

## Gas-Fired Dryer Cures Dairy Farm's Manure

For more than 5 years, Pagel's Ponderosa Dairy in Kewaunee County, Wis., has been turning methane gas from manure into energy. The liquids left over are then spread on fields and the solids reused as animal bedding.

"They wanted to further reduce the bacteria in the bedding, so they started 'baking' the solids at high temperatures in a natural gas-fired dryer," says Bryan Pagel at the Ponderosa Dairy. "The high heat of the dryer kills more bacteria, making the solids even better for the cattle to lie on."

The dryer uses a triple-pass rotating drum system that heats to 1,000°F. Four tons of manure solids go into the dryer per hour, and 2 tons come out.

Given the quantity of gas to be used, the local gas company assisted the Pagels in getting natural gas piped directly to the farm.

This required laying a 3-mile pipeline from the nearest existing pipeline.

Once the dryer was in, another benefit was realized. The heat of the manure dryer also kills weed seeds, and the end product is almost odor-free. The solids make a great fertilizer, which is bagged and supplied to area gardeners. While the Pagels are considering expanding to wholesale markets in the future, immediate benefits are clear.

"The dryer is paying for itself in improved animal health," Pagel said. "We are saving a considerable amount of money on mastitis treatment, and have a healthier herd."

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Photo courtesy Jim Kneisz

Bryan Pagel uses a gas-fired dryer to bake manure solids at high temps to kill bacteria.

## "Hot Tub" Pressure Washer

Kerry Kligora removed the pump, electric heater, control module and air-operated switches from an old hot tub that had a cracked shell. He used those parts, along with an old 65-gal. poly tank, to make a non-pressurized water heater for his gas pressure washer. It mounts on a pallet so he can use his skid loader to move it around.

"Greasy and dirty surfaces are always a pain to clean with cold water, even with a pressure washer," says Kligora. "However, I couldn't justify the cost of a diesel-powered hot water pressure washer. And since I heat my shop only when I'm inside it, a water heater didn't make a lot of sense. So I was stuck using cold water, unless I could run a garden hose from our washing machine to the shop. My wife wasn't too fond of that idea.

"If I need to use the pressure washer in an area where there's no electricity or water, I can heat the water in my shop and then use the skid loader to lift the unit off the ground and gravity feed water out of the tank."

He used schedule 40 pvc pipe and plumbing fittings to make a loop that runs from the tank's drain pipe, through the pump and heater, and back to a hole drilled into the top of the tank. He also outfitted the drain pipe

with a spigot for gravity feeding the water, and he added another spigot that lets him draw water while the system is running under power.

"I use the hot tub's air-operated switch to control the pump and the original controls for the heater element," says Kligora. "There's a stainless steel grounding cable on the pump system that clamps onto a rod in the ground, just to make sure no one gets electrocuted. Since the system is open, there's no need for a pressure valve - I just remove the top from the tank when it's in use."

He paid \$15 for the tank at a garage sale and another \$30 for plumbing fittings and electrical supplies.

He says the system can heat 65 gal. of water to 104° F in about 45 min. "My gas-powered pressure washer uses 2.2 gpm at full blast, so 65 gal. provides about 30 min. of washing time, which is usually enough for even the most demanding jobs," says Kligora. "I only heat the water to 104° F because that's the temperature limit on most cold water pressure washers. I plan to add a float valve so I can continually fill the tank with fresh water for really long wash cycles."

He says it costs about \$1 per hour to heat



Kerry Kligora used parts from an old hot tub, along with a 65-gal. poly tank, to make a non-pressurized water heater for his gas pressure washer.

the water at current electric prices. The system requires a 220-volt plug-in for the heater, and factory controls convert the pump to the required 110 volts.

"If your pressure washer doesn't have a chemical injection/siphon feature, you can add the degreaser/chemicals to the water tank. But make sure you don't add the chemicals until just before you use them in case they foam up a little," says Kligora.

"The water temperature can be easily adjusted using factory controls, so by

hooking up a hose equipped with a garden watering nozzle to the pressurized spigot, my wife can wash our horses in cool weather. She just heats the water to lukewarm and goes to work. I also think this idea would work for thawing frozen livestock waterers, although I haven't tried that yet."

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## 20-Wagon Bale Train Stops Michigan Traffic

Chuck Timm created quite a hubbub when he hooked 20 loaded straw wagons together in a single "wagon train" on one of his grain fields. The 1/8th-mile long spectacle stopped traffic on a county road near Hubbard Lake, Mich. for nearly a week as motorists paused to take photos.

"It's not every day a person sees something like this," says Timm with a smile. "One day we created even more of a stir by moving all the wagons at once with a 1206 International tractor." That event was captured on video by Timm's son-in-law Jeff and his brother, who posted it on YouTube.

Timm's 3,600-bale train was a variation on other lineups he had in previous years. "We started this with 15 and then 18 wagons a few years ago," Timm says, "and last year we put all the straw from the field on 20 wagons and lined them up. It just seemed like a fun thing to do."

While motorists knew the straw train was special, they probably didn't know that every wagon was a different size and that Timm had built all of the racks and many of the wagons in his farm shop.

"I'm one of those guys who always has to be building something," says Timm. "For the past 20 years it's been a different wagon or



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two every winter." Timm uses old axles from junked trucks to build front and rear running gears. He prefers the axles from Ford trucks because of their I-beam suspension, but he's also scrapped old axles from old school buses. His largest bale wagon is 30 ft. long, and others range from 16 to 25 ft. long. It takes him about a week to build a wagon, and a full day to make an extendable pole.

"The size wagon I build depends on the axles I'm working with," says Timm. "If it's a heavy-duty axle, I make the reach with a 3 1/2-in. pipe on the outside and a 3-in. pipe

inside. With those I use larger wheels and can make the rack larger. On the smaller wagons I use axles from 3/4-ton trucks and the reach is 2 1/2-in. pipe with a 2-in. pipe inside." He also uses scrap parts from cultivators and combines.

Timm makes the tongues, and the tie rods are original from the trucks. Hay wagons have flat bolsters, and wheels are 15, 16, or 20 in., sized to fit the wagon they're mounted on and the load they'll haul.

The smallest wagons in his fleet carry 150 bales, and the largest one can haul 350. "Most

of our hauling is done within 10 miles of the farm," says Timm, whose family runs 1,600 acres and also operates a feed dealership.

Asked why he has such a large fleet of wagons, Timm is quick to reply that he and his family don't like to handle bales any more than they have to. "We park them inside and pull them out when we need straw or hay in one of the barns."

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