Chris Kavalec
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Effect of Historical DSM Measurement on Demand Forecast

The following discusses the impact of estimated historical DSM on Energy Commission and utility forecasts. That is, the effect on the forecast of an inaccurate estimate of historical savings.

Energy Commission Models

The Energy Commission Residential and Commercial Models currently calibrate model output minus post-processed DSM to actual consumption in the base (last historical) year. Note that this refers to savings not already included in the model itself. This gives a calibration factor of:

actual consumption / (model output minus DSM).

This factor is applied to the model output (model output times calibration factor) in the forecast period, with projected DSM subtracted off to give the actual forecast.

Suppose we have a very accurate measurement of DSM in the base year. A DSM estimate lower than this "true" measurement decreases the calibration factor (the denominator gets larger) compared to a factor with "true" DSM. This biases the forecast downward, since model output in the forecast period is being multiplied by a smaller calibration factor. A base year DSM estimate that is too high increases the calibration factor and therefore biases the forecast upward.

Utility Models

Utilities in California use two basic methods of incorporating historical DSM in their forecasts. The first method adds in estimated historical DSM to actual historical sales. This constructed variable becomes the dependent variable in the estimated econometric model used to forecast. The utility program goals are subtracted from the forecast "sales plus DSM" for the final forecast. Estimates of historical DSM that are too low mean that sales plus DSM in the forecast period are understated and this leads to a forecast biased downward, assuming the goals are expected to be met. Too much historical DSM biases the forecast upward.

The second method uses actual sales to estimate a forecasting equation and then subtracts off the difference between utility program goals and the DSM assumed to be embedded in historical sales projected forward from forecast sales for the final forecast. If estimated historical DSM is too low, the incremental DSM (goals minus historic) is overstated, biasing the forecast downward. If historical estimates are too high, incremental DSM is understated and the forecast is biased upward.