CLEAN LINE
ENERGY PARTNERS

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The Honorable Carla Peterman
California Energy Commission
1516 Ninth St.
Sacramento, CA 95814

Dear Commissioner Peterman:

Clean Line Energy Partners (Clean Line) appreciates the opportunity to provide comments on the topics discussed at the May 14th Lead Commissioner Workshop on Interconnection of Renewable Development in California. Clean Line would like to comment on two areas discussed at the workshop: the resource scenarios for the California Independent System Operator's (CAISO) 2012-2013 Transmission Plan, and the transmission level interconnection processes.

Long-haul transmission projects that will deliver high-quality, low cost renewable energy directly to California are one of several options through which California can meet its renewable portfolio standard and greenhouse gas reduction goals. However, the CAISO's resource scenarios do not appear to contemplate the large amount of low-cost renewable generation that can be imported to the state via long-haul interstate transmission lines.

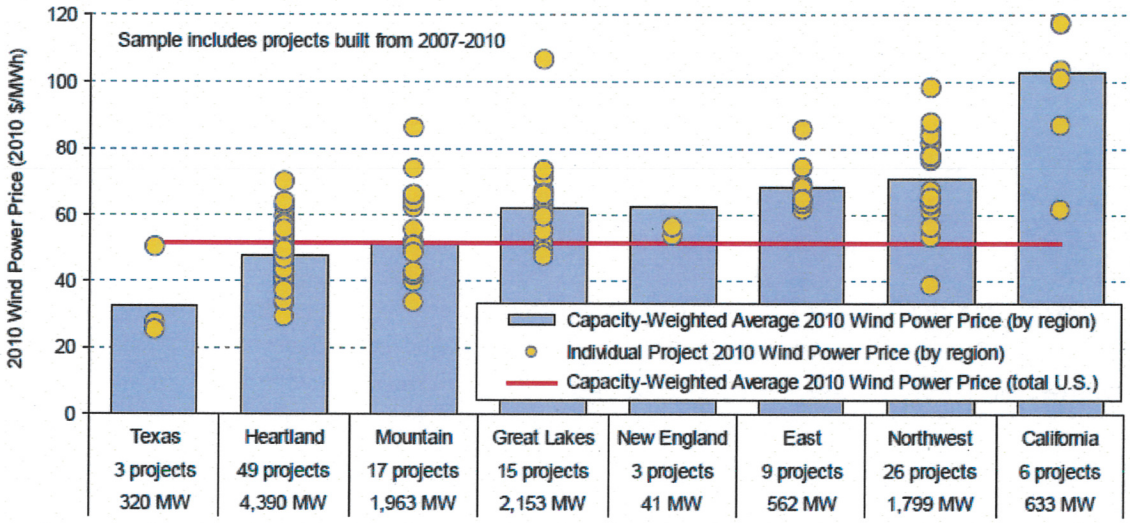
Out-of-state projects connected directly with the California grid offer the prospect of reduced energy costs and easier integration of variable resources. High quality wind resources outside California, combined with reduced land and construction costs, make for lower overall costs even when the cost of new transmission is included. According to an assessment by the National Renewable Energy Laboratory (NREL) and AWS Truepower[1], the available land area in California (excluding areas unlikely to be developed) with a 40% gross capacity factor is a fraction of that in many other Western states including Montana, Wyoming, and New Mexico.

	Available Land with 40%+ CF at 100 meters (km^2)
Montana	117,351
Wyoming	70,373
New Mexico	51,941
California	1,324

High capacity wind and reduced land and construction costs result in lower power prices, as illustrated by Figure 1, a sample of wind power purchase agreement prices by region from the Department of Energy's 2010 Wind Technologies Market Report.

[1] "Wind Powering America." National Renewable Energy Laboratory and AWS Truepower. Updated April 24, 2011.

