

Farm Energy Audit Workshop

Dairy: Phase I – day 1 (8 hrs)

I. Overview of Dairy Farm Operations and Energy Use

A. Background on Farm Energy Use

B. Farm Operations

- **Milking**
 - Stanchion Milking (Stall, Tie-stall)
 - Milking Parlor
- **Housing**
 - Stanchion Barn, Free Stall Barn
 - Free Stall Bedding
 - Dry Cow
 - Maternity
 - Natural, Curtain & Forced Ventilation
- **Feeding**
 - Milking Area
 - Free Stall Barn
 - Fence Line
 - Mechanical
 - Tractor Delivery
- **Feed Storage**
 - Bunker
 - Tower/Bunker Silo
 - Round/Small Bales
 - Bags
 - Haylage
- **Calf Housing**
 - Individual Hutches
 - Super Hutches
 - Controlled Environment
- **Shop**
- **Manure Handling and Storage**
 - Solid Handling
 - Pit Storage
 - Slurry Storage
 - Application

II. Farm Energy Assessment and Options

- **Vacuum and Milk Pump**
 - 3-Phase Motor
 - Variable Speed Drive (VSD) on vacuum and milk pumps

- on your milking equipment
- High Efficiency Pumps
- **Milk Cooling**
 - Plate Cooler - pre-cooler system to cool the milk before it enters the bulk milk tank
 - Heat Exchanger for Heating Water
 - Milk Cooler/Motor Heat Used for Heating
 - Water recycling equipment
- **Water Heating and Water Consumption**
 - Separate Unit for Milking Use
 - Separate Unit for Equipment Washing
 - Insulated Hot Water Lines
 - Milk Cooler Heat Reclaimer Used for Water Heating
 - Fuel: Electric, Natural Gas, Propane. Fuel Oil
 - Demand Water Heaters
 - Solar Assist for Water Heating

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Dairy: Phase I – day 2 (8 hrs)

II. Farm Energy Assessment and Options (- Continued -)

- **Lighting**
- **Ventilation**
- **Space Heating and Building Design**
- **Manure Handling and Treatment**
- **Electric Rates From Energy Supplier**

III. Potential Alternative Energy Sources

- **Wind**
- **Anaerobic Digesters**
- **Solar**
- **Geothermal**

IV. Single Phase and Three Phase Electrical Service Issues

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Dairy: Phase I – day 3 (8 hrs)

V. Long-Day Lighting

VI. Calculation Sessions

- Vacuum Pump and VSD
- Milk Cooling
- Water Heating and Heat Recovery
- Lighting
- Air Circulation & Ventilation
- Efficient Motor
- Tractor Heater
- Hot Water Pipe Insulation

VII. Fuel Cost Comparison and Conversion

VIII. Conducting A Farm Energy Audit

- Audit Philosophy and ANSI Tier II standards
- Analysis of utility bill and energy use records for previous 12 months
- Forms and gathering information
- What data is supplied by the farmer
- How to conduct an audit
- Review a sample Dairy Farm Energy Audit Report
- Sanitation: boots, brush, solution
- Do's and don'ts while on the farm

IX. Energy Efficiency Funding Opportunities

- USDA – REAP
- USDA – NRCS (Energy Efficiency and EQIP plate water reuse)
- Utility Companies
- Michigan Agencies

X. Grant Writing Issues and Opportunities For Auditors

Farm Energy Audit Workshop

Dairy: Phase II – 1 day (6 hrs)

I. On-Farm Energy Audit Assessment and Data Gathering

- A project staff is assigned to be a team leader (2-3 groups depending on nos.)
- In groups of 4 or 6 auditor trainees, conduct an actual farm energy assessment with the guidance of a team leader.
- Group gathers information, documents, operational process information and takes measurements. May need to return to site or contact operator for additional information at a later date.

II. Data Analysis and Report Preparation

- Group discussion regarding energy or operational issues that impact energy use observed in the on-farm assessment.
- Group develops Farm Energy Audit Report strategy, areas of emphasis, and assignments. Additional group meetings prior to finalizing the report and presentation for the next training session is anticipated.
- Calculations of project costs and energy savings using tools and software adopted by the project and comparative analysis of various recommendations.
- How to make sound energy savings decisions
- What should be in the report for the farmers and requirements for funding?
- Review of case study scenarios and presentation of sample reports.

Farm Energy Audit Workshop

Dairy: Phase III – 1 day (8 hrs)

I. Report Presentation, Defense and Evaluation

- Presentations of Farm Audit Report with group discussions.
- Detailed review of calculations, assumptions and solutions identified in each group presentation.
- Assistance and available resources.

II. Post Report Issues

- Review of problems encountered in the assessment and report phase.
- Recommendations of review team (composed of funding agencies).
- Appeal process and procedures for unaccepted proposals by funding agencies.
- Set date for final submission of reports incorporating recommendations made.

