

Faculty of Engineering

Summer Research Program 2023-2024

Project Title: Demand Flexibility from Electric Hot Water Systems to Support Energy Transition

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Objective

The objective of this project is to study the role of electric hot water systems in facilitating integration of renewable energy resources such as rooftop solar in power grids. The project will review different technologies. It will undertake a techno-economic studies to evaluate their benefits in reducing the energy bills and supporting power networks.

Project Details

Domestic hot water is responsible for around a 5th of Australian residential greenhouse gas emissions and a quarter of household energy use. Electric hot water technologies are a key solution to reduce emission reduction and achieve net zero targets. There are two general categories for electric hot water systems: heat pumps and electric storage which offer differing benefits in terms of efficiency and flexibility.

This project aims to study the flexibility of electric hot water systems and their potential for demand side management. The flexibility of these systems can provide 'solar soak' and help with the emerging minimum demand challenge in Australian power grid that has abundance of rooftop solar. In addition, consuming excess solar photovoltaic (PV) generation during the day can help reduce variability in the power flows, regulating voltage fluctuations and avoiding the need for expensive solutions such as transformer taps, voltage regulators or load compensators.

The project will evaluate how smart control of these systems can improve grid reliability, help optimise renewable integration, and benefit consumers through lower energy bills.

Prerequisites

NA

Additional Information

Potential applicants are required to attend an interview.