

**OMS Regional Planning and Resources Work Groups
Feedback on Independent Long-Term Load Forecast
May 14, 2014**

The OMS work groups appreciate the process and content of the workshop conducted on April 30, 2014. Stakeholders were engaged and had state specific and econometric knowledge to share. Likewise, the State Utility Forecasting Group (SUFG) explained their modelling process and seemed open to suggestions from the stakeholders. There was a lot of useful information exchanged between SUFG and the stakeholders. We are hopeful that the suggested modelling diagnostics and enhancements will be incorporated into the forecast effort.

The OMS Work Groups have comments on a number of aspects of the forecast modelling process.

Econometric modeling

On April 30, the SUFG presented an energy demand curve model. The model is subject to a simultaneity problem due to the data proposed to be used in the regression analysis. The energy consumption data and price data proposed to be used in regression analysis are equilibrium energy consumption and price data which are subject to the interaction of demand and supply curves. In that case, instrumental variables should be used to overcome the simultaneity problem. If the goal of the analysis is not to estimate price elasticity, or in other words, identification of the coefficient on the demand curve is not an issue, a reduced form model can produce better (unbiased and more efficient) estimates. By establishing a demand and supply curve model (structural model based on economic theory), the reduced form model can be easily derived. If the reduced form model is derived from a structural model based on sound economic theory, it will reduce potential argument over the “best fit model” which can be subject to judgment. Therefore, this process can be easily duplicated in the future without much revision.

“The Project Schedule contains these two items: “Develop an econometric forecasting model for each state” and “Develop an electricity price projection model for each state.” The OMS Work Groups would like more explanation of the latter model. The paragraph above argues that energy consumption and price are two endogenous variables that could be estimated in a better way by a reduced form equation. The two models above suggest that a historical model for energy consumption is first developed, and then the electricity price projection model is used to create a future price to be used in the running of the econometric state model for the future to produce the load forecast. In this sense, it appears there are two equations solving two variables; however, the OMS Work Groups would like more explanation of the price projection model and how that relates to the future load forecast.”

The OMS Work Groups are also concerned with what seems to be arbitrarily defined time lags on electricity price in the individual state models as well as elimination of annual observations to “get a better fit.” The OMS Work Groups also suggest more careful analysis of structural breaks. The structural break analysis based on splitting the number of observation in half seems arbitrary. For example, observations from 1990-1996 were eliminated from the Missouri model. Perhaps a structural

break analysis should be conducted on these early years. In addition a more in-depth analysis for the recession years of 2008-2010 seems prudent.

Data

Other than the trending component, weather is an essential component of the model. Therefore, this important variable should be carefully developed. First, the choice of weather station should be carefully discussed with a LSE/TO or state regulator to properly reflect the situation in the respective state. For example, in case of state of Minnesota, Minneapolis-St Paul airport weather station can reflect air conditioning load better than St Cloud weather station which was chosen by the SUFG. Further, it is not clear why cooling degree days (CDD) is used instead of temperature and humidity index (THI). THI can be a better proxy variable for summer weather. THI should be evaluated as one of the summer weather variable proxies.

The use of a price variable in proposed models raises concern with development of future price. At this point, it is not known how the future price will be developed, however, it has to be developed to forecast future energy consumption in the proposed model. If the future value of the price is developed in a precarious manner, the overall result of the forecasting process will be in doubt. This concern is minimized if the reduced form model is used instead of the proposed model.

Statistical Testing

During the April 30 meeting, proper explanation was not provided on why certain statistical tests were not carried out. A multicollinearity test is one of them. In the case of multicollinearity, interpretation of individual coefficients can be misleading. If a modeler finds any counter intuitive estimates of a coefficient, he/she cannot judge the validity of the overall model since highly correlated variables can pull the real impact from one to another. So, all the diagnostic tests discussed during the April 29th meeting should be carried out at the same time to judge the validity of the model.

Also, it is unclear how the diagnostic tests will feed back to model revision decisions. As a good practice of modeling, it is essential to have set procedure to feed diagnostic test results back into model adjustment or proxy variable selection.

Inference on the outcome

Since this is the first trial of MISO wide forecasting, MISO doesn't have a previous forecast with which to check the reasonableness of the new forecast. MISO and SUFG should specify how the reasonableness of the forecast model will be evaluated both for its initial specification and going forward as new actuals become available.

Also, it is a concern whether the proposed forecasting process is repeatable without new input from stakeholders for subsequent years. If there is clear plan for subsequent year forecasts, it should be presented to stakeholders as soon as possible.

Additional Comment

The OMS Work Groups request an additional workshop between now and July in order for the SUFG to provide an explanation on how they are converting the state energy forecast to LRZ forecasts, and how they are converting an energy forecast into a peak demand forecast for each LRZ. This would allow stakeholder input before the modelling is completed and estimates are made.