

National On-Farm Energy Initiative Guidance (NOFEI)

- A. Place all energy CAP applications under the “FY15 On-Farm Energy CAP” fund account. The applications for implementation only will be under “FY 15 On-Farm Energy”. The same ranking tool will be used for both fund pools.
- B. A screening sheet will be required for each application for On-Farm Energy Initiative Assistance. Use the attached screen sheet to put applications into “High”, “Medium” or “Low” priority. This priority is put into ProTracts with the application.
- C. The National Level Ranking guidance document is attached to reference what questions are not applicable and should be answered “No” by the Designated Conservationist.
- D. Capturing Energy Benefits – An “Energy Benefits” button is available in ProTracts to capture estimated energy savings. This button must be checked “yes” for all contract items implemented as part of NOFEI and based on the recommendations provided as part of a completed on-farm energy audit. Checking “yes” requires the user to enter the numeric values accurately in the correct units for the estimated energy savings and the reduction of greenhouse gases and air pollutants directly associated with the energy savings from the completed on-farm energy audit. If values for energy benefits are not available from an AgEMP or energy audit, they can be obtained from the COMET Farm Quick Energy tool: <http://cometfarm.nrel.colostate.edu/QuickEnergy>.

Note: The correct units for energy savings is in millions of British thermal units (MMBtu). This was previously labeled incorrectly as mBtu on the Energy Benefits button. AgEMPs may also be incorrectly labeled, but provide the correct value for energy savings in millions of Btu’s. If in doubt, using the COMET Farm Quick Energy tool should verify that energy savings is reported correctly.

- E. The “Energy Benefits” should be checked “no” for AgEMP CAP applications since energy savings do not occur unless the recommended measures provided in an AgEMP CAP report are implemented.
- F. An agency-approved worksheet has been developed to calculate an energy cost efficiency score for ranking purposes. The “Energy Cost Efficiency Worksheet” uses information from an AgEMP or other ASABE S612 compliant on-farm energy audit to calculate an energy savings to project cost score.
- G. The CAP 128 supplemental documents that were provided by David Faulkner in FY14 are included in this section. However, the poultry and tobacco farm audit examples can be found on Virginia SharePoint site in section #4 of the Farm Bill Handbook.

Approved Land Types – States must assign the following applicable land types as eligible for this initiative:

Crop
Pasture
Farmstead

Approved Natural Resource Concerns:

Energy
Inefficient Energy Use – Equipment and Facilities
Inefficient Energy Use – Farming/Ranching Practices

Note: No additional resource concerns may be added or used in ProTracts AERT to support this initiative.

Core Practices required to be offered for this initiative:

Practice Name	Practice Code
Agricultural Energy Management Plan	128
Farmstead Energy Improvement	374
Irrigation Water Management	449
Pumping Plant	533
Lighting System Improvement	670
Building Envelope Improvement	672

The following are detailed instructions for populating ranking questions and points in ProTracts AERT.

National ranking criteria are established in ProTracts by National Headquarters. National ranking criteria must account for 250 points or 25 percent of total points. The following national-level ranking questions apply to this initiative. **Other national ranking question not listed will not typically be applicable to this initiative:**

FY 2015 Environmental Quality Incentives Program (EQIP) Application Evaluation Ranking Tool (AERT) National Questions	FY 2015 Points
1. If the application is for development of a Conservation Activity Plan (CAP), the agency will assign significant ranking priority and conservation benefit by answering “Yes” to the following question. Answering “Yes” to question 1a will result in the application being awarded the maximum amount of points that can be earned for the national priority category.	
1a. the program application to support the development of a Conservation Activity Plan (CAP)? <u>If answer is “Yes”, do not answer any other national-level questions.</u> If answer is “No,” proceed with evaluation to address the remaining questions in this section.	250
3. Water Conservation – Will the proposed project conserve water by (select all that apply):	
3a Implementing irrigation practices that reduce aquifer overdraft.	15
3b. Implementing irrigation practices that reduce on-farm water use?	10
3c. Implementing practices in an area where the applicant participates in a geographically established or watershed wide project?	10
3d. Implementing practices that reduce on-farm water use as a result of changing to crops with lower water consumptive use, the rotation of crops, or the modification of cultural operations?	10
4. Air Quality - Will the proposed project improve air quality by (select all that apply):	
4a. Meeting on-farm regulatory requirements relating to air quality or proactively avoid the need for regulatory measures?	10
4c. Implementing practices that reduce on-farm generated greenhouse gases such as carbon dioxide (CO ₂), methane (CH ₄), and nitrous oxide (N ₂ O)?	10
4d. Implementing practices that increase on-farm carbon sequestration?	10
8. Energy Conservation – Will the proposed project reduce energy use by (select all that apply):	
8a. Reducing on-farm energy consumption?	10
8b. Implementing practices identified in an approved AgEMP or energy audit, which meet ASABE S612 criteria?	10
9. Business Lines – Will the practices to be scheduled in the “EQIP Plan of Operations” result in:	
9a. Enhancement of existing conservation practices or conservation systems already in place at the time the application is received?	10
Total Maximum Points:	250

NRCS Environmental Quality Incentives Program (EQIP) National On-Farm Energy Initiative

NATIONAL SCREENING CRITERIA WORKSHEET - Fiscal Year 2015

A Screening Worksheet must be completed for each eligible EQIP application.

<u>Instructions:</u>			
This screening worksheet must be completed for each eligible producer applying for EQIP On-Farm Energy Initiative assistance. Applications will be accepted on a continuous basis; however, application periods are established for purposes of evaluation, ranking, and funding decisions.			
Completion of this worksheet and documentation does not constitute agreement to provide EQIP benefits nor approval of a program contract. The original screening worksheet should be filed with the applicant case file or EQIP file and unless the application is determined to be ineligible, the screening priority (high, medium, and low) must be recorded in ProTracts. Upon request, a copy of any completed screening worksheet may be provided to the applicant.			
Detailed Screening Criteria Worksheet – Complete for each eligible EQIP applicant			
Applicant Name:		County:	
Application No: (OPTIONAL)		Field Office:	
Evaluator Name:		Date:	
Priority Determination for ProTracts – Select and circle one:			
<u>High Priority Category:</u> The application is for an Agricultural Energy Management Plan (CAP 128); Or The application includes at least one core conservation practice (374, 449, 533, 670, or 672) necessary to implement the recommendations identified in a completed Agricultural Energy Management Plan (CAP 128) or comprehensive on-farm energy audit meeting ASABE S612 Type 2 standard.			High Priority Status in ProTracts
<u>Medium Priority Category:</u> The application includes no core conservation practices but does include at least one supporting conservation practice necessary to implement the recommendations identified in a previously completed Agricultural Energy Management Plan (CAP 128) or comprehensive on-farm energy audit meeting ASABE S612 Type 2 standard.			Medium Priority Status in ProTracts
<u>Low Priority Category:</u> Low Priority Applications <u>will not be ranked.</u> All other applications			Low Priority Status in ProTracts
The priority determination of high, medium, or low must be recorded in ProTracts for this applicant.			
D.C. Approval:		Date Approved:	

PRODUCER:

DATE: (m/d/y)

Energy Cost Efficiency Worksheet

Step 1 - Enter estimated annual energy savings and calculate value ratio.

Enter estimated savings only for the energy measures which the producer has made application to implement in the schedule of operations. Note that the Agricultural Energy Management Plan (AgEMP) or another ASABE S612-compliant on-farm energy audit may have evaluated or recommended more measures than the producer wishes to implement. Exclude estimated savings for measures that are not planned.

Include only the amount of practice implementation planned. For example, a report might recommend lighting upgrades for three poultry houses. If the producer only wants to upgrade lighting in one house, then you will need to identify the savings associated with that single house. (The energy report should clearly indicate the savings associated with such easily separated measures. If not, contact the energy analyst responsible for the report to clarify the information.)

If the measures are part of a recent AgEMP, the Table 1 summary in the report will display all evaluated measures with a simple pay-back (SPB) of 10 years or less. Measures with a SPB of more than 10 years may have been evaluated and recommended by the TSP. If the producer chooses to implement measures with more than a 10 year SPB, include the energy savings of those measures in the "Savings Entry Table" as well.

Savings Entry Table

Est. Annual Energy Savings [1]		Rate Basis		Year 1 Value	Energy Content		Year 1 Est. Gain	
Source	Energy Savings Enter savings	Unit	Value	Unit	(\$/yr)	Value	Unit	(MMBtu/yr)
Diesel (No.2)		gal/yr	4.04	\$/gal	-	139,000	Btu/gal	
Electricity		kWh/yr	0.117	\$/kWh	-	3,412	Btu/kWh	
Natural Gas		CCF/yr	0.771	\$/CCF	-	103,000	Btu/CCF	
Propane		gal/yr	2.27	\$/gal	-	91,600	Btu/gal	
Wood [2]		cord/yr	200	\$/cord	-	22,000,000	Btu/cord	

	Data entry	Est. Year 1 Value:	<input type="text" value="-"/>	Est. Year 1 Gain:	<input type="text" value="-"/>
	Calculated value				

[1] Enter savings value to match units used in energy report.

[2] Cord wood is used as a proxy for all solid biomass energy sources (corn, wood chips, etc.).

Est. Year 1 Value Ratio: \$/MMBtu

Step 2 - Enter estimated project costs and calculate cost ratio.

Enter the full estimated project cost only for the measures the producer plans to implement with this contract. Do not deduct rebates that the producer may receive, such as EQIP funding, tax credits, utility incentives, etc.

