Smart systems for extracting energy savings

CASE STUDY

Key features

- Installed an Ecogate dust extraction system
- Air flow control gates installed in ducts
- Variable speed drive connected to each fan allows the dust fan extractor speed to be matched to demand

Key benefits

- 42% energy savings
- Payback period is just over 4 years
- $C0_2$ emissions reduced by 45 tonnes per year

By streamlining its dust extraction with smart controllers, Pacific Wood Products looks set to cut energy costs by $23,000 a year.

As a business that exports 95% of its finished remanufactured pine products, Pacific Wood Products (PWP) knows the importance of remaining internationally competitive. “When you’re exporting the majority of your product, many small and incremental refinements in your production and manufacturing processes can make a real difference to your ability to compete in the global market,” says Chief Executive Tony Clifford.

Looking for energy savings opportunities throughout their plant’s operations makes good business sense for PWP, and it also fits well with the company’s environmental ethos.

Napier-based PWP prides itself on finding innovative solutions that work better for the business and the planet. Its products include pre-finished weatherboards, external timber mouldings and solid pine panels and boards for DIY projects.

As a subsidiary of Pan Pac Forest Products, which owns and manages 33,000 hectares of pinus radiata forests in New Zealand, PWP is a vertically integrated company – that is, it grows, harvests and mills its own trees, which are then kiln-dried before being manufactured to high specifications and delivered to its customers. PWP is Forest Stewardship Council (FSC) certified – its customers know that their products come from a forest which is managed in line with strict environmental, social and economic standards.

The Ecogate system is installed on each dust extractor fan at the plant.

PWP's ethos of sustainability and environmental focus is further demonstrated through its waste management actions. At its plant all residual sawdust and shavings are returned to the Pan Pac plant for use as biofuel in their two boilers. This energy is then used to generate steam for their cogeneration plant and low-pressure bypass steam for kiln drying lumber.

The opportunity for energy savings

PWP runs an intensive multi-shift, wood processing operation in their 5000 m^2 plant. The different processing lines include wood planers, saws, finger jointing machines, and sanders. All generate dust emissions which must be effectively extracted and contained to maintain an efficient and safe working environment.

PWP use two ducted extraction systems to remove the wood dust across the fourteen main processing machines. With the help of a business grant from the Energy Efficiency and Conservation Authority (EECA), PWP installed an Ecogate system in each extraction fan.

By closing the extraction ducts to the workstations not being used, fan speeds can be reduced whilst still extracting dust in other areas. The central microprocessor unit continuously monitors and senses machinery activity, and adjusts workload to meet actual dust extraction requirements.

Prior to installing the Ecogate system, the extraction fans were running at full load for all the shift hours – regardless of the actual number of wood processing machines in use.

Operators at workstations with the extractor fans and Ecogate system in place.

Better energy management through smart control systems

What makes it so successful?

Tony Clifford explains, "It's about the set up of the processing machines. In our situation, not all connected machines are running at the same time. The extraction fan was initially set up to handle the total dust waste from all connected machines."

"Most importantly," he says, "with our machines we operate them in a batch-like manner rather than a single continuous process."

The main advantage of a smart control system is that the fan capacity is altered to meet the actual workload. "Through the use of a variable fan speed, the energy savings can be significant. A drop in fan speed of 20% can result in energy savings up to 50%," says Tony Clifford.

He feels that the Ecogate systems suit businesses where there are several machines connected to a central extraction system, and there is diversity of use across the system.

The set up and implementation of the system

A routine energy audit by PWP's energy retailer, Contact Energy, identified the opportunity for energy savings. Contact Energy conducted the due diligence on the system, as there is only one other site in New Zealand using it.

This involved seeing the Ecogate system working in several sites in the US which have been using it successfully for over 10 years.

PWP fitted the first of its two dust extraction control systems to its largest fan (90 kW) in January 2009 – with the second installation on the smaller, 75 kW fan being in April 2009.

With assistance and project management input from Contact Energy all mechanical and electrical contractors were coordinated to fit around the plant processing schedule. Full installation and commissioning was completed over just a few days, with minimal disruption to total output.

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The benefits and results

Energy savings were immediate from week one.

The project was independently monitored as part of the conditions of the grant from EECA. Together the systems energy savings are about 275,000 kWh/year. This reduces PWP's energy bill by about $23,000 per year – a 42% saving on their energy bill. The payback on the project is estimated to be just over 4 years.

Energy savings are not the only positive outcome. Other areas have also gained from this investment.

In the process of reducing their energy use, PWP has reduced their greenhouse gas emissions – this is estimated at 45 tonnes of CO_2 per year.

Lower noise levels within the plant have also been welcomed. Since the installation, Clifford and his team enjoy a quieter work area – especially for those based near the extraction fans.

This project helps PWP to retain its competitiveness on the global market – and to build its reputation as a manufacturer of products that account for their environmental impact.

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EECA enables organisations to increase their domestic and international competitiveness by adopting energy efficiency and renewable energy practices.

We work with businesses to identify the opportunities for energy management that are available to them and help them develop energy management action plans to make the most of these opportunities.

Good energy management has many benefits for businesses, including lower costs, increased productivity, reduced greenhouse gas emissions and a positive effect on the brand.

We have a particular interest in:

- encouraging new or under-used technology that can make processes more efficient
- projects that reduce greenhouse gas emissions, and
- developing the wood fuel industry.

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JUNE 2009