

On Farm Manure Anaerobic Digestion Economics

Introduction

- Controlling greenhouse gas emissions and producing energy from renewable sources are two key components of energy sustainability movement.
- Livestock manure is a large producer of greenhouse gases, but also has the potential to be a feedstock for energy production.

Anaerobic Digester Facility

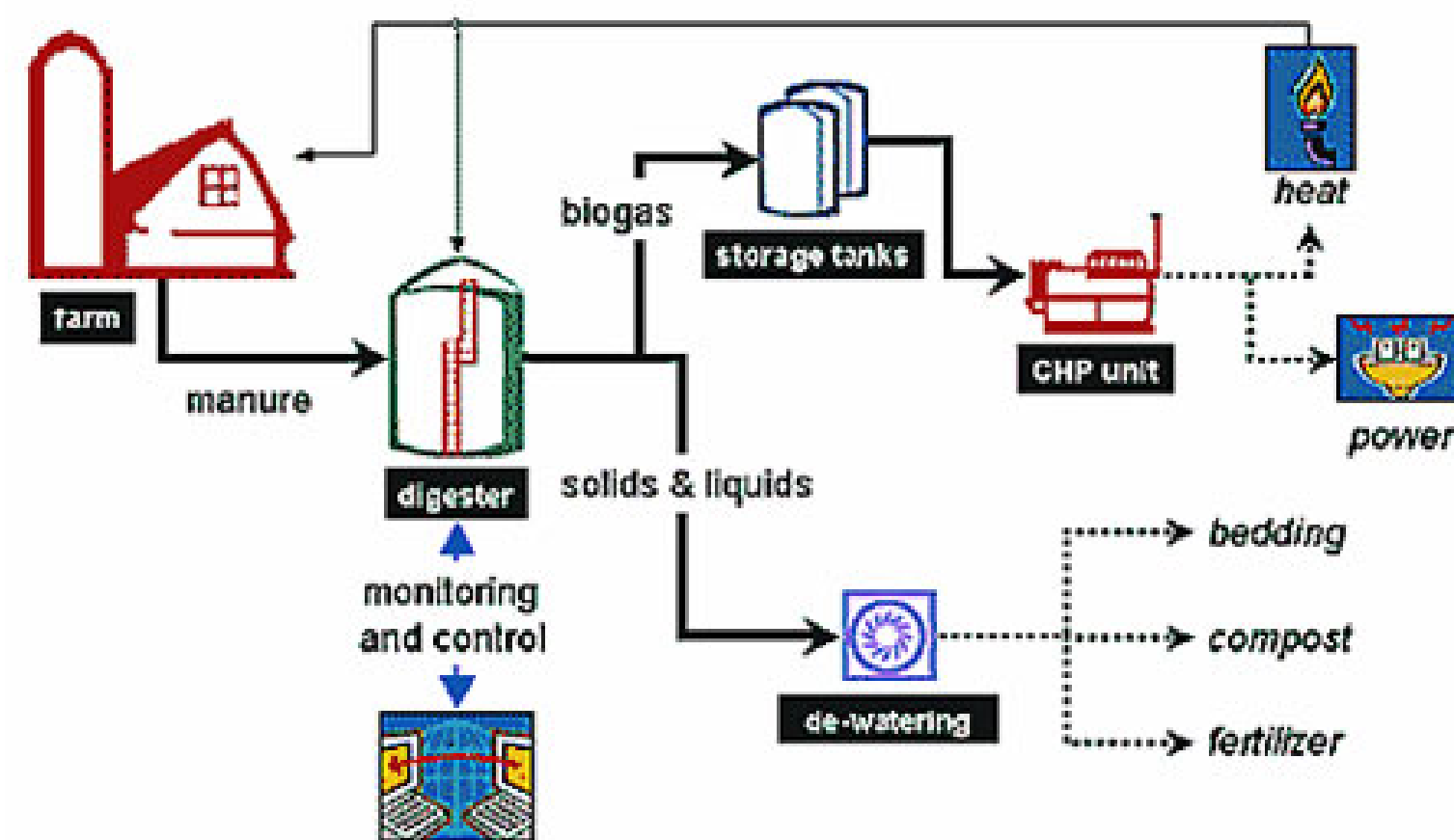


Figure 1. Main components of a typical on-farm anaerobic digestion system [3].

- Anaerobic digestion is a biological process that can be used on farms where microorganisms break down organic material in the absence of oxygen.[2]
- Biogas produced from anaerobic digestion is often burned to generate electricity and heat, or can be processed further into renewable natural gas and transportation fuels.

