



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Energy Programs Office



Agriculture Energy Initiative

Agricultural Advisory Board Meeting
June 10, 2021

Tom Wolf, Governor

Patrick McDonnell, Secretary

DEP Energy Programs Office

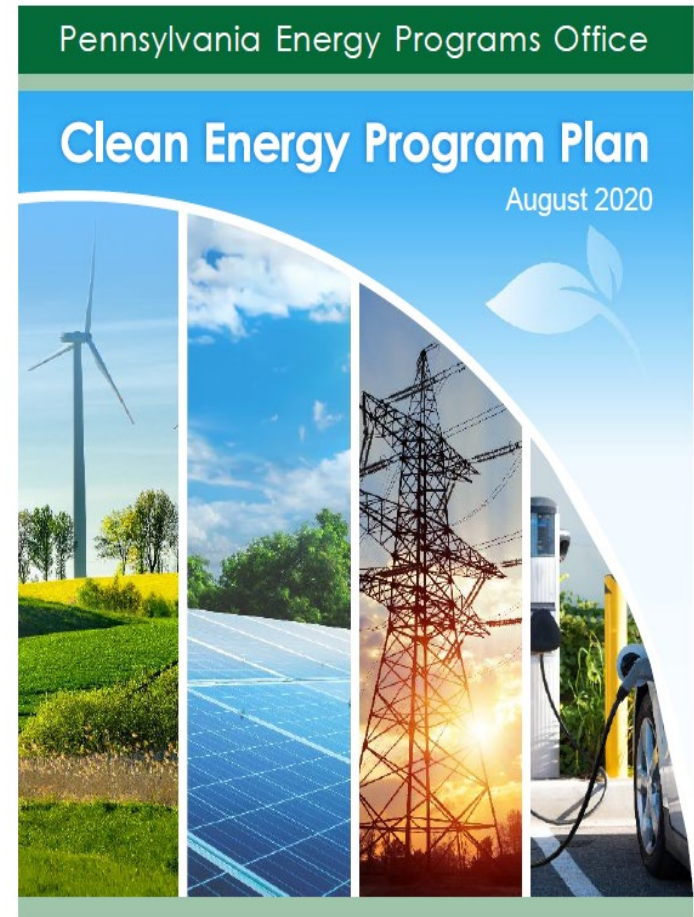
Primary agency responsible for implementing clean energy programs in Pennsylvania:

- Renewable energy
- Energy efficiency and conservation
- Climate change mitigation and adaptation
 - Alternative transportation
 - Energy assurance
- Education, outreach and technical support

Works with partners to implement, coordinate, and facilitate programs.

Clean Energy Program Plan

- Ambitious long-term clean energy goals to minimize climate impacts
- Goal: Identify and support high value renewable energy opportunities for Pennsylvania's farms and agriculture systems
- Examples: On-site solar installations, biogas digesters, vehicle electrification, and combined heat and power



Agriculture Energy Initiative

- Grew out of stakeholder input on energy-related needs in the industrial sector in 2018
- Stakeholders identified agriculture as a sector in need of information and support related to energy efficiency



Study: Energy Use on Farms

- Study of where and how energy is being used on Pennsylvania farms
- Conducted in 2019 by contractor EnSave, Inc.
- Results and recommendations report completed March 2020



Methodology

- Used the USDA Census of Agriculture to quantify the number of farms in agricultural subsectors identified by DEP: dairy, beef, swine, poultry, field crops and orchards, and greenhouses.
- EnSave adjusted the number of farms included in the analysis to include only commercial-scale operations that could implement cost-effective energy efficiency recommendations—those that spend at least \$1,000 annually on energy.

Farms Included in the Study

Sector	Farm Size Included in Analysis
Dairy	50 cows or more
Beef	100 beef cattle and calves or more
Poultry	Farms raising at least 100,000 meat birds annually or 10,000 laying birds
Swine	Farms with at least 100 pigs
Orchards	Farms using at least \$1,000 per year in diesel fuel for irrigation pumping
Greenhouse/ Indoor Agriculture	At least 2,000 square feet under glass or other protection
Field crops	Farms using at least \$1,000 per year in diesel fuel for irrigation pumping

