



# Energy Improvement Practices

374 – Farmstead Energy Improvement (no.)

670 – Lighting System Improvement (no.)

672 – Building Envelope Improvement (no.)

## Conservation Practice Job Sheet

Lifespan – 10 years

Producer:		Location:	
FSA Farm #, Tract # and Field(s) #:		Contract #:	
Program:		CIN #(s):	
Planner:		Date:	

### Definition and Purpose

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

### Requirements

- Proposed energy improvements shall be listed, referenced, recommended, and thoroughly described in a current energy audit (within the last 5 years) performed in accordance with *ASABE S612, Performing On-farm Energy Audits*. Additionally, ALL energy audits shall include Table 1, Table 2, and Table 3 in an acceptable format as required by the CAP criteria.
- All components, including their installation and workmanship, shall meet or exceed all federal, state, and local standards and guidelines.
- All components shall be designed and installed in strict accordance with all manufacturers' recommendations and guidelines.
- Proper disposal of all outdated components, considered hazardous or potentially polluting material, shall be in accordance with all federal, state, and local standards and guidelines.
- Written certification by a licensed professional shall be obtained for all work completed as part of this practice unless noted otherwise. Any required permits or inspections from local, or state governments shall be obtained by the participant. See **Appendix A** for licensing requirements for each payment scenario and **Appendix B** for a template of an installation certification statement.
- Prior to any required excavation activities, the Call Before You Dig "One Call" utility location service shall be called at 811 or 1-800-922-4455 2 full working days before excavation can commence.

## ENERGY AUDIT INFORMATION

Auditor Name: \_\_\_\_\_

Date of Audit: \_\_\_\_\_

The following measures recommended in the Agricultural Energy Management Plan (energy audit or AgEMP) are to be installed under a contract between NRCS and the participant. These measures are being installed under NRCS Practice 374 Farmstead Energy Improvement, 670 Lighting System Improvement and/or 672 Building Envelope Improvement. See additional job sheets for measures being installed under separate practices.

Contract Item #	Location	Component	Make and Model to be Installed*	AgEMP Sheet # **	Table #**	Units	Contract Quantity

\* Actual components installed may be different from those proposed in the AgEMP if they are of an equivalent nature and approved in writing by the NRCS engineer.

\*\* Include all pages and tables that reference estimated energy savings and calculations related to that Contract Item Number

- See Attached Plan View Map provided by NRCS showing the location, manufacturer, and model # for each practice
- Manufacturer Specifications and Installation Requirements (attached)

### **Additional Installation Requirements**

If applicable, list below any specific technical requirements that may be required by the payment schedule, industry standard or other relevant documents. Additional requirements for this practice shall be in concurrence with the CT Field Office Technical Guide and the CT Conservation Practice Standard for this practice. **See Standard for all required Criteria.**

### **Plans and Specifications**

Plans and specifications shall describe the requirements for properly installing all components to achieve their intended uses. ***Plans and specifications shall be developed by the participant or the participant's supplier. NRCS shall not be tasked with or responsible for completing designs related to this conservation practice standard.***

**Prior to installation, the participant shall provide the following deliverables to NRCS:**

- Written specifications and installation instructions
- Description of the existing system/components and replacement components
- Plan view showing location of components in relation to other structures
- Detailed drawings showing location and details of structural components

**Concurrence of the above deliverables must be obtained by NRCS prior to the start of installation.**

**The following documentation is required prior to practice certification:**

- Copy of all receipts and invoices
- Map or engineering drawing showing installed practices
- Photographs (either hardcopy or digital files) of completed work. As a minimum, include a wide-angle exterior view of the structure where improvements are installed and a picture of each installed component from a distance of 5-30', as appropriate. Multiple pictures of the same component (bulbs, heaters, etc.) are not necessary. Progress photos during installation are required for improvements that will become enclosed or concealed. If there are biosecurity concerns, it is recommended that photos be taken by the participant. For overhead installations (lights, for example), the installer should be taking pictures.
- Certifications, as required. See Appendix A for licensing requirements for each payment scenario and Appendix B for a template of an installation certification statement.
- Additional checkout items are required see Appendix C for specific requirements for components installed.

