

ASLEE Energy Worksheet For Larger Scale Energy Efficiency Improvements Projects

Use this worksheet and your previously completed energy audit to gather information about your farm operation's existing energy usage and the estimated level of energy savings associated with your proposed project.

This completed Energy Worksheet must be submitted with your completed application, along with your previously completed energy audit (that meets the minimum requirements as outlined for a Detailed Energy Audit (Level 2) or equivalent).

GETTING STARTED

Provide a brief description of your farm operation **where the proposed energy efficiency improvement will occur** (e.g., specify types of livestock and approximate numbers on the farm business in the past twelve months, including production metrics and barn area, number of acres (owned/rented/leased/irrigated) and include typical crops rotations/permanent crops as applicable). Greenhouse operations should identify the type of crops grown throughout the year and identify the greenhouse area used to grow the respective crops, the weight of each crop produced per cycle, and the number of grow cycles per year.

Livestock: Indicate the number and type of livestock, along with the related production metrics, over a twelve-month period on your farm operation.

	Beef Cattle	Dairy Cattle	Swine	Poultry	Other Livestock (indicate type)
EXAMPLE: Number and type	120 – cows (cow/calf)	72 – milking cows 58 – heifers 14 – calves (Holstein)	250 – breeding sows (farrow-to-finish swine)	44,000 – birds per flock (broiler chickens)	
Production Metric (over 12-month period)	Number of Head Marketed [include total live weight of cattle in kg or lbs]	kg or hectolitre (hL) of Milk Produced	Number of Head Marketed [include total live weight of pigs in kg or lbs]	Number of Head Marketed [include total live weight of birds in kg or lbs] or Number of Dozens of Eggs Marketed	[Applicant Provided Production Metric]
	115 calves sold at avg 600 lbs [31,365 kg (or 69,000 lbs) live weight sold]	650,000 kg or 6,500 hL of milk produced	6,500 piglets weaned 6,200 hogs sold [744,000 kg (1,636,800 lbs) live weight sold]	264,000 birds sold (6 flocks per year) [686,400 kg (or 1,510,080 lbs) live weight sold]	
Total Barn Area Housing All Livestock (m² or ft²)	669 m ² or 7,200 ft ²	1285 m ² or 13,824 ft ²	3473 m ² or 37,343 ft ²	4380 m ² or 47,080 ft ²	

Barn Style Layout and Insulation	<i>Free-stall and partially insulated</i>	<i>Free-stall and fully insulated</i>	<i>Free access stalls and fully insulated</i>	<i>Single-storey, wide-span, primarily fully insulated</i>	
Ventilation Type	<i>Natural ventilation</i>	<i>Natural ventilation</i>	<i>Controlled environment with mechanical ventilation/exhaust fans</i>	<i>Controlled environment with mechanical ventilation</i>	
Number and type					
Production Metric (over 12-month period)	Number of Head Marketed [include total live weight of cattle in kg or lbs]	kg hectolitre (hL) of Milk Produced	Number of Head Marketed [include total live weight of pigs in kg or lbs]	Number of Head Marketed [include total live weight of birds in kg or lbs] or Number of Dozens of Eggs Marketed	[Applicant Provided Production Metric]
Total Barn Area Housing All Livestock (m² or ft²)					
Barn Style Layout and Insulation					
Ventilation Type					

Farmland: Indicate the number of acres of farmland and typical crop rotation/ types of permanent crops grown associated with your farm business

	Acres Owned (Crop or Pasture)	Acres Owned (Non-crop or non-pasture)	Acres Rented/Leased	Acres Irrigated
EXAMPLE: <i>Number & Typical Crop Rotation/ Permanent Crops Grown</i>	<i>200 acres corn-soybean-wheat 20 acres pasture</i>	<i>5 acres bush/woodlot</i>	<i>50 acres corn-soybean-wheat</i>	<i>5 acres strawberries</i>
TOTAL	220	5	50	5
Number & Typical Crop Rotation/Permanent Crops Grown				
TOTAL				

Greenhouse (if applicable): Indicate the type of crops grown at your greenhouse operation throughout the year and identify the greenhouse area (including building construction) used to grow the respective crops, the weight of each crop produced per cycle, the number of grow cycles per year and the type of heating source used.

