

By Steve Werblow

# Poultry power

*A gasifier turns litter into heat on this turkey farm*

**B**eside one of John Zimmerman's turkey houses sits a compact industrial setup that could provide a peek into the future of manure management. The unit is a gasifier, which uses carefully controlled heat and an oxygen-starved environment to turn Zimmerman's poultry litter into combustible gas and a nutrient-rich, ash-like substance called biochar.

Zimmerman's million-dollar pilot unit provides nice, dry heat to his turkey houses, and with some modifica-



tions, could be used to cool the houses in the summer. A scheduled addition of a power generator will turn some of his heat into electricity. But to Zimmerman, whose family poultry operation has been in production since the 1950s, the biggest benefit may be the

► **Above:** These turkeys appreciate dry heat from producer John Zimmerman's manure gasifier.

► **Left:** The gasifier heats turkey litter or other waste in a low-oxygen environment to burn off most of the nitrogen and concentrate P and K in a dry, lightweight substance called biochar.



►**Above:** Zimmerman's gasifier uses a hot air system to produce dry, hot air that requires less air exchange than his traditional propane heater.

chance to concentrate his nutrients so he can sell them as biochar or at least afford to haul them farther from the phosphorus-saturated fields around his Northfield, Minn., farm.

Still, gasification has to clear several hurdles before its prospects heat up.

**Cheap energy.** Economics are the biggest challenge, Zimmerman says. When nitrogen prices are high and propane prices are relatively low, it doesn't really pay to burn his manure.

That's pretty typical, says Mike McGolden, president of Coaltec Energy USA in Carterville, Ill., which built and operates Zimmerman's gasifier.

"I would say 5% of the agricultural projects we've looked at are replacing an energy source that's so expensive that it works on those economics alone," McGolden says. "Most of those projects require something else."

That something could be better air quality in poultry houses, or the flexibility and transportation savings that come from dealing with phosphorus as biochar. Biochar concentrates manure's phosphorus (P) to one-third the weight and one-sixth the volume. And biochar P occurs as tri-calcium phosphate, a non-soluble fertilizer and valuable addition to poultry feed.

**N**utrient credits—which would allow farmers to earn money for efficient nutrient reductions to offset nitrogen (N) or P discharges from factories or wastewater treatment plants—could become a valuable revenue stream.

So far, though, just a few states are experimenting with nutrient credits, and sales are slow. A Pennsylvania auction last year inked a single contract for \$2.75 per pound of N reductions.

Regulation may be the biggest driver of all. As restrictions tighten, paying farmers more for nutrient credits become a better deal than upgrading factories and wastewater treatment



►**Top:** Zimmerman will be watching his flock for results like those seen in a West Virginia gasifier trial, in which birds grew faster and turnaround time between flocks was reduced. ►**Above:** John Zimmerman says it's likely that he'll have to transport manure nutrients farther than ever.

plants. And turning manure into biochar will become cheaper than buying more land for spreading manure.

"It's looking like a lot more of this strict regulation of phosphorus will occur," says Zimmerman, who is carefully watching emerging Chesapeake Bay regulations for hints about what could happen in the Mississippi River watershed. "If that happens, we'll definitely need to turn five tons of manure into one ton of biochar and haul it farther than we do now." ■