Project Installation Cost Estimate:

Est. Year 1 Cost Ratio: \$/MMBtu

Estimated energy cost efficiency: (ranking basis)

Completed by: (please enter name & title)

Ranking Tool Summary

for FY2015 - FY15 On-Farm Energy

(Released 11/04/2014)

Description:

Land Uses:

Crop, Farmstead, Pasture

Efficiency Score:

Scoring Multiplier: 100.000

Scoring Ranges and Results Text:

High: 100 - 75	Medium: 74 - 50	Low: 49 - 0
The conservation practices that will be established in the proposed contract are in the high point score range	The conservation practices that will be established in the proposed contract are in the medium point score range	The conservation practices that will be established in the proposed contract are in the low point score range

Optional Notes:

National Priorities:

Scoring Multiplier: 1.000

Scoring Ranges and Results Text:

High: 250 - 175	Medium: 174 - 90	Low: 89 - 0
The application is in the high point score range for addressing national priorities	The application is in the medium point score range for addressing national priorities	The application is in the low point score range for addressing national priorities

Questions:

Number	Question	Points
1	a. Is the program application to support the development of a Conservation Activity Plan (CAP)? If answer is "Yes", do not answer any other national level questions. If answer is "No", proceed with evaluation to address the remaining questions in this section.	250
2	a. Implementing the practices in a Comprehensive Nutrient Management Plan (CNMP)?	15
2	b. Implementing the practices in a Nutrient Management Plan (NMP)?	10
2	c. Reducing impacts from sediment, nutrients, salinity, or pesticides on land adjoining a designated "impaired water body" (TMDL, 303d listed waterbody, or other State designation)?	10
2	d. Reducing the impacts from sediment, nutrients, salinity, or pesticides in a "non-impaired water body"?	10
2	e. Implementing practices that improve water quality through animal mortality and carcass management?	10
3	a. Implementing irrigation practices that reduce aquifer overdraft.	15
3	b. Implementing irrigation practices that reduce on-farm water use?	10
3	c. Implementing practices in an area where the applicant participates in a geographically established or watershed-wide project?	10
3	d. Implementing practices that reduce on-farm water use as a result of changing to crops with lower water consumptive use, the rotation of crops, or the modification of cultural operations?	10
4	a. Meeting on-farm regulatory requirements relating to air quality or proactively avoid the need for regulatory measures?	10
4	b. Implementing practices that reduce on-farm emissions of particulate matter (PM2.5, PM10)?	10
4	c. Implementing practices that reduce on-farm generated greenhouse gases such as carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O)?	10
4	d. Implementing practices that increase on-farm carbon sequestration?	10
5	a. Reduce erosion to tolerable limits (Soil "T")?	10
5	b. Increasing organic matter and carbon content, and improving soil tilth and structure?	10
6	a. Implementing practices benefitting threatened and endangered, at-risk, candidate, or species of	10

	concern.	
6	b. Implementing practices that retain wildlife and plant habitat on land exiting the Conservation Reserve Program (CRP) or other set-aside program?	10
6	c. Implementing practices benefitting honey bee populations or other pollinators?	10
6	d. Implementing land-based practices that improve habitat for aquatic wildlife?	10
7	a. Implementing practices that result in the management control of noxious or invasive plant species on non-cropland?	10
7	b. Implementing practice in an Integrated Pest Management Plan (IPM)?	10
8	a. Reducing on-farm energy consumption?	10
8	b. Implementing practice(s) identified in an approved AgEMP or energy audit, which meet ASABE S612 criteria?	10
9	a. Enhancement of existing conservation practice(s) or conservation systems already in place at the time the application is received?	10
Total Points		500

State Issues:

Scoring Multiplier: 1.000

Scoring Ranges and Results Text:

High: 400 - 300	Medium: 299 - 200	Low: 199 - 0
The application is in the high point score range for addressing state resource concerns	The application is in the medium point score range for addressing state resource concerns	The application is in the low point score range for addressing state resource concerns

Questions:

Sub-heading Number	Question Number	Question	Points
1		Conservation Activity Plan (CAP) -	
	1	Is the application for the development of CAP 128 Agricultural Energy Management Plan (AgEMP)? If "Yes", do not answer any of the following questions below.	400
2		AgEMP or Energy Audit - Answer one of the following questions regarding the practices recommended in the applicant's Agricultural Energy Management Plan (AgEMP) or On-Farm Energy Audit that meets the ASABE S612 Performing On-Farm Energy Audits Comprehensive Type 2 standards, which has been completed or updated in the last four years.	
	2	a Does the EQIP Plan/Schedule of Operations include all eligible practices recommended in an AgEMP or On-Farm Energy Audit?	100
	2	b If the EQIP Plan/Schedule of Operations does not include all eligible practices recommended in an AgEMP or On-Farm Energy Audit, does it include two or more eligible practices recommended?	50
3		Water Conservation - Will the proposed project conserve water by: (select all that apply)	
	3	a Implementing irrigation practices that reduce energy use and reduce aquifer overdraft?	50
	3	b Implementing practices that recycle or re-use water?	50
4		Air Quality - Will the proposed project improve air quality by: (answer one of the following)	
	4	a Implementing energy practices that have been evaluated to reduce on-farm generated carbon dioxide (CO2) by 50,000 pounds or greater?	100
	4	b Implementing energy practices that have been evaluated to reduce on-farm generated carbon dioxide (CO2) by at least 10,000 pounds, but less than 50,000 pounds?	50
	4	c Implementing energy practices that have been evaluated to reduce on-farm generated carbon dioxide (CO2) by less than 10,000 pounds?	25
5		Energy Cost Efficiency - Use the Energy Cost Efficiency Worksheet to calculate the Estimated Energy Cost Efficiency for the practices in the EQIP Plan/Schedule of Operations. Use the resulting value to answer one of the following:	
	5	a Is the Estimated Energy Cost Efficiency more than 50%?	100
	5	b Is the Estimated Energy Cost Efficiency between 30% and 50%?	50

	5	c Is the Estimated Energy Cost Efficiency less than 30%?	25
		Maximum Points:	Total Points
			1000

Local Issues:

Scoring Multiplier: 1.000

Scoring Ranges and Results Text:

High: 250 - 200	Medium: 199 - 100	Low: 99 - 0
The application is in the high point score range for addressing local resource concerns	The application is in the medium point score range for addressing local resource concerns	The application is in the low point score range for addressing local resource concerns

Questions:

Sub-heading Number	Question Number	Question	Points
1		1. If the application is for the development of a conservation activity plan (CAP), the agency will assign significant ranking priority and conservation benefit by answering "Yes" to the following question. Answering "Yes" to question 1a will result in the application being awarded the maximum amount of points that can be earned for the State-level questions.	
	1	a. Is the program application for development of a Conservation Activity Plan (CAP) for a TSP prepared Agricultural Energy Management Plan (122 or 124)? If answer is "Yes", do not answer any other local level questions. If answer is "No", proceed with evaluation to address the remaining questions in this section.	250
2		Select all that apply	
	1	Has the producer completed a CAP 122, 124 or 128 in the last 2 years?	175
	2	The producer wants to install the suggested energy efficiency activities from the energy audit with this request for program funding?	75
		Maximum Points: 250	Total Points
			500

Selected Resource Concerns and Practices:

Inefficient Energy Use: Equipment and Facilities

- Agricultural Energy Management Plan - Wr (128)
- Building Envelope Improvement (672)
- FARMSTEAD ENERGY IMPROVEMENT (374)
- Lighting System Improvement (670)
- Pumping Plant (533)

Inefficient Energy Use: Farming/Ranching Practices and Field Operations

- Agricultural Energy Management Plan - Wr (128)
- Irrigation Water Management (449)
- Pumping Plant (533)

CAP122 Contracting Procedures for Service Centers

This document provides revised guidance regarding the preparation of CAP122 Agricultural Energy Management Plans, commonly referred to as “headquarters audits”. This revision is required due to a change in procedure related to initial screening of applicants.

- 1) Applicant signs NRCS-CPA-1200 to apply for financial assistance for a CAP122 Agricultural Energy Management Plan (Energy Audit of headquarters) and describes their headquarters operations, e.g., types of agricultural enterprises, facilities and classes of animals (if applicable) that use significant quantities of energy;
- 2) NRCS planner identifies the kind of audit to be conducted, i.e., a non-livestock operation or a combined livestock and non-livestock operation, and calculates the total animal units when applicable (this allows the Service Center planner to identify the Toolkit scenario applicable to the applicant);
- 3) NRCS contacts the applicant if/when the client’s application gets preapproved;
- 4) Once an application is preapproved, NRCS develops the contract and asks the applicant to meet with them to sign all contract documents.
- 5) **Once under contract with NRCS** (and not until then), the farmer selects a certified TSP from the list available at:
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp/> (NRCS’ “TechReg” website) and contacts them to explain their operation and negotiate a contract so the audit can begin. If the audit work is started prior to obligation of the contract, the participant is ineligible for payment for the practice.
- 6) The TSP will complete the Energy Audit and transmit a copy to NRCS. The DC or Area Engineer will conduct a functional review of the audit document. When everything is correct, proceed to step 7.
- 7) Certify completion of the CAP122 report and process payment.

Date Received:

Control No:

Field Office and TSP Certification Plan Review Checklist

**Agricultural Energy Management Plan, Headquarters
Conservation Activity Code (122)**

(Refer to National Bulletin 450-13-3 for a complete listing of CAP Criteria)

Purpose: The purpose of the checklist is to provide guidance for elements that need to be addressed or included in the Conservation Activity Plan (CAP). The checklists are recommended for use by NRCS staff and Technical Service Providers, but are not required. NRCS staff can use the checklist for administrative review of the sample plans submitted as part of the certification process as well as all other plans submitted after a TSP is certified. TSPs can use the checklist for a general guidance of elements to include in the plan, but it is still the TSP's responsibility to follow the CAP Plan Development Criteria for specific elements and the detail of each element to be included.

