

InstarAGF Asset Management

Harvesting value in North America's farms

New approaches to energize a traditional sector

Recently, **Chase McWhorter**, Institutional Real Estate, Inc.'s managing director, *Institutional Investing in Infrastructure*, spoke with **Will Chow**, principal of InstarAGF Asset Management. Following is an excerpt of that conversation.

You've been tracking infrastructure across North America for the last few decades. What changes have you seen in the industry's approach to agriculture?

Recent trends have seen agriculture shifting from a sole focus on food production to generating additional revenue through different types of food products or by-products.

One area, in particular, that has seen quite a bit of activity is waste management on farms. Manure and food residues produce significant amounts of methane as they decompose and are composted. According to the Environmental Defense Fund, methane is 84 times more potent than carbon dioxide over a 20-year period. This creates a great opportunity for players in the agricultural industry, whether by using these products for generation of onsite power or through selling the by-products.

The other piece we are seeing broadly is a very large push for clean, green operations and environmental stewardship across the sector. This movement is largely propelled by both state-and federal-level programs. *The New York Times* reported that more than 40 percent of agricultural emissions in the United States are produced through animal agriculture, creating a key area for reduction in state and federal sustainability initiatives and, by extension, becoming a new opportunity for the agricultural industry.

With the emergence of these new opportunities, how are traditional models for energy infrastructure evolving to support and shape the future of the farming industry?

Within energy infrastructure, bioenergy has always been a sector operating within a very sophisticated environment, addressing increasingly prevalent environmental and waste-management concerns. As a reliable, nonintermittent source of heat and power, bioenergy can build energy resiliency into communities, integrating with combined heat and power models to achieve efficiencies of more than 80 percent, approximately 30 percent more than traditional energy technologies. It is common to find biodigesters throughout the U.K. and Europe, and the industry is continuing to mature across the United States alongside more established renewables, such as wind, solar and hydro.

In addition, investors are focusing more and more on opportunities within the bioenergy industry, replacing intermittent power sources like wind or solar with an attractive method of generating base-load power. Currently, bioenergy accounts for 2 percent of the energy mix in the United States. With more than 8,000 dairy and swine operations across the country capable of supporting biogas systems, farmers are increasingly looking to partner with investors that can help turn cost centers into new revenue streams. The collaboration and partnerships created bring enhanced potential and value for investors across various operating models.

What other innovations are you seeing in terms of design and operations? How, if at all, does this differ from trends being seen in more urban environments?

From a design and operations perspective, things in today's technology-driven world tend to move very quickly. Advancements in chemistry and technology are rapidly increasing, strengthening the viability of bioenergy as an affordable source of non-intermittent energy, providing base-load power to local grids and contributing to the broader energy storage mix.

Developments in biochemistry are also yielding positive results for bioenergy, lowering costs and optimizing efficiencies. For example, a recent study conducted by the University of Alberta found that adding conductive materials to organic waste products could increase energy yields by up to 70 percent. What this really means is more and more bioenergy projects are becoming economically viable, aligning agricultural and energy interests and creating value for North American businesses.

That is a pretty big technological shift. Some of the prime technologies out there have been around for 100 years, but the last five years have seen as much critical advancement for this sector as were previously seen over the last 50 years.

In terms of innovation driving down the costs — it is on the design side and the biochemistry side? Those are the two main ways to reduce the cost?

There are a lot of different ways out there. But I would say both from a design and construction, as well as an operations, perspective, there are advantages on both sides. From a design perspective, there is quite a bit of advancement in terms of process design — you look at the anaerobic digester



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facilities of 50 years ago, and they were largely covered lagoons or small digesters the size of trucks.

The space right now has evolved quite significantly, where there are numerous companies out there building very large anaerobic digesting facilities, with complex designs that control temperature, flow and the biochemistry within the reactor in order to maximize the gas. On the operations side of the equation, there also have been quite significant technological advancements. Increased automation is definitely one of them.

Another major advancement is on temperature control. Focus is beginning to shift from input more toward output, as bioenergy becomes more valuable. These plants now focus from an operations perspective just as much on taking

in waste from farms and other agricultural producers as they do on producing the most amount of electricity or natural gas as possible.

Even if this effort were just offsetting some of farmers' energy bills, that could be pretty significant for these agricultural operations.

Absolutely. It is extraordinarily common right now for farmers to use waste residue, waste crops and manure to offset their onsite energy bill. What the industry is trying to do right now is improve their cost efficiency — technology is improving, scalability is certainly helping, and I think there is a massive benefit for the agricultural industry. Margins are becoming far tighter in the agricultural industry, so instead of rising food costs, the other piece of the equation that can certainly help is reducing operating costs.

How do you see energy infrastructure's relationship with the agriculture industry evolving in the future?

The answer to that is central to trends we are seeing in both the agricultural and energy sectors: the opportunities will only grow from here.

As globalization intermingles all the aspects of our lives and daily needs, the ability of agriculture to take a prominent role in our energy infrastructure will globalize as well. We see a world out there where farms can really become little islands of energy, providing local areas with energy autonomy, resiliency and scalability for future growth.

We are already starting to see quite a significant shift. Where waste energy once focused primarily on landfills, the biggest focus now is really on partnerships with farms and the related animal or food by-products. What that really means is improving that relationship with the farms — bringing those energy investors closer to the agricultural industry, and letting farmers focus on their core missions while benefiting from additional revenue streams.



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Will Chow brings over 12 years of experience in the evaluation and execution of infrastructure investments in energy, utilities, telecommunications and transportation. Will formerly held senior roles on the infrastructure teams at Brookfield Financial and Deloitte.

CORPORATE OVERVIEW

InstarAGF is building a North American investment platform focused on infrastructure, real assets and private equity investments in the middle market. Our team's significant depth of sector and investment expertise, relationships, and global reach empower InstarAGF to help investors meet their investment goals.

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