Background Information

- Economics are likely the driving factor behind anaerobic digestion not widely being used.[2]
- High capital costs to install an anaerobic digester are a barrier to utilizing systems in most operations.
- Anaerobic digestion systems require more maintenance than other manure systems, resulting in increased operating costs and additional employees.[1]
- EPA AgSTAR only reports 242 operational livestock manure anaerobic digestion in the US as of May 2016 (Figure 2). They estimate that anaerobic digestion is technically feasible on over 8000 large dairy and hog operations.[2]

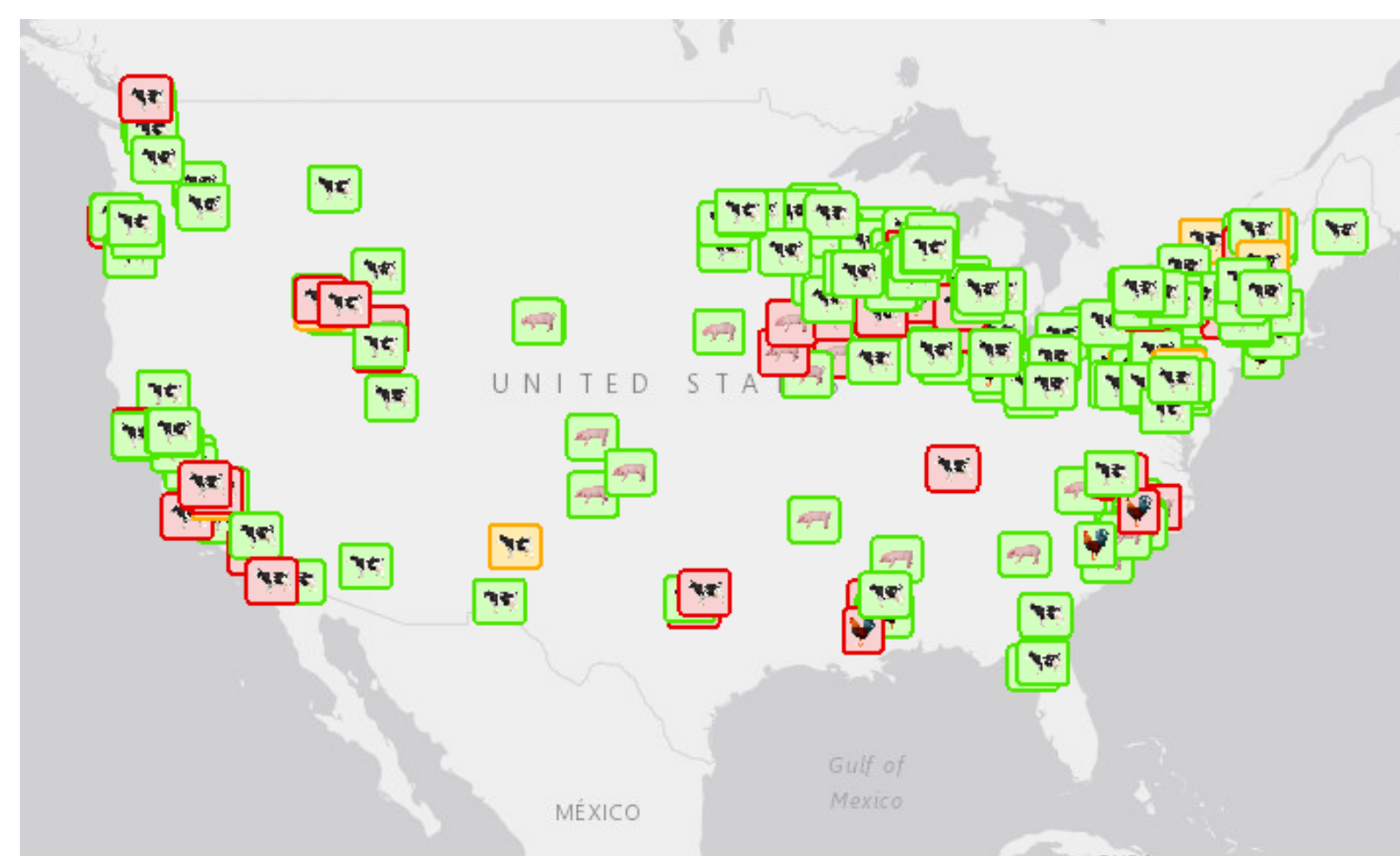


Figure 2. Map of operational anaerobic digesters in the United States, by livestock operation type [2]

Constraints and Opportunities

- Since the process is biological, it is a challenge to speed up and improve efficiency. [2]



Figure 3. Operating Anaerobic Digester Site

- Biogas revenue opportunities:
 - Electricity generated can be sold back to a power company.
 - Biogas falls under the category of a D5 RIN (Renewable Identification Number). [2]
 - D5 RINs currently trade around \$1 per RIN. [4]
- On-farm costs can be reduced by utilizing gas and fertilizers produced by anaerobic digestion.
- Digested solids do have value and can be used in many applications including:
 - Fertilizer
 - Livestock bedding
 - Processed fertilizers

Potential Solutions

- Rural development programs (FSA, NRCS, USDA) can be used to help finance, install, and provide technical support for digestion systems.[2]
- Future rules and regulations, such as methane generation regulations, may make on-farm anaerobic digestion more economical than paying large fines or fees
- Policy differences in Europe, such as European Carbon Credit, create additional revenue for biogas produced electricity, making anaerobic digestion more economically feasible [3]

References

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