**Operation and Maintenance (O&M)** – O&M is required to maintain this practice for its 10 year lifespan. Refer to Operation and Maintenance requirements specific to this installation in Checkout Certification below and from the manufacturer.

- All components shall be operated in accordance with all manufacturers’ recommendations. In addition, all warnings and cautions shall be observed. Repair or replace all items, as needed, to maintain the system in good operating order.
- Installation records, including certifications, and all manufacturers’ installation, operation, maintenance and user guides shall be retained and a copy provided to NRCS.
- Documentation of maintenance conducted on any components shall be retained for 5 years.
- Maintain records to document energy improvements for a minimum of 5 years from the beginning of operation. Records shall include monthly utility bills and fuel purchases.

**Additional O&M Requirements Specific to Installation:**

**Preconstruction Certification (Required Prior to Installation)**

*The participant certifies the deliverables provided meet the requirements of this conservation practice standard and does not hold the NRCS responsible for any damages that may result from their installation. The participant understands all installation and Operation and Maintenance requirements for this practice.*

Participant Signature	Date
Authorized NRCS Agent Signature (Must have Appropriate EJAA)	Date
EJAA Class:	

## PRACTICE CERTIFICATION REQUIREMENTS

Producer:		Location:	
FSA Farm #, Tract # and Field(s) #:		Contract #:	
Program:		CIN #(s):	
Planner:		Date:	

### Required Documentation:

- Copy of all receipts and invoices
- As-built showing installed practices with manufacturer number, model # and date of installation
- Photographs of completed work
- Certifications, as required. See Appendix A for licensing requirements for each payment scenario and Appendix B for a template of an installation certification statement
- Additional checkout items are required see Appendix C for specific requirements for components installed
- Other:

### Additional O&M Requirements Specific to Installation:

## CHECK OUT

*The participant certifies that the receipts, invoices, pictures, and certifications presented as documentation represent the materials and workmanship necessary for the equipment to fully function, and he or she does not hold the NRCS responsible for any damages associated with the installation, operation, and maintenance, of such components.*

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Participants Signature

Date

*The NRCS certifies that all plans and specifications have been met for the installation of this conservation practice standard, including examination of the required documents and photographs.*

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Authorized NRCS Agent Name (Please Print)

Title

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Authorized NRCS Agent Signature (Must Have  
Appropriate EJAA)

Date

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fax: (202) 690-7442

email: [program.intake@usda.gov](mailto:program.intake@usda.gov)

# Appendix A: Licensing Requirements for Installation<sup>1</sup>

<b>Licenses Required:</b> (or as reviewed and approved by NRCS with EJAA)	<ul style="list-style-type: none"> <li>• Electrician (E-1 or E-2)</li> <li>• Plumber (P-1)</li> </ul>	<ul style="list-style-type: none"> <li>• Fuel Oil Piping (P-8 or P-9)</li> <li>• Gas Piping (G-1, G-2, S-1, 2, 7, 8, 9 or 10)</li> </ul>
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**NOTE:** Some installations may require town inspection.

Recommended Measure	Specialized Components	Work Discipline	Provider of Installation Certification Statement <sup>2,3</sup>
Ventilation	Fans, Wiring, Controls	Electrical	Licensed Electrician
Plate Cooler	Plate Cooler, Wiring, Controls	Electrical/Plumbing	Licensed Electrician, Licensed Plumber
Scroll Compressor	Compressor, Wiring, Controls	Electrical/Plumbing	Licensed Electrician, Licensed Plumber
Variable Speed Drives	VSD, Wiring, Controls	Electrical	Licensed Electrician
Automatic Controller System	Wiring, Sensors, Controls	Electrical	Licensed Electrician
Motor Upgrades/Retrofits	Motors, Wiring, Controls	Electrical	Licensed Electrician
Heating, Radiant Systems	Heaters, Gas Lines, Wiring, Controls	Electrical/Gas	Licensed Electrician, Licensed Fuel or Gas Piping Contractor <sup>4</sup>
High Efficiency Heating System	Boiler, Heat Exchangers, Controls, Wiring	Electrical/Gas	Licensed Electrician, Licensed Fuel or Gas Piping Contractor <sup>4</sup>
Automated Attic Inlets, Heat Recovery Vents	Carpentry, Vents	Carpentry	Licensed General Contractor
Grain Dryer	Grain Dryer, Motors, Fans, Wiring, Controls, Gas Lines	Electrical/Gas	Licensed Electrician, Licensed Fuel or Gas Piping Contractor <sup>4</sup>
Evaporative Cooling System	Pump, Wiring, Cooling Equipment	Electrical/Plumbing	Licensed Electrician, Licensed Plumber
Lighting, Bulb Replacement Only	None	Electrical	Licensed Electrician or Participant
Lighting, All Other Components	Dimmers, Controls, Fixtures, Wiring	Electrical	Licensed Electrician
Insulation (Wall, Attic, Foundation)	Carpentry, Insulation, Spray Foam	Carpentry	Licensed General Contractor (Spray Foam Only) or Participant
Sealant	None	Carpentry	Licensed General Contractor or Participant
Insulated Curtains/Sidewalls	Carpentry, Insulation, Curtains, Motors, Wiring	Carpentry/ Electrical	Licensed General Contractor, Licensed Electrician or Participant

