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Clean Coalition Comments on June 17th, 2013 Lead Commissioner Workshop on Increasing Demand Response Capabilities in California

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The Clean Coalition appreciates the opportunity to offer the following comments on issues addressed in the June 17th, 2013 CEC workshop on increasing Demand Response Capabilities in California.

1) Introduction

The Clean Coalition is a California-based nonprofit organization whose mission is to accelerate the transition to local energy systems through innovative policies and programs that deliver cost-effective renewable energy, strengthen local economies, foster environmental sustainability, and enhance energy security. To achieve this mission, the Clean Coalition promotes proven best practices, including the vigorous expansion of Wholesale Distributed Generation (WDG) connected to the distribution grid and serving local load. The Clean Coalition drives policy innovation to remove major barriers to the procurement, interconnection, and financing of WDG projects and supports complementary Intelligent Grid (IG) solutions such as demand response, energy storage, forecasting, and communications.

The Clean Coalition has identified demand response (DR) as a key solution for integrating high levels of distributed renewable generation (DG) in a cost-effective way. We are uniquely focused on how DR, and especially Local Automated DR, can play a significant role in integrating centralized and distributed renewables by shifting consumer electricity usage away from peak periods, reducing spot market power purchasing, smoothing out ramping, and providing voltage and frequency regulation.

The California Energy Commission IEPR has a great opportunity to assist the CAISO in the expansion of Demand Response by providing a guide for market development. The Clean Coalition provides the following comments to ensure that important elements of DR market development are included. The CEC should continue to coordinate with the CAISO and upcoming CPUC proceeding to ensure free flow of information, consistency, and compliance with IEPR.

2) IEPR Roadmap for developing DR

The California Energy Commission IEPR should recognize DR's importance for meeting RPS and other renewable goals. This includes the ongoing requirement to meet the RPS goals set for 2020 and the rapid integration of distributed energy resources (DER). We believe the focus on DR in the upcoming IEPR is a positive step forward in highlighting all benefits that DR can provide, including as a preferred method for managing energy use, integrating renewables, and enabling a smarter grid.

As outlined in the workshop notice, the previous goal of 5% price-responsive DR by 2007 has yet to be achieved. There should be some discussion regarding why this target has not been achieved, as we need to ensure that any future targets set for DR are reached efficiently. The previous level of price-responsive DR was considered reasonable for 2007, but since then, the State's energy needs have changed dramatically. The IEPR should look at reasonable levels of DR for the needs facing California now. These needs include avoiding the contracting of additional fossil generation to replace San Onofre Nuclear Generating Station (SONGS) and once-through-cooling (OTC) plants, as well as address local capacity requirements and

transmission constraints. Most importantly, these needs should be addressed in accordance with California's Loading Order and the Governor's 12,000 MW of DG goal.

The Loading Order, which was established through the Energy Action Plan a decade ago, requires that DR be considered "a preferred resource" (alongside Energy Efficiency). The Clean Coalition advocates for the adherence to the Loading Order for all procurement, and we believe that enforcing the Loading Order will assist in meeting any procurement targets set for DR in upcoming regulatory proceedings.

3) The DR Market should be based on best practices

The DR market in California should be based on best practices from existing DR programs, tailored for specific California needs, and should facilitate the integration of renewables. An example of a successful DR program includes PJM's use of DR to maintain reserve margins, an important service for ensuring no energy shortfalls during peak times and responding to sudden changes in energy usage and supply. In addition, the recent announcement of the retirement of SONGS provides the CEC an opportunity to explore successful DR programs and ensure that California's specific needs are met.

Global best practices have shown that combining DR and DG into an integrated Distributed Energy Resource (DER) is essential for increasing the value of both DG and DR in the energy market. Local Automated DR can support higher penetrations of intermittent local and regional generation, while simultaneously reducing the need for transmission capacity and reducing the need for generation providing peaking or flexible ramping capacity. In looking to 'best' or 'other' practices around the country and around the world, the integration of DR and DG has proven to be successful where integration of DR and DG can be seen as an integrated DER.

In the United Kingdom, the integration of demand-side resources and DG "increase utilisation of existing distribution network assets." In other words, integration of these technologies actually takes advantage of existing distribution system, rather than contributing to the need to build additional distribution networks. In recent years, the UK has supported increased deployment of DG "to reduce carbon emissions and to meet the need to improve system efficiency. Given the interest in wind power in particular, and the inherent variability of the output of this form of

generation, there may be a useful role for DSM in the provision of system support services, such as reserve." [1] This study corroborates the Clean Coalition's firm belief that DSM/DG integration is a feasible and reliable option for meeting system reliability needs, GHG emissions reduction and to contribute to reserve margins.

