United States Department of Agriculture
Natural Resources Conservation Service

CPS 374 – Farmstead Energy Improvement

Planning Unit: Each
Reporting Unit: No.

ARKANSAS FACT SHEET ***December 2012***

PRACTICE DEFINITION
Development and implementation of improvements to reduce on-farm energy use or improve the energy efficiency of on-farm equipment.

PRACTICE PURPOSE
Reduce energy use from agricultural systems or components by implementing the recommendations from on-site energy audit. The practice is applicable to all farming enterprises, including but not limited to, confined animal, grazing, and cropland.

PRACTICE INFORMATION
The practice applies to non-residential structures and energy-using systems where reducing energy use is the identified goal. This practice shall be used exclusively for implementing recommendations from a current on-farm energy audit performed in accordance with the standard ASABE S612 Performing On-Farm Energy Audits.

Where required, certify that the new, replacement, or retrofit system and related components or devices meet or exceed currently applicable federal, state, and local standards and guidelines.

Components shall meet NRCS conservation standards or industry standards, as appropriate. Common standards include NRCS 533 Pumping Plant, NRCS 372 Combustion System Improvement, ASABE EP566.1 Selection of Ventilation Fans, ASABE EP406.4 HVAC for Greenhouses, ASHRAE 90.1-2010 Energy Standard for Buildings, NEMA MG 1-2009 Motors and Generators.

This document is not all inclusive and should not be considered as the final rule for implementation. The Conservation Practice Standard, Practice Specification and applicable Arkansas amendments are the official guidance documents for implementation of this practice.

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CPS 374—Farmstead Energy Improvement

For all scenarios in CPS 374, associated activity plans and practices include 122-AgEMP – Headquarters and 374-Farmstead Energy Improvement. The principle resource concern addressed is Inefficient Energy Use—Equipment and Facilities.

IMPORTANT—scenario descriptions do not constitute practice specifications.

Attic Insulation

This scenario provides for the installation of additional insulation in the attic of an existing agricultural building, typically a poultry house. The added insulation must provide a minimum R-15 thermal resistance, which is equivalent to a minimum 4-inch settled depth of blown-in cellulose.

Feature Measure: nominal floor area of the building

Unit: square feet

Sealant

This scenario provides for the interior-face sealing of the cracks in the exterior walls of an existing agricultural building. This scenario is not intended to provide additional insulation on the flat planes of the building panels. Rather, the intent is to seal the cracks which may exist at the linear junctions of the flat planes and to seal miscellaneous holes. Thus, in a poultry house, the common sealing lines are the ridge cap, gable ends, eaves, and the junction of exterior walls with the footer plate. The sealing must be performed by a professional contractor spraying the areas with a sealant approved for poultry production facilities. Sealant is not merely spray foam from a can.

Feature Measure: nominal length of the building

Unit: feet

The payment schedule provides separate scenarios and payment amounts for Open-Truss buildings and Drop-Ceiling buildings.

Wall Insulation

This scenario provides for the conversion of obsolete sidewall curtains and other flexible walls of an agricultural building, typically a broiler house, to insulated permanent walls. The sidewall curtain is removed, a permanent exterior wall is installed in the former curtain, the entire wall area from footing to eave is reinsulated, a vapor barrier is installed, and appropriate protective layers are installed over the insulation. Various construction options are acceptable; see the applicable job sheet for specifications.

Feature Measure: wall area rebuilt/reinsulated

Unit: square feet

Greenhouse Screen

This scenario provides for the installation of a mechanically controlled screen or blanket to control solar radiation and heat transfer from an agricultural greenhouse. The screens are typically installed flat across the house from gutter to gutter or truss to truss, and along the sidewalls as necessary. The mechanical screen system consists of controls, a drive motor, support cables, and the shade screen, which may be knitted, woven, or non-woven strips of aluminum fiber, polyethylene, nylon or other synthetic material.

Feature Measure: area of screen installed

Unit: square feet

LED

This scenario provides for the replacement of inefficient light bulbs, such as incandescent bulbs, in an existing agricultural facility with light-emitting diode (LED) bulbs. Old bulbs are replaced with new bulbs on a 1:1 ratio, and replacement of light fixtures is not necessary. The typical use of these LED bulbs is for 'Grow-Out' bulbs in a broiler house. As such, these bulbs must be dimmable and designed for poultry house use. Arkansas policy states that existing CFL bulbs are not eligible for replacement with LED bulbs. Typically, a 40x400' broiler house requires 40 bulbs, and a 40x500' broiler house requires 50 bulbs.

Feature Measure: the number of bulbs installed

Unit: each

CFL

This scenario provides for the replacement of inefficient light bulbs, such as incandescent bulbs, with compact fluorescent (CFL) bulbs. Old bulbs are replaced with new bulbs on a 1:1 ratio, and replacement of light fixtures is not necessary. The typical use of these CFL bulbs is for 'Brooding' bulbs in a broiler house. As such, these bulbs must be designed for poultry house use but do not require dimming ability. Typically, a 40x400' broiler house requires 20 bulbs in the brood end of the house only, and a 40x500' broiler house requires 24 bulbs.

Feature Measure: the number of bulbs installed

Unit: each

Linear Fluorescent

This scenario provides for the replacement of an inefficient lighting system, such as incandescent bulbs or T12 fluorescent fixtures, with a high-efficiency linear fluorescent system using T8 or T5 bulbs. The replacement of the light fixtures is usually required. The fixtures must use single electronic ballast. Appropriate disposal of existing lamps, ballasts and other materials is required.