Instructions: The checklist should be completed and submitted with the sample plan or the hardcopy of the client's plan as described below:

- **Prospective TSP's** should submit the completed checklist and sample plan by mail or email (complete plans should be sent as a single electronic file for example pdf, word or scanned file) to the appropriate State TSP Coordinator for administrative review to ensure the plan contains all necessary components. Once administrative review is complete then the State TSP Coordinator should forward the sample plan to National Headquarters for technical review. A list of State TSP Coordinators is located at: <https://techreg.sc.egov.usda.gov/RptStateContact4Admin.aspx>. States should submit the complete plan and checklist by mail or email to the TSP Team. (See below for address information.)
- **Certified TSP's** should submit the completed checklist, hardcopy and electronic copy of the client's plan to the local NRCS Field Office or appropriate State TSP Coordinator for administrative review. A list of State TSP Coordinators is located at: <https://techreg.sc.egov.usda.gov/RptStateContact4Admin.aspx>.
- **NRCS Staff** should complete the checklist for administrative review and place the completed checklist in the client's file. Administrative review involves a review of the content of the plan to ensure all required elements are present, but does not involve technical review for correctness. (Please Note: If technical review is needed, the completed checklist and client plan should be forwarded to the appropriate State Office staff or NHQ for technical review.)

Agricultural Energy Management Plan, Headquarters

State/County: VA /	Date Plan Submitted: 2/24/2013
Producer/Owner:	Technical Service Provider: EnSave Inc.
<p>Definition: An Agricultural Energy Management Plan - Headquarters (AgEMP) is a detailed documentation of energy consuming components and practices of the current operation, the previous year's on-farm energy consumption, and the strategy by which the producer will explore and address their on-farm energy conservation concerns, objectives, and opportunities.</p> <p>Minimum components of a Headquarters AgEMP (122) shall include:</p>	

A.	General AgEMP Headquarters Criteria:
<input checked="" type="checkbox"/>	<p>An AgEMP - Headquarters shall be developed by a certified Technical Service Provider (TSP). In accordance with Section 1240 (A) of the 2008 Farm Bill, the Environmental Quality Incentives Program (EQIP) provides funding support through contracts with eligible producers to obtain services of certified TSPs for development of an AgEMP- Headquarters. The TSP proficiency criteria required to develop an AgEMP - Headquarters for an EQIP eligible producer is located on the TSP website at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp/</p>
B.	Criteria for Specific Elements of an AgEMP Headquarters:
1.	The AgEMP - Headquarters will meet the Type 2 on-farm energy audit minimum criteria established in the ANSI/ASABE S612 July2009 Performing On-farm Energy Audits standard, hereafter referred to as the industry standard.
2.	Background and Site Information – The AgEMP will provide a narrative for:
<input checked="" type="checkbox"/>	a. Name of producer
<input checked="" type="checkbox"/>	b. Facility location(s)
<input checked="" type="checkbox"/>	c. Type and size of the operation (e.g., description of the poultry, dairy, or swine, etc. as well as production levels, and any unusual factors that affect energy use)
<input checked="" type="checkbox"/>	d. Producer concerns, objectives, opportunities, and overall management scheme for the enterprise (i.e., description of why the producer wants an on-farm energy audit and their specific objectives)
3.	Documentation of Baseline Current Energy Use: The AgEMP will provide comprehensive documentation of the current energy resources (e.g., electricity, natural gas, etc.) used for all of a producers farming enterprises, respective total current energy usage, and total cost data.
<input checked="" type="checkbox"/>	This will also be broken down by major activity per month over the past annual cycle.
<input checked="" type="checkbox"/>	The evaluation of current energy use shall address major activities listed in (but not limited to) the industry standard associated with the processing and storage of agricultural commodities, feeding, housing, processing of farm animals, and animal products.

<input checked="" type="checkbox"/>	Current energy use for stationary engine driven equipment used in the cultivation, protection, and harvesting of agricultural commodities will also be evaluated as applicable.
<input checked="" type="checkbox"/>	A comprehensive summary of all of the above items will be presented by energy resource.
ALSO	In addition to the above comprehensive farm energy baseline, the AgEMP will document the major activities associated with each of the individual farm enterprises:
<input checked="" type="checkbox"/>	a. Components/details of the major activities, as appropriate, and primary equipment: <ul style="list-style-type: none"> • Manufacturer of equipment, • Equipment component factory ratings (hp, efficiency, BTU input and BTU output) • Management use efficiencies (eg. manual/automatic systems)
<input checked="" type="checkbox"/>	b. Annual energy use
NOTE	If a major activity is not applicable to the farm enterprise or the major activity has no opportunities for improved energy use, the report needs to state this.
4.	Recommended Measures/Conservation Practices: The AgEMP will provide appropriate energy savings for each major activity (including a comparison to the baseline energy use) that reduces energy use and addresses the energy management needs for the agricultural operation (see ASABE S612 Table 1).
<input checked="" type="checkbox"/>	a. The Recommended Measures for energy improvement are to be presented.
<input checked="" type="checkbox"/>	b. Estimated energy savings are to be presented. Energy savings shall be documented for the major activities at the farm headquarters as kWh, joules, gallons, etc. and shall also be converted to a common measure of millions of British Thermal Units (mBTU).
<input checked="" type="checkbox"/>	c. Estimated installed cost and energy cost savings in years are to be presented
<input checked="" type="checkbox"/>	d. Simple payback period (in years) shall be documented for each of the recommended energy improvement measures.
<input checked="" type="checkbox"/>	e. Estimated emissions reductions based on energy savings (specific estimates for CO ₂ , N ₂ O, CH ₄ , SO ₂ , and NO _x) are to be provided for each recommended energy improvement/measure.
<input checked="" type="checkbox"/>	f. The plan may include, but is not limited to, the conservation practices listed below: <ul style="list-style-type: none"> • Farmstead Energy Improvement (374) • Irrigation System, Micro-irrigation (441) • Irrigation System, Sprinkler (442) • Irrigation Water Management (449) • Pumping Plant (533)
<input checked="" type="checkbox"/>	g. The plan may include, but is not limited to the following recommended energy improvement measures: Lamps, timers, sensors, fans, control systems, variable drives, compressors, motors, insulation, heaters, waterers, evaporator/chillers, planting, tilling, harvesting, engine driven equipment. (Refer to Table 1 in the ASABE S612 industry standard, for more information on the components listed for each of the major energy activity categories)
5.	Summary Reporting of Recommended Measures: The following Tables 1 and 2 and their formats must be provided at the beginning of the AgEMP report. The Summary Table 1 (shown below) will contain each of the various recommended measures, prioritized according to pay-back period.

☒	a. Estimated reduction in energy use (electricity, propane, other), estimated energy savings, estimated installation cost, estimated energy cost savings, estimated greenhouse gases and air pollutant co-benefits will be provided for each energy improvement/recommended measure.
☒	b. The Payback in Years column determines the sequence in which recommended measures are to be listed in the Summary Table. This sequence can be used to provide guidance on the recommended sequence of implementation, from shortest time of payback to longest time of payback.
☒	c. Recommended measures with payback periods exceeding 10 years may be presented in the body of the report but shall not be included in the Summary of Recommendations.
☒	d. Guidance on how to calculate the estimated greenhouse gases and estimated air pollutant co-benefit is provided in Appendix A. (found in Plan Development Criteria).

Table 1. Summary of Estimated Annual Energy Efficiency Improvements

Recommended Measure	Estimated Reduction in Energy Use				Estimated Costs, Savings, Payback, and Prioritization for Implementation			Environmental Benefits				
								Greenhouse Gases			Air Pollutant Co-Benefits _{1/}	
	Electric Savings (kWh)	Propane Savings (Gal)	Other _{2/}	Energy Savings _{1/} (mBTU)	Installed Cost [a]	Energy Cost Savings [b]	Payback in Years [a / b]	Estimated CO2 (lbs)	Estimated N2O (lbs)	Estimated CH4 (lbs)	Estimated SO2 (lbs)	Estimated NOx (lbs)
Totals												

Table 1 Notes:

1) SO₂ and NO_x are ambient air contaminants; CO₂ is a greenhouse gas.

2)Other: Gasoline, Diesel fuel, Natural Gas

Energy Savings as a percent of total energy use must also be presented for each energy type in Table 2 format (as shown below).

Table 2. Energy Savings of Recommendations

Fuel	Current Usage	MBTU Usage	Savings	MBtu Savings	% Savings
Electricity (kWh)					
Natural Gas (ccf)					
Totals					

6.	References: The AgEMP shall include technical documentation of sources used for the Headquarters AgEMP. Include the actual documents or web sites that contain the technical documentation useful for the producer such as:
<input checked="" type="checkbox"/>	Fact sheets, product information, recommendations and/or comparisons of specific products, journal articles, manufacturer product information sheets, etc.
7.	Deliverables for the Client: a hardcopy of the AgEMP report shall include:
<input checked="" type="checkbox"/>	a. An Agricultural Energy Management Plan Checklist with all items checked that are contained in the Plan report.
<input checked="" type="checkbox"/>	b. The Cover page of the AgEMP will contain the following: <ul style="list-style-type: none"> • Name and address of producer and TSP • Date AgEMP was performed • Signature blocks for the TSP and producer • Signature and date block for the NRCS Field Office concurrence.
8.	Deliverables for NRCS Field Office:
<input checked="" type="checkbox"/>	Complete electronic copy or hard copy (MS Word) of the completed AgEMP Headquarters report.

Yes	No	Checklist Approval
		I have administratively reviewed this Agricultural Energy Management Plan, Headquarters and it meets all the FY13 Plan Development Criteria for Conservation Activity Plan 122.
NRCS Representative Name and Title (print or type):		
NRCS Representative Signature		Date:
Notes (If "No" is checked, include reasons for denial, comments, missing items that need to be added, etc.):		

Email: tsp@wdc.usda.gov.