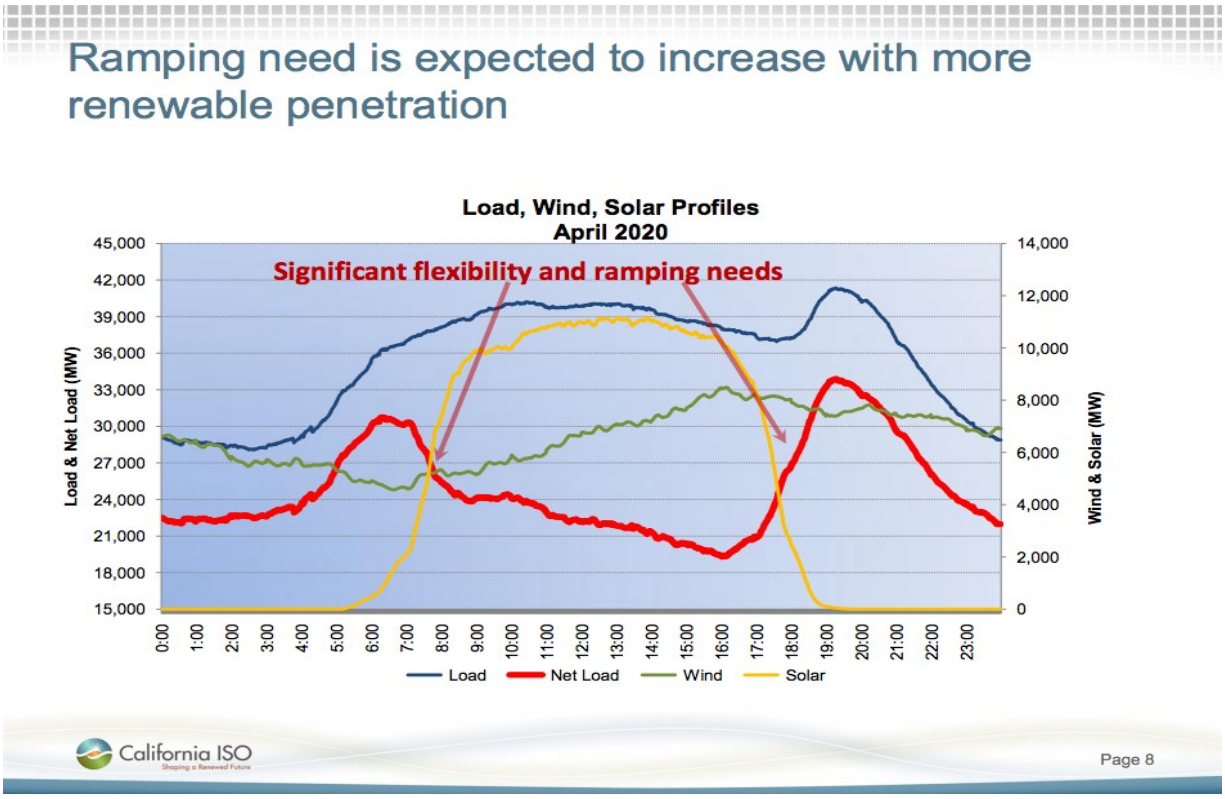
In many discussions held regarding the integration of DG and DR, stakeholders have often commented on potential problems caused by variable output of some forms of DG. The International Energy Association has done some examination of this factor. They recommend adding "energy storages into the systems (centralised or distributed energy storages DS). In this sense distributed generation (DG), distributed energy storages (DS) and demand response (DR) can be seen as an integrated distributed energy resource (DER). *Combining the different characteristics of these resources is essential in increasing the value of variable output generation in the energy market.*[2] The Clean Coalition concurs with this conclusion.

4) Renewable Integration and Ramping

DR is extremely useful for renewable integration since it shifts load away from peak periods that overlap with little to no renewable generation (for example, early evening) and for reducing spot market power purchasing. Automated DR can respond rapidly to reduce steep ramps, which is required for successful renewable integration. The figures below demonstrate the need for technologies with rapid ramping capabilities in order to facilitate increased renewable penetration.

[1] *Demand-side management: benefits and challenges.* Professor Goran Strbac, Imperial College London. http://www.bis.gov.uk/assets/foresight/docs/energy/demand-side-management-benefits-and-challenges.pdf
[2] *Integration of Demand Side Management, Distributed Generation, Renewable Energy Sources and Energy Storages.* Seppo Kärkkäinen, International Energy Association. http://energy-storage.org/files/dsm_k_rkk_inen.pdf (Emphasis added).

