independently of projected needs may  
16 result in undervaluing of demand response products that can most cost-effectively meet  
17 operational needs, and overvaluing of demand response products that have performance  
18 characteristics more similar to fossil generation.

19  
20 Specifically, we recommend that the Commission design “use-cases” that provide details  
21 about the local and system needs that demand response can effectively address, and then  
22 determine which types of demand response can meet these needs. Goals would be set in  
23 relation to needs and based on estimates of potential, and procurement mechanisms  
24 would be aligned with such goals.

25  
26  
27 **a. Develop Use-Cases**

28  
29 We recommend development of “use-cases” that provide details about the local and  
30 system needs that demand response can effectively address. The use-case approach was

1 very useful for the Commission’s development of the energy storage targets. This  
2 approach made it possible for EPRI and DMV KEMA to estimate the cost-effectiveness  
3 of different types of storage projects for meeting different types of operational needs,  
4 which gave the Commission enough information to set reasonable storage procurement  
5 targets.<sup>1</sup> Similarly, different types of demand response can meet a broad range of  
6 operational needs in a myriad of different ways.

7  
8 We recommend that the use-cases focus on projected needs in 2020, especially related to  
9 transitioning to higher levels of local and central generation from intermittent, renewable  
10 resources. The CEC’s 2013 IEPR pointed to the reliability issues raised by the CAISO  
11 “Duck” chart about meeting California’s 2020 Renewable Portfolio Standard with high  
12 levels of intermittent solar generation, and concluded that there is “an urgency to expand  
13 DR as a frontline resource for maintaining system reliability and taking full advantage of  
14 the contributions of low-carbon renewable generation.”<sup>2</sup>

15  
16 Traditionally, California has primarily used DR for emergencies and peak shaving on hot  
17 summer days, and DR goals were framed accordingly. The California Energy  
18 Commission’s Energy Action Plan and Energy Action Plan II incorporated a statewide  
19 DR goal of 5 percent of system peak demand by 2007.<sup>3</sup> Since the reliability concerns of  
20 the CAISO have changed, we recommend that the Commission focus on projected needs  
21 in 2020 as California approaches its clean energy goals, such as the Renewable Portfolio  
22 Standard, electric vehicles, and Zero Net Energy targets.

23  
24 For illustration, we have outlined a few potential use-cases for projected local and system  
25 needs in 2020 as California integrates higher levels of local and remote solar and wind  
26 generation.

- 27  
28
- Balance Daily Net Load. Smooth out projected seasonal daily net load  
29 curve concerns, including those illustrated by the CAISO Duck – avoiding

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<sup>1</sup> Commission D.13-10-040

<sup>2</sup> California Energy Commission, *2013 Integrated Energy Policy Report*, at 61

<sup>3</sup> *2013 Independent Energy Policy Report*, at 62

1 over-generation and reducing both ramp rates and peak demand.

2  
3 • Contingency Response. Reduce load quickly to provide frequency  
4 response and power balancing in the event of the loss transmission lines or  
5 central generators.

6  
7 • Regulation Services: Address minute-to-minute variations in demand and  
8 local intermittent generation.

9  
10 The use-cases should address how operational needs will evolve as California integrates  
11 higher levels of distributed resources, including local renewable energy, electric vehicles,  
12 and energy storage. These use-cases can also help the Commission and stakeholders  
13 work through questions about how demand response will be used by both CAISO and  
14 utilities to meet both local and system needs.

15  
16  
17 **b. Match demand response products to needs**

18  
19 Next, the Commission and stakeholders would identify which types of demand response  
20 can address each use-case based on the performance characteristics of each type of  
21 demand response. In its proposal for non-conventional alternatives to transmission and  
22 conventional generation, CAISO determined that the relevant performance characteristics  
23 of a preferred resource are duration, availability and response time.<sup>4</sup> Different or  
24 additional criteria may be necessary to evaluate non-dispatchable demand response.

25  
26 For example, the steep ramps in the CAISO “Duck” curve may be reduced by load  
27 modifying demand response that shifts load away from peak periods, towards low-use  
28 periods. The remaining ramps can be addressed with supply resource demand response  
29 that can provide flexible capacity.

