

**NATURAL RESOURCES CONSERVATION SERVICE
MARYLAND CONSERVATION PRACTICE STANDARD
FARMSTEAD ENERGY IMPROVEMENT
(No.)**

• **CODE 374**

DEFINITION

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

PURPOSE

This practice may be applied as part of a conservation management system to reduce energy use.

CONDITIONS WHERE PRACTICE APPLIES

The practice applies to non-residential structures and energy using systems where reducing energy use is the identified goal.

CRITERIA

General Criteria Applicable to All Purposes

Implement recommendations for components of a current energy audit performed in accordance with the American Society of Agricultural and Biological Engineers (ASABE) Standard S612, Type 2, Performing On-farm Energy Audits.

Where required, certify that the replacement or retrofit system and related components or devices meet or exceed currently applicable federal, state, and local standards and guidelines. Components of major activities by farm enterprises defined in ASABE S612 shall meet the appropriate NRCS or industry standard, such as:

- NRCS Conservation Practice Standard, Pumping Plant (Code 533)
- NRCS Conservation Practice Standard, Combustion System Improvement (Code 372)

- Heating Ventilating and Air Conditioning (HVAC) per American Society of Heating, Refrigerating and Air Conditioning Engineers Standard 90.1-2010
- Ventilation fans per ASABE EP 566.1
- Greenhouse HVAC per ASABE EP406.4
- Motor efficiency per National Electrical Manufacturers Association MG 1-2009, Rev. 2010

CONSIDERATIONS

Energy conservation and energy efficiency improvements should consider greenhouse gas emissions and ambient air pollutants. Methods may be implemented to account for greenhouse gas emissions credits, if applicable. Actual greenhouse gas emission reductions would require separate documentation.

In order to reduce energy imported onto a farm, consider possible use of renewable energy resources.

Plan progressive implementation of energy measures with ranking metrics such as life-cycle energy savings, payback period, or cost-effectiveness, etc., based on the landowner's goals and objectives.

PLANS AND SPECIFICATIONS

Plans and specifications to implement the energy conservation and efficiency measures shall be in accordance with this standard and describe the requirements for properly installing the practice to achieve its intended purpose. Plans and specifications shall:

- include written specifications that describe the site specific details of installation.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the [Natural Resources Conservation Service - Maryland](#) or visit the [Field Office Technical Guide](#).

- identify and describe the existing system and related components or devices.
- identify and describe the replacement or retrofit system and/or related components or devices.
- document system energy usage and resulting potential energy savings from the implementation of this practice.
- include a plan view showing the location of the measures in relationship to other structures or natural features where appropriate.
- detail drawings of the measures and appurtenances, such as piping, inlet and outlet connections, mounting, foundations, and other structural components where appropriate.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that is consistent with the purposes of this practice, its intended life, and safety requirements.

Replacement or retrofit systems and related components or devices shall be operated and maintained in accordance with the manufacturer's recommendations.

Maintain records to document the implementation of energy improvements. Retain and update records for a minimum of five years from the beginning of operation of measure implementation. Recommended records to be retained include:

- monthly utility bills, fuel purchases, and yield of agricultural commodities.
- documentation of maintenance conducted on the replacement, or retrofitted system and related components or devices.

SUPPORTING DATA AND DOCUMENTATION

Field Data and Survey Notes

Provide the following:

1. A areal map of the site showing the location of all buildings, and other permanent features adjacent to the site;

2. Identify on the map, where and what is to be installed, including the number to be installed;
3. All information contained in the section, PLANS AND SPECIFICATIONS, located in the standard.
4. An energy audit developed by a qualified technical service provider and accepted by NRCS, or results of the Type 2 On-Farm Energy Audit conducted as per the American Society of Agricultural and Biological Engineers (ASABE) S612.

Design Data

Record on the appropriate AutoCAD template for energy practices. For guidance on the preparation of engineering plans see Chapter 1 of the National Engineering Handbook, Part 641. The following is a list of the minimum required design data:

1. Documentation of all site visits and any conversations the landowner or venders on the CPA-6. Include the date, who performed the visit, specifics as to what was discussed, including all alternatives, and decisions made and by whom;
2. Copies of all required permits and documentation to be on file with the design information;
3. Plan view of the facility including, location map, all system components, material and construction specifications;
4. Construction drawings, and component details;
5. Job class on plan;
6. Design calculations appropriate for the type of system being designed;
7. List of quantities with supporting computations;
8. Show construction specifications on drawings.
9. Provide an operation and maintenance plan.

Construction Check Data

Record on the appropriate AutoCAD drawing for energy practices. Check off all items on the plans in red. The following is a list of minimum data needed for As-built:

1. Documentation of all site visits on CPA-6. Include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom;
2. Actual dimensions of installed practices, if applicable;
3. Material certifications and photographs of certification markings and/or stamps;
4. A certification statement from the contractor(s), suppliers, licensed electricians, licensed plumbers or licensed heating contractor that they have constructed/assembled and installed all items in accordance with the plans and specifications, i.e. proprietary or manufactured items or products;
5. Red lined as-built and certification;

6. Sign and date checknotes and plans by a person with appropriate approval authority. Include statement that the practice meets or exceeds plans and NRCS practice standards.

REFERENCES

American Society of Agricultural and Biological Engineers. 2003. Heating, ventilating and cooling greenhouses. ANSI/ASAE EP406.4 JAN2003 (R2008). ASABE, St. Joseph, MI.

American Society of Agricultural and Biological Engineers. 2008. Guidelines for selection of energy efficient agricultural ventilation fans. ASAE EP566.1 AUG 2008. ASABE, St. Joseph, MI.

American Society of Agricultural and Biological Engineers. 2009. Performing On-Farm Energy Audits. ANSI/ASABE S612 JUL2009. ASABE, St. Joseph, MI.

American Society of Heating, Refrigerating and Air Conditioning Engineers. 2010. Energy standard for buildings except low-rise residential buildings. ANSI/ASHRAE/IES, Standard 90.1. ASHRAE, Atlanta, GA.

National Electric Manufacturing Association. 2006. Motors and generators. NEMA MG1 – 2009 (R2010). Rosslyn, VA.