Impacts and Responses to Rising Costs

Energy costs have been on the rise over the last decade and have strongly influenced the wood industry’s ability to remain profitable. While the United States has had some of the lowest-cost energy in the world, indications are that energy costs will increase with time and how we respond will impact our future. In this article, we share some information on how the wood industry has been impacted by rising energy costs and how they have responded. Many of the energy reduction and management strategies suggested apply to wood businesses of all sizes.

The Problem
Energy expenditures for U.S. wood products manufacturers have risen during the last decade. Electricity prices have gone up at an average annual rate of 1.6%, diesel prices climbed 11.5%, and the price for natural gas for industrial use has more than doubled during the same period, while hardwood stumpage and lumber prices have decreased. Figure 1 shows these impacts for a 10-year period ending in 2008. Sawmills, for example, have seen the share of their energy purchases on value of shipments rise from 1.9% to 3.4% from 1999 to 2009 (Figure 2). Hardwood lumber manufacturers are particularly affected by increases in energy prices, as their production requires a higher energy input than softwoods, in a large part because the drying process takes longer. Hardwoods are dried to a lower moisture content and the material is more prone to drying defects. Moreover, hardwood lumber is typically sawn to maximize grade as opposed to throughput, which means longer processing times in the sawmill.

Virginia Tech recently completed a study to learn about the impact of energy prices on the industry and the strategies adopted by companies to decrease energy costs. The average lumber output was 6.7 million board feet (MMBF), the average consumption of natural gas was 1.8 million cubic feet and $43,000 in expenses and the average consumption and expenses of electric energy was 1.9 million kWh and $149,000, respectively. On average, mills consumed 247.6 kWh per thousand board feet of lumber sold. When wood residues were used as energy source for lumber drying, the average specific consumption was 0.67 tons of wood biomass per thousand board feet dried on-site.

Impact of Higher Energy Prices
To assess the impact of rising energy prices on the companies’ profits, they were asked to estimate this as a percent of profits over the last five years. Results are summarized in Figure 3. Close to 32% reported an impact smaller than 5%, while 65.2% of companies reported impacts of 5% or greater. Only 2.8% of companies indicated no impact on profits from higher energy prices.

Responses to Higher Energy Prices
There are several ways a company can respond to increased energy prices, like talking to their utility company to find a better rate schedule, installing energy-saving equipment, or training personnel to save energy. We asked companies what they were doing to ameliorate the effect of higher energy expenditures and their responses are listed in Table 1. Surprisingly, 28.8% of respondents indicated that they were not taking any action and were accepting a lower profitability as a result of higher energy costs. 16.4% of companies were reviewing energy suppliers’ agreements, negotiating a different rate schedule, or switching suppliers. About a fifth (19.2%) increased prices to customers to offset higher energy prices. The adoption of energy-saving technologies was selected by 20.5% of companies. Lastly, a similar number of companies (35.6% and 37%) were improving the energy efficiency of their operations and improving productivity.

When asked to select from a list of actions implemented to reduce energy consumption, the majority (50.8%) started documenting energy consumption and savings. 14.1% of companies trained employees on energy-saving practices (e.g., turning off lights in areas with no traffic, lowering thermostats by 2°F during the day, etc.). 31.9% established cross-divisional plans, 16.4% started documenting energy consumption and savings, while 9% established use baseline, and 3.8% increased prices to customers.

Table 1. Responses to higher energy prices.
SAWMILL BUSINESS

most in winter, reporting leaks); 14.1% indicated that they started documenting energy consumption and savings. Only 9% reported having established a usage baseline—not surprising, considering that only 12.5% of respondents reported practicing energy audits. A small number of companies reported establishing performance indicators (3.8% of respondents), using external standards (5.1%), and establishing a cross-divisional plan (3.8%). These low percentages reflect a lack of a systematic and strategic approach to energy efficiency among survey respondents, since these are all necessary to achieve sustained and significant improvements in this area.

ENERGY AUDITS AND ENERGY MANAGEMENT PRACTICES

Energy management is any activity performed systematically with the purpose of reducing energy consumption. A critical input for any energy management endeavor is conducting an energy audit. An energy audit is a comprehensive assessment of the energy usage at a facility. Results from energy audits are useful to learn about current consumption, assessing the potential for improvement (by comparing results with industry benchmarks or designed value), and measuring progress towards the established goals. The hardwood industry companies responding to this survey were asked if they had conducted at least one energy audit during the last two years, and surprisingly only one in eight respondents (12.5%) reported having done so. These audits were paid for using company resources or, in some cases, by the electric utility. Most electric utilities want to work with their industrial customers to reduce energy consumption!

There are other energy management strategies that can be used to reduce electric bills, including interval metering, special rate schedules, power factor correction, electric load control, standby generation, and federal and state programs. These are discussed in more detail below, along the adoption level reported by respondents to the survey.

- **Interval metering** is the recording of energy usage at very short intervals (for example, every 15 minutes). This usually involves the installation of specialized equipment and software that allows tracking with great detail energy consumption at individual processes and on a continuous basis. This can be a great tool when trying to find energy-saving opportunities. Only 4.3% of respondents were involved in this practice at the time of the survey (Figure 4).

- **Special rate schedules** are sometimes offered by utilities to facilitate companies to manage their electric bills. Examples are flat rate schedules or time-of-the-day schedules. In the latter, different rates are charged depending on whether consumption happens during peak or off-peak hours. In this survey, 8.1% of companies reported this practice.

- **Power factor correction** is the installation of banks of inductors or capacitors, sometimes in individual equipment, to reduce the reactive load. Companies have a financial incentive to do this when utilities have a reactive demand charge.

- **Electric load control** is any initiative by the electric utility to control the load from the demand side. This can be accomplished by offering a different rate for peak or off-peak hours, or by agreements by which the facility reduces its load at short notice from the utility in exchange for—as an example—credits in its electric bill. Among respondents, 4.9% were using this strategy.

- **In standby generation programs**, facilities agree to transfer load to the network from its standby generator at a signal from the facility. This was practiced only by 2.2% of companies in this survey.

- **State and federal government and utilities** provide financial incentives, usually in the form of rebates, to companies willing to install high energy-efficient equipment, such as adjustable speed drives; 5.4% of respondents reported having used this approach.

The results of the study clearly show that energy prices have had an impact on the profitability of hardwood producers; however, surprisingly few have taken serious steps to reduce their energy consumption or to reduce energy expenditures. We hope that this article has not only provided some insight on the current situation but has also presented some ideas on how to change it.

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