

Coal and timber drying in New Zealand

As timber volumes and markets increase dramatically, the timber processing industry is facing crucial long-term investment decisions to remain competitive and profitable, both here in New Zealand and in overseas markets.

And coal is poised to play a significant role in timber processing, as industry operators increasingly recognise this fuel offers both efficiency and cost benefits to those looking to get the most out of their energy systems.

In the kiln drying sector, it's clear a dramatic increase in exports of sawn radiata pine in coming years will place some pressure on new and existing operations in terms of both volumes to be processed and product quality. Acceptance of radiata in international markets is increasing as availability of tropical hardwoods and North American conifers is reduced.

But while Pacific Rim timber markets are expanding at as much as 10 per cent a year, quality products will also be required to meet rigorous standards. Mills will have to process a higher proportion of their timber to meet those high export market standards for drying and sterilisation.

While many mills can now adequately run their kiln drying operations burning only the wood waste produced by their own plants, this fuel source is unlikely to provide the efficiency or yields necessary to meet these export market demands. A

modern high yield mill drying about 40 per cent of its sawn output is capable of energy self-sufficiency, but wood waste alone is insufficient as the dried proportion of total production rises above that level.

Furthermore, as the value of wood waste rises for uses such as board manufacture, its availability as a simple fuel source will decrease.

Already, operators of kiln dryers are encountering fuel quality and fuel cost problems because pulp mills are prepared to pay ever higher prices for slab wood. Waste wood which is wet or has a high proportion of bark is hard to burn and relatively low in energy output.

Coal is by far the cheapest other form of thermal energy available, and its advantages are becoming increasingly evident to many owners of kiln dryers.

The average energy requirement to dry a cubic metre of timber is about two gigajoules. Depending on the grade of coal and the distance from the mine, the cost to provide two gigajoules of energy from coal is between \$4 and \$8. And one tonne of coal will dry about nine cubic metres of timber.

Even the cheapest options are almost twice as expensive as coal. The equivalent cost for natural gas is between \$14 and \$20, while oil is about \$24. Liquefied petroleum gas costs about \$40 to produce two gigajoules and electricity runs at about \$48.

What's more, coal can be a cheaper

energy source than even wood waste, depending on the source of the wood waste, its transport cost, and the plant and energy requirement to hog it for boiler use.

Coal, too, can run in existing boilers with only few modifications, and is also suitable for mixing with wood waste.

Essentially, there are two coal-firing options for kiln drying. First, boiler-produced hot water or steam is run through a heat exchanger to allow fine control over kiln temperature from 40°C to about 170°C.

Second, combustion gases are passed through a heat exchanger, heating air for direct use in the kiln. This option, however, is generally used for smaller units operating at lower temperatures.

In the case of the timber-drying kilns at New Zealand Timber Processors in the Waikato, efficiency has been the key factor in its decision to use coal in its two Veko 275 boilers.

Before it converted its boilers to coal last year, NZTP used about 30 tonnes of waste wood a day, mostly hauled in as slabs from mills around the region. That wet waste wood was often producing only 2000kg of steam each hour – only 40 per cent of capacity.

Now, running just one of the two boilers on coal, total steam production has risen to a constant 4000kg/hour, with potential to produce 8000kg/hour should the other boiler be converted – something the company is considering.

The results are clear. More steam is produced for around the same cost. More timber is dried more quickly. Production from NZTP's seven kilns has risen from 700 cubic metres a month to nearly 2000 cubic metres a month. And the system runs seven days a week, 49 weeks a year.

Conversion of one Veko boiler at NZTP was carried out by Bart Engineering of Christchurch, which also installed a pneumatic coal-handling system to move the coal from a 30-tonne hopper to a seven-tonne ready-use hopper above the boiler.

An electric heater dries both the air in the transport and the coal on its way to the hopper. An automatic control system augers the coal from the hopper into the boiler. Little clinker is produced and clearing of ash is needed only every four hours. This all adds up to a low-maintenance, reliable and efficient energy system.

The pursuit of higher volumes and increased quality, as kiln-dried timber exports increase, seems likely to encourage others in the industry to consider coal as a viable fuel alternative.

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