

SUMMER RESEARCH 2024/25

PROJECT ABSTRACT



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

PROJECT # 42

SUPERVISOR/S:	Senior Lecturer Martin Atkins
PROJECT TITLE:	Electricity Demand Flexibility from Industrial Process Heat for Demand Response and Interruptible Load
FIELD:	Chemical, Mechanical, or Electrical Engineering
DIVISION/SCHOOL:	HECS - Te Kura Mata Ao School of Engineering
PROJECT LOCATION:	Hamilton

PROJECT ABSTRACT:

Electrical grids and distribution networks are becoming increasingly difficult to manage and control due to increased levels of non-dispatchable renewable energy (e.g. wind and solar). Demand response and interruptible loads are becoming more critical for the control, stability and reliability of these grids and networks and to minimise the overall cost of expanding and operating them. Exacerbating the situation is the large scale of electrification of industrial process heat. This project explores the potential of industrial plants to provide demand response and interruptible load to provide flexibility to grid and network operators. Industrial plants can play a crucial role in managing electricity demand, minimising peak loads, and enhancing grid stability. The study focuses on the operational characteristics and flexibility of industrial process heat systems, evaluating their ability to shift or reduce energy consumption during peak demand periods. Through a combination of literature survey, simulation and modelling, and economic assessment, this project will examine an industrial case study to identify and quantify key factors that influence the effectiveness and feasibility of industrial demand response and interruptible load.

STUDENT SKILLS:

- Basic Thermodynamics
- Microsoft Excel
- Basic Python (helpful but not compulsory)
- Engineering data analysis and communication

PROJECT TASKS:

1. Undertake detailed literature review of demand response from industrial process heat
2. Review current framework for demand response and interruptible load in NZ
3. Conduct technical and economic analysis of industrial case study
4. Prepare final report
5. Prepare and present a research poster

EXPECTED OUTCOMES:

- Student's Research Poster (as per clause 6 of the [Scholarship regulations](#))
- Detailed literature review
- Industrial case study

