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Enhancement of Long Term Peak Demand Forecast in Peninsular Malaysia Using Hourly Load Profile

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Abstract : The peak demand forecast is crucial to identify the future generation plant up needed in the long-term capacity planning analysis for Peninsular Malaysia as well as for the transmission and distribution network planning activities. Currently, peak demand forecast (in Mega Watt) is derived from the generation forecast by using load factor assumption. However, a forecast using this method has underperformed due to the structural changes in the economy, emerging trends and weather uncertainty. The dynamic changes of these drivers will result in many possible outcomes of peak demand for Peninsular Malaysia. This paper will look into the independent model of peak demand forecasting. The model begins with the selection of driver variables to capture long-term growth. This selection and construction of variables, which include econometric, emerging trend and energy variables, will have an impact on the peak forecast. The actual framework begins with the development of system energy and load shape forecast by using the system's hourly data. The shape forecast represents the system shape assuming all embedded technology and use patterns to continue in the future. This is necessary to identify the movements in the peak hour or changes in the system load factor. The next step would be developing the peak forecast, which involves an iterative process to explore model structures and variables. The final step is combining the system energy, shape, and peak forecasts into the hourly system forecast then modifying it with the forecast adjustments. Forecast adjustments are among other sales forecasts for electric vehicles, solar and other adjustments. The framework will result in an hourly forecast that captures growth, peak usage and new technologies. The advantage of this approach as compared to the current methodology is that the peaks capture new technology impacts that change the load shape.

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