Adjusted Number of Farms

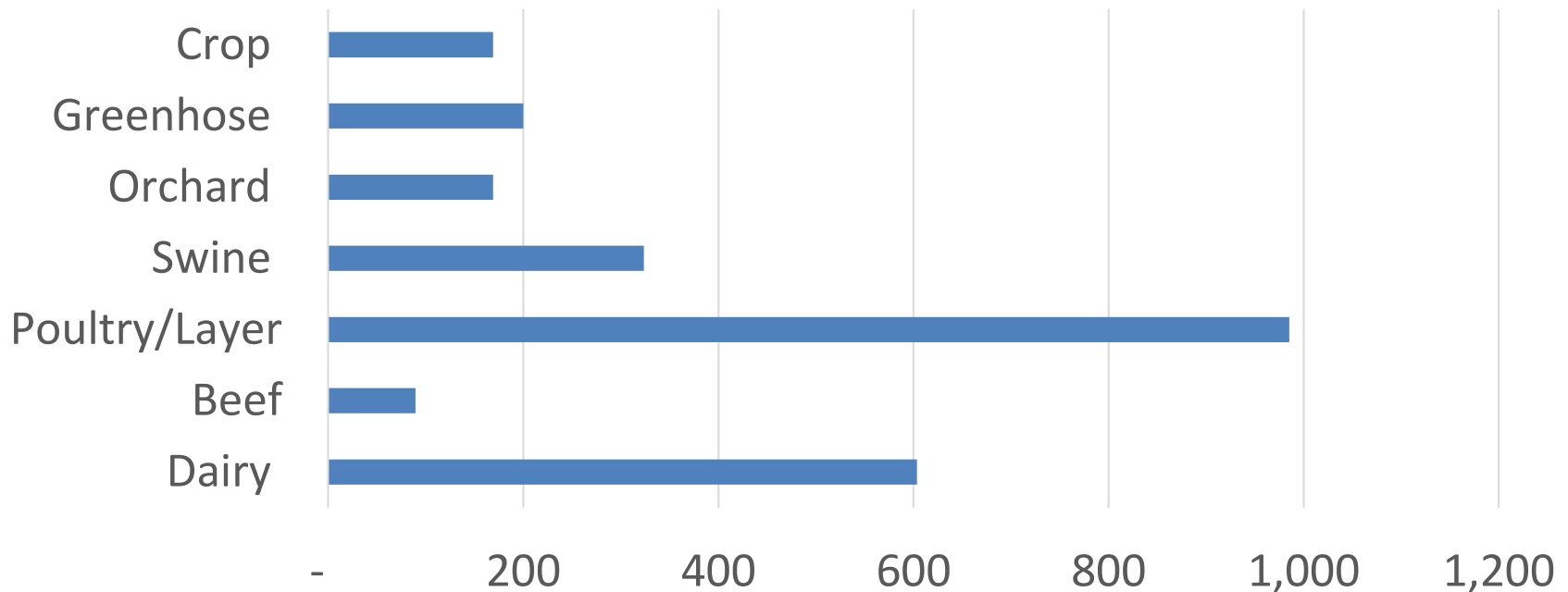
Dairy	Beef	Poultry	Swine	Orchards	Greenhouse	Crop
3,913	145	701	617	18	474	140

Total Annual Energy Costs

	Dairy	Beef	Poultry	Swine	Orchard	Green-house	Crop	Total
Electricity	\$44,573,969	\$310,538	\$7,347,451	\$1,192,090	\$40,740	\$715,643	\$308,460	\$54,488,891
Fuel	\$18,437,813	\$0	\$9,467,039	\$3,414,270	\$33,915	\$957,040	\$256,785	\$32,566,862
Total Energy Cost	\$63,011,782	\$310,538	\$16,814,490	\$4,606,360	\$74,655	\$1,672,683	\$565,245	\$87,055,753

Energy Use by Subsector

MMBtu per Farm



Energy Savings Potential

Technical Annual Energy Savings Potential:
– \$20,368,103

Achievable Annual Energy Efficiency Potential* -
10% of Technical Potential: **-\$2,036,811**

*Based on audit data and factors such as incentive levels, farmer's cash on hand, market volatility, and changes to commodity prices that affect ability to invest in energy projects.

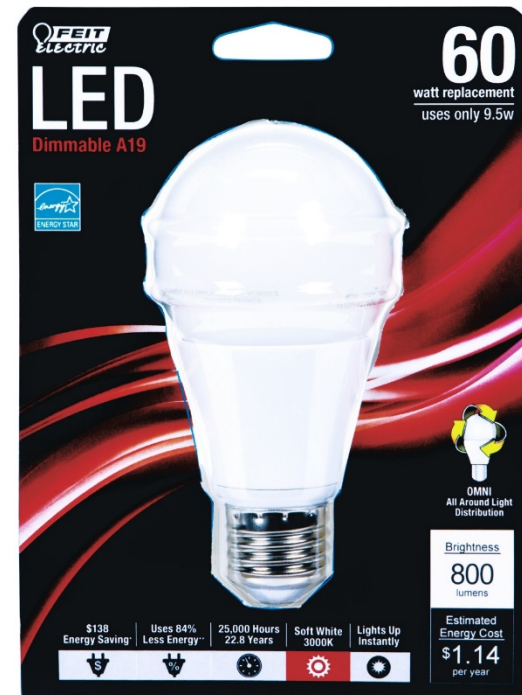
Study Conclusions

- **Dairy and poultry** are by far the most energy-intensive subsectors of PA agriculture and have the greatest potential for energy savings.
- These two subsectors and the energy efficiency measures associated with them should be the focus of an energy efficiency program.

