

# COGEN SAVES 87% ON ELECTRIC BILL

Tradewinds of VA called on services of REM Engineering.

**T**hrough custom-designed cogeneration systems, REM Engineering, Inc. of Atlanta, Ga. is helping sawmills operating dry kilns gain major savings in their annual electric bills and at the same time see significantly reduced costs of operations.

Tradewinds of VA, located in Bumpass, Va., has been benefiting from an REM-designed cogeneration system installed in early 1998. REM Engineering President Robert Mooney and son, David Mooney, Vice President Engineering, custom designed a cogeneration plant for the progressive lumber/fiber optimization facility that saved the mill 87% in its annual electric bill. In addition to the electric savings, REM Engineering designed the system to gain further savings by making use of numerous existing factors.

REM designed the cogeneration project to take full advantage of Tradewinds' boiler, a 600 HP unit operating at a steam pressure of 135 psig, which qualifies as a biomass gasifier and is thus eligible for federal gasification credits. In order to make the most of the federal gasification tax credits, Tradewinds needed a "beneficial use for the steam."

Cogenerating electricity with the REM-designed system provided the "beneficial use" needed for the tax credits and requires the boiler/gasifier to operate around the clock, thus maximizing the federal gasification tax credits. Maximizing the available tax credits added another 52% to the annual savings generated by the project. The combined annual savings of approximately \$450,000 creates a project with less than a year and a half simple payback. Although such an impressive payback cannot always be obtained, Dave Mooney says a two-year payback is normal.

"A properly designed system will provide many operational benefits, in addition to electric generation, to the host facility," says Mooney. "REM Engineering designs cogeneration systems that are easily maintained and operated to convert thermal energy to electricity."

The cogen plant for Tradewinds required no additional operators. Existing powerhouse operators were trained to run the new turbines and condensing system. "These turbines have an expected



Left to right, Dave and Bob Mooney are hands-on with every job.

life of more than 50 years," Mooney says. "A routine oil change with an annual inspection is recommended. The component that requires the most attention is the generator and it is exactly the same as any other large motor on site. Our systems are designed with maintenance and ease of operation in mind."

While the cogen plant at Tradewinds generates nearly 1,000 kW of electricity, it also significantly improves the response time of the dry kiln. Without tampering with a facility's dry kiln process, the REM-designed system provides the dry kilns with steam immediately upon demand. The cogen plant requires the boiler to produce steam all the time for



Turbine in flight toward its foundation

electrical generation; however, the dry kiln process remains the primary user for the steam. Control valves are strategically located throughout the system to dictate where the steam goes. When the dry kilns need steam, the control valves redirect the necessary amount of steam to the dry kilns. When the dry kilns are satisfied, the steam goes back to the turbine to generate electricity. No time is spent waiting for the boiler to make more steam when the kilns call for it.

Most boilers in existing dry kiln facilities are driven by the steam demands of the dry kiln. Bob Mooney explains why this fact often slows the drying process. "Dry kiln steam demands are quite variable. Our system uses a turbine to drive the boiler. The turbine provides a steady steam demand for the boiler and when the dry kiln requires heat, steam is immediately available. Time is not wasted waiting for the boiler to fire harder to make more steam for the kiln."

Steady operating conditions for the boiler is another benefit of cogeneration systems designed by REM Engineering. "Boilers are made to run at steady load," says Bob. "Cycling a boiler will damage refractory and create premature maintenance problems." Like many mills, Tradewinds had an abundance of wood waste, so the steady operation of the boiler also addressed a material handling issue.

REM's creative approach to system design enables it to realize additional savings over "off-the-shelf" systems. "We work with our customers to design the best possible system to meet their individual needs," explains Dave. "No two mills are exactly the same; that is why we believe our ability to tailor design cogen systems gives us an edge over our competition."

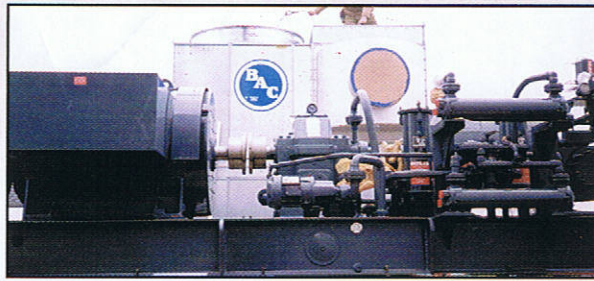
REM's ability to optimize the use of existing equipment has meant significant savings to its clients. Prior to the REM cogeneration system, the Tradewinds boiler was operating at approximately 25% capacity making steam for the dry kiln. The return on investment for the gasifier boiler was dramatically improved with the installation of the REM cogen plant. "By maximizing an existing investment, we can minimize the need for new equipment and therefore minimize capital costs," says Bob.

Another way REM minimizes capital

costs is through its use of previously-owned, factory-rebuilt equipment. Because REM is not an equipment vender or tied to any vendors, it is able to shop the market. REM used both new and rebuilt equipment at Tradewinds, providing a total savings of approximately \$200,000 in equipment costs over the cost of using only new equipment.

With more than 40 years of power generation and energy conservation experience in many different industries, the Mooneys use their multi-industry experience to overcome boundaries to successful cogeneration that have often hindered smaller plants from reaping the benefits of cogeneration.

Dave explains that a common misconception in the industry is that a large, high pressure boiler is required to cogenerate. REM has successfully designed cogen systems for boilers as small as 150 HP and 135 psig with paybacks of less than two years. Dave admits the savings generated from these small boilers aren't as large as those generated at Tradewinds; however, they are still very significant. The size and pressure of the boiler affects the size of the cogen plant and, therefore, the avail-



Setting the condensing system

able savings; but the capital investment for the smaller systems reflects the reduced plant size as well.

"Our small, turnkey systems typically cost approximately \$130,000 with annual savings near \$70,000. It all depends upon the individual circumstances of the plant," he explains.

At Tradewinds, the boiler size is 600 HP but the operating pressure is only 135 psig. "No one at Tradewinds thought we could generate the guaranteed 800 kW, not to mention nearly one MegaWatt, with this boiler," recalls Dave. "Our use of state-of-the-art condensing equipment combined with the use of a simplified vacuum system conceptualized by Bob enabled us to deliver on our promise."

Bob explains that although many sawmills can benefit from an REM-de-

signed cogeneration system, there are other methods of generating savings. "Cogeneration is not for everyone," he says. "All electric savings are not based on cogeneration. Other systems such as peak shaving and interruptible power can also result in substantial savings."

With electric deregulation in the immediate future, cogeneration provides security to companies. By self-generating, a company positions itself to take full advantage of deregulation. Should electric rates climb, the company purchases less power and therefore realizes savings. If the power rates drop, savings are still realized either through the reduced need to purchase power or through different electric rate structures. Many programs are available to dramatically reduce the electric rate, sometimes as much as 50%, with the ability to self-generate.

Dave adds, "Cutting operating expenses will always improve plant profit, regardless of the market conditions." TP

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Article reprinted from the September 1999 issue of Timber Processing.

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A publication of Hatton-Brown Publishers, Inc.

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