Figure 1



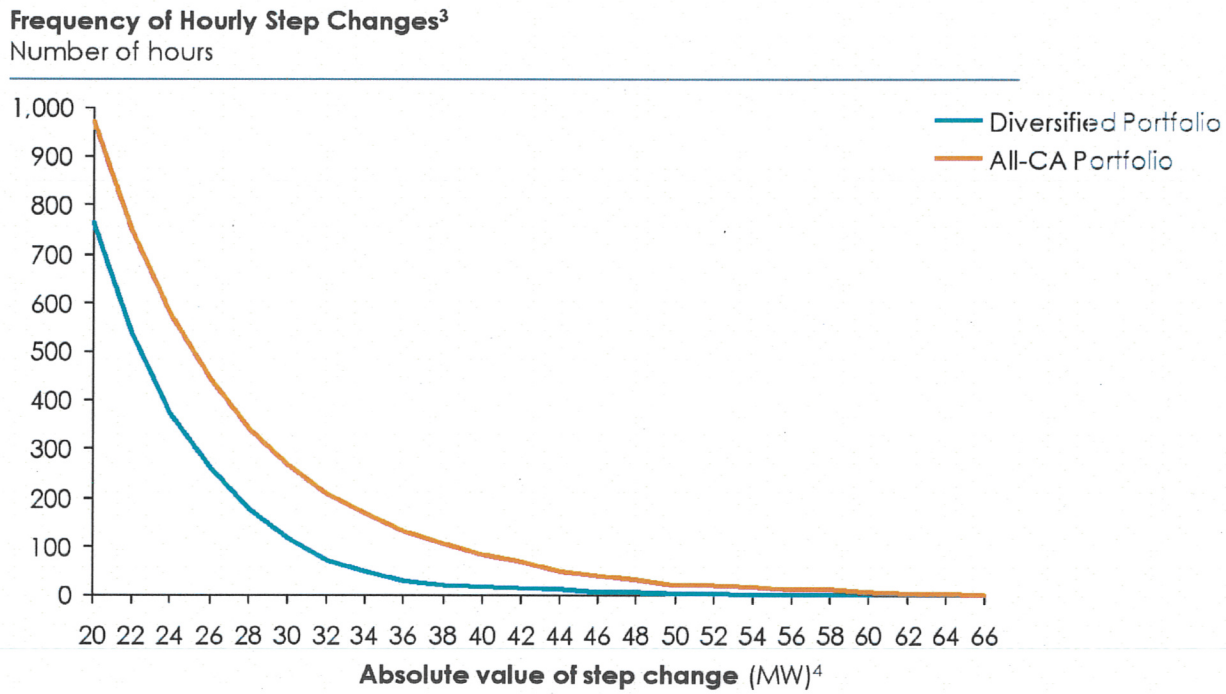
Source: Berkeley Lab

According to the report, wind from the "Mountain" region averages around $50/MWh as opposed to over $100/MWh in California. Even with a transmission charge of $25/MWh (based on Clean Line estimates for a 900 mile HVDC facility), the delivered cost of mountain region wind is well below both in-state wind and in-state solar PV price estimates. As a reference, the average energy cost from a Large Scale Solar PV plant is $114/MWh.[2]

Increasing the geographic diversity of a generation portfolio also provides integration benefits. By integrating geographically diverse, uncorrelated (to California) wind resources through HVDC transmission, the CAISO can greatly reduce variability by decreasing the likelihood that wind generation will ramp up or down simultaneously. See Figure 2 below for more detail.

[2] California Public Utility Commission's Cost-Constrained Scenario presented to the CAISO as part of the 2012-2013 Transmission Planning Process

Figure 2[3]



Source: NREL WWSIS study

The graph above shows the frequency of discrete up or down shifts in wind output for two portfolios: A portfolio including generation in California, Wyoming and New Mexico, and a portfolio with the same amount of generation located only in California. The x-axis gives the absolute value of the shifts in output[5] while the y-axis gives the number of hours in the year during which such a shift occurred. The curves show that changes in output in a diversified portfolio are smaller in magnitude than those occurring in an all-California portfolio. Larger hourly swings in production are more difficult and more expensive to balance with dispatchable generation, storage, or demand response. Therefore, the reduction in hourly swings as a result of a diverse portfolio can lower overall system costs.

Combining imported wind and California solar also creates a production curve that more closely fits California's load profile, as shown in Figure 3 below.

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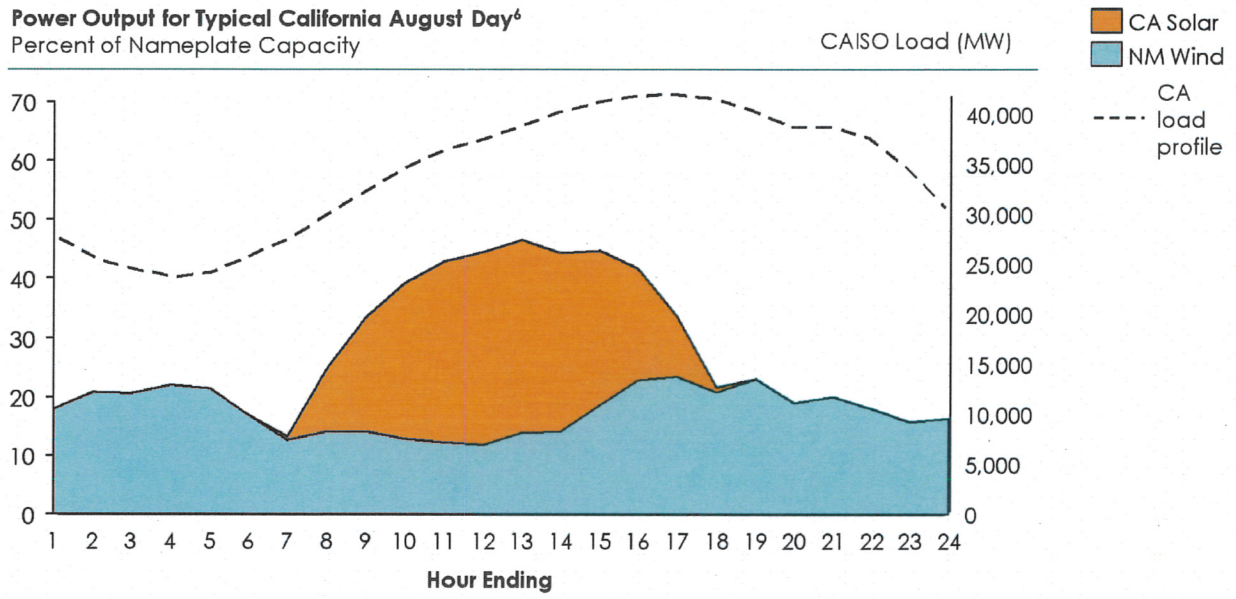
[3] Unless otherwise noted, all graphs are from Clean Line Energy Partners

