

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
- Age: New, 5 Years, 10 Years, Older
- 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

- **Lighting**

- Incandescent: Mercury Vapor - Low Efficiency
- Sodium Lamps - Outside/High Clearance Buildings
- Metal Halide - High Clearance Buildings
- Enclosed Fluorescent Fixtures
- Electronic Ballast Fluorescent Fixtures
- Replace Incandescent Lamps with Fluorescents

- **Ventilation**

- Fans in Free Stall/Stanchion Barns
- Fans in Milking Area

- **Space Heating and Building Design**

- Check for Air Leaks - Have tight fitting windows and doors in your farm buildings
- Weatherproof Windows - Seal windows with caulking and weather stripping
- Areas Not Adequately Insulated - Insulate farm building outside walls with greater than R20 and ceiling greater than R30
- Need Ideas for New Construction

- **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

Farm Energy Audit Workshop

Dairy: Phase I – day 2 (8 hrs)

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

- **Manure Handling and Treatment**
- **Machinery and Equipment**
 - Match the size of the tractor to the size of implements
 - Ensure that your equipment tires are inflated properly
 - Follow the recommended maintenance schedule for your machinery and equipment
- **Irrigation**
 - Avoid irrigating on hot sunny or windy days
 - Apply only the amount of irrigation water required for crop growth
- **Drying Equipment**
 - Find out what to look out for and what information to collect
- **Electric Rates From Energy Supplier**

III. Energy Efficiency Funding Opportunities

- **USDA Rural Development – REAP**
- **USDA NRCS Summary – CSP**
- **RETAP Summary**
- **NRCS-Michigan has an EQIP Incentive Payment program (Plate Cooler Water Reuse)**

IV. Conducting A Farm Energy Audit

- **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 (virtual farm tour and audit)**
- **Review a sample Dairy Farm Energy Audit Report**
- **Sanitation: boots, brush, solution**
- **Do's and don'ts while on the farm**

V. Potential Alternative Energy Sources

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

Farm Energy Audit Workshop

Dairy: Phase II – 1 day (8 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.

Farm Energy Audit Workshop

(Dairy: Phase IV)

