# CASOM 25: THE FUTURE IS NOT WHAT IT USED TO BE

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## INTRODUCTION

We are often called upon to make estimates of future plant reliabilities for use by in a variety of ways from expansion planning and design optimisation studies to economic dispatch analysis to goal setting using benchmarking techniques and to Operations and Maintenance improvement of existing plants. As has been noted in previous case studies, historical reliability data of plants with similar design and mode of operations is a key element in forecasting these reliabilities. However, using only this data can introduce significant inaccuracies in that these data are statistical measures based on observed events during some previous time period, whereas what is needed is a prediction of what is going to happen in the future. This probability forecast is not necessarily the same as yesterday's statistics.

## EXAMPLES

As discussed in previous WEC case studies there are many examples that demonstrate the difference between historical and future power plant performance (for complete case studies visit www.worldenergy.org/forward.asp?page=pgp and select "See Previous Studies at the bottom of the banner page):

- In our September 2002 study we discussed the principle of understanding and quantifying the cause-effect relationship between past conditions and past performance and applying that to our prediction of future conditions to arrive at a prediction of future performance. We also presented a summary of the results of an effort to develop an equation to predict future reliabilities and the improvement that was achieved when compared to previous methods;
- Our November 2002 study discussed a prediction technique for maturing technologies based on using historical data as a starting point but incorporating learning curve theory for future performance forecasts;
- The June 2002 study summarised a report that described and quantified the tendency of units to exhibit lower reliabilities during the first days and weeks after a return to service following a major planned outage;
- In March of 2002 an important study was summarised that proved the premise that the majority of generating units were ***more reliable*** during their peak seasons, leading some companies to reduce their generation expansion plans ***without*** jeopardizing customer service reliability;
- The October 2002 study shows how installing new pollution control can impact reliability;
- In May 2002 we demonstrated the fact that management style can account for as much as 75% of the difference in the reliabilities of different generating units;
- The December 2002 study documented reliability changes due to dispatch changes.
    1) In July 2003 we discussed how some changes in a plant's Planned Outage programme might affect reliability;

2) Our first case study in Feb. 2002 discussed how the implementation of a High Impact – Low Probability (HILP) reduction program has resulted in reliability improvements.

Other examples that have not yet been summarised as WEC case studies include the effect on plant reliability of aging equipment or the impact due to changes in fuel quality.

Also, many analysts agree that there is likely to be a significant impact on "traditional" reliability indices as countries move into a more de-regulated and competitive business environment (for more details see the monographs published by other working groups of the WEC Performance of Generating Committee on the WEC website www.worldenergy.org; also a brief discussion can be found in our June 2003 case study).

Another aspect that may be very important is related to item 6 above (impact of management on reliability) in which the relationship between proactive and reactive maintenance cost is quantified and related to reliability.

## SUMMARY

In summary in order to more accurately predict a unit's future reliability we should ***start*** with a good understanding of the historic reliabilities of similar generating units as well as a comprehensive understanding of the prevailing conditions that influenced those reliabilities. But from there we will have to estimate what the future prevailing conditions will be and use our understanding of the past to develop better estimates of the future. Since we cannot be sure about what the actual future conditions will be, we might use a range of possible futures, weighted by their probabilities, and utilise statistical techniques such as Monte Carlo simulations in order to arrive at the most appropriate set of predictions.