Mailing Address: **Technical Service Provider Team**
 USDA - Natural Resources Conservation Service
 1400 Independence Ave SW, Room 6016
 Washington, DC 20250

CAP122 Guidance Document directed to all Service Center Planners and Area Engineers

This document provides current guidance regarding the preparation of CAP122 Agricultural Energy Management Plans, commonly referred to as “headquarters audits” in light of Engineering Job Approval Authority (EJAA) changes being implemented in Virginia associated with the 374 Farmstead Energy Improvement Practice, and due to continuing evolution of the 374 practice at the national level. State Conservation Engineer, Mat Lyons, recently delegated EJAA to select Area Engineers and DCs for implementation of the 374 Farmstead Energy Improvement practice. Mat communicated directly with the affected engineers and DCs and will continue delegating EJAA as additional DCs get the 374 Farmstead Energy Improvement practice under contract. Along with the EJAA for 374 Farmstead Energy Improvement comes EJAA for the Investigations and Evaluation (I&E) portion of 374 installs. CAP122 Agricultural Energy management plans constitute the I&E portion of the 374 practice in that a 374 practice installation cannot be contracted without explicit recommendation within a CAP122 audit report.

Previously, the I&E EJAA was delegated to David Faulkner and he has conducted reviews of all CAP122 plans submitted by certified TSPs in Virginia to date. Going forward, the certified TSPs conducting CAP122 plans will submit plans directly to the Service Center DCs. DCs with delegated EJAA will conduct “functional reviews” of all CAP122s submitted. DCs that have not been delegated EJAA should contact the Area Engineer for review and approval of CAP122 submittals.

Two sample CAP122 agricultural energy management plans and a sample Field Office and TSP Certification Plan Review Checklist for headquarters audits have been posted to the Virginia SharePoint site within the Farm Bill Handbook Appendix Documents to facilitate functional reviews. The key items to check are: a) tables 1 and 2 (for the environmental benefits and total energy savings data needed during planning and contracting of 374 improvements) and the appendix table NRCS/VA requires (see “CAP122 quantification requirement for Table 1 within the Farm Bill Handbook Appendix Documents for details on these supplemental instructions) that itemizes all improvement recommendations (for the quantities of items recommended which are also needed for planning and contracting 374 improvements; alternatively, this same data can be incorporated into table 1 as long as). Here’s an example of Tables 1 and 2.

Table S.1. Summary of Estimated Annual Energy Efficiency Improvements

Measure	Estimated Reduction in Energy Use			Estimated Costs, Savings, Payback, and Prioritization for Implementation			Environmental Benefits ¹				
	Electricity Savings (kWh)	Propane Savings (gal)	Energy Savings (MMBtu)	Installed Cost [a]	Energy Cost Savings [b]	Est. Payback in Years [a]/[b]	Greenhouse Gas (Estimated Values)			Air Pollutant Co-Benefits (Estimated Values)	
							CO ₂ (lbs)	N ₂ O (lbs)	CH ₄ (lbs)	SO ₂ (lbs)	NO _x (lbs)
Poultry House Lighting	22,521	0	77	\$4,616	\$2,808	1.6	26,936.2	0.5	0.9	129.8	40.3
Air Heating and Building Environment	0	3,844	354	\$54,566	\$5,724	9.5	48,639.0	1.5	7.7	0.4	38.4
Totals	22,521	3,844	431	\$59,182	\$8,532	6.9	75,575.2	2.0	8.6	130.2	78.7

Notes: 1. Environmental Benefits are reduction estimates, values are as per <http://cometfarm.nrel.colostate.edu/>.
 2. A portion of the benefits for some of the improvements offset the benefits of others; for example, insulating side walls will actually seal up some of the air leaks and reduce heat load in the winter.

Table S.2. Energy Savings of Recommendations

Fuel Type	Current Use	Current Use (MMBtu)	Savings	Savings (MMBtu)	Savings (%)
Purchased Electricity (kWh)	80,960	276	22,521	77	28 %
Propane (gal)	9,380	863	3,844	354	41 %
Totals		1,139		430	38 %

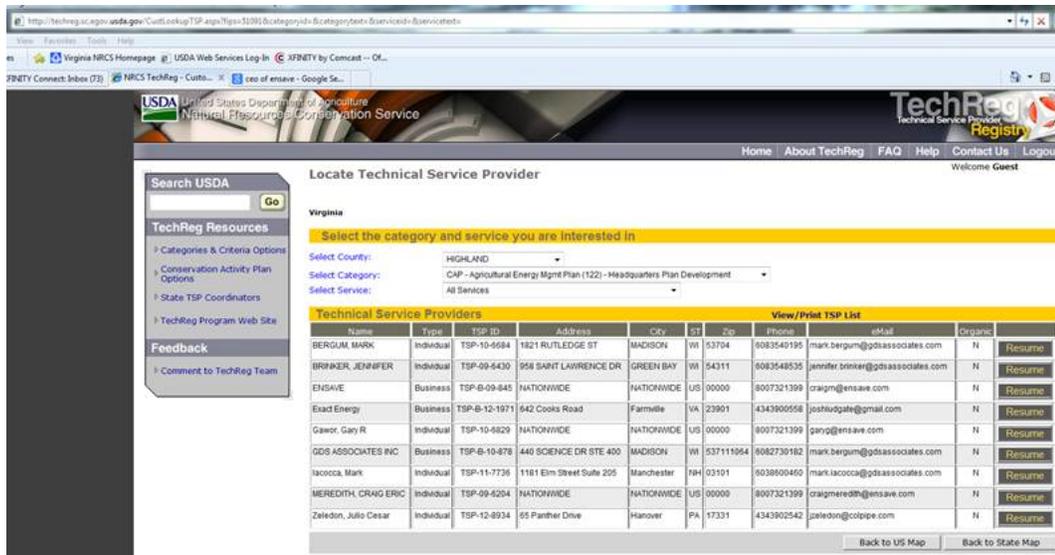
The normal engineering spot-check system will examine implemented 374 Farmstead Energy Improvement practices as well as the CAP122 plans that the 374 practices are based upon. (374 installs require that each install be an explicit recommendation contained within a CAP122 plan). If the engineering spot-checks find sufficient deficiencies in CAP122 plans in the future, then the responsible certified TSP could be recommended to be de-certified for conducting CAP122 audits.

In addition, it has come to our attention that one TSP certified for preparing CAP122 Headquarters Audits is now requiring that their clients sign the NRCS-CPA-70 form to do business with them. This form grants access to program participant data contained in the NRCS National Conservation Planning database to third parties. The same certified TSP is also requiring that the NRCS-CPA-1236 form be signed by clients. This form grants assignment of payment directly from NRCS directly to third parties. With respect to these matters it is important to understand that:

- 1) Granting access to program participant data to a third party, e.g., such as a certified TSP, is completely optional to our clients.
- 2) Assignment of payment from NRCS to a third party, e.g., such as a certified TSP is completely optional to our clients.
- 3) If a certified TSP requires of their clients that they be granted either a) access to the national conservation planning database or b) assignment of payment to them, in order to prepare a Conservation Activity Plan, then our mutual client will have to either accept these conditions and grant access or decline and find another certified TSP to prepare their CAP122 agricultural energy management plan.

Any TechReg certified TSP can set-up whatever terms and conditions they want to between them and their clients, but our NRCS clients do not have to grant access to data nor assign payments to a third party.

Below is a copy of the current list of certified TSPs for CAP122 audits in VA:



Please share with your clients the following summary of EQIP procedures needed to develop a CAP122 Ag.EMP contract:

- 1) Applicant signs NRCS-CPA-1200 to apply for financial assistance for a CAP122 Agricultural Energy Management Plan (Energy Audit of headquarters);
- 2) Participant selects a certified TSP from the list available at: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp/> (NRCS' "TechReg" website) and contacts them to explain that they have applied for an EQIP contract to conduct a CAP122 on their operation;
- 3) Participant explain to the certified TSP regarding their headquarters operations and asks them to assist in either: a) calculating their animal units (AUs); or b) identifying the kind of audit to be conducted for non-livestock operations or mixed livestock and non-livestock operations.
- 4) The TSP will either advise the participant to not proceed if they determine that major benefits are not likely or provide the participant with the total AUs and/or scenario description that the farm merits.
- 5) The applicant then needs to let the local NRCS planner know the outcome of this initial screening and NRCS will select the corresponding CAP122 payment rate scenario appropriate for the operation.
- 6) NRCS will contact the applicant if/when the application gets approved.
- 7) Once an application is approved, NRCS will develop an EQIP contract and ask that the applicant meet with them to sign all contract documents.
- 8) **Once under contract with NRCS** (and not until then), the farmer can call back the TSP they selected earlier and negotiate a contract with them so the audit work can begin.
- 9) The TSP will complete the Energy Audit and transmit a copy directly to NRCS. The NRCS field office will conduct a functional review of the document and then the District Conservationist will:

10) Certify completion of the CAP122 report and process payment into the banking account that the client gave NRCS at contract signing.

(Note: Thank you to David Harris for assisting in the development of the latest summary procedures)

FYI, “functional reviews” do not necessarily entail checking the numbers contained within audit reports. However, David Faulkner prepared and used a template to facilitate checking plan numbers contained within report tables. This template might be of use to DCs and Area Engineers during future spot-checks of the 374 practice and supporting CAP122 plans. The template has also been posted on the Virginia SharePoint within the Farm Bill Handbook Appendix Documents.

Revision to VA the Farm Bill Program Handbook regarding Supplemental Instructions for CAP128 Agricultural Energy Management Plans

All recommended improvements with payback periods of 10 years or less must be quantified in either: 1) the “Recommended Measure” column in Table 1 of each CAP128 report or 2) as a separate table of each report inserted as an attachment. The quantified estimates must specify quantities and units needed and be referenced to each building (by #) or other identification (named) that the improvements correspond to per the example below.

