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it economically viable for years to come," she says.

NEW-AGE REFINERIES

Welcome to the closed-loop revolution. While the United States hasn't built a new oil refinery in more than 30 years, new steel for so-called "biorefineries" is quickly going up in Ohio, Nebraska, Texas, California, Iowa and other states, driven by larger livestock operations, higher energy costs and a thriving ethanol industry. Some are attached to already-existing confined dairy and beef operations; others, like the one in Ohio, are being built from scratch.

Besides the obvious benefits of lower costs and increased revenue streams, these self-sustaining systems use little if any fossil fuels, reduce or eliminate environmental concerns from manure loss, and help large-scale operations expand within pollution restrictions.

It's the next step in the evolution of the ethanol industry, says Mark Lambert, communications director for the Illinois Corn Marketing Board.

"We're seeing a surge in development," he says. "This is something people have dreamed about for

"We're moving from a disposal mentality to a capture-value mentality." —Boehlje

decades. What's prompting this is a healthy ethanol industry that's good for the country and good for agriculture.

"People were tinkering around with this when ethanol was first emerging," adds Lambert. "What's changed is the technology and the scale. Some of these places can be real players. Now you're talking about facilities making fuel for a lot of folks, feeding a large number of livestock, or selling fuel or power to a lot of neighbors nearby."



Photo: Kent Sievers

"You get a lot more by putting three processes together than by keeping them apart. It's a win-win-win in any direction," says Dennis Langley, CEO at E3 BioFuels, Shawnee, Kan.

Recycling and capturing more value from products and processes is not a new concept, notes Purdue University ag economist Mike Boehlje. However, the biorefinery revolution should certainly cause folks in production agriculture to sit up and rethink how they do business.

"People are thinking about how to capture value from all products being produced by the prime industry they are in," he says. "They're starting to recognize when you produce an animal, you're producing more than just milk or meat. The animal waste is a product.

"Historically, it was a throwaway," he adds. "Now we're saying maybe we ought to reframe what we're doing and think about how we might create value from that byproduct."

Ethanol surely is a catalyst in closed-loop production, but stiffer regulations are also driving change. "We now have regulations that have made it more costly to dispose of the byproduct," notes Boehlje. "Sometimes out of regulation comes creativity: 'Gee, if it becomes costly to throw it away, let's take the byproduct and create value. It's no longer free to dispose it, so let's generate revenue from it.'

"We're moving from a disposal mentality to a capture-value mentality," he says. "We are, in some sense,

trying to return back to a concept of creating value — to when we grew our own feed, produced our own fertilizer and saved those transaction costs."

NOT YOUR GRANDPA'S FARM

There's nothing conventional about these operations, including where they are sited. Most of the grain for the Coshocton ethanol plant will need to be shipped in from nearby counties, but the company has ensured demand for its food and fuel products by locating close to the Eastern seaboard.

Panda Ethanol plans to build four 100 million-gallon ethanol plants — three powered by cattle manure. One is in development for Kansas, and the other two are in Texas in a region where corn is scarce. According to Panda, each plant will need 40 million bushels of corn or milo each year.

"The plants are in a corn-deficit area, so they will bring 95% of their corn in from other locations and mainly from the central Midwest," says Illinois farmer Bryan Fogerson. "Half the corn currently going into the [Texas] Panhandle comes from Illinois, so we are well-positioned to service this new market."

Folks like Dennis Langley are also feeling optimistic these days. Langley is CEO of E3 BioFuels, a Kansas company dedicated to stitching ethanol, ▶