



# COW POWER

Teague Diversified lives up to its name.

Story & photos by **Eric Grant**

**G**ary Teague's feedlot produces a mountain of manure — about 200,000 pounds (lb.) of it — every day.

"Most of the time we'll have about 20,000 head of cattle on feed at one time," says Teague, who owns Teague Diversified Inc. of Fort Morgan, Colo. "These cattle will generate about 20 semi loads of manure every day."

So, a decade ago, the cattle feeder started looking for alternative uses for manure. Last year, Teague received federal and state funding to construct a methane digester and electrical generator. The system, which extracts methane from manure and other biomass and burns it to produce electricity, should be fully operational by early 2006.

"Manure has become one of the cattle-feeding industry's biggest liabilities," Teague says. "But, this methane digester will provide us with a way to manage manure and supply all of our company's electrical needs. Down the road, it should produce enough energy to provide much of the electrical needs for Fort Morgan, population 11,000."

## Compost success

Once the methane is extracted, the liquid wastes are spread onto fields through pivot irrigation, and solid wastes are converted into nutrient-rich composts that Teague sells to local farmers and other clients for use as fertilizer.

"We think the real key is looking for opportunities and capitalizing on them," Teague says. "We make mistakes, but we're not afraid to make decisions."

Teague's methane digester is just one of many systems now being developed and pioneered for use by livestock producers. Generally, anaerobic digesters range from covered anaerobic lagoons that trap methane and burn it off to control odors, to more complex systems that include an engine and a generator to convert biogas, a mixture of methane and carbon dioxide produced by bacterial decomposition, into electricity.

Ultimately, Teague's \$7-million system will include 14 stainless steel modules into which biowaste of all kinds will be placed. Inside these modules, biogases are trapped and then pumped to the burner. In addition to manure, Teague's system uses other carbon-based waste products like spoiled cheese, waste milk from dairies, wood chips, brewers' grain from local industries, and even dead animals from his feedlot.

The entire methane-extraction process takes about five days.

"I think you can expect to see this technology adopted by farmers on a widespread basis, especially if EPA (the Environmental Protection Agency) actually puts in place stiffer regulations that will require a greater cleanup of manure," says Ed Lewis, senior deputy director for the Colorado Governor's Office of Energy Management and

Conservation. "This is the best way to manage and add value to manure. I know of dairies that are making more money selling compost than they are selling milk."

## Invested in energy

Teague estimates it will take about seven years before he recoups his initial investment in the digester. He figures he'll generate about \$90,000 in electricity sales from each of the 14 modules he's planning to build. He'll phase in each module throughout time, using revenues generated from electrical sales to pay for additional units.

"For dairies and feedlots, systems like Teague's are fairly expensive to put in," Lewis says. "The initial outlay is considerable. Not only do you have to buy the technology, you also have to train people how to



► "Manure has become one of the cattle-feeding industry's biggest liabilities," says Gary Teague of Teague Diversified Inc., Fort Morgan, Colo.

use it. But, the bottom line is that you can directly offset your energy costs because you're making energy that you can use yourself or even sell back into the grid."

An additional benefit to the system is that it also helps Teague with his growing compost business. Teague currently produces and sells about 300,000 cubic feet (cu. ft.) of it each year. It's being used to fertilize lawns, landscaping projects and road-building projects across Colorado. His clients include the state highway department, which uses compost to fertilize road shoulders and medians after construction projects, and the University of Colorado, which uses compost on its athletic fields and landscaping projects. About 20% of Teague's compost winds up on lawns and gardens in Denver.

"With this technology, you can greatly decrease the risks associated with contamination of air and water," Lewis says. "The digesters eliminate pathogens — 99% of them are destroyed through this process. You don't have the smell from volatile organics and volatile acids. And, after you've treated it, you don't have to put it back into a lagoon. This lowers your costs of maintaining reservoirs to trap runoff, and you don't have to spend money to build larger lagoons."

Looking long-term, Teague believes his feedlot will provide many valuable lessons for others in the livestock industry. The result may increase numbers of cattle producers all across the country entering the electrical-generation business and reduce dependence on other sources of nonrenewable energy.

"We realize this is going to take time and considerable investment," Teague says. "But, we're confident we're doing the right thing."



### **Industry innovator**

Gary Teague has long been an innovator in the livestock business. Educated at Colorado State University, he started out by developing and artificially inseminating (Aling) large groups of beef and dairy heifers.

He expanded into large-scale beef cattle feeding, and built his company into one of Colorado's best-known feeding operations.

Today, his company is aligned with Ranchers Renaissance, one of the more successful integrated beef production systems in the business.

Recently, Teague also added 2,000 Boer goats (to meet the demand of the growing Hispanic population) and a 7,500-sow operation.

"My wife and I started with very little. We put all of our savings into this business and built it from there," he says.