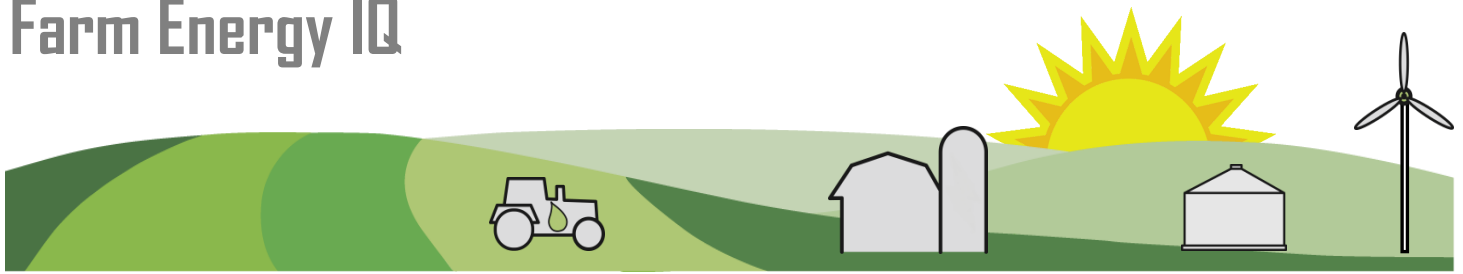


Farm Energy IQ



On Farm Biogas—ASP Activity

Using Martindale’s calculator, estimate the annual electrical energy available from dairy farm biogas (methane) produced by an anaerobic digester.

We are looking for a range here because energy available from the anaerobic digestion of manure varies with the diet of the dairy herd and the water content of the manure. Water content varies in part due to water added when cleaning the barn floor and to water that may be added to enhance flowability through the digester and its piping and pumps.

Assume: 200 cows and about 4 kWh per cow per day.

On Farm Biogas—Activity Solution

Using Martindale’s calculator, estimate the annual electrical energy available from dairy farm biogas (methane) produced by an anaerobic digester.

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Assume: 200 cows and about 4 kWh per cow per day.

$$200 \text{ cows} \times 4 \text{ kWh per cow per day} \times 365 \text{ days/yr} = 292,000 \text{ kWh / yr}$$

This calculation can vary significantly since estimates of manure produced per cow vary from 40,000 lb per year to over 80,000 lb per year. Estimates of kWh per lb of manure also vary.

Based on the above assumptions, the answer is about 300,000 kWh/yr produced by 200 (lactating) cows.

Using the Digester Economics calculator yields a similar result.

On the ‘INPUT’ tab of the spreadsheet, enter 200 in cell B4 (number of lactating cows).

Go to the ‘Energy Sales’ tab, cell B10. About 245,000 kWh.

The results vary widely depending on assumptions made regarding manure energy content and the conversion efficiency of the electric generation equipment.

This project supported by the Northeast Sustainable Agriculture Research and Education (SARE) program. SARE is a program of the National Institute of Food and Agriculture, U.S. Department of Agriculture. Significant efforts have been made to ensure the accuracy of the material in this report, but errors do occasionally occur, and variations in system performance are to be expected from location to location and from year to year.

Any mention of brand names or models in this report is intended to be of an educational nature only, and does not imply any endorsement for or against the product.

The organizations participating in this project are committed to equal access to programs, facilities, admission and employment for all persons.