SUMMARY OF RECOMMENDATIONS

Table 1 below contains a summary of the recommended energy improvement measures for a poultry operation. Energy efficient equipment lowers costs by performing the same or more work with less energy.

Table 1. Summary of Estimated Annual Energy Efficient Improvements

Recommended Measure	Estimated Reduction in Energy Use				Estimated Costs, Savings, Payback, and Prioritization for Implementation			Environmental Benefits				
	Electric Savings (kWh)	Propane Savings (Gal)	Other3/	Energy Savings1/ (mBTU)	Installed Cost [a]	Energy Cost Savings [b]	Payback in Years [a/b]	Greenhouse Gases			Air Pollutant Co-Benefits	
								Estimated CO2 (lbs.)	Estimated N2O (lbs.)	Estimated CH4 (lbs.)	Estimated SO2 (lbs.)	Estimated NOx (lbs.)
Example: Lighting - replace 192 incandescent light bulbs in houses 1-2 (96 each) with 192 LED bulbs in houses 1-2 (96 ea.)	25,210			86	\$1,740	\$2,094	0.8	30,988	0.562		0.038	0.020
Example: Seal Air Leaks – seal 2,850ln.ft. of air leaks in the exterior walls, gable ends and ceilings with low density spray foam in houses 1-2		477		44	\$1,500	\$809	1.9	5,962	0.043		0.000	0.003
Example: Insulate Brood Curtain – replace 3 existing brood curtains with insulated brood curtains in houses 1-3		98		9	\$450	\$167	2.7	1,226	0.009		0.000	0.001
Example: Exposed Foundation Wall Insulation – seal exposed foundation wall with 3,950sq.ft. of high density spray foam insulation in houses 1-2		383		35	\$5,621	\$651	8.6	4,788	0.034		0.000	0.002
Totals	25,210	958		174	\$9,311	\$3,721	2.5	42,964	0.648		0.038	0.026

Table 1 Notes:

- 1) The estimated energy and cost savings are approximate values provided from an actual on-farm energy audit. A portion of the benefits for some of the improvements offset the benefits of others; for example, insulating side walls will actually seal up some of the air leaks and reduce the heat load in the winter.
- 2) SO₂ and NO_x are ambient air contaminants; CO₂ is a greenhouse gas.
- 3) Other: Gasoline, Diesel fuel, Natural Gas

On-Farm Agricultural Energy Management Plan (Energy Audit) Review Template Version 1.1
USDA/NRCS/Virginia

Client Name:					Farm Location:			
Farm/Business Name:					Service Center:			
Other Energy Sources (rarely used in Virginia)				Current Energy Use by Energy Source^{4/}	Expected Energy Savings by Source^{5/}	Expected Energy Use by Energy Source^{5/}	Expected Δ as a % of Each Category^{6/}	Expected Δ as a % of Total BTUs Used^{6/}
Natural Gas^{1/}:				---	---	---	---	---
Current use (col.D), savings (col.E) & expected future use (col.F) in CCF (hundred cu.ft.)/y				17,741	-2,817	14,924	-15.9%	-15.9%
Current annual cost (col.d), expected ann. cost savings (col.e) & expected tot. cost in \$/yr.:				\$12,241	-\$1,944	\$10,298	-15.9%	
Current annual use (col.d), expected annual savings (col.e) and expected annual use in mBTU/yr. (millions of BTUs/yr.) equivalent ^{3/} :				1,810	-287	1,522	-15.9%	
#2 Fuel Oil^{2/}:				---	---	---	---	---
Current use (col.D), savings (col.E) & expected future use (col.F) in gallons/year:				0	0	0	0.0%	0.0%
Current annual cost (col.d), expected ann. cost savings (col.e) & expected tot. cost in \$/yr.:				\$0	\$0	\$0	0.0%	
Current annual use (col.d), expected annual savings (col.e) and expected annual use in mBTU/yr. (millions of BTUs/yr.) equivalent ^{3/} :				0	0	0	0.0%	
Wood^{3/}:				---	---	---	---	---
Current use (col.D), savings (col.E) & expected future use (col.F) in cords/year:				0	0	0	0.0%	0.0%
Current annual cost (col.d), expected ann. cost savings (col.e) & expected tot. cost in \$/yr.:				\$0	\$0	\$0	0.0%	
Current annual use (col.d), expected annual savings (col.e) and expected annual use in mBTU/yr. (millions of BTUs/yr.) equivalent ^{3/} :				0	0	0	0.0%	
Current/Projected Average Annual BTUs of Energy Used from all Sources:				1,809.6	-287.3	1,522	Tot. % Δ:	-15.9%
Summary Results			Template Est.	Report Est.	Difference	% Difference	<input type="checkbox"/> % Differ. < 3% Approved <input type="checkbox"/> Edits Needed	
Total Energy Cost per Year without Improvements:			\$12,241	\$12,223	\$18	0.1%		
Total Energy Cost per Year with Improvements:			\$10,298	\$10,279	\$18	0.2%		
Projected Net Cost Savings per Year:			\$1,944	\$1,944	\$0	0.0%		
Projected Net Energy Cost Savings/Year as a % of Total Cost:			15.9%	15.9%	0.0%	-0.1%		
1/ mBTU (millions of BTUs) equivalent determined assuming 1 hundred cu.ft. (CCF) of natural gas = 102,000 BTUs; 2/ mBTU (millions of BTUs) equivalent determined assuming 1 gallon of fuel oil = 139,000 BTUs; 3/ mBTU (millions of BTUs) equivalent determined assuming 1 cord of wood = 20,000,000 BTUs;					Assumed Average Costs for Energy		\$/Unit	
					Assumed average cost of natural gas/CCF		\$0.690	
					Assumed average cost of #2 fuel oil/gallon		\$1.490	
4/ Current use assuming no new efficiency improvements are installed (future without treatment scenario); with treatment scenario); and 6/ The symbol "Δ" is the mathematical symbol for "change"; as in net difference;					Prepared by:	David L. Faulkner		
					Job Title:	Natural Resource Economist		
					Date Prepared:			

On-Farm Agricultural Energy Management Plan (Energy Audit) Review Template Version 1.1
USDA/NRCS/Virginia

Client Name:	Any VA Farmer	Farm Location:			▼
Farm/Business Name:	Farm's business name	Service Center:			▼
Energy Source Category	Current Energy Use by Energy Source^{4/}	Expected Energy Savings by Source^{5/}	Expected Energy Use by Energy Source^{5/}	Expected Δ as a % of Each Category^{6/}	Expected Δ as a % of Total BTUs Used^{6/}
Electricity:	---	---	---	---	---
Current use (col.D), savings (col.E) & expected future use (col.F) in kWhrs/year:	173,208	-31,240	141,968	-18.0%	-18.0%
Current annual cost (col.d), expected ann. cost savings (col.e) & expected tot. cost in \$/yr.:	\$15,589	-\$2,812	\$12,777	-18.0%	
Current annual use (col.d), expected annual savings (col.e) and expected annual use in mBTU/yr. (millions of BTUs/yr.) equivalent ^{1/} :	591.2	-106.6	485	-18.0%	
Propane:	---	---	---	---	---
Current use (col.D), savings (col.E) & expected future use (col.F) in gallons/year:	0	0	0	0.0%	0.0%
Current annual cost (col.d), expected ann. cost savings (col.e) & expected tot. cost in \$/yr.:	\$0	\$0	\$0	0.0%	
Current annual use (col.d), expected annual savings (col.e) and expected annual use in mBTU/yr. (millions of BTUs/yr.) equivalent ^{2/} :	0.0	0.0	0	0.0%	
Diesel:	---	---	---	---	---
Current use (col.D), savings (col.E) & expected future use (col.F) in gallons/year:	0	0	0	0.0%	0.0%
Current annual cost (col.d), expected ann. cost savings (col.e) & expected tot. cost in \$/yr.:	\$0	\$0	\$0	0.0%	
Current annual use (col.d), expected annual savings (col.e) and expected annual use in mBTU/yr. (millions of BTUs/yr.) equivalent ^{3/} :	0	0	0	0.0%	
Current/Projected Average Annual BTUs of Energy Used from all Sources:	591.2	-106.6	485	Tot. % Δ:	-18.0%
Summary Results	Template Est.	Report Est.	Difference	% Difference	
Total Energy Cost per Year without Improvements:	\$15,589	\$24,061	-\$8,472	-54.3%	<input checked="" type="checkbox"/> % Differ. < 3% Approved
Total Energy Cost per Year with Improvements:	\$12,777	\$21,249	-\$8,472	-66.3%	
Projected Net Cost Savings per Year:	\$2,812	\$2,812	\$0	0.0%	<input type="checkbox"/> Edits Needed
Projected Net Energy Cost Savings/Year as a % of Total Cost:	18.0%	11.7%	6.4%	35.2%	

BTU conversion and other assumptions:	Assumed Average Costs for Energy	\$/Unit
1/ mBTU (millions of BTUs) equivalent determined assuming 1 kilowatt hour of electricity = 3,413 BTUs;	Assumed average cost of electricity per kWhr	\$0.090
2/ mBTU (millions of BTUs) equivalent determined assuming 1 gallon of propane = 92,000 BTUs;	Assumed average cost of propane per gallon	\$1.490
3/ mBTU (millions of BTUs) equivalent determined assuming 1 gallon of diesel = 129,500 BTUs;	Assumed average cost of diesel per gallon	\$0.000
4/ Current use assuming no new efficiency improvements are installed (future without treatment scenario);	Prepared by:	David L. Faulkner
with treatment scenario); and 6/ The symbol "Δ" is the mathematical symbol for "change"; as in net difference;	Job Title:	Natural Resource Economist
	Date Prepared:	March 26, 2013

