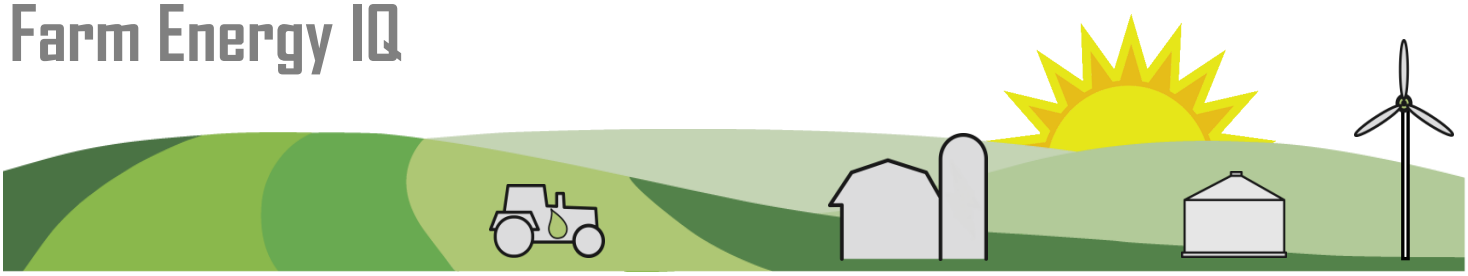
Farm Energy IQ



On Farm Biogas—ASP Presentation Outline

The intent of this lesson is to provide information and skills to the attendees who have an interest in producing biogas on their dairy farm as a means to reduce farm energy (electricity) costs and to extract additional value from animal manure.

Slides 1 and 2: The first slides are introductory in nature. The presenter introduces self and points out that the topic is a bit complex but that the essential information will be presented to improve understanding about biogas production on the farm.

Slide 3: Outlines the content of the module and the topics included.

Slide 4: Methodology for producing biogas using an anaerobic digester and dairy manure.

Slide 5: While dairy manure is often the primary ingredient in biogas production, other wastes may also be used and may improve the quality of the biogas produced.

Slide 6: A graphic of the basic process that occurs in an anaerobic digester.

Slides 7 and 8: Describes the conditions necessary to optimize biogas production including operating temperature and bacteria present.

Slide 9: Describes the make-up of the gas produced through the process of anaerobic digestion of dairy manure.

Slides 10 through 15: Introduce processing equipment and describe sizing considerations – the how much and how many related to the production of biogas and its most common application (electricity generation). How many cows, how much manure and how much electricity?

Slide 16: Further develops the estimation of electricity that can be produced from the process and the use of byproduct heat in maintaining digester temperature and preheating water for cleaning.

Slide 17: Photo of pumps and controls in a cheese whey digester.

Slide 18: Compares the energy content of waste products of cows versus other sources of waste. Not surprisingly, larger animals produce more waste than smaller animals.

Slides 19 through 21: Two types of plug flow digesters. 'Plug flow' simply means that there is no (or very little) mixing of ingredients that enter the digester. Ingredients--manure, and possibly other ingredients—are fed into the digester at the inlet; they are pushed in one direction toward the outlet. Flow happens in a straight line in a linear plug flow digester and occurs around a ring in a round, plug flow digester. Manure must remain in the digester for 20 to 30 days for optimum biogas production. Therefore, the more manure, the larger the digester must be.

Slide 22: An image of a motor generator set used to produce electricity from biogas. The engines are often modified diesel engines due to their heavy duty construction which enables them to perform reliably for extended periods between services.

Slide 23: Micro turbines are another way to produce energy from biogas. Generally, turbines produce lower emissions than reciprocating engines and require less frequent maintenance. The disadvantages are higher purchase cost and parts availability.

Slide 24: Enumerates the safety considerations associated with the production and use of flammable gas. Regardless of the application, biogas is highly flammable and must be treated accordingly.

Slide 25: Enumerates electrical precautions for biogas-produced electricity. There are additional safety considerations and measures that must be put in place to ensure that the production of on-farm electricity does not endanger linemen.

Slide 26: Cue for questions.

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