



Operational Wind and Solar Energy power forecasting for the Australian Energy Market

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Renewable energy generating capacity in the Australian National Electricity Market (NEM) has been rapidly expanding. Wind and solar energy generation is predicted to reach about 40% of installed generation capacity by 2030. To handle this growing proportion of variable generation operational forecasting of both wind and solar power production is essential to ensure stable and efficient operation of both the grid and the energy market. Australia's market is unusual in that it couples the physical operation of the national grid to the market at 5-minute intervals and requires forecast products and uncertainties to cover timeframes from 5 minutes to 2 years.

The Australian Energy Market Operator (AEMO), manager of the NEM, has been successfully operating wind forecasting for all wind farms larger than 30MW since 2008. Based on the European ANEMOS consortium product, the system has recently been extended to forecast solar generation, the solar extension entering full service in May 2014.

While the wind forecasting system has provided excellent results, the solar forecasting system, presents a number of significant technical challenges, with the initial operational system employing only basic statistical and numerical-weather prediction-based techniques. CSIRO, in conjunction with the Australian Bureau of Meteorology and a number of Australian research institutions and together with the National Renewable Energy Laboratory (NREL) in the USA, are developing more advanced operational forecasting techniques, such as those based on sky cameras and satellite imagery which will provide enhancements to the operational solar forecasting system.

This paper describes the structure, operation and performance of the wind and solar forecasting systems in the NEM, the scope and results of the solar forecasting research developments.