

## CASE STUDY

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**PRECISION**

PRECISION MACHINE & MANUFACTURING, INC.



### COLMAC ENERGY'S SECRET TO SUCCESS - RELIABILITY AND MAXIMUM UPTIME

Maximizing uptime and throughput are key factors enabling the country's largest biomass power plant to consistently turn a profit. The key ingredients of success for Colmac Energy, Inc., operator of a 47 MW net biomass-fueled facility in the Coachella Valley of Riverside County, California, are the constant supply of quality landfill-diverted wood waste and the highest quality processing equipment.



**The plant, which has been in continuous operation since 1992, consumes approximately 325,000 tons per year of wood waste, landscape and right-of-way tree trimmings, broken pallets and used boxes.** The company will accept construction waste, but no treated wood or painted materials. About 12% of the plant's fuel (40,000 tons per year) consists of locally collected agricultural residues that would otherwise have been disposed by burning in open fields. And because of Colmac's plant, Riverside and San Bernardino counties are able to meet their state mandated recycling standard (AB939).

Unlike companies that convert trash into power, Colmac processes only biomass material. 60-80 trucks arrive at the facility per day coming in from a 200-250 mile radius, from east of Phoenix to south of LA. The trucks discharge up to 25 tons of biomass every 5 minutes. Upon arrival, the biomass material passes through separators that take out any ferrous materials, after which it is deposited into the first holding cell of a two-cell system. From that holding cell, it is transferred to an operating cell, from which it is broken down by grinding equipment prior to being fed into the boilers. No biomass fuel stays on site for more than 30 days at a time.

Though Colmac takes care to make sure that the biomass provided by its suppliers is of high quality and is cut into small pieces so as to limit stress on the material handling machinery, the internal biomass feed system still sees considerable wear. "Biomass is among the hardest fuel sources on equipment," said Colmac's Vice President and Plant Operations Manager Graeme Donaldson. Critical path transfer components must be selected and maintained with care in order to avoid failures that can shut down the whole line. It is in this area where maintaining close working relationships with equipment suppliers pays off.

**The Colmac site has been using screws and valves supplied by Precision Machine and Manufacturing, Inc. of Eugene, Oregon since the current generating plant came on line in 1992.** The plant now employs two sets of 12 metering bin screws (that feed the boilers), two sets of transfer screws, and two rotary valves per boiler, all provided by Precision Machine. Plant manager Donaldson regularly consults with the company on things that Precision can do to improve the reliability of the plant. "Precision Machine's valves last longer because they are built to tighter tolerances and the metallurgy has been designed to match the chemistry of our fuel," says Donaldson, himself an ex-marine materials engineer. This attention to detail is critical because if a boiler were to go down for any reason, including the interruption of the biomass transport line, the cost to Colmac in terms of lost productivity would be substantial. Donaldson estimates it at \$5,000 per hour per boiler.

**When a plant is shut down, the adverse impact goes beyond lost power output.** “You can’t shut down the fuel flow when a plant goes down,” says Donaldson. “If you send the fuel away, it gets used someplace else and it’s hard to acquire again.”

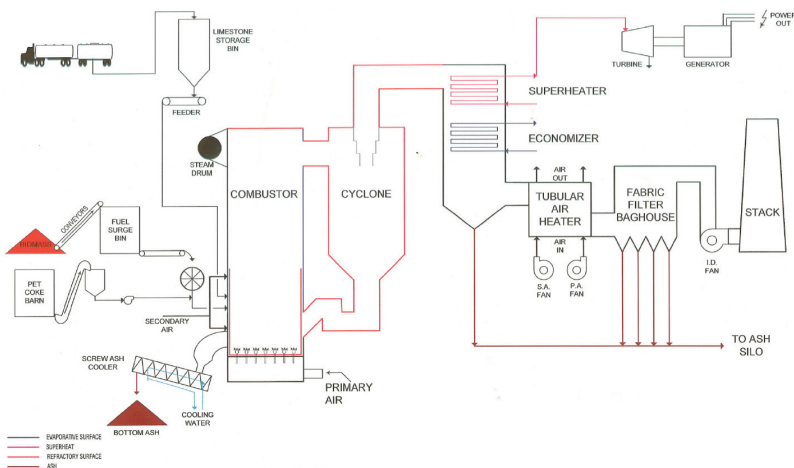
“We continue to push the envelope on the reliability of our system,” said Graerne. “We used to change our rotary valves every 3 months. Now, due to Precision Machine’s experience with advanced metallurgy and quality control, we do so only once per year, and we’re looking at ways to improve the reliability beyond that. The payoff is in lower costs and increased efficiency.” The Colmac plant runs an efficiency of 92-95% whereas other plants run between 82 and 85%. Using equipment with longer operating lifetimes also helps Donaldson keep the cost of maintaining spare parts inventories under control.

“We can’t increase our plant’s output,” adds Donaldson. “We’re limited by the original boiler design to 47 MW. The only way that we can improve the financial returns from our process is to increase the system’s reliability, which translates to more continuous uptime. And when it comes to maximizing, Precision Machine engineers it into every one of their products.”

**Plant Location** The Colmac Energy plant is located on the Reservation of the Cabazon band of Mission Indians in the Coachella Valley near Riverside, California.



**Systems Diagram** The Colmac plant contains two boiler systems manufactured by ABB-CE. The diagram shows the equipment involved in transporting combustible biomass materials into one of the boilers. Precision Machine and Manufacturing Company supplies the screws and rotary valves used in the plant. The plant has the option of using petroleum coke as a supplemental fuel. The limestone is fluidized and using a lean phase blowing system, it is conveyed into the lower combustor to neutralize the SO<sub>2</sub> (sulphur dioxide).



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