Template Instructions:

1) Use the mouse to go directly, or use the "Tab" key, to move through the template to the **light yellow colored cells** where data entry by the user is required;

2) Enter client name and farm/business name;

3) Select farm location and service center location from the drop-down list-boxes;

4) Refer to client's CAP122 energy audit report, Tables 1 & 2 to identify the Current and Projected electricity use and savings in kWhrs/year (**enter net decreases in energy use with a minus sign**; if energy category is not used, then enter **zeros**);

5) Refer to client's CAP122 energy audit report, Tables 1 & 2 to identify the Current and Projected propane use and savings in gallons/year (**enter net decreases in energy use with a minus sign**; if energy category is not used, then enter **zeros**);

6) Refer to client's CAP122 energy audit report, Tables 1 & 2 to identify the Current and Projected diesel use and savings in gallons/year (enter **net decreases in energy use with a minus sign**; if energy category is not used, then enter **zeros**);

7) Refer to client's CAP122 energy audit report (Summary Overview section) to identify the Current and Projected costs for a) electricity cost in \$/kWhr, b) propane cost in \$/gallon & c) diesel cost in \$/gallon (**if category not used, enter a zero**);

8) Use resulting estimates for energy use and expected savings (costs, BTUs and % saved) to check the energy costs, BTU equivalents and % saved numbers provided in the TSP's audit report in Tables 1 and 2; Note: due to rounding, the numbers just need to approximate those reported in Tables 1 and 2 of the audit document; **if $\leq 3\%$ difference, approve; if $> 3\%$ difference, send back for edits**;

9) Use the resulting % reductions (energy savings) displayed in **red font** to answer Toolkit application ranking questions regarding practice 374 Farmstead Energy Improvement; **If all energy recommendations are not being implemented, then prorate the expected savings accordingly to determine % reduction attributable to the intended improvement(s)**;

10) **Print-out results for each review and place in the client's file folder**;

11) Use "Ctrl" "c" pressed at the same time to clear the template and start over;

12) Enter "Prepared by: and your job title;

Created by: David L. Faulkner, Natural Resource Economist, NRCS/VA/Richmond, January, 2013; Contact information for questions and/or suggested improvements: Tel. (804) 287-1664; email: david.faulkner@va.usda.gov

ANSI/ASABE S612 JUL2009
Performing On-farm Energy Audits



American Society of
 Agricultural and Biological Engineers

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ANSI/ASABE S612 JUL2009
Approved July 2009 as an American National Standard

Performing On-farm Energy Audits

Developed by ASABE with the cooperation of USDA NRCS. Approved by cross division representation of the society under the guidance of T-11, Energy, and approval of T-01, Standards (Policy & Adoption). Adopted July 2009. Approved by ANSI July 2009.

Keywords: Audit, Costs, Efficiency, Energy, Management

1 Purpose

1.1 This Standard establishes procedures for performing on-farm audits to determine and document current energy usage, and to provide an estimation of energy savings from alternatives in the cultivation, protection, harvesting, processing and storage of agricultural commodities and in the feeding, housing and processing of farm animals and animal products. This Standard is provided to guide the reporting of data and the preparation of specific recommendations for energy reduction and conservation with estimates of energy savings.

Scope

2.1 This Standard is intended to support energy audits of all types of farming operations (which includes ranching) typically found in North America. Energy audits shall exclude the farm residence, except where it is not practical to separate base line data.

2.2 This Standard does not address secondary (off-farm) energy savings in the development and evaluation of alternatives. For example, reduction in the amount of fertilizer used on a farm would represent a reduction of the associated energy needed to produce fertilizer for the farm at a fertilizer production facility (off-farm). This type of energy savings is not addressed as a part of this Standard.

3 Definitions

3.1 Energy: For the purposes of this Standard energy is the resource used to power equipment to do mechanical work or to generate heat, light or cooling.

3.2 Energy resource: Source from which energy is obtained, including gasoline, diesel fuel, biofuel, propane, natural gas, electricity, solar, wind, wood, biomass, geothermal, etc.

3.3 Farm enterprise: Production category of a farm. For example, a farm may include a field crop enterprise and a livestock enterprise. (See Table 1)

3.4 Major activity: A discrete activity associated with a farm enterprise that utilizes an energy resource, or that heavily impacts energy resource use. For example, a cropping enterprise may include grain drying, crop planting, tilling, and harvesting activities. (See Table 1)

3.5 Component: Individual parts of a major activity. For example: lighting systems include lamps, ballasts, timers, sensors, etc. (See Table 1)

3.6 Energy auditor: A licensed professional engineer or other technically qualified individual who will certify that the audit report provided to the farmer/rancher meets the requirements outlined in ASABE S612.

3.7 Management operation Describes the specific routine and timing of tasks that would allow someone to understand how the farm/ranch runs an enterprise on a day to day basis.

3.8 Management scheme A general overview of the enterprise, what it consists of, future plans, and any other factors that influence the overall operation of the farm. For example, a free-stall dairy operation with 150 milking cows, etc.)

3.9 Type 1 Audit: An evaluation and report of farm enterprise energy use that considers, at a minimum, the major activities highlighted in Table 1, as applicable. A Type 1 Audit is not required to address individual components.

3.10 Type 2 Audit A more detailed evaluation and report of farm enterprise energy use that considers all major activities and components included in Table 1, as applicable.

4 Documenting the base-line condition

4.1 This section specifies the procedure for developing a record of a farm's energy use over the past annual cycle.

4.2 For each of the audited farm enterprises describe:

4.2.1 Overall management scheme for the enterprise.

4.2.1.1 Address enterprise specific management operations as required by the audit type.

4.2.1.2 Acquire from operator energy use and cost data for most recent 12 month period.

4.2.2 Major activities associated with the enterprise.

4.2.2.1 Describe activity and primary equipment involved.

4.2.2.2 For each major activity, document type of energy resource used and current energy consumption. Also, as appropriate, electrical service information (single or three phase; voltage) (natural gas or propane) needs to be included.

4.2.2.3 Describe components of major activities, as appropriate/available, (required for Type 2 only).

4.2.2.3.1 Manufacturer of equipment

4.2.2.3.2 Component factory ratings (hp, efficiency, Btu input, and Btu output)

4.2.2.3.3 Management use efficiencies (are manual systems in place that could be automated or timed)

4.2.2.3.4 Annual energy use

4.3 Summarize by energy resource

5 Assessment and Recommendations

5.1 This section specifies how recommendations shall be presented and minimum information needed to be provided consistent with audit type (see paragraphs 3.9 and 3.10).

5.2 Energy savings at the enterprise level shall be reported in units useable and understandable by the end-user (J, Btu, kWh).

5.3 Appropriate energy savings recommendations shall be made for each major activity including a comparison to the base-line condition for:

5.3.1 Estimated cost of replacement/upgrade equipment.

5.3.2 Estimated savings in energy and energy cost, including appropriate assumptions and documentation.

5.3.3 Estimated simple payback period (in years) for implementing each recommendation.

6 Certifications

6.1 All audit reports shall contain a certification statement that the auditor(s) possess the technical expertise and experience to perform on-farm energy audits, and that the audit report meets all requirements in ASABE Standard S612. (See informative annex A.)

Table 1 – Suggested Components within Major Activities by Farm Enterprises for Audit Assessment

Major Activity	Components	Farm Enterprises							
		Dairy	Swine	Poultry	Beef/ veal	Field crops	Fruit/ vegetables	Aquaculture	Nursery/ Greenhouse
Lighting ^{1,7,10}	lamps, timers, sensors	X ⁶	x	x	x		x	x	X
Ventilation ^{2,7,10,11}	fans, control system, variable drives, humidity control	x ⁶	x	x	x		x	X(aeration)	x ^{8,9}
Refrigeration ^{5,7,10}	compressor, evaporator/chiller, motor, insulation	milk, products ⁶		eggs			commodity	x	Veg/cut flowers
Milk harvesting ^{7,10}	pumps, motors, controllers	x ⁶							
Controllers ^{7,10}	master system automation	x	x	x				x	x
Other motors/ pumps ^{3,4,7,10}	Types, compressors	X ⁶	x	x	x	x	x	x	x
Water heating ^{7,10,12}	heater, energy source, insulation, recovery, waterers	x ⁶	x	x	x				
Air Heating/ Bldg environment ¹⁰	heater, energy source, insulation, recovery, variable drives	x	x	x	x		x		x ^{8,9}
Drying ¹⁰	energy source, airflow (motors/fans), handling equipment						x		
Waste handling	collection and dispersal equipment/methods	x	x	x	x			x	
Air Cooling	energy source, airflow (motors/fans), control systems, evaporative	x	x	x	x				x ^{8,9}
Cultural Practices	planting, tilling, harvesting, engine driven equipment						x	x	
Crop/feed Storage					x	x	x	x	x
Water management	wells, reservoir, recycled	x	x	x	x	x	x	x	x
Material handling ^{7,10}	equipment, motors, pumps	x ⁶	x	x	x	x	x	x	x
Irrigation ¹⁰	motors/engines, pumps, power source						x	x	x

Footnotes:

Listed references are guidance documents or tools useful for assessing the energy use and/or efficiency associated with various major activities and/or farm enterprise. Not included here are the numerous planning guides that address the design of farm enterprise systems and the major activities involved because most do not directly assess energy conservation or efficiency. These planning and design guides provide a reference for understanding elements of efficient production systems, but do not specifically address energy use or efficiency as is the intent of this standard. These are by no means the only guides and tools that can be used in performing these audits.

