

## Harvesting Energy from Livestock Waste

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Livestock producers are often plagued with the problem of handling waste. Waste management is generally a daunting task, both from an economic and time management perspective. Meanwhile environmental regulations are becoming increasingly stringent. One promising alternative can be anaerobic digestion of waste. This technology produces energy in the form of methane that can offset on-farm operation costs and may even have the potential to generate external profit for producers.

Anaerobic digestion is a biological process for treating wastes containing high solids and organic content. Anaerobic microorganisms convert organics present in the waste to methane. The biogas produced typically contains 50% to 75% methane, and can be purified to be utilized as a source of natural gas or directly used to fuel a generator to produce electricity. The end product is a stabilized waste that is nearly pathogen free. Wastewater can be utilized to irrigate nearby crops and solids can be land applied, serving as a source of carbon and nitrogen for crop growth.

The advantages of anaerobic digestion are numerous. In addition to generation of a clean source of energy, treatment of the waste products is improved over traditional methods, odors are reduced, and green house gas emissions are mitigated. Dairy facilities are ideal sites for anaerobic digesters as there is often high water content in the wastes, high energy content, and on-site uses for the generated biogas. Dairy facilities across the United States have successfully realized the benefits of anaerobic digestion, particularly in California, the Midwest, and East Coast. Nonetheless, very few anaerobic digesters have been installed in the Rocky Mountain West Region. The cold and dry climate in this region provides some challenges, but the principal barrier is that producers in this region lack the tools necessary to make informed decisions about installation of anaerobic digesters at their facility.

Our group is currently funded by USDA to determine economic and technical barriers unique to anaerobic digester installation in Colorado and develop decision-making tools which address these barriers and provide guidance on installation of anaerobic digesters. The decision-making tools developed in this project will be used as educational tools for dairy producers and their advisors. These tools will be simple and web based, making them readily available. Specific examples of tools include a preliminary assessment of technical and economic feasibility and guidance on selection of technology type and technology providers based on needs of individual producers. It is our belief that such tools will result in the installation of more anaerobic digesters in Colorado, thus tapping into a major source of renewable energy. It is our goal to expand this concept throughout the Rocky Mountain West.