<u>Type of Crops Grown Throughout the Year (12-month period)</u>	<u>Area of Greenhouse used for Crop Grow Cycle and Packaging *</u> <u>(acres, m² or ft²)</u>	<u>Greenhouse and Packaging Building Type(s) (Describe Structure & Panel Construction)</u>	<u>Age of Greenhouse and Packaging (Years)</u>	<u>Weight of Crop Production per Cycle (tonnes, kg, lbs)</u>	<u>Number of Grow Cycles per Year</u>
EXAMPLE: <i>Tomatoes</i>	<i>Grow area: 15 acres or 60,703 m² or 653,400 ft² Packaging area, fertilizer mixing, heating plant area 2 acres or 8104 m² or 87,120 ft²</i>	<i>Grow area: Galvanized steel structure and framing with double-layer Polyethylene film panels Packaging area: Galvanized steel structure and framing with insulated metal panel (IMP) walls</i>	<i>Grow area: 5 years Packaging area: 5 years</i>	<i>3,035 tonnes or 3,035,150 kg or 6,691,030 lbs</i>	<i>1</i>

*** If the baseline energy use data provided in Step 1 does not relate to the packaging area of the greenhouse operation, then exclude the packaging area from the total greenhouse area reported in this table.**

STEP 1 – Determine the total annual Baseline energy usage associated with your whole farm operation where your energy efficiency improvement project is proposed. *This is your whole farm’s existing energy usage before implementing the proposed improvement project.*

- Referring to your previously completed energy audit and considering all sources of energy associated with the farm operation, enter in the STEP 1 Tables below your energy usage for the past year, for a consecutive 12-month period (e.g., August 2023 to July 2024), by type of energy source.
 - If weather or other extreme events occurred in the past 12 months which would impact the energy consumption at your operation, an alternate 12-month period may be used. Indicate on your application worksheet if this applies to your operation.
- Use the conversion factors to **convert all energy usage to kWh**.
- Include the name of your energy provider in the tables below for each source pertaining to your farm operation.

<p>Please enter the page numbers of your previously completed energy audit where the Baseline energy usage for your farm operation is described and quantified:</p>

What is the consecutive 12-month period you have selected for your application?	
_____	to _____
mm/yyyy	mm/yyyy

Are you selecting an alternate or older 12-month period to refer to for your operation? If yes, describe what extreme event impacted your farm operation:	
<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes, describe the extreme event:	

STEP 1 TABLES:
Baseline Energy Usage, by Type of Energy Source, for your Whole Farm Operation

A. Energy Type: Electricity (kWh)	
Electricity Provider Name:	_____
Line A. Total Annual Amount of Electricity Used:	(kWh)

B. Energy Type: Natural Gas (m³)	
Natural Gas Provider Name:	_____
Conversion Factor for m ³ to kWh. Multiply annual m ³ use by 10.82	Total annual Natural Gas Use over 12 months (m ³):
	x 10.82 kWh/m ³ * = (kWh)
Line B. Total Annual Amount of Natural Gas Energy Used:	(kWh)

* Based on a caloric value of 38.97 MJ/m³

C. Energy Type: Propane/LPG (L)	
Propane/LPG Provider Name:	
Conversion Factor for L to kWh. Multiply annual L use by 7.09	Total annual Propane/LPG Use over 12 months (L):
	x 7.09 kWh/L * = (kWh)
Line C. Total Annual Amount of Propane/LPG Energy Used:	(kWh)

* Based on a caloric value of 25.53 MJ/L

D. Energy Type: Diesel (L)	
Diesel Provider Name:	
Conversion Factor for L to kWh. Multiply annual L use by 10.74	Total annual Diesel Use over 12 months (L):
	X 10.74 kWh/L * = (kWh)
Line D. Total Annual Amount of Propane/LPG Energy Used:	(kWh)