<sup>1</sup> This appendix should serve as a recommendation and may not apply to every possible situation. The person with Engineering Job Approval Authority should use the above table as a guide to determine which installation certification statements are required. Participant or representative may be able to complete installation, if approved by NRCS.

<sup>2</sup> Any highly specialized equipment that is installed should be certified by the contractor or a technical representative from the equipment supplier/vendor/manufacture. The above table indicates this is required for some scenarios; however, this should be applied to all scenarios if a non-standard item is being installed. The NRCS Engineer reserves the right to require a licensed contractor or technical representative from the supplier/vendor/manufacture certification statement when deemed necessary to ensure an acceptable installation.

<sup>3</sup> All licenses must be current and issued in the state of Connecticut for commercial construction (residential licenses are not allowed).

<sup>4</sup> All new natural gas and propane connections shall be made by a certified installer and inspected and approved by the gas or propane company.

Job Sheet: 374, 670, 672  
 CT, March 2016

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**Appendix B**  
**Conservation Practice Standards 374/670/672**  
**Installation Certification Statement**

**PARTICIPANT INFORMATION**

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

PHONE: \_\_\_\_\_

BRIEF DESCRIPTION OF WORK COMPLETED (Type, Quantity, Units, Etc.):

*I hereby certify that all components installed were in accordance with the manufacturer's recommendations and meet or exceed the requirements of all applicable building codes and standards.*

NAME (print): \_\_\_\_\_

TITLE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

DATE: \_\_\_\_\_

*(Note: If the installation was completed by the participant or representative, the below items are not applicable. A licensed contractor is required for electrical, natural gas or fuel oil installations).*

LICENSE TYPE: \_\_\_\_\_

LICENSE NUMBER: \_\_\_\_\_

COMPANY NAME: \_\_\_\_\_

COMPANY ADDRESS: \_\_\_\_\_

COMPANY PHONE: \_\_\_\_\_

## Appendix C: Minimum Requirements for Inspection by NRCS

Practice 672 Building Envelope Improvement			
Payment Item	Items to be inspected	Checked	Notes
Wall Insulation	Verify insulation material matches AgEMP and design		
	Verify insulation thickness and "R" value match AgEMP and design		
Greenhouse Bubble Insulation	Insure that vapor barrier (if any) is installed on the correct side		
	Insure that any plumbing or wiring is installed on the correct side		
Greenhouse Solid Insulation	Insure insulation is installed tightly with no gaps or holes		
	Measure area of insulation installed		
Sealant	Verify product used matches AgEMP and design		
	Verify product used is compatible with environmental conditions of installation (moisture, temperature, atmospheric)		
	Confirm temperature at time of installation is within the allowable range for the particular product installed		
	Measure length of sealant installed		
Slab/Floor Insulation in Cold Storage	Verify insulation material matches AgEMP and design		
	Verify insulation thickness and "R" value match AgEMP and design		
	Verify that there are no gaps or holes in the insulation		
Greenhouse Screens	Verify products and materials match the AgEMP and design		
	Verify that there are no gaps or holes present that could cause a chimney effect		
	Verify that all components are securely fastened		
	Verify that tracks and moving parts are properly aligned and working		
	Measure area of screen installed		

