

North Carolina Energy Audit Criteria Checklist

Purpose: Provide guidance for elements that shall be included in a Natural Resources Conservation Service (NRCS) compliant energy audit. This checklist is required to be used by NRCS review staff and is recommended for use by TSPs as a guide when developing an energy audit in North Carolina. NRCS staff shall use the checklist for administrative review of the energy audit to ensure compliance with the CAP 128 AgEMP Criteria. TSPs shall use the checklist for general guidance of elements to include in the plan, but it is still the TSPs responsibility to follow the audit criteria for specific elements and the detail of each element to be included. This checklist is for use with all energy audits that are produced by a TSP, regardless of whether the audit was part of a CAP 128.

FY15 Energy Audit Criteria Checklist	
County:	Date Plan Submitted:
Participant:	TSP:
The minimum components of an AgEMP shall meet the following criteria:	
A. General Criteria	<input type="checkbox"/> Developed by a certified Technical Service Provider (TSP). A listing of AgEMP, CAP 128 certified TSPs is located at the following website: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/tsp/
	<input type="checkbox"/> Meets the Type 2 on-farm energy audit minimum criteria established in the ANSI/ASABE S612 July2009 Performing On-farm Energy Audits standard.
	<input type="checkbox"/> Evaluates the entire farm operation by enterprise and major activity as defined by ASABE S612, Table 1 – Suggested Components within Major Activities by Farm Enterprises for Audit Assessment. Refer to Appendix A for detailed information.
B. Criteria for Specific Elements of AgEMP	1. Cover Page: The AgEMP must have a cover page providing the following:
	<input type="checkbox"/> a. Farm Identification: <ul style="list-style-type: none"> i. Farm name, participant name (if different from farm), street address, county/state ii. Primary phone number of participant iii. Primary enterprise of the farm
	<input type="checkbox"/> b. TSP Identification: name, mailing address, and primary phone number.
	<input type="checkbox"/> c. Date AgEMP was completed and delivered to the participant.
	2. Summary Report of Energy Practices: The below three tables must include the information as shown in Appendix B and be presented in a similar format (tabular data). These tables must be included in the summary section at the beginning of the report.
	<input type="checkbox"/> a. Table 1: Summary of Energy Improvements. Recommended measures should be sorted by priority of installation, with consideration to payback in years and estimated life in years. Note: Estimated life in years is a new column that is required in Table 1.
	<input type="checkbox"/> b. Table 2: Annual Energy Savings if Recommendations are Fully Implemented.
	<input type="checkbox"/> c. Table 3: Estimated Annual Reduction of Pollutants. Note: Table 3 is a new requirement and should include the environmental benefits as they are no longer part of Table 1.
	3. Background and Site Information: The AgEMP will provide a narrative to include:
<input type="checkbox"/> a. Facility location(s)	

<input type="checkbox"/>	b. Type, size, and overall management scheme of the operation (e.g., a description of the poultry, dairy, or swine, etc., production levels, and any unusual factors that affect energy use).
<input type="checkbox"/>	c. Participant concerns and objectives for the enterprise (i.e., description of why the participant wants an on-farm energy audit and their specific objectives).
<input type="checkbox"/>	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 report also must provide:
<input type="checkbox"/>	a. The evaluation of energy usage must be broken down for the primary farm enterprise by the major activities listed in the ASABE S612, Table 1 (See Appendix A).
<input type="checkbox"/>	b. The usage and costs for the prior year energy consumption shown by energy resource.
<input type="checkbox"/>	c. A description of the components, primary equipment, and/or details of the activity, as appropriate according to the amount of energy used, such as <ul style="list-style-type: none"> i. Type and size of equipment; ii. Component equipment ratings such as hp, Btu input, Btu output, efficiency; iii. Auxiliary items to enhance management such thermostats, timers, and manual overrides of automatic systems.
<input type="checkbox"/>	d. Provide an estimate of the annual energy usage of the major activity.
<input type="checkbox"/>	e. Provide an estimate of hours in use per year for each component evaluated.
<input type="checkbox"/>	f. The report must address all major activities for the primary farm enterprise even though the TSP may not have an improvement recommendation for every activity. The report must note any major activity which has no opportunity for improved energy use.
5.	Energy Improvement Measures: For each measure examined, the report must present:
<input type="checkbox"/>	a. 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)
<input type="checkbox"/>	b. The estimated energy cost savings (\$/yr)
<input type="checkbox"/>	c. The estimated installed cost (\$)
<input type="checkbox"/>	d. The estimated reductions in emissions with specific estimates for CO ₂ , N ₂ O, CH ₄ , SO ₂ , and NO _x . (Guidance on how to calculate greenhouse gas emission reductions and air pollutant co-benefits is provided in Appendix E).
<input type="checkbox"/>	e. The simple payback period in years.
<input type="checkbox"/>	f. Estimated life in years of the recommended measure.
<input type="checkbox"/>	g. 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.
6.	Signature Page: The AgEMP must have a signature page providing the following:
<input type="checkbox"/>	a. Farm identification: Farm name, participant name (if different from farm), street address, county, primary enterprise of the farm.

<input type="checkbox"/>	b. TSP Certification Statement: i. A statement to the effect that the TSP 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. ii. TSP Signature and date.
<input type="checkbox"/>	c. Participant Acceptance Statement: i. A statement to the effect that the plan correctly lists the farm identifying information, addresses the primary farm enterprise under the participant's control, adequately represents the baseline conditions of the farm enterprise, adequately represents the participant's concerns and objectives, and that the participant has received a final copy of the Plan. ii. Fillable spaces for the participant signature and date.
7.	References: The AgEMP must include technical documentation of sources used for the AgEMP. The report shall include the actual documents or electronic addresses that contain technical information used to gain energy savings in the report, such as:
<input type="checkbox"/>	Fact sheets, existing component product information or manufacturer product information sheets, product recommendations and or comparisons of specific products, journal article citations.
Important Note: The items listed below in sections 8 and 9 are only for audits produced as part of a CAP. If your audit is not part of a CAP, please skip to "Checklist Approval".	
8.	Deliverables from the TSP to the Participant include:
<input type="checkbox"/>	a. A complete hardcopy and/or electronic copy of the finalized AgEMP report, with the TSP signature. Note: 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.
<input type="checkbox"/>	b. A detachable or separate hardcopy signature page, signed by the TSP. This hardcopy signature page is to be signed by the participant and forwarded to the NRCS field office for the official files. A second complete hardcopy may be substituted for this single signature page.
9.	Deliverables from the TSP for NRCS field office include:
<input type="checkbox"/>	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. Microsoft Word format is also acceptable.
NRCS Checklist Approval	
YES	NO
<input type="checkbox"/>	<input type="checkbox"/>
I have administratively reviewed this audit and it meets all the North Carolina Audit Criteria. Note: If "No" is checked, include reasons for denial, comments, missing items below that need to be added, etc.):	
NRCS Field Staff Approval:	
Name and Title	
Signature	Date:
NRCS ENG Staff Approval:	
Name and Title	
Signature	Date:
Additional Comments:	

Appendix A: ASABE S612, Table 1

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

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

Appendix B: Examples of Tables 1, 2, and 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 ²
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%

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

Recommended Measure	Energy Savings (MMBtu)	Environmental Benefits				
		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