

Nelson Pine Industries – lowering costs and environmental impact through compressed air system improvements

A commitment to low environmental impact practices and engaging expert advice results in better value from Nelson Pine's compressed air system.

Nelson Pine Industries Limited produces GoldenEdge MDF (Medium Density Fibreboard) and NelsonPine LVL (Laminated Veneer Lumber) from radiata pine grown in the plantations of Nelson. It is one of the world's largest single site producers of medium density fibreboard, and exports this product to markets around the world.

Low environmental impact practices

One of Nelson Pine's company values is to adopt 'low environmental impact practices'. In keeping with that ethos, in 2008 they took the opportunity to participate in the Compressed Air Systems (CAS) efficiency programme offered by the Electricity Commission.

At the time, Nelson Pine viewed compressed air merely as a utility, with little appreciation of its impact on energy demand and the direct costs of production.

CAS auditing at Nelson Pine

A preliminary 'Walk-thru CAS Assessment' by an Accredited CAS Auditor identified several areas of significant opportunity and resulted in the auditor recommending an 'In-depth CAS audit' to accurately quantify the savings opportunities, costs and benefits of the improvement options.

Nelson Pine recognised the value of proceeding with an In-depth CAS Audit and entered into an agreement with the Electricity Commission. In return for funding of the audit, Nelson Pine committed to implement recommendations that met agreed cost-benefit criteria. And with its commitment to low environmental impact, that was not a hard decision for Nelson Pine.

An In-depth CAS Audit involves a full-system inspection of the compressed air system including: measuring the performance of the compressors over an extended period; measuring the rate of air leakage; reviewing the sizing and suitability of the air treatment (dryer and filtration) and air reticulation systems; and the sizing and control of the air compressors.

In-depth CAS Audit findings

The In-depth CAS Audit established the baseline electricity consumption of the compressed air systems at 2.8 gigawatt hours (GWh) per annum, and identified significant opportunities for efficiency gains in the following areas:

- **Air leakage.** Many of the PVC reinforced hoses and hose tails extensively used on site for the transfer of compressed air from valves to application connections were leaking. An ultrasonic leak detection survey enabled the leaks to be identified, quantified and tagged. Across all air networks, leakage was measured to consume 0.51GWh per annum of electricity.
- **Compressor utilisation and control inefficiencies.** Inefficiencies were identified due to imbalances in the air demand and supply capacity on all the air networks. The effect of these imbalances was considerable energy waste from excessive off-load running of the compressors. A savings opportunity of 0.78GWh per annum was identified, through linking air networks, reconfiguring the compressors and adding control systems.



Nelson Pine Industries Limited

✓ Key features

- Nelson Pine Industries committed to efficiency and low environmental impact practices
- In-depth CAS Audit by an Accredited CAS Auditor identifies significant efficiency opportunities
- Audit results justified proceeding with a specific plan of action

✓ Key benefits

- Electricity savings of \$95,000 per annum from the compressed air system
- Reduction of \$0.23 per cubic metre of output
- Simple payback period of less than two years

✓ Sector relevance

- Applicable to all businesses with compressed air systems

Actions taken

An action plan was developed and implemented in three phases.

Phase 1 – Leakage rectification: This was progressed through a methodical repair of the leaks as tagged by the Accredited CAS Auditor during the ultrasonic survey of the plant. Subsequent monitoring of the CAS electricity demand indicated resultant savings of 0.43GWh per annum.

Phase 2 – Interconnecting the MDF and veneer plant air networks: The interconnection of these air networks, along with reconfiguration of the control logic of the compressors concerned, resulted in reduction of a further 0.47GWh per annum.

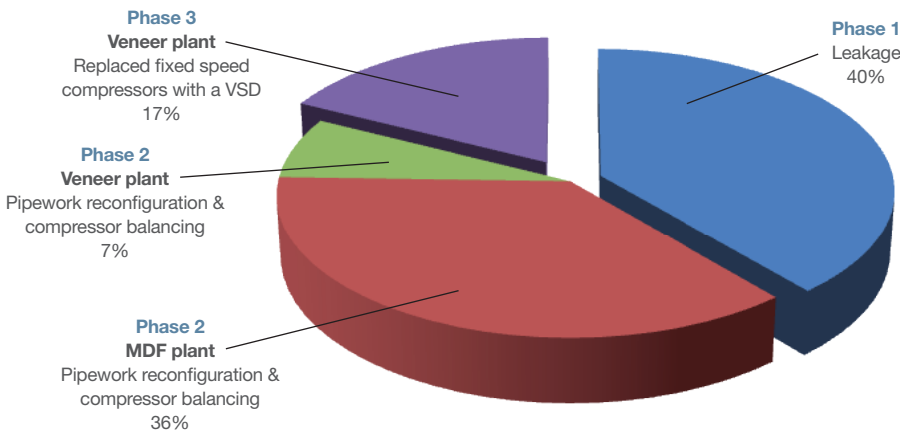
Phase 3 – Variable speed drive compressor for the veneer plant: Following the successes of the first two phases, Nelson Pine turned its attention to opportunities identified to reduce off-load running of the compressors supplying air to the veneer plant. Re-measurement of the CAS usage confirmed the value of replacing the existing 45kW and 90kW fixed speed compressors with a 75kW variable speed drive compressor, thereby eliminating off-load running and allowing a reduction in the air system operating pressure. The replacement has resulted in reduction of a further 0.21GWh per annum.

Overall result

By completion of phase 3 of the action plan, Nelson Pine had removed 1.1GWh per annum of energy wastage from its compressed air system. This represented more than a 38% reduction in the baseline CAS electricity usage measured during the In-depth CAS Audit, and a cost saving of \$95,000 per annum.

All actions implemented had a simple payback period of less than 2 years.

The diagram below shows the electricity savings from actions taken, each as a percentage of the total CAS electricity savings.



Process Engineer James Cameron in MDF plant with air wand

Key personnel

James Cameron (Process Engineer – Nelson Pine Industries Limited)

Robert Norriss (Accredited CAS Auditor – PSL Wholesale Ltd)

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