Agriculture Energy Management Plan, Landscape Criteria - Practice/Activity Code (124) (No.)

1. Definition

A Landscape Agricultural Energy Management Plan (Landscape AgEMP) contains the strategy by which the producer will explore and address his/her on-farm energy problems and opportunities on the working land.

2. Landscape AgEMP Criteria:

This section establishes the minimum criteria to be addressed in the development of AgEMP.

A. General Criteria

A Landscape AgEMP shall be developed by certified Technical Service Providers (TSPs). In accordance with Section 1240 (A), the Environmental Quality Incentive Program (EQIP) program provides funding support through contracts with eligible producers to obtain services of certified TSPs for development of a Landscape AgEMP. The specific TSP criteria required for Landscape AgEMP development is located on the TSP registry (TechReg) web site at: http://techreg.usda.gov/

B. The Landscape AgEMP plan shall address and document the following elements:

1. Background and site information;
2. Energy audit for Landscape (Working Lands);
3. Energy conservation practices planned;
4. Reference documents.

C. Landscape AgEMP Element Specific Criteria

1. Each of the Landscape AgEMP elements will address specific criteria for working land elements. The degree to which these elements are addressed in the development and implementation of a site-specific AgEMP is determined by the use of working lands and the producer objectives. The specific criteria provided for each element of the AgEMP identified below.
2. Background and Site Information - This element provides:
   a. Name of producer
   b. Facility location(s) and mailing address
   c. Type and size of the operation
   d. Brief description of producer concerns
3. On-farm Landscape Energy Audit: This element determines and documents current energy usage, over the past annual cycle, and provides cost-effective alternatives and recommendations for energy conservation. The evaluation of

energy conservation activities shall include energy used in the cultivation, protection, and harvesting of agricultural crops.

4. Definitions:

   a. Energy: Fuels (purchased propane, diesel and natural gas) and electricity used to perform stationary farm and ranch activities. This definition includes renewable energy sources.

   b. Energy Management: Optimization of energy use on farms and ranches to minimize non-renewable energy consumption.

   c. Certified Energy Auditor: A person who has the technical qualifications to perform an agricultural energy audit.

   d. Energy Source: The type of fuel (liquid or gas), electricity, or renewable power used to perform farm and ranch activities.

5. NRCS Landscape (cropland, pastureland, forestland, etc.) AgEMP is an energy audit that is designed to (a) estimate energy use associated with current farming/ranching operations and (b) identify energy savings associated with alternative management activities. The Landscape AgEMP shall address energy use for the following elements (as applicable):

   a. Cropland field equipment operations - estimate energy use associated with the current field equipment operations (Compare in common units):

      - Field equipment operations
      - Embedded energy in synthetic nitrogen used
      - Irrigation
      - Pasture management
      - Forest operations

   b. Specific Criteria: The Audit will address specific criteria for each element as identified below:

      1) Cropland field equipment operations - Estimate energy use associated with current field equipment operations:

         - Tillage
         - Planting
         - Harvesting
         - Manure application
         - Application of inorganic soil amendments and pesticides

      2) Identify potential energy savings associated with alternative activities. As a minimum the analysis will address the following, as appropriate. Each item will be expressed in comparison to the existing situation with total savings expressed in common units:

- Number and type of field operations
- Trips to the field
- Trips across the field
- Precision farming practices
- Equipment maintenance and calibration
- Size of tractor relative to implement

3) Embedded energy in synthetic fertilizer, especially nitrogen. Estimate indirect energy use associated with synthetic fertilizer used in the operation. Identify potential indirect energy savings associated with alternative management activities. Analysis may include, for example:

- Presence of a professionally developed nutrient management plan that reduces the amount of fertilizers applied and minimizes losses.
- Potential adjustments to crop rotations such that the amount of nutrients is reduced by optimizing residual nutrient supplies to subsequent crop.
- Precision application techniques that minimize agrichemical needs and optimize the effectiveness of the chemicals used.

