



Clean Energy for Agriculture Task Force (CEATF) Strategic Plan

March 2017

Strategies were developed with contributions from representatives of many organizations, including:

- New York State Energy Research and Development Authority
- New York State Department of Agriculture and Markets
- New York State Department of Environmental Conservation
- New York State Department of Public Service
- New York Farm Viability Institute
- New York State Pollution Prevention Institute
- New York Farm Bureau
- New York Cow Power Coalition
- Empire State Development
- US Department of Agriculture Rural Development
- Cornell College of Agriculture and Life Sciences
- Cornell PRO-DAIRY
- Cornell Cooperative Extension
- Dairy Farmers of America
- Farm Credit East
- Northeast Dairy Producers
- National Grid
- Rochester Gas and Electric

Clean Energy for Agriculture Task Force (CEATF) Strategic Plan

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1. Introduction

New York Governor Andrew M. Cuomo created the Clean Energy for Agriculture Task Force (CEATF) to identify and prioritize clean energy opportunities for the agricultural sector. The CEATF is comprised of leading agricultural organizations, farmers, universities, and individuals active in the State's agriculture sector. The CEATF is being co-managed by the New York State Energy Research and Development Authority (NYSERDA) and the New York State Department of Agriculture and Markets (NYS DAM). This Clean Energy for Agriculture Strategic Plan (Strategic Plan) is the result of suggestions from CEATF participants in a series of discussions held by the CEATF steering group and its seven working groups.

1.1 Objective

The objective of this Strategic Plan is to guide the continued development and implementation of impactful clean energy initiatives in support of the New York State Energy Plan. Increasing the energy efficiency of the State's agricultural sector and expanding access to and understanding of clean energy technologies are critical components of the Governor's nation-leading Clean Energy Standard goal of sourcing 50 percent of the state's power from renewable sources by 2030. This Strategic Plan represents the commitment of key agriculture sector stakeholders and identifies recommended core initiatives and initial action steps to expand clean energy opportunities for the State's agricultural producers.

1.2 Importance of Agriculture to New York State Economy

The agricultural sector in New York State is a significant contributor to the overall economy, with the State's total agriculture production valued at over \$5.4 billion annually and total cash income for farm operators at over \$1.4 billion in 2012.¹ There are over 35,500 farms in New York, occupying about 25 percent of the State land and spending an estimated \$443 million on utilities, gasoline, fuels, and oils purchased in 2012.² The State is a major producer of many agricultural products; milk from cows is the largest component of the New York State agricultural sector, and other significant contributions come from grains/oilseeds, cattle, and nursery and greenhouse products. Together these four subsectors exceed 75 percent of the total agricultural market value.

Significant additional economic benefits can be seen by including other related impacts, such as manufacturing of agriculture-based products using farm commodity outputs; indirect effects, including upstream supply chain activity; and induced economic multiplier activity from the re-spending of sector income. These impacts have been analyzed by the Cornell University Charles H. Dyson School of Applied Economics and Management. For 2011, the analysis found that the direct contribution of agriculture, including support services and manufacturing, as well as farm production contributed \$37.6

¹ United States Department of Agriculture (USDA), 2012 Census of Agriculture New York State and County Data – Data accessed 1/20/16 online through National Agricultural Statistics Service Quick Stats Database, <http://quickstats.nass.usda.gov/>.

² USDA, 2012 Census of Agriculture.

billion in output, 115,000 jobs, and over \$9 billion in value added to the gross domestic product (GDP) of the State economy.³ After adding in the indirect upstream and induced downstream effects, the calculated economic contribution reached almost \$54 billion in output, over 200,000 jobs, and just under \$20 billion in State GDP.⁴ An update for 2013 found that the total of direct, indirect, and induced impacts had increased to \$61 billion in output, over 235,000 jobs, and over \$24 billion in State GDP.⁵

1.2.1 Clean Energy Activity

Clean energy renewables and energy efficiency measures can help sustain the economic vitality of the State's important agriculture sector. Farms have begun to take advantage of clean energy opportunities. There were 1,379 renewable energy systems on farms in New York by the end of 2012, about one for every 26 farms.⁶

Approximately 800 New York farms participated in NYSERDA's Agriculture Energy Efficiency Program (AEEP) between 2011 and 2014. Additionally, farmers participated in other efficiency programs, including NYSERDA's FlexTech, Existing Facilities, and Industrial and Process Efficiency programs and their respective investor-owned utility programs.

The AEEP program has delivered almost 24 million kWh/yr in electric savings.⁷ While this is a significant accomplishment, many more opportunities exist to reduce the sector's electricity use. Meeting the agricultural equivalent of the State's targeted 30 percent reduction in building energy use by 2030 will require a sustained and elevated effort. The strategic initiatives highlighted in this Strategic Plan offer a path toward this objective.

³ Todd Schmit, "Agriculture-Based Economic Development in New York State: The Contribution of Agriculture to the New York Economy," May 2014.

⁴ Schmit, 2014.

⁵ Todd Schmit, "Trends and Impacts of Food & Beverage Manufacturing & Food Hubs: Opportunities for Agriculture in NYS," Presentation 10/14/15 at New York Loves Food Conference.

⁶ USDA, 2012 Census of Agriculture.

⁷ See Table 2 in *Energy Efficiency in New York State Agriculture: Summary of Energy Efficiency Programs and Research Opportunities, Final Report*, Report Number 15-14, prepared by EnSave for NYSERDA, June 2015, p. 5, available at <https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Other-Technical-Reports/energy-efficiency-in-new-york-state-agriculture.pdf>.