Feature Measure: the number of fixtures installed

Unit: each

Exhaust

This scenario provides for the replacement of a conventional exhaust fan in an agricultural building with a high-efficiency exhaust fan. Typically, the new fan will feature a 48" or greater diameter and low RPM speed. Typically, these fans are 'tunnel ventilation fans' installed in a broiler house.

Feature Measure: the number of fans installed

Unit: each

HAF (Circulation Fan)

This scenario provides for the installation of stir fans in an existing agricultural building (typically a broiler house or greenhouse) to force the mixing of the inside air to reduce stratification and promote uniform temperature and moisture of the air. The acronym HAF means 'horizontal air flow', but a vertical blowing fan (like a household ceiling fan, also called a paddle fan) is often used in an open-truss building. In a 400- to 500-ft long broiler house, 6 to 8 stir fans are typically used, with 6 being the more prominent number.

Feature Measure: the number of fans installed

Unit: each

Radiant Heater

This scenario provides for the replacement of conventional heaters (which provide heat by heating the air) in an existing agricultural building with new radiant-style heaters. Radiant tubes, “radiant quads”, and radiant brooders are all acceptable. The scenario is typically used to replace obsolete “pancake” brood heaters in the renovation of a broiler house. The scenario payment includes costs for the materials and labor to remove of old heaters, re-plumb gas lines, cables and wench systems, and install the new heaters and includes all other associated costs.

Feature Measure: radiant heating capacity

Unit: 1000 BTU/hour

Please refer to the Amendment 22 Policy document for instructions on the amount of radiant heating to contract. As an example of the order of magnitude, a typical 40x500 broiler house at 45 BTU/hour per square foot will require 900,000 BTU/hour of heating capacity.

Plate Cooler

This scenario provides for a heat exchanger to transfer a large amount of heat into or out of an agricultural product in an existing production system. Typically, the scenario is used to install a plate cooler to remove a large amount of heat from milk before the milk enters a bulk storage tank, which significantly reduces the heat load on the bulk tank refrigeration system.

Feature Measure: rated capacity of the plate cooler

Unit: gallons/hour

Scroll Compressor

This scenario provides for the replacement of a reciprocating compressor in an existing agricultural refrigeration system with a new scroll compressor. The scenario is typically used to retrofit the milk cooling system of a dairy. The scenario payment covers costs for the new scroll compressor, associated controls, wiring, and miscellaneous materials to retrofit an existing refrigeration system, but the scenario does not include a new condenser (the radiator typically positioned outdoors) or evaporator (the unit located inside the bulk tank being cooled).

Feature Measure: nameplate horsepower of the compressor

Unit: horsepower

(Continuous Flow) Grain Dryer

This scenario provides for the replacement of an existing manually-controlled continuous-flow grain dryer with a computer-controlled continuous flow dryer. The microcomputer-based control system adjusts the burner and/or the grain flow rate to achieve a consistent and accurate moisture content of the exiting grain. The typical operation requires a capacity of 860 bushels per hour.

Feature Measure: rated capacity of the dryer

Unit: bushels/hour

Automatic Controller System

This scenario provides for the installation of an automatic control system on an existing manually-controlled agricultural system. Components typical to such a system include a logic controller and/or a data logger, software, sensors, switches and/or relays, communication links, and wiring. Note—single component controllers (such as variable speed drives for electric motors, control units for a grain dryer, etc.) are not system controllers. System controllers operate multiple components. A broiler house controller is great example as it controls lights, curtains, fans, ventilation openings, etc.

Feature Measure: each controller installed

Unit: each

Variable Speed Drive (for an Electric Motor)

A variable-speed drive (VSD) provides a modern practical method to vary the speed of an electric motor and the attached machinery. This scenario provides for the installation of a VSD to an electric motor to drive existing agricultural machinery—such as an irrigation pump, vacuum pump, ventilation fan, etc. The VSD works by varying the frequency of the input power from the standard 60 Hz, and for that reason the unit is sometimes called a variable-frequency drive or VFD. A VSD typically provides connections for a limited number of sensors (such as for flow rate or pressure head), displays a digital readout of the measurements and other system parameters, and automatically controls the motor based on those measurements. The scenario pricing includes the cost of typical appurtenances such as control blocks, line filters, and lead wires to the VSD. But, the scenario does not include an electric motor.

Feature Measure: nameplate horsepower of the attached electric motor

Unit: horsepower

A VSD can only drive a three-phase motor. Luckily, some VSDs can accept single-phase input power to drive a three-phase motor. Check with the local power company regarding the specific installation site.

Motor Upgrades

These scenarios provide for the replacement of an existing standard efficiency motor with a new high efficiency motor. The existing motor must drive existing agricultural machinery—such as an irrigation pump, vacuum pump, ventilation fan, etc. These scenarios can be used to convert an internal combustion (IC) power unit to an electric motor system, but note that the old IC unit must be disabled. When recommended by the energy audit, a variable speed drive can be contracted alongside the electric motor to maintain the variable-speed flexibility normally associated with an IC power unit.

Feature Measure: nameplate horsepower of the installed motor.

Unit: horsepower

The payment schedule provides differing payment rates for the following horsepower ranges:

- > 100 HP
- ≥10 and ≤ 100 HP
- >1 and <10 HP
- ≤ 1 HP