PRES17.0223

**Industrial Symbiosis Case Study – Integrated Compressed Air System for a Diversified Industrial Precinct**

J. Neale*¹, L. Wong², M. Atkins¹, T. Walmsley¹, M. Walmsley¹

¹University of Waikato, New Zealand
²Waikato University, New Zealand

**Abstract**

Achieving true integration of the utility systems servicing an industrial precinct is critical to realising the full benefits of industrial symbiosis arising from the co-location of multiple manufacturing plants and associated engineering service centres. The Kawerau basin located in the Bay of Plenty region of the north island of New Zealand comprises one such industrial precinct where the co-location of multiple large scale manufacturing plants along with multiple light to heavy engineering service centres provide for such an opportunity. As a forerunner to broader utility system integration across the industrial precinct a detailed study of the opportunities to fully integrate the compressed air systems across this precinct has been completed, with significant energy and direct operational cost savings identified for a range of scenarios.

Using detailed system demand profile data and associated life cycle costs models, the benefits, both direct and indirect, of an integrated compressed air system for the Kawerau industrial precinct are fully explored for a range of future economic scenarios. With limited uncertainty surrounding individual manufacturing plants with in the precinct a range of successful system designs have been identified that will still deliver substantial savings for each individual stakeholder in terms of both energy consumption, emissions, reduced life cycle costs, whilst also delivering increased utility system resilience. Savings include a possible reduction of compressor plant numbers from over 30 to under 5, delivering substantial maintenance cost savings and also increased specific system energy efficiency through a significant reduction in unloaded air compressor operation.