FIGURE 1



This chart was created to show increasing needs for flexible capacity to address steep ramps during certain months in 2020, due to higher levels of intermittent solar and wind generation paired with conventional base load resources (nuclear and less flexible natural gas). The chart also shows potential over-generation in the afternoon of April 2020, when base load resources that cannot be easily ramped down are paired with high levels of solar and only moderate demand.

The Clean Coalition replicated the net load and ramping from publicly available data provided by CAISO for a similar spring day in order to explore the value of various mitigation measures, as shown below in Figure 2.

FIGURE 2

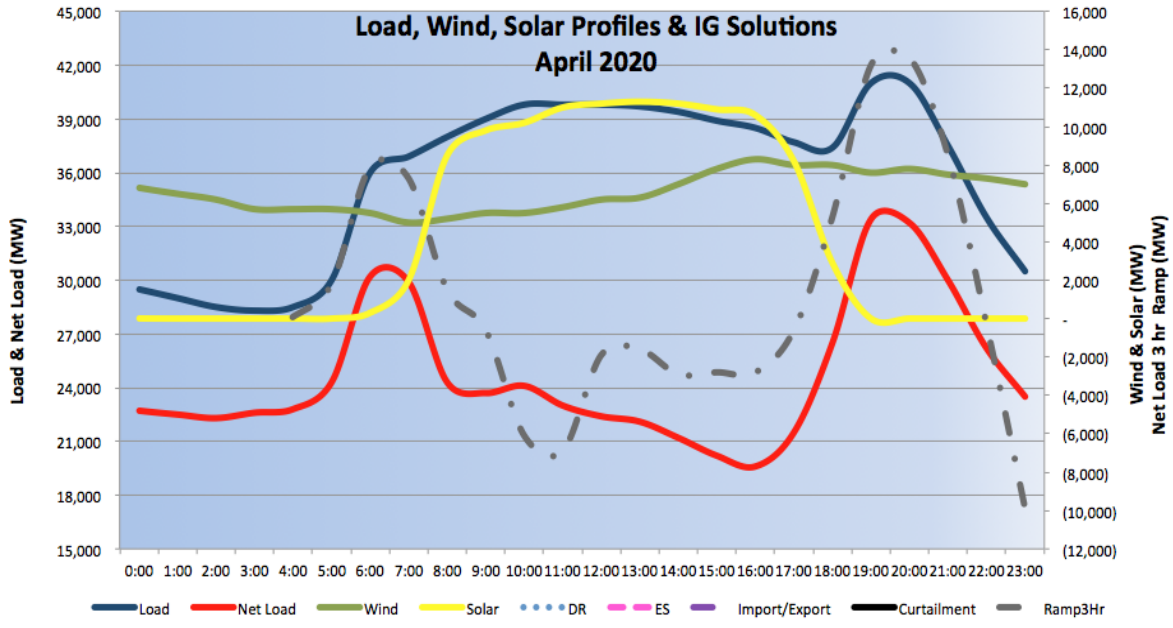
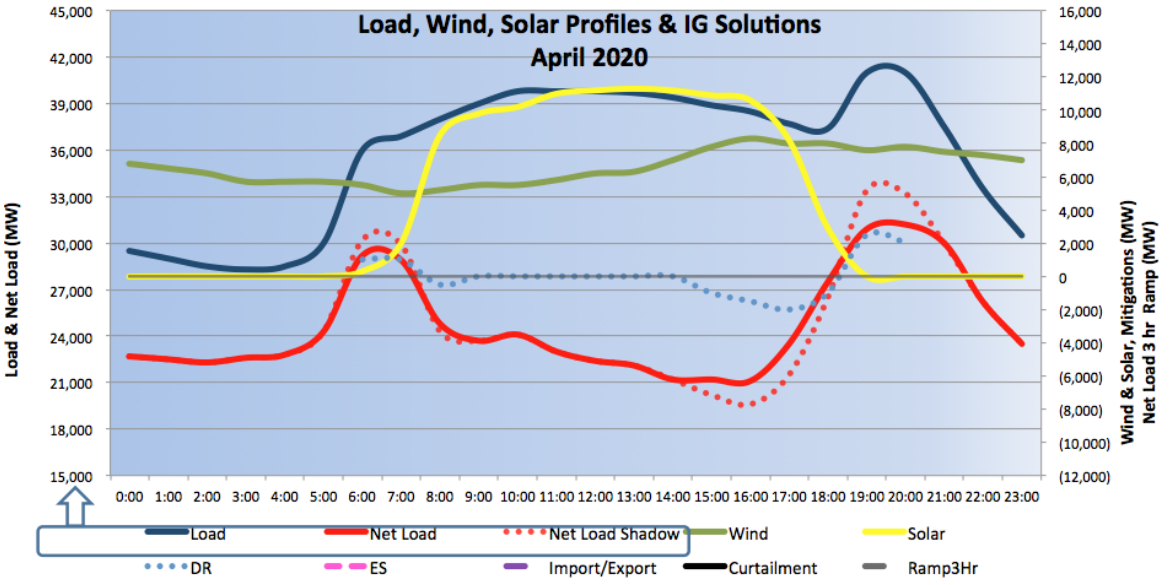


