IEEE
Power & Energy Society & Power Electronics Society - WA Chapter

Optimal Sizing of Battery Energy Storage Systems (BESS) in Microgrids

19th April 2018, **1600 – 1730 hrs**

Lecture Theatre, Central Park Building
152 St Georges Terrace, Perth

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Registration is essential - please contact: Michelle Kenworthy-Groen;
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Event fee: no charge

Dr Thair Mahmoud is a power system and control engineer with extensive academic research and industry experience focused on power system operation and expansion planning.

He is a MIEEE, MIEAust and an awardee of the Australian and Malaysian International Postgraduate Research Scholarships. His current main role is a Senior Engineer at the Australian Energy Market Operator (AEMO) performing operation and dispatch planning for the South West Interconnected System (SWIS) within the Wholesale Electricity Market (WEM). From this position he is serving as an Adjunct Senior Lecturer at both the University of Tasmania and Edith Cowan University. Previously, he worked in different roles within Western Power's distribution and transmission network planning areas. In 2015, he was nominated by Western Power to take a secondment role at Carnegie Wave Energy. In this role, he was planning the grid connection of the world's first microgrid, which involves wave energy as part of its generation mix. With this combination of academic research and industry experience, he gained significant background knowledge in the application of Artificial Intelligence (AI) techniques on power system planning and operation optimization issues.

Dr Mahmoud is also an active reviewer of a number of journals and a reviewing committee member of several international conferences. His current academic research activities include: power system analysis, microgrids control, Battery Energy Storage System (BESS) placement, sizing and utilisation, Linear/Non-linear-programming based dispatch optimisation, Artificial Neural Networks (ANN) and Agent-based load forecasting and electricity market modelling.

A Microgrid is a small scale power system that consists of distributed generation sources; linked in an intelligent communication and control system to supply power to distributed loads. It can operate autonomously to be part of the main grid or switch to be islanded depending on its type and operation scenarios. With such complicated operation requirements, microgrids' control in general is designed to optimise their operation by maximising their efficiency and reliability. Operation control in microgrids including constraint dispatch/unit-commitment, ancillary services (spinning reserve, load following and reactive support) planning, can be formulated as a mixed linear integer problem, and can be solved using linear/non-linear solvers.

Battery Energy Storage Systems (BESS) can be key players in optimising the operation of microgrids due to their ability to perform multi-operational functions e.g. demand management, power quality control, backup power and energy trading. Due to their high installation cost, finding their right size is an essential part of the planning and design of a microgrids development.

Integrating BESS within the unit-commitment problem in microgrids requires complicated decision making algorithms and can formulate another optimisation problem. The objective of this problem is to reduce the operation cost at minimum BESS size.

This lecture presents the art of using Artificial Intelligence (AI) in operating microgrids and the use of BESS to reduce their operation costs. The lecture will also cover the BESS sizing options and highlight the role of intelligence in reducing their size and maximising their utilisation.

Getting There:

The link below will give you a virtual tour of the Central Park Conference Facility. Entry is either via Ground level then stairs, which lead up to the first floor foyer, and in turn the theatrette and other board/seminar rooms. Or if required there is also elevator/disabled access to the first floor from an alternative entry approx. 20m to the left of the main entrance. The main entrance to the Conference facilities is off the arcade/courtyard located behind the main Central Park office tower. This area can be accessed from St. Georges Tce, Hay or William Streets. Several public parking areas are within easy walking distance.

http://www.central-park.com.au/Core/Content/ConferenceCentre/Content3407.aspx