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- Peebles, R.W., D. J. Reinemann, R. J. Straub. 1994. Analysis, of milking center energy use. *Applied Engineering in Agriculture* 10(6): 831–839.
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- UW-Madison. 2009. Farm energy assessment toolkit. Madison, Wisc.: University of WI-Madison and Wisconsin Focus on Energy. Available at: <http://www.soils.wisc.edu/foe/login?resource=%2Ffoe%2Flogin%20>.
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- Sanford, S., et al. 2009. Energy Self Assessment tools, University of Wisconsin-Madison, Available at: <http://www.ruralenergy.wisc.edu/>.
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- Directory of Certified Product Performance. 2008. Gas Appliance Manufacturers Association, Available at: <http://www.ahridirectory.org/ahridirectory/pages/home.aspx>.

Annex A (informative) Commentary

This Annex provides additional information and explanation of considerations used in developing this Standard.

Documentation: The Standard provides flexibility in how audit reports are developed and documented. The Standard only addresses the minimum requirements for documentation that would provide for sufficient information from which the farm operator could make informed decisions. However, greater documentation is encouraged to provide as complete a supporting case file as is practical. This documentation may not be included in the report provided the farm operator, but should be maintained in a case file. It is suggested that for each alternative major activity component an appropriate reference be included that would support recommendations for improving energy efficiency.

Assessments: In determining the economy of various energy use activities on a farm, it is important to consider potential increases in product as part of the benefit used in the analysis. It is recognized that sometimes an increase in energy use will facilitate greater production on-farm (i.e., larger ventilation fans in poultry houses, that provide for healthier bird production), thereby increasing the benefit to cost relationship. Therefore, it could be appropriate to consider these factors in the energy use assessment and determinations of changes in efficiency. This evaluation is sometimes referred to as “energy density unit calculations.” Also, it was assumed in the crafting of paragraph 5.3.2 that changes in energy management (i.e., timing of power demand to off-peak times; or sequential starting of large motors) should be addressed as a “savings of energy cost” even though it does not necessarily represent a saving in overall energy consumption. Furthermore, it is recognized that the standard does not identify specific procedures for performing various audit functions associated with the major activities and their associated components. Other standards exist that provide this function, that were too numerous to reference

specifically; however, it is recommended that recognized standards (ASABE, AWWA, ASTM, etc.) be used whenever possible.

Renewable Energy: The developers of this Standard recognize that in some situations conversion to a renewable energy resource may be a practical alternative to present to a farm operator. It is also recognized that the use of renewable energy resources should be encouraged whenever possible. However, the intent of this Standard is not to facilitate a reduction in non-renewable energy resources, but rather to provide a method to facilitate increased efficiency in the use of whatever energy resources are being used.

Certification: Ideally, there would be a process in-place, provided by non-profit, State, or National entities, for certification of on-farm energy auditors. This certification could be referenced as a requirement for performing on-farm energy audits to add credibility to individuals wishing to perform such audits. There are certifications and licensing processes that do provide a level of assurance that an individual is qualified, if only ethically bound, to perform the audits described in this Standard, such as licensed engineers, Association of Energy Engineers (AEE)—Certified Energy Managers (CEM), the Association of Energy Engineers—Certified Energy Auditor (CEA), or state certified/licensed farm energy auditors.

Commentary on Table 1: Table 1 contains a listing of the most common major activities and their most often associated components found on-farm for various farm enterprises. As a minimum for a Type 1 audit, it is expected that each of the major activities highlighted for a specific enterprise will be addressed, as a whole, in the assessment and report. The highlighted major activities are those assumed to address the most likely opportunities for improving energy use efficiency on a typical farm operation. For the more comprehensive Type 2 audit, it is intended that for all applicable major activities, each component type found on the farm would be addressed.

Support facilities such as farm shops and offices are not addressed specifically in the Standard; however they should be included in the various major activities assessed within an enterprise.

Agricultural Energy Management Plan Criteria Conservation Activity Plan Practice Code (128) (No.)

I. Definition of an AgEMP

An Agricultural Energy Management Plan (AgEMP) is a detailed documentation and inventory of the energy consuming activities and components of the current agricultural operation. The plan will document a typical prior year of on-farm energy consumption, and the strategy by which the producer will explore and prioritize their on-farm energy conservation concerns, objectives, and opportunities.

II. Definition of Terms

Component (as used in the ASABE Standard) —Individual parts of a major activity. For example, a lighting activity would include lamps, timers, and sensors.

Energy—for the purposes of these criteria, energy is the resource used to power equipment to do mechanical work such as heat, light, ventilation, irrigation or cooling.

Energy Resource—source from which energy is obtained, including gasoline, diesel fuel, biofuel, propane, natural gas, electricity, solar, wind, wood, biomass, geothermal, etc.

Farm Enterprise—the production category of a farm. For example, a farm may include a field crop enterprise and a swine enterprise. (See ASABE S612 Table 1, appended to this document).

Major Activity—a discrete activity associated with a farm enterprise that utilizes an energy resource or that controls energy resource use. For example, a field cropping enterprise may include grain drying; a dairy enterprise may include lighting. (See ASABE S612 Table 1).

Prior Year Energy Consumption—the energy consumption for the previous 12 months, or another recent 12 month period germane to that enterprise. Where weather or other extreme events alter the typical energy use in the previous 12 months, alternate years may be used for the evaluation with complete documentation and reasoning included in the final report.

III. AgEMP-Criteria

A. General Criteria

- An AgEMP shall be developed by a certified Technical Service Provider (TSP) and shall address the energy natural resource concerns on the entire farm operating enterprise where the resource concern is identified. The Environmental Quality Incentives Program (EQIP) provides funding support through contracts with eligible producers to obtain services from certified TSPs for development of an AgEMP. The TSP proficiency criteria required to develop an AgEMP for an EQIP eligible producer is located on the TSP web site at: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp>. The AgEMP will meet a "Type 2 Audit" minimum criteria established in the **ANSI/ASABE S612 (July2009) Performing On-farm Energy Audits** standard.

B. Criteria for Specific Elements of an AgEMP

1. Cover Page

The AgEMP must have a cover page providing the following:

- a) Farm identification
 - (1) Farm name, owner name (if different from farm), street address, and county/state
 - (2) Primary phone number of producer

Conservation activity plans are reviewed periodically and updated if needed. To obtain the current version of this criteria, contact your Natural Resources Conservation Service [State Office](#) or visit the [electronic Field Office Technical Guide](#).

- (3) Primary enterprise of the farm
- b) TSP identification
- (1) Name, mail address, and primary phone number
- c) Date that the AgEMP was completed and delivered to the producer.

2. Summary Report of Energy Practices

The tables below must be presented in the summary section of the AgEMP report. Table 1 will contain each of the various recommended improvement measures, sorted by priority of installation. Table 1 also documents estimates of energy use reduction, energy savings, installation cost, and energy cost savings. The energy savings by energy type, as a percent of total energy usage, shall be presented as shown in Table 2 below (with data similar to Table 1). Estimated reduction in greenhouse gas emissions and air pollutants must be provided for each recommended energy improvement measure as shown in Table 3.

Table 1: Summary of Energy Improvements (Examples of recommended measures shown.)

Recommended Measure	Estimated Annual Reduction in Energy Use					Estimated Costs, Savings, Payback, and Prioritization for Implementation			
	Electric Savings (kWh)	Natural Gas Savings (ccf)	Propane Savings (gal)	Other ¹	Energy Savings (MMBtu)	Installed Cost [a]	Annual Cost Savings [b]	Payback in Years [a/b]	Est. Life in Years
Lighting	25,210				86	\$1,740	\$2,094	0.8	7
Seal Air Leaks			477		44	\$1,500	\$809	1.9	8
Insulate Brood Curtain			98		9	\$450	\$167	2.7	10
Exposed Foundation Wall Insulation			383		35	\$5,621	\$651	8.6	20
Curtain to Solid Insulated Sidewalls			442		41	\$7,168	\$754	9.5	20
Totals:	25,210		1,400		215	\$16,479	\$4,475	3.7	

Table 1 Notes

- 1) Use the *Other* column to aggregate any miscellaneous sources of energy.
- 2) Estimated Life is expected useful life of the equipment recommended with standard O&M activities.

Table 2: Annual Energy Savings if Recommendations are Fully Implemented

Fuel	Current Usage	MMBtu Usage	Savings	MMBtu Savings	% Savings
Electricity (kWh)	135,920	464	25,210	86	18.5%
Propane (gal)	4,214	386	1,400	129	33.2%
Natural Gas (ccf)					
Diesel Fuel (gal)					
Other					
Totals		850		215	25.2%

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Table 3: Estimated Annual Reduction of Pollutants. (Examples of environmental benefits for recommended measures from Table 1 shown.)

Environmental Benefits						
Recommended Measure	Energy Savings (MMBtu)	Greenhouse Gases			Air Pollutant Co-Benefits	
		Estimated CO ₂ (lbs)	Estimated N ₂ O (lbs)	Estimated CH ₄ (lbs)	Estimated SO ₂ (lbs)	Estimated NO _x (lbs)
Lighting	86	37,902.5	0.62	0.46	125.42	35.12
Seal Air Leaks	44	6,036.2	0.19	0.95	0.05	4.77
Insulate Brood Curtain	9	1,240.1	0.04	0.20	0.00	0.98
Exposed Foundation Wall Insulation	35	4,846.7	0.15	0.77	0.04	3.83
Curtain to Solid Insulated Sidewalls	41	5,593.3	0.18	0.88	0.04	4.42
Totals:	215	55,618.8	1.18	3.26	125.56	49.12

3. Background and Site Information

The AgEMP will provide a narrative to include:

- a) Facility location(s);
- b) Type, size, and overall management scheme of the operation (e.g., a description of the poultry, dairy, field crop enterprise, etc., along with production levels, and any unusual factors that affect energy use);
- c) Producer concerns and objectives for the enterprise (i.e., description of why the producer wants an on-farm energy audit and their specific objectives).
- d) An aerial map or equivalent drawing indicating the farm operation to include all the structures included in the AgEMP (animal housing, shops, grain storage, processing, etc.) the headquarters and the fields that were evaluated in the farming operation.