4) Irrigation: Estimate energy used in current irrigation system and identify energy savings associated with alternative equipment and management activities. Analysis may include, for example:

- System type
- System pressure
- Irrigation water management techniques
- Pumping plant evaluation
- System maintenance

5) Pasture management: Estimate direct energy used in pasture management for example watering facilities and pasture maintenance/renovation and identify energy savings associated with alternative management and equipment. Examples include:

- Impact of grazing management on reseeding requirements
- Hauling distance for water/feed vs. water facility development
- Other

6) Forest operations: Estimate current energy use associated with the forest management/harvest system and identifies energy savings associated with alternative management and equipment. Analysis might include (but not be limited to):

- Forest trails and landings

- Types of equipment used
- Identify potential energy savings in other land uses associated with windbreaks/shelterbelts
- Other

7. Conservation plan (record of decisions) *(Utilizing Customer Service Toolkit – Plug-In or MsWord Document)* conservation practices to address the energy management needs for the "Landscape AgEMP". The record of decisions shall include the planned practice, schedule for implementation, and site specific specifications to apply the conservation practice. The site specific specifications can be on an NRCS Jobsheet available for the conservation practice or in a narrative form for the non-engineering type practices. Planned engineering type practices shall include the conservation practice, schedule of implementation, and identified on the plan map. The plan may include, but are not limited to the conservation practices listed below:

   (a) Brush Management (314)

   (b) Conservation Crop Rotation (328)

   (c) Cover Crop (340)

   (d) Conservation Cover (327)

   (e) Fence (382)

   (f) Herbaceous Weed Control (315)

   (g) Irrigation System, Microirrigation (441)

   (h) Irrigation Water Management (449)

   (i) Land Smoothing (466)

   (j) Mulching (484)

   (k) Nutrient Management (590)

   (l) Pasture and Hayland Planting (512)

   (m) Pesticide Risk Mitigation (596)

   (n) Pipeline (516)

   (o) Prescribed Grazing (528)

   (p) Residue and Tillage Management, Mulch Till (345)

   (q) Residue Management, No Till/Strip Till/Direct Seed (329)

   (r) Residue Management, Ridge Till (346)

   (s) Residue Management, Seasonal (344)

   (t) Stripcropping (585)

   (u) Terrace (600)

(v) Watering Facility (614)

(w) Windbreak/Shelter Belt Establishment (380)

8. References: This element lists the technical documentation sources used for the AgEMP and may include the actual documents or web sites that contain the technical documentation useful for the producer.

9. **Deliverables for the Client – a hardcopy of the plan that includes:**
   - Cover page – name, address, phone of client and TSP; Total Acres of the Plan, signature blocks for the TSP, producer, and a signature block for the NRCS acceptance.
   - Soils map and appropriate land use soil descriptions
   - The completed energy audit report will include the following sections:
     a. Summary of how much money the producer would save if the recommended measures were included, and how much money the producer would lose if no action were taken.
     b. A list of recommended measures to reduce energy use including their annual energy (kWh, propane, fuel oil, BTU,…) savings and an estimated payback in years.
     c. A narrative summary of the recommendations made through the audit including description of technology, how the technology would affect the site, and how much energy would be saved annually.
   - Resource assessment results (wind and water erosion, water availability, soil fertility, and others that may be needed)
   - For management practices. The planned practices and the site specific specifications on how each practice will be applied; when the practice will be applied, and the extent (acres or number) that will be applied.
   - For engineering/structural practices. The planned practice when it will be applied and extent, and located on the conservation plan map.

10. **Deliverables for NRCS Field Office:**
    - Complete Hardcopy and Electronic copy of the client's plan (MsWord copy). **Optional**: If a Conservation Plug-in version is provided to NRCS a Hardcopy of the plan, conservation plan map and soils map is not required.
    - Digital Conservation Plan Map with fields, features, and structural practices located.
    - Digital Soils Map.

Tools Needed

One or more tools are needed to evaluate energy associated with tillage, agrichemicals, irrigation, pasture management, and forest operations. Some tools already exist or can be made functional with minimal effort. Others will need to be developed.

Tools Available to Support the Landscape Audit

Audit Element	Tools Available or needed	Tool output	Already existing?
Field Equipment Operation	• RUSLE2 • Cropland Energy Estimator (CLE). • Size of tractor relative to implement(s) used	• Fuel or BTU use per acre • Table to identify ideal tractor size for specific implements based on ASABE equipment standard	• Yes (RUSLE2, WEPS and CLE) • No
Embedded Energy in Agrichemicals	• CLE • CLE upgrade	Embedded energy in agrichemicals applied. (Current tool does not automatically adjust for management changes)	• Yes • Upgrade needed)
Irrigation	• Energy Self-Assessment • CLE Upgrade	Fuel or Btu use per acre	• Yes • Upgrade needed

*CLE = Cropland Energy Estimator