[3] Comparison of generation output (for the years 2004-2006) of a portfolio of 3 wind farms all located in California versus a portfolio of 3 wind farms, with one wind farm each in California, Wyoming and New Mexico

[4] For a total capacity of 90 MW (30 MW per wind farm)

[5] Called "step changes" in the graph

Figure 3



Source: NREL PVWatts; V-BAR

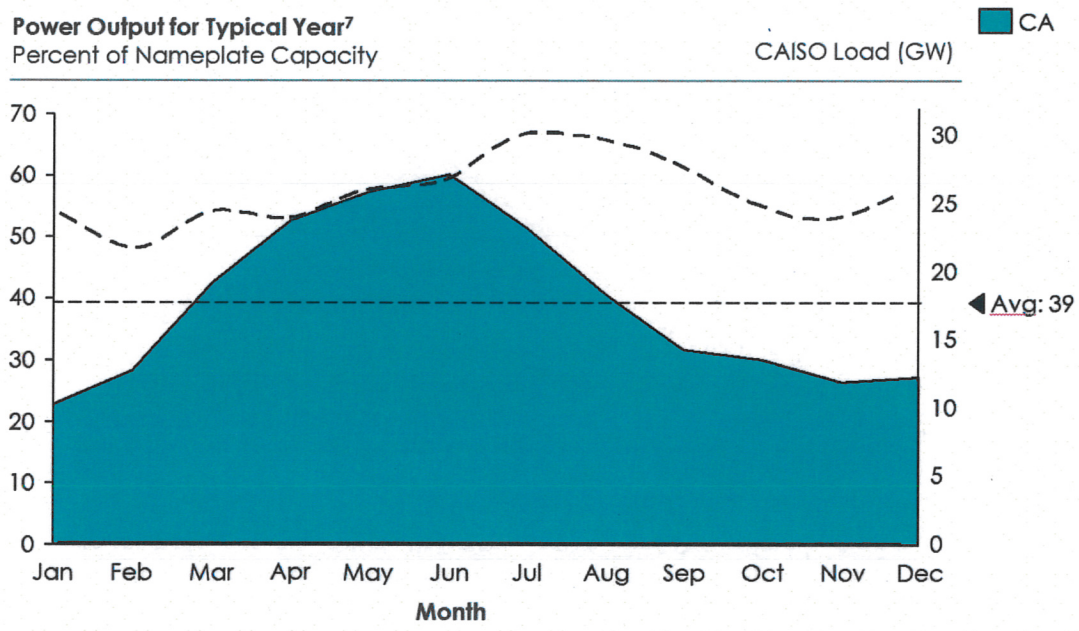
The graph above shows the combined production, as a percentage of a generic facility or facilities' nameplate capacity, of solar generation in California and wind generation in New Mexico over the course of a day. The California load profile demonstrates how demand fluctuates throughout the same day. The combination of solar and imported wind more closely follows the load profile than either would if taken individually.

Sourcing wind generation from multiple states also smoothes seasonal variation as can be seen in the comparison of Tehachapi wind output (Figure 4) with the output from a combination of California, New Mexico and Wyoming wind (Figure 5).

These graphs below show wind production as a percentage of a facility's nameplate capacity over the course of a year. The first graph, Figure 4, shows output generated by a wind farm in Tehachapi, CA. The second graph, Figure 5, shows output as a percentage of the total nameplate capacity of three same-sized wind farms located in Wyoming, New Mexico, and Tehachapi, CA. As shown by the average line, output in each graph is the same when averaged over the year. The output of the diversified portfolio, however, is smooth throughout the year, with lower seasonal variation.

