Ecoinflow
SawBenchmark

Good practices sheet
Energy savings in sawmills

VARIABLE FREQUENCY DRIVE FOR DRIER VENTILATION

INVESTMENT LEVEL (FROM 1 TO 3):

- HUMAN INVESTMENT : 👐
- RETURN ON INVESTMENT : ⏳⏳⏳
- COSTS : €€€

BACKGROUND AND ISSUES

The drying unit has the highest impact in sawmills in terms of energy consumption.

Enterprises are endeavouring to find effective and simple systems to enable them to optimise costs while maintaining a high-quality level of drying. As ventilation requirements vary throughout the drying cycle, efforts to ensure energy efficiency depend principally on adapting to the kinetics of the ventilation.

PRESENTATION OF THE PLAN AND ITS IMPLEMENTATION

Summary of the case of sawmill no. 5:

Each drier has a bank of fans (6 per drier in the case in question), the operation of which remains consistent and invariable throughout the drying cycle. By using variable frequency drives (VFDs), it is possible to vary their performance according to the actual needs at different stages of drying. Accordingly, a programmable logic controller linked to a computer controls the speed of the motors. The VFDs reduce speed between the start of drying (100%) and the end (50%). The rotation speed of the fans that cause the air to circulate in the drier varies on account of the VFDs and in accordance with the information received from the various constant measurement devices (a number of humidity probes in the wood and sensors for the temperature of incoming and outgoing air).

Some of the variable frequency drives for the driers

It is possible to increase energy savings by adapting the drying to peak hours. Using this system, sawmill no. 5 has programmed the driers differently in winter mode. During the 3 winter months, the peak hours are billed at premium price (4 hours per day). The cycle's computerised programming will halve the rotation speed of the fans during the hours when the billing rate is highest. In this way, the energy bill is reduced by decreasing the requirement for subscribed power.

Comment: It is advantageous to have a VFD controlling the extractors by varying the opening of valves in line with the temperature and humidity.

POTENTIAL GAIN

- Energy savings as a result of the technology: 25%

Example of energy savings calculation without taking account of the "peak hour" winter tariff (saw mill no. 5):

Drier fan power (236 kW)	Estimated energy saving (approx. 25% of the nominal power)
Annual consumption	Annual consumption saving
1,903 MWh	475 MWh

- Other examples observed during visits to sawmills
    - Variable frequency drives (sawmills nos. 3, 9, 10, 11, 14 and 18): savings not calculated

- 4 to 5% decrease in speed of air movement over the first few hours and the last three hours: savings estimated at €2,000 (sawmill no. 11).

- Other improvements:

The investment provides an improvement in drying quality by adapting the cycles to actual needs (therefore a decrease in drying faults).

- Points to note:

Equipment such as the variable speed drive is likely to cause harmonic currents, which disrupt the network. It is possible to counter these currents by installing anti-harmonic filters.

- Reproducibility:

This operation can easily be used in any sawmill or enterprise with one or more driers. The investment is in proportion to the number of fans to be equipped.

- In addition:

The angle of the blades can be adjustable, optimising the required air flow rate in line with the kinetics of the drying.

The power absorbed (and therefore the electricity cost) is proportional to the speed cubed.