



Motor Decision MatterSM **CASE STUDY**

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Weyerhaeuser Saves \$2.5 Million by Developing Motor Plan

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Weyerhaeuser, one of North America's largest forest products companies, has saved an estimated \$2.5 million in energy costs since implementing a motor management plan five years ago.

In addition, the company is anticipating that additional savings will accrue due to longer service life of the motors, reducing downtime and the number of replacement motors needed each year.

Weyerhaeuser, headquartered in Federal Way, Washington (near Seattle), generated \$16 billion in sales in 2000 and employs more than 47,000 people in 17 countries. With more than 57,000 motors in plants throughout the United States and Canada, it became apparent that a motor management plan was needed to reduce energy costs and keep the operation running smoothly.

Through aggressive motor management, the company was able to establish consistent specifications for purchasing new motors, create guidelines for repair/replace of a failed motor and specify the types of motors the company should be using for maximum productivity and energy efficiency.

Weyerhaeuser's experience highlights the business value and cost advantage of proactive motor management. Companies of all sizes can also tap into these benefits by taking similar steps. *Motor Decisions MatterSM* (see sidebar) has the resources and tools to help management teams get started.

Motor efficiency has become even more important today because of the increasing cost of electricity. Motor horsepower requirements, relative to production, are increasing in most instances and motors are the largest part of the mill electrical power requirements.

Weyerhaeuser engineers had written motor specifications for both maintenance and major capital projects, but the company never had consistent company-wide specifications for purchasing new motors.

National campaign promotes motor planning

To broaden awareness of the benefits of motor planning, the *Motor Decisions Matter* campaign (MDM) was launched in June 2001. MDM sponsors include motor manufacturers, trade associations, electric utilities, energy conservation groups and government agencies. The Consortium for Energy Efficiency (CEE), a national non-profit organization, is coordinating this effort.

Motor Decisions Matter provides tools that enable commercial and industrial customers to develop a motor plan. A motor plan addresses common motor decisions before equipment failure, helping ensure motor availability, reduce downtime and lower energy costs.

A Motor Planning Kit containing helpful tips, tools and information on developing a motor plan can be viewed or downloaded in PDF format on the *Motor Decisions Matter* Web site at www.motorsmatter.org.

For additional information about the campaign refer to the MDM Web site or contact the DOE's Office of Industrial Technologies Clearinghouse at 1-800-862-2086 or MDMinfo@cee1.org.

Based on past experience, motor specifications written for new green field mills included features, higher efficiency and higher quality that were not available on motors usually provided. If additional and/or replacement motors were needed, a special "production run" was required to manufacture these motors which cost more to purchase, and requiring longer delivery times.

The engineers needed to determine whether the time, cost and effort necessary to purchase these higher efficiency and higher quality motors for more general use made economic sense.

Weyerhaeuser began their process by looking for a manufacturer to provide a high quality energy-efficient motor that could be used in all mills. Was the IEEE 841-1994 the right motor to be using? The benefits of the IEEE 841 motor, built to withstand hostile, rugged environments, include: high energy efficiency (higher efficiency than required by EPACT [Energy Policy Act of 1992]), isolators on both bearings, longer life, better insulation, lower vibration, machined feet and a five-year warranty.

Weyerhaeuser asked six motor suppliers to provide responses to 170 different items for each of a list of motors. The consensus clearly showed the IEEE 841 motors to be more energy efficient and cost effective over the life of the motor. Each manufacturer was then asked to furnish a 75 HP and a 15 HP IEEE 841 motor for testing and inspection purposes.

A cross-functional team was formed to examine the current purchasing and rebuild practices and to make a corporate decision concerning how this should be done in the future.

One of the major goals was to reduce the "total cost of ownership." This involved looking at energy costs and how purchasing and installing higher efficient motors can reduce energy costs. Although higher efficient motors cost more, they make economic sense because of sharply reduced energy costs. And because they run at cooler temperatures and include higher quality parts, higher efficient motors also tend to be more reliable, thus reducing downtime at the plant.

Weyerhaeuser engineers also examined repair/rewind and in-and-out costs as well as the energy rebates. The bottom line: Would greater standardization result in lower ownership costs?

Another important task was to inventory the company's motors. Data included motor descriptions, full nameplate data, the age of the motor, operating hours per year, operating efficiency, ammeter load checks and rewind history, as well as special electrical and mechanical characteristics.

Weyerhaeuser's Conclusions

Upon completion of its survey, Weyerhaeuser was able to make the following conclusions about its new motor policy:

- All new motors purchased shall be similar to IEEE Standard 841-1994 motors.
- All motors 50 HP or less that fail should be replaced with new Weyerhaeuser 841 motors.
- All motors greater than 50 HP that fail should be evaluated using MotorMaster+, a motor systems management program distributed by the US Department of Energy's Motor Challenge Program.
- All motor repairs should follow a specific written Motor Repair and Rewind Specification.
- Life cycle cost for all existing motors should be evaluated using MotorMaster+.

Development of a motor management plan and decision tree has helped to keep Weyerhaeuser's operation running smoothly by streamlining the way motor decisions are made, creating specifications for motor repair and rewinding, and helping to reduce energy and maintenance costs.

John R. Holmquist is a Professional Electrical Engineer at Weyerhaeuser, one of North America's largest producers of forest products. Weyerhaeuser grows and harvests trees for the production and sale of

forest products including logs, lumber, building products, wood chips, pulp, paper and packaging. Holmquist has worked for Weyerhaeuser for over 45 years, holds two patents and was recently named Fellow of the Institute of Electrical and Electronics Engineers (IEEE) for the implementation of advanced electrical technologies in the pulp and paper industry. He was also inducted into the Oregon State University Engineering Hall of Fame in 1998, which honors individuals who have performed sustained and meritorious engineering and/or managerial contributions throughout their careers.



FAILED MOTOR LOGIC DIAGRAM