Practice 374 Farmstead Energy Improvement			
Payment Item	Items to be inspected	Checked	Notes
Ventilation Exhaust Fans	Verify fan, wiring, controls and associated appurtenances installed and fan is functioning properly		
	Verify fans being installed are models previously tested by BESS lab or the Air Movement and Control Association and be in top 20th percentile of fans tested.		
Ventilation Horizontal Air Flow fans	Verify fan, wiring, controls and associated appurtenances installed and fan is functioning properly		
	Verify fans being installed are models previously tested by BESS lab or the Air Movement and Control Association and be in top 20th percentile of fans tested.		
Plate Cooler	Verify plate cooler installed per manufacturers requirements and is functioning properly		
Scroll Compressor	Verify scroll compressor installed per manufacturers requirements and is functioning properly		
Evaporator defrost heater control	Verify system installed per manufacturers requirements and is functioning properly		
Variable Speed Drive	Verify VSD, wiring, controls and associated appurtenances installed per manufacturers specifications and VSD is functioning properly, if possible to see in use		
	Verify pump or fan VSD installed on is appropriate for VSD		
Automatic Controller System	Verify wiring, sensors, data logger, logic controller, communication link, software, switches and relay are installed per manufacturers requirements and system is functioning properly		
Greenhouse Step Controller System	Verify wiring, sensors, step controller, switches and relay are installed per manufacturers requirements and system is functioning properly		

Motor Upgrade	Verify motor, wiring, controls and associated appurtenances installed per manufacturers specifications and motor is functioning properly		
	Verify motor is a NEMA approved premium efficiency motor		
Compressor Heat Recovery	Verify CHR units installed per manufacturers requirements and are functioning properly		
High Efficiency Hot Water Heater	Verify high efficiency tankless hot water heater units installed per manufacturers requirements and are functioning properly		
Heating (Building)	Verify high efficiency heater units installed per AgEMP and manufacturers requirements and are functioning properly		
	Based on input kBTU/hour needed per AgEMP		
Greenhouse Roof Vent	Verify vent, motor, wiring, wind speed sensor, controls and associated appurtenances installed per manufacturers specifications and vent is functioning properly		
Root Zone Heating	Verify in-ground PEX tubing, manifold, valving and insulation installed per manufacturers requirements and system is functioning properly		
Reverse Osmosis	Verify RO systems installed per AgEMP and manufacturers requirements		
PreHeaters	Verify preheaters installed per AgEMP and manufacturers requirements		
Evaporators (all recommended kinds)	Verify evaporators installed per AgEMP and manufacturers requirements		

Practice 670 Lighting System Improvement			
Payment Item	Items to be inspected	Checked	Notes
CFL	Verify dimmable CFLs installed on a one for one basis.		
	Bulbs are replaced with a minimum of 8 Watt, 4100 Kelvin, grow-out bulb, industrial grade and are suitable protected from dirt accumulation and are gasketed or in weather proof housing as needed.		
LED	Verify dimmable LEDs installed on a one for one basis.		
	Bulbs are replaced with a minimum of 6 Watt, 3700 Kelvin, grow-out bulb, industrial grade and are suitable protected from dirt accumulation and are gasketed or in weather proof housing as needed.		
LED 23 W flood fixtures	Verify LED flood lighting installed on a one for one basis.		
	Bulbs are replaced with an industrial grade fixture and are suitable protected from dirt accumulation and are gasketed or in weather proof housing as needed.		
LED linear fixtures	Verify LED linear lighting installed on a one for one basis.		
	Bulbs are replaced with an industrial grade fixture and are suitable protected from dirt accumulation and are gasketed or in weather proof housing as needed.		
Linear Fluorescent	verify previous lighting system removed.		
	High efficient T8 or T5 lamps installed		
	Bulbs are replaced with an industrial grade fixture and are suitable protected from dirt accumulation and are gasketed or in weather proof housing as needed.		
Pulse -start metal halide	pulse-start metal halide lamp with a matched ballast or LED equivalent fixtures as recommended in energy audit installed.		
	verify previous lighting system removed.		
Automatic Controller System	verify automatic controller system installed to replace manually controlled system.		
	Verify system installed per manufacturers requirements and is functioning properly		