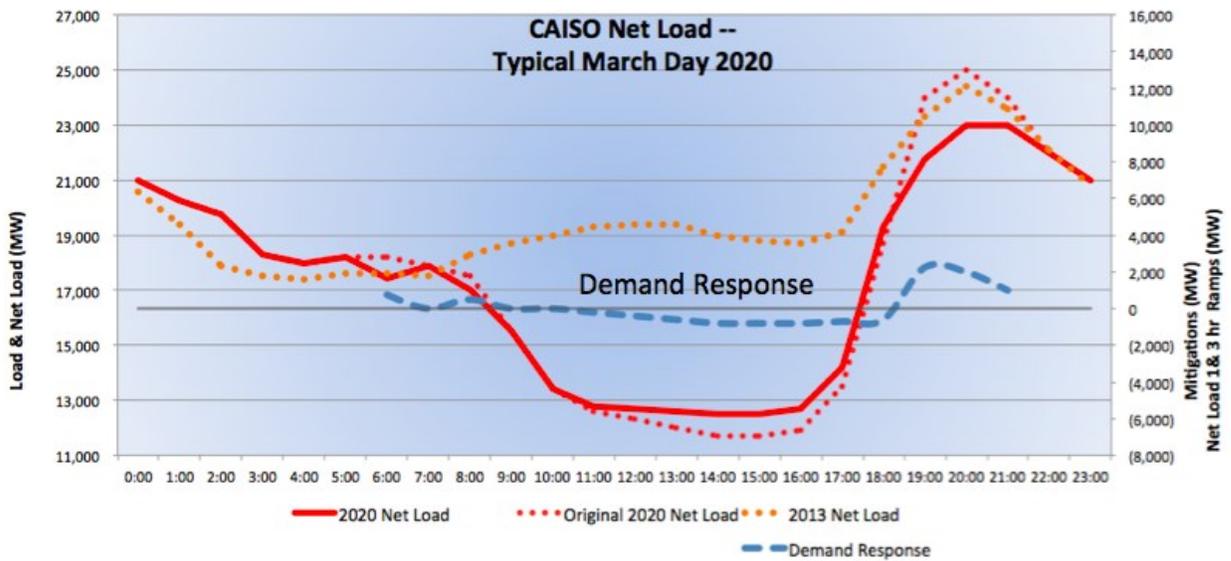
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<sup>4</sup> California Independent System Operator, *Consideration of alternatives to transmission or conventional generation to address local needs in the transmission planning process* (September 4, 2013)

1 The Clean Coalition has developed a model to illustrate how a combination of intelligent  
 2 grid solutions, including demand response, can reduce CAISO system needs for flexible  
 3 resources by smoothing out the net load profile.<sup>5</sup> The graphic below shows that demand  
 4 response programs can incentivize customers to shift power consumption away from high  
 5 net demand periods (flattening the head and neck of the duck) and towards low net  
 6 demand periods (lifting the belly of the duck); this is shown by the blue dashed line,  
 7 which represents demand response in megawatts reflected on the scale to the right. The  
 8 dotted red line represents the original 2020 net load from the CAISO graphic above, and  
 9 the solid red line represents the modified 2020 net load curve. For comparison, the  
 10 dotted orange line represents the 2013 net load curve.

11

**Addressing the Duck Chart with Demand Response** 



12

13 Source: Clean Coalition (2013)

14

15

16

**c. Estimate potential of demand response to meet needs**

<sup>5</sup> The Clean Coalition’s February 2014 presentation to the California Energy Commission on *Flattening the Duck: Facilitating Renewables for the 21<sup>st</sup> Century Grid* is available at <http://www.clean-coalition.org/events/cec-craig-lewis-to-present-flattening-the-duck-chart/>

