

# Californian grid operator to address net imbalance

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The Californian Independent System Operator (CASIO) is addressing the famous load duck and attempting to "let the duck fly."

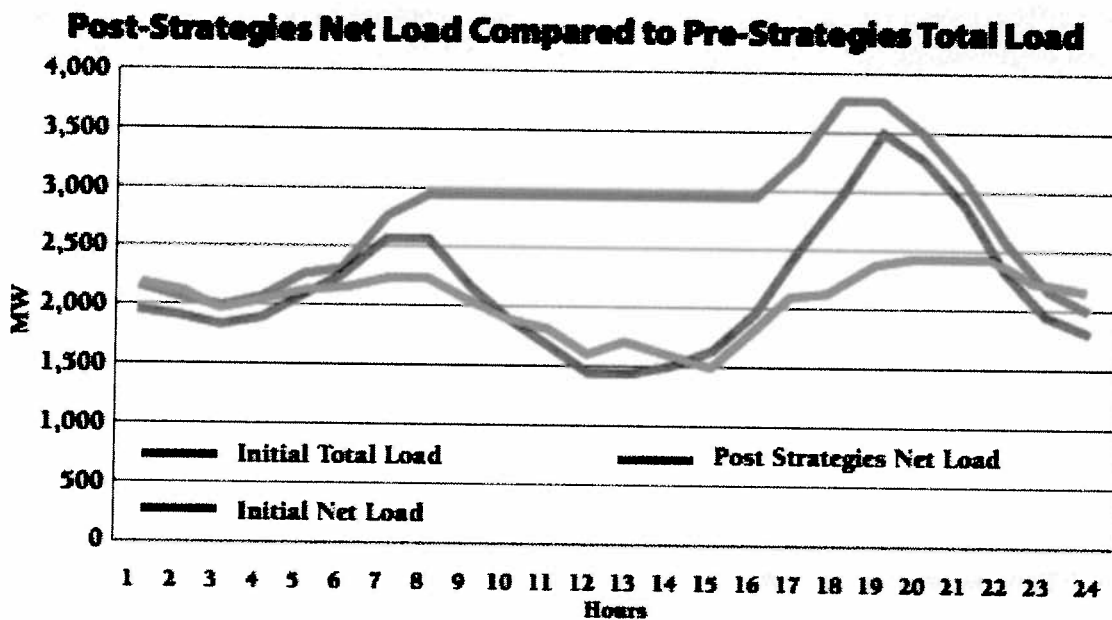
The range of approaches to help the duck load "fly" includes flexible resources, storage and demand response.

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The California Independent System Operator (CAISO) is concerned that the shape of the famous load "duck" (see chart) -- which illustrates the difference between total system load and the net load, after the addition of solar and other renewable energy sources -- is changing shape, and at times is placing wider-ranging demands on utilities and operators. "California's changing net load patterns are expected to create a greater need for flexible, dispatchable capacity to manage operational and reliability challenges," reported a U.S. Energy Information Administration (EIA) bulletin in December.

The still-growing peaks in the duck curve typically rise up the rump of the duck in the morning as people prepare to leave for work. The second and higher peak occurs in the post-work early evening and results in a steep ramp up the neck of the duck. At the same time, solar assets perform best during the middle of the day, causing the back and the belly of the duck to grow farther apart. Thus the energy range of utility demand response is widening.



Jim Lazar, a senior advisor to the Regulatory Assistance Project (RAP), based in Montpelier, Vermont, has suggested ten strategies that utilities can utilize to create a load shape that can be met with existing resources. "Each of the strategies -- such as implementing aggressive demand response programs or targeting efficiency to the hours when load ramps up sharply -- creates modest changes in the load shape," wrote Mr. Lazar in a January 2014 RAP paper, Teaching the "Duck" to Fly. "But, when combined, they completely solve the problem by turning the sitting duck into a streamlined flying duck. The resulting load curve is easier to serve than the projected load would have been, even without the addition of renewable resources."

The CAISO has already developed plans to adopt many potential solutions to the problem, including:

\* Increased focus on flexible resources.

The California Public Utilities Commission (CPUC) has adopted a flexible capacity framework scheduled to start this year, requiring load serving entities under CAISO jurisdiction to procure a certain level of flexible capacity when meeting resource adequacy needs. CAISO is also considering the introduction of upward and downward ramping products into its market processes, including the day-ahead market.

\* Storage mandate.

The CPUC is requiring that the state's three investor owned utilities procure 1.325 GW of energy storage at transmission, distribution, and customer sited levels by 2020; the first wave of contracts have already been signed.

\* Market design enhancements for intra-hour scheduling.

CAISO implemented a 15minute market for generators, imports, exports, and participating loads in May 2014 as part of its compliance with Federal Energy Regulatory Commission (FERC) Order No. 764, which required intrahour scheduling options to aid the integration of renewable resources into the grid.

\* Creation of an energy imbalance market.

CAISO and PacifiCorp formally launched an energy imbalance market (EIM) in November between the two balancing authorities to create a market mechanism to tap the generation assets of both authorities, using more diverse set of solutions to manage short-term supply and demand imbalances. NV Energy will join in the balancing in October 2015.

\* Time-of-use pricing.

California has enacted legislation enabling the CPUC to authorize utilities to default (with an opt-out option) residential customers to a timeofuse rate schedule in 2018. Under timeofuse rates, customers' rates will reflect the variation in the cost of generation at the time, and is expected to shift consumption hours away from periods when peak generation is required.

\* Demand response.

California enacted legislation in September directing the CPUC to include demand response in its assessment of resource adequacy requirements and to establish a set of rules and tariff policies to encourage the efficient and cost effective deployment of demand response resources.

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