Canberra smart grid

Canberra smart grid

Imagine if electricity suppliers could know exactly when consumers use high-energy appliances like clothes dryers, eliminating the need for expensive standby power and reducing wasteful operations.

Associate Professor Hemanshu Pota from UNSW Canberra is leading cutting-edge research to transform renewable energy and electric vehicle integration into the power grid, using advanced tools and real-time data for enhanced stability and efficiency.

Life for an electricity supplier would be a lot easier if a consumer called the power company and said, "I am going to turn on my clothes dryer, may I do so?". This would make spinning reserves - supply that is online but not in the grid - unnecessary and prevent wasteful operations.

Smart grids are a way to achieve this with advanced metering, data analysis, and artificial intelligence. Australia"s electricity network is the longest in the world, and perhaps with the least number of users. Smart grids can reduce transmission losses and achieve a high level of renewable integration, especially suited to Australia with abundant sunshine and coastal wind.

My research is focused on the finer aspects of renewable energy integration for smart grids. Most media reports and research are based on bulk analysis that considers only the total amount of electrical load and renewable generation.

In our finer analysis, two issues are important:

These aspects enable us to ensure that the electricity network meets all the regulatory constraints.

Our research has found that there is a substantial difference between the bulk and finer analysis when predicting generation or electric vehicle operating or hosting capacity. The inclusion of dynamics enables us to analyse system stability and design controllers to enhance system stability for abnormal operating conditions. We have designed and demonstrated high-performance controllers that extend the operating range of generation resources for abnormal operating conditions.

Our work improves how renewable energy and electric vehicles are integrated into the power grid by providing advanced tools for enhancing network capacity. We develop algorithms that use data from a few key network locations to accurately predict the grid"s capacity in real-time. These predictions help with smart scheduling, ensuring the grid stays stable and uses its capacity to the fullest.

Our approach is different from the traditional bulk analysis, which looks at overall data and often leads to limitations. Instead, our research uses detailed, real-time data to create more accurate and effective solutions

for designing and operating smart grids. This leads to better performance and a more reliable and efficient power system.

Potentially yes, a finer analysis of renewable energy integration for smart grids could help bring down the cost of an energy bill. By analysing and optimising the integration of renewable energy sources, electricity companies can improve the efficiency and capacity of the energy network. This means that the grid can handle higher amounts of renewable energy without requiring expensive upgrades or expansions, resulting in cost savings that can be passed on to consumers in the form of lower energy bills.

This not only provides them with compensation from electricity companies but also reduces their dependence on grid imports, significantly lowering their energy bills. Additionally, reduced demand on the grid can lead to lower overall energy costs for all users.

Contact us for free full report

Web: https://kary.com.pl/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346