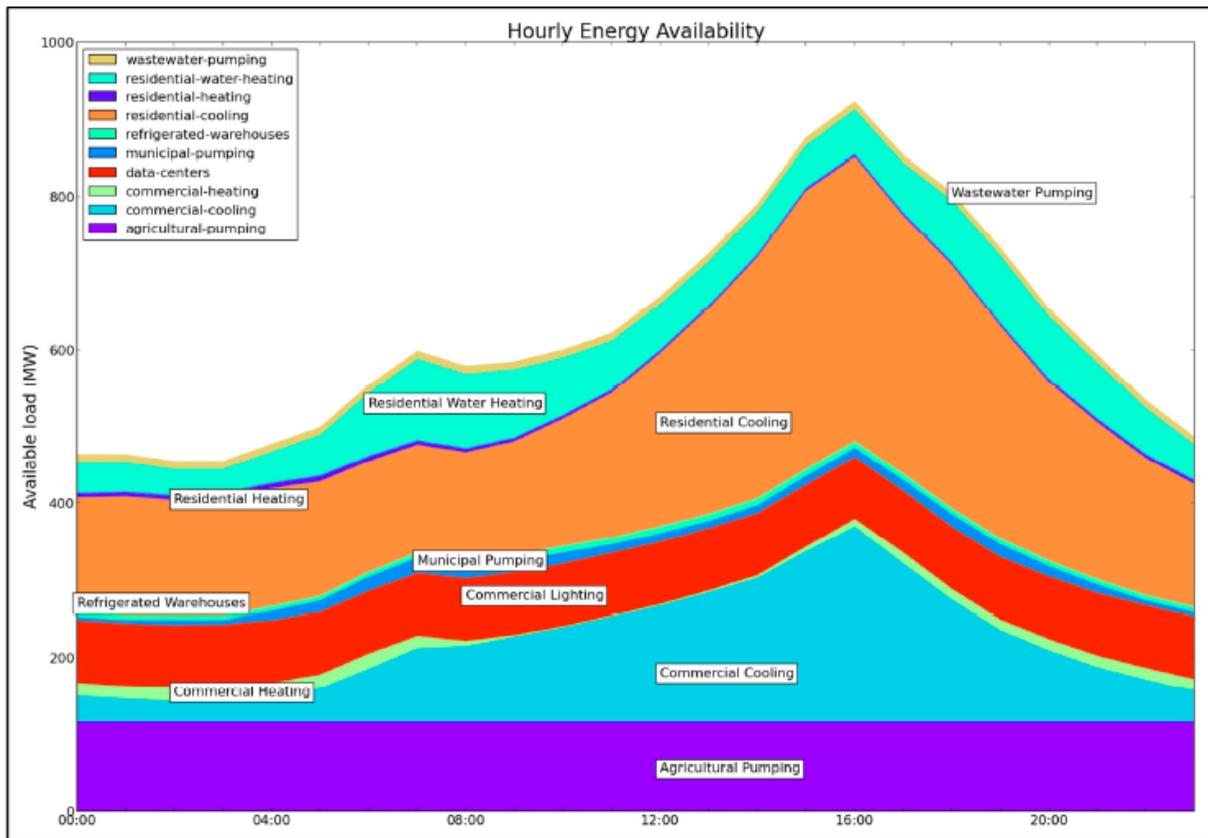
1 We recommend estimating potential to meet initial goals based on well-designed pilot  
2 programs. Long-term goals for demand response should reflect an assessment of the  
3 potential availability of each type of demand response that can meet use-case needs, and  
4 the projected level of response of each type of demand response. The following would be  
5 helpful for making such an assessment.

- 6
- 7 • Study of 2020 projected seasonal customer load profiles that show the  
8 hourly capacity of different types of major loads throughout the state.
- 9
- 10 • Estimates of the potential of specific types of customer loads that would  
11 be available to meet use-case needs for a cost-effective payment based on the  
12 results of pilot programs.
- 13
- 14 • Pilot programs designed to assess the potential amount of cost-effective  
15 demand response that could be available to meet each use-case. Such pilot  
16 programs would offer the highest cost-effective payments, long-term  
17 contracts, and reasonable performance constraints.
- 18

19 Seasonal customer load profiles will help the Commission and stakeholders develop  
20 estimates of potential that can meet use-case needs. For example, such information can  
21 reveal the types and quantities of major customer loads that could be shifted away from  
22 the early evening peak (head of the Duck), towards mid-day. The Lawrence Berkeley  
23 National Laboratory and the National Renewable Energy Laboratory published a report  
24 in 2013 with data on the projected 2020 availability of loads, by type, that will be  
25 available to respond to grid services needs on an hour-by-hour basis in the Western  
26 Interconnection.<sup>6</sup> The chart below from this study shows projected hourly capacity of  
27 different types of major loads in the Western Interconnection in 2020.

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<sup>6</sup> Chart from Daniel J. Olsen, et al., *Grid Integration of Aggregated Demand Response, Part 1: Load Availability Profiles and Constraints for the Western Interconnection*, Lawrence Berkeley National Laboratory and National Renewable Energy Laboratory, September 2013, at Appendix E, page 86.



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**d. Set goals that relate to needs**

We recommend setting measurable goals that directly relate to needs shown in the use-cases. For example, goals could be framed in terms of meeting a certain percentage of projected operational needs for each use-case with demand response.

We recommend that the Commission set a floor for procurement of each type of demand response that has significant potential to cost-effectively meet use-case needs. When paired with implementation of the Loading Order as described below, minimum procurement targets can help demand response markets grow sustainably.

**e. Align procurement with goals**

1 We expect that needs-based goals include a goal for increasing load modifying demand  
2 response that will not be met by existing programs and policies. Neither will the  
3 proposed CAISO market opportunities and Demand Response Auction Mechanism  
4 promote load modifying demand response.

5  
6 Accordingly, we recommend consideration of new policies and programs for increasing  
7 procurement, use and reliance on load modifying demand response. Such consideration  
8 should begin with an exploration of the barriers to the procurement and use of load  
9 modifying demand response.

