

# Iowa State University professor working to turn manure into fuel with \$10 million grant

## No silver bullet, but likely 'silver buckshot,' for ag, economic, environmental challenges



Lisa Schulte Moore, Iowa State University professor, has won a \$10 million federal grant to develop new ways of turning biomass and manure into fuel. She will lead a consortium of ISU, Penn State University and Roeslein Alternative Energy researchers in the five-year study. (Submitted photo)

Lisa Schulte Moore wants to get the average Iowan as excited about anaerobic digestion as she is.

“Like I said, I like a good challenge,” the Iowa State University professor says with a laugh.

The professor of natural resource ecology and management has \$10 million and five years to work on her challenge, courtesy of a federal grant to develop new ways of turning biomass and manure into fuel.

The USDA’s National Institute for Food and Agriculture will fund the Consortium for Cultivating Human and Natural regenerative Enterprise (or, C-Change) to create solutions to economic, environmental and agricultural challenges.

At the same time, the research could lead to what Schulte Moore calls new “value chains” — the generation of renewable natural gas; stronger rural economies; and better protection of the environment, including water quality.

Schulte Moore, associate director of ISU’s Bioeconomy Institute, will lead the consortium of ISU, Penn State and Roeslein Alternative Energy of St. Louis in looking for ways farmers can their resources more efficiently, while being profitable and protecting the environment.

“Farmers, you know, their identity is to produce stuff ... to grow things for markets,” she says. “We recognize the benefits of current production systems but also that there’s a lot of inefficiency in how we use land, sunlight, nutrients and water.

“So I’m coming at it from sort of the agricultural end of things, looking at how do we use our farm environments in ways that make sense from the standpoint of maintaining profitability, but also trying to address the significant environmental concerns,” says Schulte Moore, who has worked with farmers on incorporating native grasses and cover crops into their practices.

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It's not just the manure issue from intense livestock production, but also water quality, soil erosion, nutrient runoff, flood control and wildlife habitat.

**Q. This seems like a broad project involving three institutions, people from academia as well as the private sector. Where do you start?**

A. "You do your homework," Schulte Moore says, adding that the project doesn't start from ground zero. There's been a lot of research done on incorporating anaerobic digestion into farm operations in Europe. There, individual farms may have a digester or, because the farms tend to be smaller, a group of farms shares a digester.

The research partners each bring something different to the table. Penn State has worked with Pennsylvania farmers who make greater use of digesters than their Iowa counterparts. Roeslein is partnering with Smithfield Foods to address manure issues at the company's pork production facilities.

"And I'm coming at it from the agro ecosystem side" in an effort to help farmers create a market for perennial crops grown on parts of their farms where the soil and landscape are less suitable for row crops, Schulte Moore says.

**Q. What are we talking about when we say anaerobic digestions?**

A. "It's the process by which microorganisms break down biomatter and produce biogas, which is mostly methane, the main component of natural gas."

Schulte Moore explains that with new separation technologies, biogas can be upgraded to renewable natural gas and distributed through the gas pipeline network, much like renewable electricity is distributed through the electrical grid.

Anaerobic digestion is common in processing municipal waste, and Schulte Moore sees a possibility cities could expand their facilities to capture economies of scale and become more efficient by handling manure or biomass from farms.

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Another possibility would be to co-locate digesters with biofuel plants that would process the material and use the natural gas in ethanol production.

"That would help them lower the carbon intensity scores associated with ethanol," she says.

**Q. You're talking about solving a lot of challenges farmers and rural communities face in being economically and environmentally sustainable. Are you searching for a silver bullet?**

A. "The better analogy is we're putting together a bunch of silver buckshot," Schulte Moore says. "We're putting several pieces together."

"Some things that we already know work, like the integration of native grasses, the prairie strips. We know that cover crops work. We know about anaerobic digestion as a technology associated with manure works.

"So what that allows us to do is, hopefully, be better able to hit the target because we're throwing a whole bunch of things at it, some of which we already know work really, really well.

"While the individual pieces work well by themselves, what we're trying to do is put it together in a system that's going to be a real winner and make a meaningful difference."



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