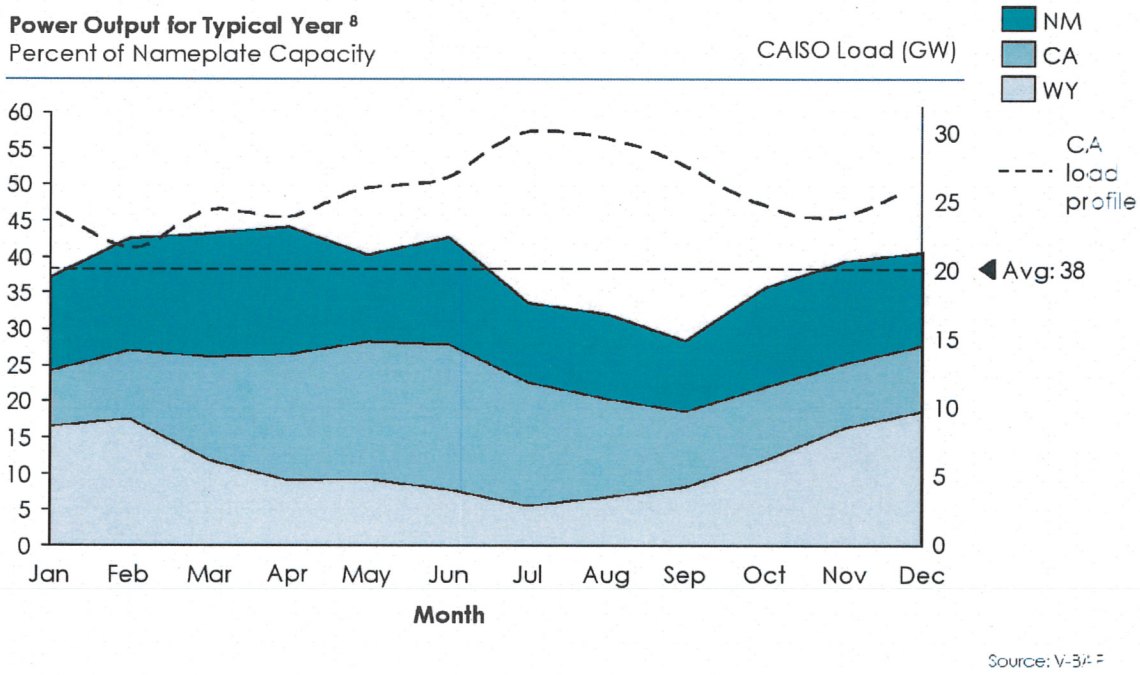
[6] Assuming equal nameplate capacity for solar and wind

Figure 4



Source: V-BAR

Figure 5



Source: V-BAR

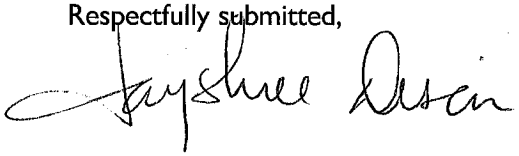
[7] Wind at Tehachapi

[8] Assuming equal nameplate capacity for each location shown

To ensure the benefits associated with out-of-state renewable generation are incorporated into future transmission planning efforts, such resources should be incorporated into the scenarios used for the 2012-2013 Transmission Plan. These resources will be even more important if Renewable Portfolio Standard (RPS) targets increase. Unfortunately, the current resource scenarios omit consideration of broader Western resources available to California consumers. Therefore, Clean Line requests that the CEC work with the CPUC and CAISO to create an additional scenario that includes out-of-state generation transmitted directly to California via HVDC transmission lines, like the Centennial West Clean Line being developed by Clean Line Energy Partners.

The May 14th workshop also addressed transmission level interconnection processes. The CAISO presented on their recent efforts to integrate the Transmission Planning Process (TPP) and Generator Interconnection Process (GIP). Clean Line followed this process closely and submitted comments on several occasions, but was disappointed to see that several critical issues were not resolved. Chief among these is the lack of a process by which high-voltage direct current (HVDC) lines connecting to areas external to the CAISO can achieve "deliverability rights" on behalf of generators located in these external resource areas. As the generators are almost entirely dependent on the HVDC lines for interconnection, it is simpler for the CAISO to study the line as a single injection and assign deliverability rights to the HVDC line itself. Otherwise, numerous individual external generators would need to request CAISO interconnection contingent upon a future transmission facility whose development timeline exceeds their own. This is an unreasonable burden for generators to bear. The CEC, as part of its ongoing efforts to improve integrated energy policy in California, should work with the CAISO to reform the interconnection process such that external transmission lines can receive deliverability rights.

Respectfully submitted,



Jayshree Desai, Executive Vice President
Clean Line Energy Partners LLC