Low-Hanging Fruit: LED Lighting

LED lighting and controls:

Best opportunity for cost-effective energy savings in all sectors of agriculture, particularly for horticultural and animal production, and exterior lighting



Other Energy-Saving Opportunities

Equipment upgrades:

- High-efficiency ventilation (circulation and exhaust fans)
- Variable-speed drives for ventilation and milk vacuum pumps
- Scroll compressors for refrigeration



The Building Environment

Buildings present great energy efficiency opportunities:

- Wall/attic insulation
- Sealing major air leaks
- Insulated brood curtains
- Dynamic temperature controls, shade curtains, waste heat recovery
- High-efficiency furnaces

Especially for swine, poultry, and greenhouses



Review of Current Assistance Programs

- EnSave, Inc. researched federal, state, and private energy efficiency programs serving Pennsylvania
- Surveyed program administrators to learn more about past participation of agricultural producers in these programs, if known

Finding: Many farmers don't know about financial or technical assistance programs

Recommendations

1. Develop and disseminate information on agricultural energy best practices and financial assistance programs that support them.
2. Fund energy audits and deeper exploration of energy efficiency projects.
3. Establish a low-interest revolving loan fund for agricultural projects.

Recommendations

4. Develop a competitive grant program for energy efficiency projects.
5. Create a full-scale energy efficiency incentive program, to include rebates.
6. Be all-inclusive, but prioritize poultry and dairy.
7. Engage the farming community.

Current Ag Programs through EPO

1. Free energy assessments
2. Free utility bill analyses
3. Education and outreach
4. Best practice materials
5. Alternative fuels for transportation grants
6. Stakeholder engagement



Free Energy Assessments

- Performed by Pennsylvania Technical Assistance Program at Penn State with DEP State Energy Program funding from U.S. Department of Energy:
 - On-site energy assessment
 - Recommendations report
- We also promote USDA REDA (Renewable Energy Development Assistance)-funded assessments through the Emerging Technology Applications Center and St. Francis University.

Free Utility Bill Analysis

- DEP in partnership with Penn State Extension through State Energy Program funds from U.S. DOE.
- Farm provides copies of utility bills for analysis.
- Helps farmers understand energy costs, fees, and rate schedules.



Education and Outreach

DEP and Penn State Extension free eight-part webinar series on energy topics for farmers, March-May 2021

- Over 1,300 individuals registered for the webinars
- Approximately 85 Pennsylvania farmers tuning in received a complimentary tractor engine block heater timer (first come, first served).

Best Practice Materials



Farming and Energy Use

Understanding Energy Efficiency

Energy efficiency cuts costs for farms and can even lead to profitability. It also benefits the natural resources farms depend on—air, land, and water—because it decreases fuel and electricity use, which reduces greenhouse gas emissions and other pollutants.

Energy efficiency means using less energy to perform the same task. The number one priority of an energy efficiency project is to cut the amount of energy you use yet still complete a task successfully. If you don't accomplish your task as well as you did before implementing an energy efficiency project, then the measure wasn't carried out correctly, or may not have been a true energy efficiency measure after all.

First Step: Perform an Energy Inventory on Your Farm

The saying, "you can't manage what you don't measure" applies directly to energy use. Before you put energy efficiency measures in place, first identify where and how your operation is using energy.

Write down some category headings such as:



Sustainability On The Farm:
Berks County

"When we built our dairy barn, we

EPO is developing a series of educational handouts on energy topics, with assistance from Penn State Extension.

Alternative Fuel Vehicle Grants

- EPO administers the Alternative Fuels Incentive Grant program, which provides grants for alternative fuel vehicles. **Farms are eligible.**
- Funds electric, natural gas, biodiesel, propane, and hydrogen vehicles.
- On-road vehicles registered in Pennsylvania.

Stakeholder Engagement

- EPO has an agriculture energy efficiency stakeholder group
- Several organizations participating
- We are always looking for stakeholder ideas on how EPO can best assist the ag sector!





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Questions?

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DEP Agriculture Energy Website:
www.dep.pa.gov/agricultureenergy



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