Centralized Systems for Anaerobic Digestion to Renewable Natural Gas

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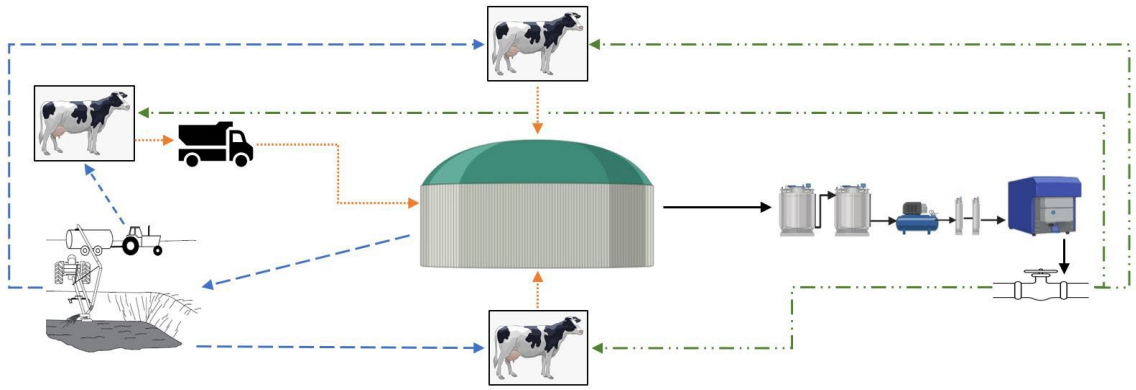
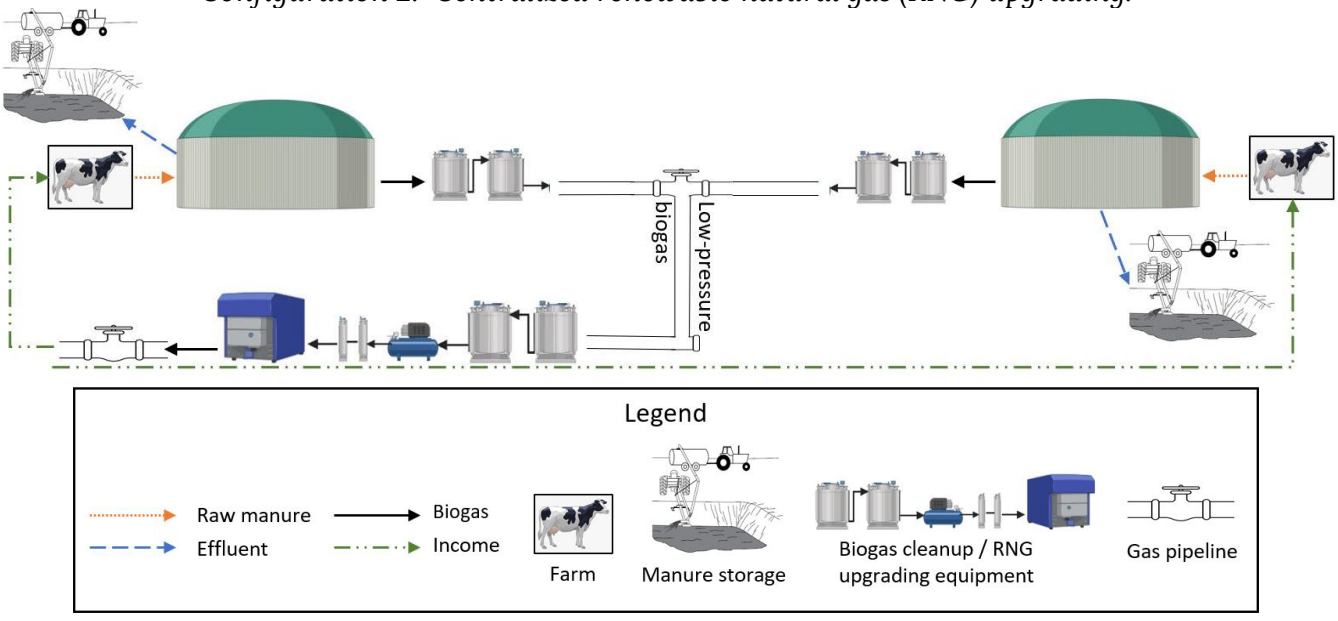
Anaerobic digestion (AD) of dairy manure to produce renewable natural gas (RNG) requires large scale to be economically viable. Centralization of manure AD-to-RNG systems can enable medium or smaller scale dairies to participate. Farms are paid for the RNG produced from the manure that they supply to these systems by a developer who sells the RNG. Centralized AD-to-RNG systems may be set up in different ways. Configuration 1 below is where a single digester is fed with manure from multiple farms and the biogas is upgraded to RNG at the digester site. This may allow any number of local small to medium scale dairies to participate. Configuration 2 below is where multiple farms each have a digester and initial biogas cleanup (hydrogen sulfide and water removal), with interconnected biogas piping to a centralized RNG upgrading and pipeline injection system. A third centralized configuration (back) is where each participating farm has their own digester and biogas upgrading to RNG system, with the RNG transported to a single injection or use point. A single developer may assemble this configuration to distribute the cost of the RNG injection point among multiple farm projects. Combinations of these configurations are also possible. Important considerations and questions for discussion among the farms and developer are outlined in this fact sheet.

