FOREWORD: A USER'S VIEWPOINT

Electricity is a commodity that is strongly influenced by variability of climate, for both supply and demand. Consequently, EDF, the French Energy Group, has developed advanced collaborations with the scientific community to be able to anticipate as well as possible future climatic conditions.

Until the early 1960's, half of electricity production originated from hydroelectric power plants. Thus, the ability to forecast several weeks ahead, or even several months ahead, the reservoir status was a major challenge for EDF. Therefore, collaborations between EDF and scientists focused then on this aspect.

Starting in the 1980's, the sensitivity of electricity demand to cold weather spells increased significantly and the forecast of the air temperature became a priority for EDF. A good short-term forecast (ranging from a few hours to about ten days) of temperature over the entire French territory is essential to correctly plan the start-up of power plants and the purchase of electricity needed to fulfill the electricity consumption by EDF's customers. During winter, a 1°C error in the temperature forecast translates into a difference in electricity demand that is equivalent to the electricity consumption of the second and third largest French cities (Marseille and Lyon). Given such a challenge, EDF imposes stringent requirements on the provider of meteorological data concerning both the forecast delivery schedule and the accuracy of the forecast.

However, a good short-term forecast is not sufficient. Given the time scales associated with the operation of its electricity production plants, EDF must also obtain a forecast over several months in order to schedule in an optimal fashion the maintenance of its plants, acquire the fuel necessary to operate those plants, manage its energy storage, and anticipate extreme climatic events (cold weather spells as well as heat waves). EDF has high expectations in that domain and, accordingly, is a partner of various projects pertaining to seasonal forecasts to improve current forecasting approaches, which are now mostly based on historical temperature records.

As wind power production is expected to increase greatly over the coming years, the electricity system will be subject to variations of several thousands of MW depending on wind intensity. The ability to anticipate with accuracy those rapid variations is, therefore, essential to the electric industry from an economic standpoint. This ability must be based on a reliable forecast of winds and their geographical distribution.

Concerning the selection of future means of energy production for the long term, EDF is very interested in climate change research. The 2003 and 2006 summers showed that the temperature of rivers could reach high values upstream of power plants, which affects the cooling capacity at those plants. Will such events occur more frequently in the future? Are decisions that are currently based on historical records still relevant? Will future winters be as cold as in the past?

This brief overview shows that the electric industry has high expectations for climate forecasts. From the short term to the long term, from the local scale to the global scale, scientific collaborations must lead to better scientific tools in the future: without any doubt, this book is a significant step in that direction.

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