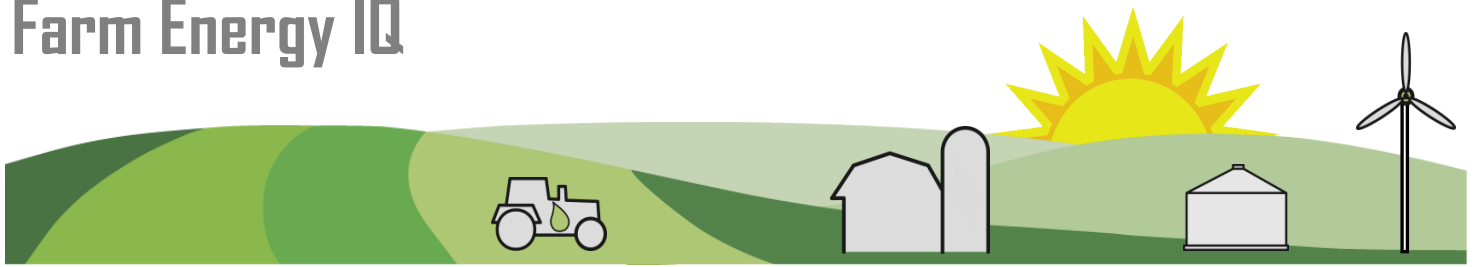


Farm Energy IQ



Dairy Farm Energy Efficiency—Module Overview

1. Agricultural Service Provider (ASP) Training Description

- a. Learning Objectives—Participants in the educator training session will understand how energy is used on dairy farms and techniques that can save energy in the dairy business. This includes the ability to:
 - i. Explain how energy is typically used on a dairy farm, with emphasis on the highest energy consuming devices.
 - ii. Explain the difference between energy efficiency and energy conservation.
 - iii. Describe: energy efficient lighting, plate cooler, refrigeration heat recovery (energy recycling), high efficiency refrigeration/scroll compressors, energy efficient ventilation, and variable speed vacuum pumps.
 - iv. After identifying the major uses of energy on dairy farms, collect equipment data.
 - v. Explain some methods for keeping track of energy use for the benefit of keeping equipment efficiency on track.
 - vi. Be ready to visit a farm and assess equipment and applications that may be candidates for efficiency upgrades.
 - b. Presentation Outline –
 - i. 05 min – Introduction – Typical energy uses on the dairy farm. Introduce self, purpose of presentation; give brief overview of major energy using devices: lights, motors (including refrigeration, compressors, vacuum and watering pumps), heating.
 - ii. 05 min – Outline the many energy applications on the dairy farm. Common efficiency upgrades: eliminate incandescent lighting, heat recovery, eliminating unneeded work that motors do. Estimate the number of light fixtures on a typical dairy farm.
 - iii. 10 min – Fan loads as a cubic function. Discuss what changes might be made to significantly reduce energy costs using variable speed drives so the motors only do what needs done.
 - iv. 10 min – Discuss methods of improving efficiency using existing energy applications. Uses of timers, sensors, energy storage
 - v. 15 min - Discuss effects of maintenance on energy efficiency. Discuss potential reduction in energy costs.
 - c. Activity – ASPs will be given information about a dairy operation and be asked to estimate the energy savings attributable to installation of a variable speed (also called variable frequency) drive powering the milk vacuum pump.
 - d. Calculation Tools – The USDA Energy Estimator will be used for energy savings estimates for dairy farm applications.
2. Presentation File – Dairy Farm Energy Efficiency—ASP Presentation.pptx.
 3. ASP Activity Sheet – Dairy Farm Energy Efficiency ASP Activity Sheet (and Solution)
 4. Dairy Farm Energy Efficiency ASP Activity Sheet output.pdf.

4. Calculation Tool – <http://ahat.sc.egov.usda.gov/DairyAnalysis.aspx>
5. Additional Reading for ASP – Ludington Calculators.doc;
http://www.engineeringtoolbox.com/fan-affinity-laws-d_196.html

6. Farmer Training Description -

- a. Presentation Objectives – Farmers who participate in the farmer presentation will learn about energy use on the dairy farm and techniques to save energy in the dairy business. This includes the ability to:
 - i. Explain how energy is typically used on the dairy farm, especially the larger energy consuming devices.
 - ii. Know the difference between energy efficiency and energy conservation.
 - iii. Describe: energy efficient lighting, plate cooler, refrigeration heat recovery (energy recycling), high efficiency refrigeration/scroll compressors, energy efficient ventilation, variable speed vacuum pump and low/no energy waterers.
 - iv. Identify the major uses of energy on their farms and collect equipment data.
 - v. Explain some methods for keeping track of energy use for the benefit of keeping equipment efficiency on track.
 - vi. Identify and describe some strategies to shift energy use to lower cost energy sources.
 - vii. Assess equipment and applications that may be candidates for efficiency upgrade.
 - b. Presentation script – Dairy Farm Energy Efficiency—Farmer Presentation Outline.
7. Slide File for Farmer Training – Dairy Farm Energy Efficiency—Farmer Presentation.pptx
 8. Fact Sheet for Farmer Training – Fact Sheet h87 Dairy Farm Energy.pdf – Describes the top ten energy savings opportunities found on dairy farms.
 9. Case Study for Farmer Training - (included in Supplemental Files)
<http://energy.maryland.gov/Business/mathiasag/documents/WhitelynCaseStudy.pdf>

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.

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