Figure 3 illustrates the changes observed when up to 2 GW of DSM is incorporated, profoundly reducing both the over-generation and ramping factors.

FIGURE 3



We understand that the CAISO is currently developing models of solutions provided by DSM and other Intelligent Grid capabilities including Advanced Inverters, and we include this example to indicate the scale of likely results related to DR.

5) DSM/DR and DG should be integrated together, as DR/DG can effectively integrate Distributed Energy Resources (DER)

DSM, including a variety of DR opportunities, represents major and most preferred methods of managing energy use. While DSM may not reduce total usage, it can be implemented quickly and effectively to manage usage that addresses peak demand capacity at the lowest cost and matching demand with supply to support much fuller use of renewable resources in a cost effective fashion. The ability of DSM to be used in conjunction with other renewable resources is DSM's most valuable asset.

As illustrated in the following table[3], DR has the potential to play an invaluable role in multiple services across a range of timescales, in conjunction with DG and potentially, Distributed Energy Storage (DS). Among other things, these services include frequency and voltage control. The vision for the integration of DER is an intelligent grid platform that would link a web of diverse generation sources, including a variety of renewable and distributed sources across the grid to a large set of consumers with possibilities for improved energy efficiency, local generation, controllable loads or storage devices.

[3] *Integration of Demand Side Management, Distributed Generation, Renewable Energy Sources and Energy Storages,* International Energy Agency Demand Side Management Programme (in conjunction with the US Department of Energy and NREL), Seppo Kärkkäinen (author), 2009

Table 1

	< One minute	15 minutes	30 minutes	Hour ahead	Day ahead	Year ahead
Frequency control (primary, secondary, tertiary)	Local automated DG, Local automated DR, Load shedding	Centralized signals to DG and DR	Direct load control DR Manual DR	DG DR		
Voltage control	Power electronics	Power factor corrections, DS	Power factor corrections DS, DR			
Meet system peak load				DR	DR	EE DR
Portfolio balancing		DR, DG, DS	DR,DG, DS	DR,DG, DS		
Relief of HV network congestion		DR	DR	DR		
Network restoration		DR, DG, (DS)	DR, DG, (DS)	DR, DG, (DS)		
deferring network investments						Energy efficiency, DR, DS

It is expected that the costs of a system with a better DER integration would be reduced compared to the present situation, because of increased levels of renewables, but also due to lowered peaking power as well as a better use of transmission and distribution assets. The "Integrated DG & DSM/DR" approach is based on distributed control and efficient integration of

DER. This means that the same load needs less generation and network capacity than other options. Such integration will result in substantial financial savings from reductions in total capacity requirements.

6) Non-Transmission Alternatives (NTAs)

The Clean Coalition strongly supports enabling DR to be included as an alternative for transmission and local capacity, as we have requested in prior comments proposing the pursuit of non-transmission alternatives (NTAs).[4] The ISO has acknowledged the importance of this in a draft study plan, which we support. However, the IEPR needs to go further. The CAISO and the CEC should explore examples of how NTAs can address demand and system performance needs. This should be done regularly as a matter of practice and examples should be included in each evaluation of alternatives modeled. While the SONGS shutdown has undoubtedly created a great deal of uncertainty, one thing it can do is provide more clarity on is the ability of the ISO to model NTA and non-generation alternatives that can and do play an important role in grid stability and the IEPR should account for this.

The IEPR should also direct to include a reasonable DR target in the Transmission Planning Process (TPP), rather than explore DR on a case–by-case basis. We believe this change is necessary to give DR equal consideration with Energy Efficiency (as per the Loading Order).

The Clean Coalition appreciates the opportunity to provide comment on DR capabilities and we look forward to continuing our collaboration with the CEC on DR and the IEPR.

Respectfully submitted,

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[4] CAISO Transmission Planning Process Joint Comments on 2013/2014 Draft Study Plan March 14, 2013

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