* Based on a caloric value of 38.68 MJ/L

E. Energy Type: Heating Oil (L)	
Heating Oil Provider Name:	
Conversion Factor for L to kWh. Multiply annual L use by 10.21	Total annual Heating Oil Use over 12 months (L):
	X 10.21 kWh/L * = (kWh)
Line E. Total Annual Amount of Heating Oil Energy Used:	(kWh)

* Based on a caloric value of 36.72 MJ/L

F. Energy Type:	(unit of measure):
Provider Name:	
Conversion Factor for (unit of measure) to kWh. Specify conversion unit of measure to kWh * _____	Total annual _____ Use over 12 months (_____):
	X _____ * = (kWh)
Line F. Total Annual Amount of _____ Energy Used:	(kWh)

* Consult with OSCIA for conversion factors where required.

G. Energy Type:		(unit of measure):	
Provider Name:			
Conversion Factor for (unit of measure) to kWh. Specify conversion unit of measure to kWh *	Total annual _____ Use over 12 months (_____):		
	X _____ *	=	(kWh)
Line G. Total Annual Amount of _____ Energy Used:			(kWh)

* Consult with OSCIA for conversion factors where required.

CALCULATION: The total annual baseline energy usage (in kWh equivalent) for your whole farm operation is calculated by adding the annual energy usage for each different energy source (all converted to kWh) applicable to your farm over the historical 12-month period. *Reminder: Retain copies of the monthly energy bills as OSCIA may request copies to validate application.*

Total annual baseline energy use (in kWh) for whole farm operation (BASELINE). Add Total Use over 12 months in kWh for Lines A, B, C, D, E, F, and G (as applicable) from above tables.		
Energy Type	Total Use over 12 months (kWh)	
Line A. Electricity	(kWh)	
Line B. Natural Gas	(kWh)	
Line C. Propane/LPG	(kWh)	
Line D. Diesel	(kWh)	
Line E. Heating Oil	(kWh)	
Line F. _____	(kWh)	
Line G. _____	(kWh)	
* TOTAL:	(kWh)	

*You will need to enter your response above on your application form for **question 12.**

STEP 2 – Estimate the change in annual energy usage associated with implementation of the proposed energy efficiency improvement project, considering all sources of energy that may be impacted by the proposed change. This is the estimated annual project-specific energy savings (kWh savings).

- Refer to your previously completed energy audit to complete the tables below specific to your proposed energy efficiency improvement project.
- In Table STEP 2A you will report your current energy usage associated with your proposed project (baseline energy usage of specific project) and the estimated energy use after the

implementation of the proposed this energy efficiency project. This will allow you to calculate the anticipated energy savings associated with the proposed project.

- Actual energy usage values required to operate your current system should be used where available (e.g., from monitoring conducted during your energy audit).
- All energy usage must be in kWh. Use the conversion factors from STEP 1 to convert to kWh if not already done in your previously completed energy audit.
- Note: Calculations for your project may be completed on a monthly basis but be sure to record your project-specific savings on an annual basis in the tables below (e.g., multiply by 12 if the system is used year-round).

TABLE STEP 2A

Estimated Annual Energy Usage SAVINGS anticipated as a result of implementing your proposed Project

Type of Energy Source	A. Electricity (kWh/yr)	B. Natural Gas (kWh/yr)	C. Propane/ LPG (kWh/yr)	D. Diesel (kWh/yr)	E. Heating Oil (kWh/yr)	F. Other (specify) (kWh/yr)	G. Other (specify) (kWh/yr)	Total Change in Energy Usage Resulting from Proposed Project (add all columns A to G) (kWh/yr)
<i>Example: Lighting change from high pressure sodium to LED</i>								
<i>Current Annual Energy Usage associated with Project Specific System (high pressure sodium lights)</i>	50,000							50,000
<i>Estimated new Energy Usage after proposed project implemented (LED lights)</i>	30,000							30,000
<i>Estimated annual project-specific energy savings</i>	20,000							20,000 (total savings)

Describe your proposed energy efficiency project and the intended outcome * (i.e., include a description of your current baseline (existing conditions) and what changes are proposed to achieve the new energy efficient condition, and any changes you are proposing to make from the recommendations outlined in your detailed energy audit (if any changes):

