



WOOD^{to} ENERGY

Case Study

Waste-to-Energy Program

Jon E. Berg & Martha C. Monroe

Even in Kentucky, where coal is a major industry, communities are searching for alternative energy sources to counter the rising cost and dwindling supply of heating oil. They are also seeking improved ways to recycle or dispose of increasing volumes of waste. One such community is Campbellsville, a small town of just over 10,000 residents, located in Taylor County, the “Heart of Kentucky.”

Campbellsville was first settled in 1808, and formally established in 1817. Named for its original settlers Andrew and Adam Campbell, the city enjoys a rich history. From the 1830s to the 1870s, the city served as a stagecoach stop on the national mail route between Ohio and Alabama. During the Civil War, Campbellsville was a stopping point on the invasion routes of both the Northern and Southern armies. Today it is the only incorporated city in Taylor County.

In 1983, Charles Cox and his family founded Cox Interior, Inc., now one of Campbellsville’s largest employers and one of Kentucky’s largest secondary wood manufacturers. Today the company employs 840 people; its sixty-five-member sales force covers a nine-state region; and its facilities span 105 acres, with twenty acres of indoor manufacturing space.

Cox manufactures interior and exterior finishing products for homebuilders, such as poplar, oak, and cherry interior moldings, poplar and mahogany doors, stair parts, and fireplace mantels (Figure 1). Each day the manufacturing of these products alone produces over one hundred tons of wood waste. Increasingly strict landfill regulations and growing disposal costs led the company to look for new ways to manage the disposal of its wood waste. In the

early 1990s, possible alternatives to traditional wood waste disposal included mulch, fireplace logs, wood fuel pellets, charcoal, and co-generation. Cox Interior chose co-generation, the practice of producing two forms of energy from one source of fuel. This was an attractive option since the company had a large quantity of wood waste along with growing demands for steam, heat, and electricity.

In 1992, Cox Interior began the Cox Waste-to-Energy program and developed a co-generation plant with the intent to burn wood waste from the manufacturing process and approximately 10 percent refuse-derived fuel (RDF). RDF is typically gathered from municipal solid waste after a recycling process and has the potential to provide a constant fuel source to supplement the co-generation plant. The facility was unable to get permitting from state regulatory agencies to burn RDF and thus only uses wood waste. In 1994, the co-generation plant began limited operation. While the co-generation facility was designed primarily to meet the company’s energy needs, Cox sells a small amount of surplus electricity,



Figure 1. Cox Interior produces beautiful moldings, rails, mantels and other finishing products of homebuilders. PHOTO COURTESY OF COX INTERIOR, INC.

about 1,267 megawatts (MW) in 2006, to Eastern Kentucky Power Cooperative (EKPC). In fact, it was the first small energy producer in Kentucky to sign a power contract with EKPC.

Today, the facility consists of twin, 61.4-million British thermal units per hour (Btu/hr) boilers, which combust over 300 tons of wood waste per day, producing 1.7 million pounds of steam and 5 MW of electricity per hour. In 2006, the facility produced over 14 million kilowatt hours (kWh), which provided 90 percent of in-house energy needs. The company recently found a more lucrative market selling its finer wood shavings for pet bedding and is supplementing its fuel supply with sawdust and slabs purchased from local sawmills and used pallets from local manufacturers (Figure 2). A large grinder is used to chip the wood before use. At \$400,000 to \$450,000, this machine represents a large expense and also costs a lot to maintain, however, it saves the company from having to pay more for pre-chipped wood waste. Once chipped, the wood is stored in a large, 20,000-square-foot fuel storage building and two smaller staging areas, although most of the fuel is used up daily and typically not much storage is needed. Cox Interior requires a fleet of fifteen to twenty trucks with two full-time drivers to transport wood waste to the boilers. Water for the facility's cooling towers is

provided by a twenty-acre lake located on company property.

The wood-to-energy system has provided many benefits for Cox Interior, including a reduction in costs. In 2006, the cogeneration plant helped save the company \$4.5 million by providing the energy to dry lumber. This enables Cox to purchase green lumber at a much lower cost than dried lumber. The facility also saved \$978,897 in electricity costs and produced a profit of \$48,170 from electricity sales to EKPC. The co-generation plant contributed an annual savings of approximately \$5.5 million, with expenditures totaling \$2.6 million, yielding a total profit of \$2.9 million.

After thirteen years of operation, Cox Waste-to-Energy is proving to be an invaluable asset to Cox Interior, Inc. Ruth Logsdon, the company's environmental manager, believes that the advantages of the plant far outweigh the disadvantages. "Cox Interior is a ninety-million-dollar-plus industry that produces over one hundred tons of wood waste a day. The co-generation facility provided a waste disposal solution, while producing steam for our millwork operation and electricity for our entire operation." Currently, there are no plans to expand this facility since there are limited amounts of wood waste fuel available. Future plans for the facility include upgrades and general maintenance only.

For more information regarding specific concerns about wood-to-energy facilities, refer to the other fact sheets, case studies, and community economic profiles available in this series at <http://www.interfacesouth.org/woodybiomass>. Additional information is available at <http://www.forestbioenergy.net>.

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Figure 2. A fleet of trucks transports wood waste to the boilers at the waste-to-energy facility.

PHOTO COURTESY OF COX INTERIOR, INC.