4. Current Equipment and Baseline Energy Use

The AgEMP will provide comprehensive documentation of the prior year energy consumption for the primary farm enterprise as a minimum. The evaluation of energy usage must be broken down by the major activities listed in, but not limited to, the ASABE S612 production category for the primary farm enterprise. The major activities that must be addressed for the primary farm enterprise are those shown in ASABE S612 Table 1 that have an "X" next to them in the column for the enterprise. The report must address all major activities for the primary farm enterprise, with the **only exception is that cultural practices are not a required major activity for CAP128**. For example: a field crop enterprise must at a minimum address the following major activities: Other motors/pumps; Drying; Crop/Feed Storage; Water Management; Material Handling; and Irrigation.

The report must at a minimum provide:

- a) The usage and costs for the prior year energy consumption shown by energy resource.
- b) To create a baseline energy use the AgEMP must document all major activities associated with the primary enterprise (at a minimum) being audited by:
 - (1) Describing the components, primary equipment, and/or details of the activity, as appropriate according to the amount of energy used, such as:
 - (a) Type and size of equipment;
 - (b) Component equipment ratings such as hp, Btu input, Btu output, efficiency;
 - (c) Auxiliary items to enhance management such thermostats, timers, and manual overrides of automatic systems.
 - (2) Provide an estimate of the annual energy usage for each activity.
 - (3) Provide an estimate of hours in use per year for each component evaluated.

5. Energy Improvement Measures

The AgEMP will identify potential energy improvement practices that will reduce energy use and address the energy management concerns of the entire agricultural operation. The AgEMP must provide appropriate estimated energy savings relative to the baseline energy use for each examined improvement practice.

- a) For each measure examined, the report must present:
 - (1) The estimated energy savings—first in the common sale units (kWh, gallons, etc.) and secondly in the energy units of millions of British thermal units (MMBtu);
 - (2) The estimated energy cost savings (\$/yr.);
 - (3) The estimated installed cost (\$);
 - (4) The estimated reductions in emissions with specific estimates for CO₂, N₂O, CH₄, SO₂, and NO_x. (Guidance on how to calculate greenhouse gas emission reductions and air pollutant co-benefits is provided in Appendix A);
 - (5) The simple payback period in years; and
 - (6) Estimated Life in years of the recommended measure.
- b) The report must include sufficient information in the way of specifications, product information, or comparisons between specific products. The report must include references to support assumptions and calculations that support numerical cost or savings values. Organize this information in the Appendix of the report. These details are not a design for installation, but rather a compendium of possibilities, and relative long-term benefits. Documentation for recommended improvement measures must be sufficient to allow a third party to evaluate the recommendations. Calculations or the basic data that was used to calculate the energy savings must be included within the report.
- c) The audit must reflect non-discounted prices for reporting the installation cost and payback period. Do not factor in incentives such as EQIP payments or state energy rebates in installation cost. However, the mention of these separately and the recognition that these will shorten the payback period is encouraged.
- d) The auditor must keep all recommendations closely linked to improvements that optimize energy use. Some improvements are primarily related to production improvement and while it is worthwhile to note these, they must not be a part of the energy analyses but can be documented in the Appendix.

- e) From the possible energy improvement measures examined, the report must clearly distinguish those measures that have the most benefit. Similarly, if a practice has very little benefit, the auditor must explain any improvement measures considered but found to be too expensive or having a very long payback period.
- f) The auditor is encouraged to organize the analyses by enterprise and major activity as listed in Table 1 of the ASABE S612 standard.

6. Signature Page

The AgEMP must have a signature page providing the following:

- a) Farm identification:
 - (1) Farm name, owner name, street address, and county.
 - (2) Primary enterprise of the farm.
- b) TSP certification statement:
 - (1) A statement to the effect that the auditor possesses the technical expertise and experience to perform on-farm energy audits and that the report meets all the requirements of ASABE S612 (per §6.1) and NRCS CAP 128;
 - (2) The signature of the TSP, and date.

Directly above this statement, or elsewhere on this page, may be an opportune place for the auditor to make any disclaimers and documentation of the auditor's credentials.
- c) Producer acceptance statement:
 - (1) A statement to the effect that the Plan correctly lists the farm identifying information, addresses the primary farm enterprise under the Producer's control, adequately represents the baseline conditions of the farm enterprise, adequately represents the Producer's concerns and objectives, and that the Producer has received a final copy of the Plan.
 - (2) Spaces for the signature of Producer, and date.
- d) Placement

The recommended placement of the signature page is immediately behind the last page of the audit report, but preceding any appendices/references.

7. References

The AgEMP must include technical documentation of sources used for the AgEMP. The report should include the actual documents or electronic addresses that contain technical information used to gain energy savings in the report, such as:

- a) Fact sheets;
- b) Existing component product information or manufacturer product information sheets, etc;
- c) Product recommendations and or comparisons of specific products;
- d) Journal article citations.

IV. Deliverables and Certification

- A. The auditor is encouraged to generate separate reports for separate enterprises of a farm. The parts must be bound together and delivered to the Client with an overall cover and signature page.
- B. Deliverables from the TSP to the Client include:
 - 1. A complete hardcopy and/or electronic copy of the finalized AgEMP report, with the TSP signature.
 - 2. A duplicate detachable hardcopy signature page, signed by the TSP. This second hardcopy signature page is to be signed by the Client and forwarded to the NRCS Field Office for the official files. A second complete hardcopy may be substituted for this single signature page.
- C. Deliverables from the TSP to the NRCS Field Office include:
 - 1. A complete electronic copy of the finalized AgEMP report. The preferred format is PDF, using software digital conversion rather than scanning, except for the signature page. The MS Word format is also acceptable.

APPENDIX A
ENVIRONMENTAL BENEFITS

Guidance on how to determine values for greenhouse gases and air pollutant co-benefits environmental benefits.

In order to estimate the environmental benefits associated with estimated energy savings, NRCS has developed a Quick Energy calculator that transforms energy saving measures for fuels and electricity into atmospheric emission reductions. The Quick Energy Tool relies on the U.S. Energy Information Administration state- level aggregated emission factors for electricity, to generate estimates of emissions savings for electricity, and emission factors for liquid and gaseous fuels, to generate estimates of emissions savings for liquid and gaseous fuels.

The Web link to the NRCS COMET Quick Energy Calculator for converting Energy Savings into Emissions Reductions is located at: <http://cometfarm.nrel.colostate.edu/QuickEnergy>

Table 1 – Suggested Components within Major Activities by Farm Enterprises for Audit Assessment

Major Activity	Components	Farm Enterprises							
		Dairy	Swine	Poultry	Beef/ veal	Field crops	Fruit/ vegetables	Aquaculture	Nursery/ Greenhouse
Lighting ^{1,7,10}	lamps, timers, sensors	X ⁶	x	x	x		x	x	X
Ventilation ^{2,7,10,11}	fans, control system, variable drives, humidity control	x ⁶	x	x	x		x	X(aeration)	x ^{8,9}
Refrigeration ^{5,7,10}	compressor, evaporator/chiller, motor, insulation	milk, products ⁶		eggs			commodity	x	Veg/cut flowers
Milk harvesting ^{7,10}	pumps, motors, controllers	x ⁶							
Controllers ^{7,10}	master system automation	x	x	x				x	x
Other motors/ pumps ^{3,4,7,10}	Types, compressors	X ⁶	x	x	x	x	x	x	x
Water heating ^{7,10,12}	heater, energy source, insulation, recovery, waterers	x ⁶	x	x	x				
Air Heating/ Bldg environment ¹⁰	heater, energy source, insulation, recovery, variable drives	x	x	x	x		x		x ^{8,9}
Drying ¹⁰	energy source, airflow (motors/fans), handling equipment					x			
Waste handling	collection and dispersal equipment/methods	x	x	x	x			x	
Air Cooling	energy source, airflow (motors/fans), control systems, evaporative	x	x	x	x				x ^{8,9}
Cultural Practices	planting, tilling, harvesting, engine driven equipment					x	x		
Evaluation of cultural practices is optional for an NRCS AgEMP									
Crop/feed Storage					x	x	x	x	x
Water management	wells, reservoir, recycled	x	x	x	x	x	x	x	x
Material handling ^{7,10}	equipment, motors, pumps	x ⁶	x	x	x	x	x	x	x
Irrigation ¹⁰	motors/engines, pumps, power source					x	x		x

Footnotes:

Listed references are guidance documents or tools useful for assessing the energy use and/or efficiency associated with various major activities and/or farm enterprise. Not included here are the numerous planning guides that address the design of farm enterprise systems and the major activities involved because most do not directly assess energy conservation or efficiency. These planning and design guides provide a reference for understanding elements of efficient production systems, but do not specifically address energy use or efficiency as is the intent of this standard. These are by no means the only guides and tools that can be used in performing these audits.

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- Go, A. and Surbrook, T. 2009. Michigan dairy farm energy audit guide. East Lansing, Mich.: Michigan State University, Departments of Biosystems & Agricultural Engineering, Food & Resource Economics. Available at: <http://web5.anr.msu.edu/fa/farm%20energy%20calculators.html>.
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- Directory of Certified Product Performance. 2008. Gas Appliance Manufacturers Association, Available at: <http://www.ahridirectory.org/ahridirectory/pages/home.aspx>.

Table 1 used courtesy of the American Society of Agricultural and Biological Engineers, ASABE S612, July 2009.

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