***You will need to refer to your response above in your application form for question 16.**

Type of Energy Source	A. Electricity (kWh/yr)	B. Natural Gas (kWh/yr)	C. Propane/ LPG (kWh)/yr	D. Diesel (kWh/yr)	E. Heating Oil (kWh/yr)	F. Other (specify) (kWh/yr)	G. Other (specify) (kWh/yr)	Total Change in Energy Usage Resulting from Proposed Project (add all columns A to G) (kWh/yr)
Current Annual Energy Usage associated with Project-Specific System (a)								Total (a)
Estimated Annual New Energy Usage after proposed Energy Efficient Project is Implemented (b) [Note: use section i) in the box below to provide a detailed explanation of how the energy savings have been estimated for the proposed project and use section ii) of the box to list all supporting documentation that is being provided with the application to support the energy savings estimations. This supporting documentation is in addition to the completed Energy Audit that is to accompany the application.]								Total (b)
Estimated Annual Project-Specific Energy Savings (c) = (a) - (b)								Total (c)
Estimated total annual energy saving after implementing your proposed energy efficiency improvement project (from all energy sources) (SAVING) *								Total (c) * kWh/yr

* You will need to enter your response above on your application form for **question 13**.

i) Indicate what page(s) of your previously completed energy audit were consulted to support the completion of Table STEP 2A above (provide the page number references of the energy audit with the data) and explain how you determined your estimated energy savings* associated with your proposed energy improvement project. Include additional information or supporting documentation* with your application in addition to providing your completed Energy Audit documentation.

Please be sure to explain how you determined (calculated) your current annual energy usage related to the specific project and the estimated new energy usage after the implementation of the proposed project, which you've presented in the table above (Step 2A). If this explanation is already described in your Energy Audit, please indicate where in the audit (i.e., page numbers) this information can be found.

ii) List any additional information or supporting documentation* with your application in addition to providing your completed Energy Audit documentation.

*You will need to refer to your responses in the boxes i) and ii) above on your application form for **question 15**

Using the information reported in Table **STEP 2A above**, calculate the estimated percent (%) energy savings on an annual basis associated with your Project-specific savings (go to TABLE STEP 2B).

TABLE STEP 2B

Estimated Percent Energy Savings on an annual basis associated with your proposed Energy Efficiency Improvement Project

Enter your result from Table Step 2A – SAVING Total (c) – Estimated total annual energy saving after implementing your proposed energy efficiency improvement project	Total (c) kWh/yr
Enter your Total (a) result from Table Step 2A (Current Annual Energy Usage associated with Project-Specific System)	Total (a) kWh/yr
Calculate: Percent (%) Energy Savings- Project-Specific by dividing Total (c) by Total (a) and multiplying by 100 *	%

* You will need to use your response above (Percent Energy Savings – Project-Specific) to select the appropriate range on your application form for **question 14**. You will also be asked to provide the specific value of the percentage calculated above on your application form for **question 15**.

STEP 3 - Estimate the savings in energy usage for your whole farm operation after implementing your proposed Project

- Estimate the annual energy usage savings associated with your **whole farm operation** after implementing your proposed energy efficiency project.
- Where applicable, consider if your proposed project may result in a change in another type of energy usage. For example: change in lighting type from high pressure sodium lights to LED lights results in a reduction in electrical energy usage; however, this change could result in an increase in natural gas usage to replace heat previously generated by high pressure sodium lighting. For this example, the estimated increase in natural gas usage should be considered when completing TABLE STEP 3.
- All energy usage must be in kWh and reported on an annual basis.

TABLE STEP 3

Estimated Annual Change (reduction/increase) in Energy Usage for your **whole farm operation** anticipated as a result of implementing your proposed Project

Type of Energy Source	A. Electricity (kWh/yr)	B. Natural Gas (kWh/yr)	C. Propane/ LPG (kWh/yr)	D. Diesel (kWh/yr)	E. Heating Oil (kWh/yr)	F. Other (specify) (kWh/yr)	G. Other (specify) (kWh/yr)	Total Change in Energy Usage Resulting from Proposed Project (add all columns A-G) (kWh/yr)
From Step 1 – Total Baseline Whole Farm Energy Use for each Energy Type - BASELINE								Baseline
From Step 2: Estimated Annual Project Specific Energy Savings after implementing your proposed energy efficiency project - SAVING								Total (c)
<u>Optional:</u> Estimated Annual Energy Use Savings in Other Areas of the Farm Operation as a result of Implementing your Proposed Energy Efficiency Project <i>[This may not be applicable to all projects – only provide information in this row if it applies to your project]</i>								Total (d)

