

# **Business Case for the Pyrenees Timber Wood Chip Processing System**

## **Executive Summary**

Pyrenees Timber has installed a system to screen dry and store wood chips produced by the sawmill to be used as a heating fuel for the Beaufort Hospital and potentially its own drying kiln. The total cost for the installation was \$53,500 and annual income is estimated to be \$44,700 giving a simple payback of 1.2 years. There are potential additional markets for the processed chips in the region as well as other sources of raw chip.

## **Proposal summary (Value proposition)**

Pyrenees Timber is a small sawmilling business located at Chute. The sawmill processes around 3,500 cubic metres of timber, mostly hardwood, each year and has a small drying kiln where some of the sawmill output is kiln dried. Around 1,000 cubic metres of wood chips per annum are also produced from the sawmill offcuts. This chipped waste is currently sold, as produced, into the garden landscaping market.

Recently Pyrenees Timber has entered into an agreement with the Beaufort Hospital to supply approximately 200 tonne (600 cubic metres) of wood chip per annum as heating fuel. In order to meet fuel chip specifications, the chips must be screened of oversized material, dried to less than 30% moisture and stored under cover. In addition to supplying the hospital Pyrenees Timber are also investigating also using chips to fuel its own drying kiln which is currently fuelled by brown coal briquettes. By value adding to the current chipped waste, Pyrenees Timber will be able to increase revenue and reduce its own heating fuel expenditure.

To process the raw chip correctly, the business built a chip storage shed, installed a refurbished shaker screen and modified a used concrete agitator to dry the chips. The use of largely second hand components allowed the system to be developed at minimum cost and therefore risk to the business. The total cost of the installation has been estimated by the manager of Pyrenees Timber, Mr Ian Crick, to be \$53,500.

The annual revenue of \$21,600 from the sale of processed chip is based on supplying up to 200 tonnes with an average moisture content of 20% to the hospital. The price of the chip is determined by its moisture content with the maximum price of \$135/tonne for chip with no detectable moisture (bone dry).

Additional cost savings will be made when the existing timber drying kiln is converted to run on wood chips. When converted, the annual fuel cost saving is expected to be \$22,000 per annum.

In addition to increasing income and reducing costs for the business, the installation will reduce its carbon footprint which may lead to reduced liability for any future carbon tax and allow the business to claim lower embedded carbon content for its product. This will increase the long term sustainability of the business.

The financial benefit is estimated as a simple payback of 1.2 years and the project will provide a reduction in business operating costs.



**Figure 1: Photo of the chip shaker screen**



**Figure 2: Photo of the chip drier**



**Figure 3: Photo of the chip storage shed**



**Figure 4: Photo of the timber kiln boiler**



**Figure 5: Photo of the timber kiln**

### **Proposal development**

Pyrenees Timber was approached by the project manager of the Regional Bioenergy Project in regard to supplying wood chip fuel for a boiler installation at the Beaufort Hospital. To meet fuel chip specifications required the raw chips to be screen and dried. This additional process processing would require installation of additional equipment/facilities at the sawmill but the processed chips would attract a higher sale price.

In addition, the sawmill currently uses brown coal briquettes to fuel its drying kiln and these will soon be unavailable. By modifying the kiln boiler system to use wood chips as fuel the sawmill will reduce operating costs. Funding to assist in modifying the kiln boiler is being sought from the Victorian Government.

This proposal was developed by the project manager as part of the Regional Bioenergy Project with advice from potential boiler suppliers and bioenergy references.

### **Technical changes required**

The wood chip processing system required the installation of a chip shaker screen (Figure 1) to correctly size the chips to G50 standard by removing oversized pieces and fines. An elevator to carry the screened chips to the chip drier was installed. The drier (see Figure 2) is a modified concrete agitator with an air heater/blower system installed at the drum entrance. Heat for the drier is sourced from the kiln boiler next door (see Figure 4). With the agitator in mixing mode, chips are tumbled and hot air from the heater/blower dries them to the required moisture content. Once dried, the rotation of the drum is reversed and the internal worm in the agitator

deposits the chips onto another elevator that leads to the chip storage shed (see Figure 3). Once in the shed chips can be stored in a dry state until required by the hospital, drying kiln (see Figure 5) or other customer. The raw chips are brought to the screen with the existing sawmill front end loader and the dried chip are delivered using the existing sawmill tipper. No additional modifications are required to the front end loader and only minor modifications are needed to the tipper.

## Cost/Benefit analysis

### Costs

Item	Value	Assumptions and accuracy
Project Management	\$10,500	Estimated by manager
Site Preparation	\$2,000	Estimated by manager
Equipment Costs	\$22,500	Estimated by manager
Construction cost of chip storage shed	\$18,500	Estimated by manager

### Financial and other benefits

Item	Value	Assumptions and accuracy
Sale of chips to the Beaufort Hospital	\$21,600 / annum*	Boiler output based on average wood chip moisture of 20% and expected usage by hospital ( $\pm 10\%$ accuracy).
Reduced fuel cost for drying kiln	\$22,000	Based on previous fuel briquette cost and amount used.
Reduced carbon emission	\$1,100	Estimated reduction based on current Australian carbon price of \$9/tonne
Reputation	Not included in this estimate	The resulting reduction in energy and greenhouse gas emissions by Pyrenees timber will ensure it is well placed to reduce its carbon liability and take advantage of any "green" building materials market.

\*Gross return based on an average price of \$108/tonne. The chip price is calculated on the fuel moisture content. Drier chip will attract a higher price and increase total revenue. It does not include production or delivery costs.

Total costs = \$53,500

Quantifiable benefits = \$44,700

Approximate simple payback on the project is 1.2 years without inclusion of co-benefits such as business reputation.

### Project risks

A risk assessment has been conducted in accordance with internal procedures. A summary of key risks and how they were be managed is described below.

Risk	Mitigation strategy
Safety during installation	A risk management plan was in place and standard operating procedures were followed,
Impact on sawmill operations	The chip screen, drier and storage shed are located well away from the rest of the mill so there was no impact on normal operations. Connection of power and kiln boiler piping was done when the mill and kiln were not in operation. Disruption to normal mill operation is expected to be minimal.
Income/Savings not achieved	Chip sales to the hospital is likely to be long term given the location of the sawmill and nature of the hospital operation. The fuel is being produced from a waste product of the main sawmill operations and will remain very cost effective against other energy types.

### Next steps

After the installation has been operating for 12 months, a detailed assessment of actual operating costs, issues and expected future demand will be made. Based on this assessment, improvements or enlargement of the installation will be made. There is potential for the fuel chip market to increase as the cost of LPG rises. Institutions such as the Skipton Hospital and the local poultry industry are potential future customers.

The system could also be used to process and store chips from other sources such as tree pruners or municipal green waste. Developing alternate sources of raw chip will increase the security of the operation and volume available giving the business more opportunity to grow.

## Attachments

Detailed costings are attached.

## Breakdown of Installation Costs

Description	Amount (excluding GST)
Project management	\$10,500
Site Preparation	\$2,000
Purchase of shaker screen	\$10,000
Installation of screen (electrical connection, modification)	\$3,500
Purchase of agitator (drier) unit	\$2,000
Installation cost of drier including electrical and plumbing costs	\$3,000
Construction of Fuel Storage Shed	\$18,500
Chip Handling and Feeding System	\$4,000
<b>TOTAL</b>	<b>\$53,500</b>