

## Smart Grids and the Future Electrical Network: Towards a Smarter, More Reliable and Resilient Power System

It is well accepted, both here in New Zealand and internationally, that the electrical power system will need to be modernized to cope with future demands. This has led to the Smart Grid concept as a means of increasing the smartness of the electrical grid. The objectives are to transform over time to a smarter, more reliable, resilient power system that is economic and sustainable. Can all these objectives be met?

The term *Smart Grids* means different things to different people. This presentation will discuss the present smartness in the grid and the concept of Smart Grids. The challenges of integrating new technologies into the grid will be discussed. Issues such as managing supply variability (wind and photovoltaic (PV) generation) and the uptake of new technology including, PV, LED lighting and electric vehicles and residential demand side management.

An important part of Smart Grids is the advance in metering infrastructure, which will enable a large amount of data to be available. The vast amount of data will necessitate the use of smart algorithms to take full advantage of the available data, in order to improve the management of the distribution system.

An overview of research and initiatives to develop a smarter, more reliable and resilient power system from a New Zealand perspective will be given.



**Professor Neville Watson** received the B.E. (Hons.) and Ph.D. degrees in Electrical Engineering from the University of Canterbury, Canterbury, New Zealand. He is currently a Professor with the University of Canterbury. His research interests include power quality and steady-state and dynamic analysis of AC/DC power systems. He has co-authored seven books, three book chapters and over 200 technical papers.

Neville has been very active in professional societies and is a member of CIGRE AP C4 committee on Technical Performance, and of the joint Australia/New Zealand standards committee EL034 on Power Quality. In the past Neville has been a contributing member of various other standards & IEEE committees. He has over the years also helped industry to solve issues by undertaking various consultancies under the auspices of Canterprise, and later the EPECentre after it was established.

More recently he has been the PI on the FRST/MSI Power Quality project. Neville is a senior member of IEEE, a member of IPENZ and IET (UK). He is also a Chartered Professional Engineer, CPEng (NZ), on the International Professional Engineers register, Int.PE(NZ), and a Practice Area Assessor for IPENZ.