10  
11 We note that the record does not provide sufficient reasons to assume that load modifying  
12 demand response will be less reliable than supply resource demand response for meeting  
13 operational needs. If the Commission is concerned about the reliability of load  
14 modifying demand response, we recommend further fact finding on this topic.

15  
16 We also reserve testimony or comments on the potential for better load forecasting tools  
17 and methodologies to improve our ability to rely on all types of demand response.

### 18 19 20 **III. IMPLEMENT THE LOADING ORDER**

21  
22 The Loading Order approach to expanding DR continues to have great promise, subject  
23 to clarification from the Commission on how to fully implement this mandate. The  
24 Loading Order requires procurement of all “cost-effective” and “feasibly available”  
25 demand response before renewable and conventional generation. In 2003, the California  
26 Public Utilities Commission (CPUC) and California Energy Commission (CEC) signed a  
27 joint agency Energy Action Plan that envisioned a “loading order” of preferred energy  
28 resources to meet California’s energy needs.<sup>7</sup> These preferred resources are cost-

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<sup>7</sup> Energy Action Plan, Adopted April 2003 and updated in September 2005

1 effective energy efficiency and demand response, followed by renewable energy and  
2 distributed generation.<sup>8</sup>

3  
4 The CPUC has emphasized that the Loading Order requires procurement of all “cost-  
5 effective” and “feasibly available” preferred resources before fossil fuel procurement,  
6 which may be greater than the statutory minimum standards.<sup>9</sup> CPUC D.12-01-033  
7 provides:

8  
9 We understand that opportunities to procure additional energy efficiency or  
10 demand response resources may be more constrained than just signing up for  
11 more conventional fossil generation, but the utilities should still procure  
12 additional energy efficiency and demand response resources to the extent they are  
13 feasibly available and cost effective. If the utilities can reasonably procure  
14 additional energy efficiency and demand response resources, they should do so.<sup>10</sup>

15  
16 Since the Commission will soon propose a new methodology for evaluating the cost-  
17 effectiveness of demand response, this is the ideal time for the Commission to clarify  
18 how to fully apply the Loading Order to demand response procurement. One major  
19 question to address is how to define “feasibly available.” We recommend inclusion of  
20 the following concepts: (a) meets needs according to the use-cases, (b) will accept an  
21 offer of up to the highest payment amount that would make it still cost-effective, and (c)  
22 can be procured through effective programs and processes that provide a level playing  
23 field for demand response participation.

24  
25 The use-case approach for developing demand response goals described above can reveal  
26 how much demand response will be available to meet operational needs identified in  
27 procurement and transmission planning processes. The Commission can apply the

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<sup>8</sup> Id. Page 2. This goal was first articulated in CPUC Decision 03-06-032 in Rulemaking 02-06-001. D.03-06-032 further describes this goal in terms of “% of annual system peak demand” and translated the goal into interim annual megawatt targets for each IOU.

<sup>9</sup> Commission Decision 12-01-033, at 20.

<sup>10</sup> Id, at 20.

1 estimates of cost-effective demand response potential from the needs-based goals  
2 development process to long-term procurement and transmission planning.

3  
4 We urge the Commission to also clarify how to apply the Loading Order to specific  
5 procurements. For example, if a utility requests authorization to procure resources to  
6 meet an operational need that a use-case shows that demand response can meet, then the  
7 Commission could require a utility to design an all-resource request for offers that  
8 provides a level playing field for demand response bids, and then accept all cost-effective  
9 bids for demand response before accepting other offers.

10  
11  
12  
13 **IV. SUMMARY OF QUALIFICATIONS FOR STEPHANIE WANG**

14  
15 Q1: What is your name and business address?

16 A1: My name is Stephanie Wang and my business address is as follows:  
17 16 Palm Ct. Menlo Park, CA 94025.

18  
19 Q2: What is your job title?

20 A2: Policy Director, Clean Coalition.

21  
22 Q3: Please describe your educational background and professional experience.

23 A3: I have over ten years of policy and legal experience, and I have been a director of the  
24 Clean Coalition for over three years. Before joining the Clean Coalition, I advised  
25 Pacific Environment on California energy policy. I practiced project development and  
26 finance law in San Francisco and New York for about six years. I received my J.D. from  
27 the University of Michigan in 2003 and my B.A. from the University of Michigan in  
28 2001.

29  
30 Q4: Have you been involved in other related proceedings before this Commission?

1 A4: Yes, I have submitted comments on related proceedings before this Commission,  
2 including the Long Term Procurement Plan and Energy Storage.

3

4 Q5: Are you willing to be cross-examined in evidentiary hearings?

5 A5: Yes.

6

7 Q6: Is this the end of your testimony?

8 A6: Yes.