<p>Optional: Estimated Annual Energy Use Increases in Other Areas of the Farm Operation as a result of Implementing your Proposed Energy Efficiency Project</p> <p><i>[This may not be applicable to all projects – only provide information in this row if it applies to your project]</i></p>								Total (e)
<p>Estimated New Total Annual Whole Farm Energy Usage After Implementing Your Proposed Energy Efficiency Project</p> <p>[Calculated as Baseline minus Total (c) minus Total (d) plus (Total e)]</p>								Total (f)
<p>Total Whole Farm Operation Estimated Annual Energy Usage after implementing your proposed Project (combined for all types of energy source) (AFTER) *</p>								Total (f) *

* You will need to enter your response above (AFTER) on your application form for **question 18**.

<p>Describe any anticipated annual energy use savings or energy use increases <u>in other areas of the farm</u> operation as a result of implementing your proposed energy efficiency project.</p>
<p></p>

STEP 4 - Estimate the energy savings of your proposed energy efficiency improvement project for your whole farm operation

- Use information from **STEPS 2 and 3 above** to determine the percent (%) energy savings for your whole farm operation.

<p>Line 1. Calculate the WHOLE FARM SAVINGS Total Annual Energy Use Savings for the Whole Farm after implementing your proposed energy efficiency improvement project Calculated as Total (c) plus Total (d) minus Total (e)</p>	<p>WHOLE FARM SAVINGS (Line 1)</p> <p style="text-align: right;">kWh/yr</p>
<p>Line 2. Enter your result from STEP 1 (BASELINE) Total annual baseline energy usage – whole farm operation)</p>	<p>BASELINE (Line 2)</p> <p style="text-align: right;">kWh/yr</p>
<p><u>STEP 4 RESULT:</u> Percent (%) Energy Savings for Your Whole Farm Operation* calculated by dividing WHOLE FARM SAVINGS (Line 1) by BASELINE (Line 2) then multiplying by 100</p>	<p>Line 1 / Line 2 x 100</p> <p style="text-align: right;">%</p>

* You will need to use your response above (**Percent Energy Savings – Whole Farm Operation**) to select the appropriate range on your application form for **question 19**. You will also be asked to provide the specific value of the percentage calculated above on your application form for **question 20**.

STEP 5 - Estimating Reduction in Fossil Fuel Energy Usage as a result of your proposed Project

If your proposed Project is anticipated to reduce the use of fossil fuel energy sources (natural gas, propane, diesel, heating oil) on your farm, complete the table below.

- Consider only the use of fossil fuel energy sources as reported in Step 2A to determine the estimated annual reduction in fossil fuels as a result of implementing your project. Do not include savings from electricity or any other non-fossil fuel in this step.

TABLE STEP 5

Estimated Annual Reduction in Fossil Fuel Energy Usage (Project Specific) anticipated as a result of implementing your proposed Project.

Type of Energy Source	A. Electricity (kWh/yr)	B. Natural Gas (kWh/yr)	C. Propane/ LPG (kWh/yr)	D. Diesel (kWh/yr)	E. Heating Oil (kWh/yr)	F. Other (specify) (kWh/yr)	G. Other (specify) (kWh/yr)	Total Annual Reduction in Fossil Fuel Energy Usage resulting from proposed Project Total (add all columns B to E, plus F and/or G if applicable) (kWh/yr)
From STEP 2 : Estimated Annual Project-specific Energy Savings						Include only if fossil fuel usage reduced	Include only if fossil fuel usage reduced	
Total Estimated Annual Project-Specific Energy Savings as a result of implementing your proposed Project (considering only fossil fuel energy sources) *								kWh/yr

* You will need to enter your response above on your application form for **question 7**.