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## Comment on Methodological Improvements to the Energy Demand Forecast Workshop

*Additional submitted attachment is included below.*

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Comment on IEPR Commissioner Workshop on Methodological Improvements to the Energy Demand Forecast for 2017 and Beyond

## Role in the Proceeding

I am the Principal at LoadForecast.net. LoadForecast.net is currently under contract to LADWP to provide services related to Load Forecasting. The opinions that follow are my own and reflect my experience in forecasting for LADWP service area.

## Forecasting Photovoltaic Adoption: Data Needs and Potential Changes in Modeling

The technical and market potential of residential sector behind the meter solar installation in the LADWP service area is limited compared to other utilities. The technical potential is limited by the fact that 46% of the housing units are part of large complexes with 5 or more units according to the California Department of Finance Demographic Unit. Market potential is limited by the fact that owner-occupied housing is only 40 percent of total housing according the American Housing Survey. However, within the Los Angeles service area, there are geographies that have both high technological and market potential. A photovoltaic adoption forecast in the LADWP service area would need to reflect the geographical differences to be valuable. From my experience, data at planning area level within the LADWP service area tends to be less reliable and more difficult and expensive to obtain.

## Weather Normalization for Peak Forecasts

LADWP's forecasting methodology is regularly filed in IEPR proceedings and in compliance with NERC CIP standards.

LADWP currently uses a weighted-average temperature obtained from three weather stations in its peak demand weather normalization process – Los Angeles Civic Center, LAX and Woodland Hills Pierce College. Woodland Hills Pierce College is not a National Weather Station (NWS). The advantage of using the Pierce College station is that it records the more extreme temperatures at the base of the San Fernando Valley when compared to the temperatures recorded at the official NWS stations located at

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the Van Nuys and Burbank airports. The disadvantage of using the Pierce College data is that the station does not collect humidity data.

LADWP uses an eight-year study period to develop its weather response function. CEC Staff mentioned using a three-year time period.

LADWP subtracts a known non-weather-sensitive load from its peak demand before developing the weather-normalization function. It forecasts the non-weather-sensitive load separately using a ten-year moving average.

LADWP uses peak day weather since 1966 to build a normal curve in order to calculate its 1-in-2, 1-in-10 and 1-in-40 peaks. The CEC and IOUs mentioned using a shorter time period.

Another alternative to consider is to use the extreme weather day for the year rather than the peak day. Sometimes the extreme day occurs on a holiday or a weekend and does not yield an annual peak. Using the extreme day will yield higher peaks.

LADWP uses the normal distribution to calculate 1-in-2, 1-in-10 and 1-in-40 peaks. CEC Staff uses the median and percentile statistics. Given the LADWP weather response function, the normal distribution calculations tend to be higher than the percentile calculations because the distribution of peaks produced by LADWP's weather response function is right-skewed. Because the underlying distribution is unknown, a simulation may be a more appropriate technique.

The LADWP peak model is capable of accepting alternative inputs including varying the weather stations, the study period for weather response function and the number of historical years included to build peak distribution. Modeling using agreed-upon inputs and comparing outcomes would be a useful and could be achieved without a burdensome amount of work. In the end, it is a matter of forecaster's judgement on which ultimate model is best.

## Peak Shift

Peak shift is occurring in the LADWP service area. In the last ten years, 3 of the annual peaks occurred at hour ending 1700 with the rest occurring at hour ending 1600. Based on an unofficial back of the envelope calculation, all annual peaks should begin occurring at hour ending 1700 in 2018 if not sooner.

Currently LADWP's 8760 hour forecast is a deterministic. LADWP morphs a historical average load shape using the parameters of forecasted monthly NEL, minimum demand and peak demand to develop its long-term 8760 Forecast. The deterministic model does accommodate peak shift. As a preliminary study on peak shift, LADWP might be able to perform a static bottom up analysis. The initial thought is to hold the current load constant using the historical average load shape. Forecasted new loads and

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savings would be assigned separate load profiles. These forecasted profiles would be summed with the historical shape to identify load shifts and/or ramping issues.

LADWP has experimented with 24-hour load models similar to what CAISO presented. The technology is available to LADWP to pursue further if the Energy Commission finds value in the methodology.

## Data Collection

Creating a repository of load forecasting data at the state level is an excellent idea. One that could potentially meet any cost benefit test. Currently, it is technologically challenging and time consuming to scrape publically available data from websites to statistically test relatively simple ideas. More work invested in analysis and less in data collection intuitively would be more productive. Perhaps it would encourage more research from university students or even small practitioners.

Government already plays a key role in collecting, maintaining and making available data. Data.gov might be used as a blueprint. Census, economic and weather data currently are all available from federal and state government. Annual electric load data by class and rate is available through FERC Form 1 filing.

The data should be stored as time series in an OBDC generic format so that it would be accessible by any of the statistical packages commonly used in load forecasting and research such as Metrix ND, SAS and R.

The issue of proprietary data might be solved by putting a two or three year lag on making the data accessible. Of course, the longer lag is a negative for analysis if technology is rapidly changing.

I am certain the devil would be in the details to create any such data repository.