Wellington microgrid benefits

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Developing microgrids can be challenging - the renewable energy potentials of the site need to be thoroughly assessed and consumers" power usage habits need to be investigated. Taking these into consideration is critical in planning a microgrid; over-indexing can result in excessive spending while under-resourcing can result in further spending down the line. To identify the true and necessary size of a microgrid, optimisation tools and software packages are commonly used.

Early simulations show that SMOULDER can provide a ~20% closer-to-true optimisation than competing software, resulting in $100,000s of saving in community-scale size projects.

Assists in the transition of consumers to "prosumers" where they will be both producing and consuming power and selling the excess to the grid or to neighbours.

The optimisation tool is currently available for use in-house and can be run for nearly all configurations of grid-connected and -isolated microgrids. The team are also working on a commercially available version of the tool and making it a software package.

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Roomana’s Master’s research explored the potential of solar panels and wind turbines as sources of renewable energy. She focused on optimising microgrids, which involved electrifying communities using these sustainable resources. The aim was to size the microgrid and ensure its feasibility while promoting sustainability and zero-carbon emissions.

Her research focused on two communities on Aotea Great Barrier Island. These communities are off-the-grid and individual households and businesses are self-reliant in terms of supplying their energy needs—mostly from fuel generators for electricity. Microgrids enable the communities to collectively supply their electricity needs more cost-effectively utilising renewable resources.

Roomana"s interest in renewable energy was ignited when she contemplated the possibility of harnessing natural resources to power homes without relying on utilities—the national grid and local lines companies.

“Imagine electrifying your house with natural energy sources, such as the sun and wind, without paying any bills. Renewable energy is a more sustainable and realistic technology in this era. You can not only power your appliances with these resources but also store excess power in battery storage devices to utilise it later.”

Grateful for the guidance and encouragement she received at Te Herenga Waka—Victoria University of Wellington, Roomana cherished the support of her supervisor and colleagues. The open lines of communication fostered a responsive and helpful atmosphere, contributing to her growth and the acquisition of invaluable skills.

“I have met students with different cultural backgrounds, which fascinates me. My friends, supervisors, and colleagues are very supportive, and I have learnt a lot from them. I have enjoyed the whole research period, where I gained insight into different perspectives and acquired new skills. Doing my thesis is one of the best decisions I have made in my life.”

Roomana acknowledges that traditionally engineering was perceived as a male-centric field. However, times have changed, and women are now empowered to pursue any career path they desire.

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