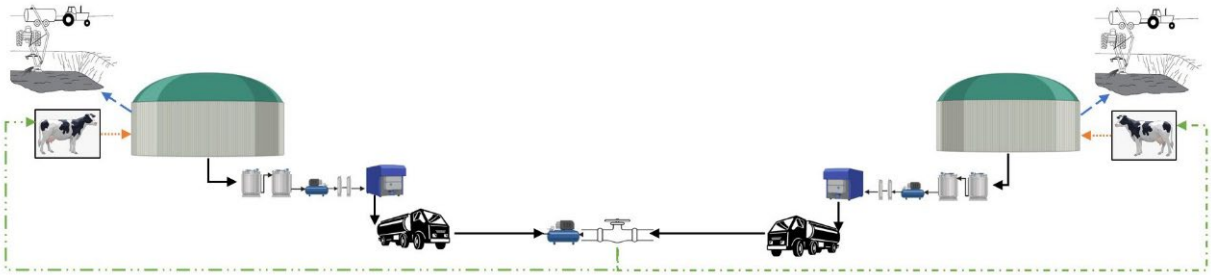
Configuration 1: Centralized anaerobic digester.



Configuration 2: Centralized renewable natural gas (RNG) upgrading.



Configuration 3: Centralized RNG use / pipeline injection point.



Considerations

Configuration 1	• Manure transportation options and subsequent labor costs • Biosecurity (if bringing central digester effluent back to the farm) • Impacts/changes to manure management (e.g., equipment, storage, quality) • Quantity and quality of digester inputs
Configuration 2	• Quantity and quality of biogas inputs to RNG upgrading • Biogas cleaning equipment needed at the farm • Biogas pipeline construction, permitting, and right of way requirements
All Configurations	• Impacts/changes to daily farm operations (e.g., bedding, water inputs) • Use of biogas for AD system electricity and/or digester heating • RNG transportation to pipeline injection or use point • System ownership • Operation and maintenance responsibilities • Tax and insurance implications • Permitting needs • Financing • Project term; termination conditions and limits

Questions for discussion

1. Will the digester effluent (digestate) be separated for bedding?
2. How and where will quantities of separated liquids and/or solids be divided?
3. Will nutrient management plans need to be altered?
4. What happens if the RNG company or one of the farms goes out of business or is bought?
5. What happens if there is a manure shortage?
6. How will compensation be determined?
7. How will tax credits be distributed?
8. What will be done with the carbon credits?
9. Will land need to be purchased or leased to accommodate the digester, RNG equipment, gas piping, and/or injection point?
10. Will this scale/format of RNG production cause treatment as a utility?
11. Who is buying the RNG and for how long?
12. Will co-digestion of food waste be considered?

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