2. Strategic Initiatives

The CEATF formed seven working groups to identify and prioritize the strategic initiatives included in this Strategic Plan. Collectively, the working groups initially identified over 80 possible initiatives. These initiatives were streamlined, grouped, and prioritized into 20 initiatives across eight distinct focus areas. The following sections present the focus areas of this Strategic Plan and identify the strategic initiatives and recommended initial action steps for each. As the CEATF groups work to further advance and implement these strategies, it is anticipated that the individual working groups of the CEATF will develop more detailed implementation or investment plans and schedules that build on the strategic initiatives and initial action steps identified in the Strategic Plan. During this process CEATF participants may find more effective approaches and collaborate in adjusting strategies and action steps accordingly. The implementation of the plan will be guided by the Memorandum of Understanding (MOU) entered into by NYSERDA, NYS DAM, and other CEATF participants.

2.1 Continuing Engagement and Collaboration

Multiple organizations have supported agricultural activities to ensure the sustainability of the State’s agriculture sector for generations to come. In the last few years New York State’s energy economy has been undergoing significant changes through the initiatives for Reforming the Energy Vision (REV). These changes are being developed to bring significant clean energy opportunities throughout the State’s economy by greatly scaling up the application of energy efficiency measures and energy production from renewable sources. Emerging clean energy opportunities can be more effectively realized through a collaborative effort of these multiple organizations. The CEATF is a good example of the collaboration across these organizations required to most effectively implement new energy initiatives that can enhance the economic and environmental sustainability of farms in the State. The recommendations in Table 2-1 identify key roles to address new energy initiatives and opportunities.

Table 2-1. Strategic Initiatives for Continuing Engagement and Collaboration

Initiative Number	Strategy	Strategic Action Steps	Lead Organizations(s)
1.1	Continue to engage with initiatives for Reforming the Energy Vision (REV) and related changes.	<ol style="list-style-type: none"> 1. Identify opportunities for input into REV proceedings and in the development of programs, tariffs, regulations, and legislation affecting clean energy. 2. Alert relevant stakeholders with key roles in the sustainability of the State’s agriculture sector. 3. Facilitate examination of issues and pros and cons of possible input. 4. Deliver significant findings to stakeholders to assist in providing sound input to proceedings as appropriate. 	CEATF
1.2	Continue stakeholder collaboration through the CEATF.	<ol style="list-style-type: none"> 1. Identify stakeholders willing to participate in continuing collaboration. 2. Issue Strategic Plan and Memorandum of Understanding documenting commitment to continue for two years. 3. Continue collaboration through the CEATF and its working groups to further evaluate, develop, and implement impactful strategies. 	CEATF leadership

2.2 Outreach and Education

Strong communication and consistent quality messaging are essential components of initiatives to advance clean energy in the agricultural economy and bring potential improvements in energy efficiency, yields, resiliency, adapting to climate change, and sustainable profitability. Providing information about these opportunities and benefits is key to better enabling farms and their advisors to evaluate projects that may be suitable for their farms. This Strategic Plan presents two complementary initiatives explicitly targeting outreach and education: establish reliable locations for access to information for the agricultural community, and expand outreach to actively deliver clean energy information to the agricultural community.

Table 2-2. Strategic Initiatives for Outreach and Education

Initiative Number	Strategy	Strategic Action Steps	Lead Organization(s)
2.1	Establish reliable information sources that farms can access for clean energy information.	<ol style="list-style-type: none"> 1. Identify information and responses for farms and relevant stakeholders. 2. Evaluate approaches such as “Convenience Store” and “One-Stop-Shop” methods for making information available for farm and stakeholder access. 3. Establish collaboration procedures selected for developing and maintaining current information. 4. Implement procedures for compiling, developing, and maintaining current information. 	NYSERDA
2.2	Expand outreach to deliver clean energy information to the agricultural community.	<ol style="list-style-type: none"> 1. Inventory programs currently engaging in outreach to provide clean energy information for farms and relevant stakeholders. 2. Identify information to be compiled or developed for outreach delivery. 3. Establish collaboration procedures for preparing, maintaining, and delivering that information. 4. Implement outreach procedures for collaborating across organizations where appropriate. 	Cornell Cooperative Extension (CCE)

2.3 Renewable Energy on Farms

The New York State Energy Plan set an ambitious renewable energy goal to increase renewable generation to 50 percent by 2030. Greater use of clean energy brings benefits consistent with the policies set forth for the State in its Constitution, “to conserve and protect its natural resources and scenic beauty and encourage the development and improvement of its agricultural lands for the production of food and other agricultural products.”⁸ An expansion of cost-effective renewable generation, along with energy conservation, can contribute to sustaining the economic viability of the State’s farm economy. Such benefits are consistent with the State’s Agricultural and Farmland Protection Program Law, which

⁸ The Constitution of the State of New York – ARTICLE XIV Section 4.

declares “that agricultural lands are irreplaceable state assets” and charges the State “to explore ways to sustain the State’s valuable farm economy and the land base associated with it.”⁹

Agricultural land in the State encompasses 25 percent of the total land area, presenting an opportunity for the sector to become a contributor to the achievement of State energy goals while also providing economic viability benefits by bringing clean energy to the farm economy. NYSERDA administers initiatives to expand the use of renewable energy, such as NY-SUN, On-Site Power, and Large Scale Renewables Programs. NYSERDA, NYS DAM, and other key stakeholders will work together to find effective approaches to increase participation in such programs, while at the same time developing information that helps protect the value of agricultural lands by expanding the resources available to agricultural communities for the smart siting and acceptance of renewable energy systems.

Other approaches to increase renewable energy applications include expanding community resources for ownership, financing, and implementation models; finding ways to monetize additional values of renewables; and improving transparency of renewable pricing. The following strategic initiatives outline opportunities for renewables within the agricultural sector.

⁹ New York State Agriculture and Markets Law, ARTICLE 25-AAA, Section 321.

Table 2-3. Strategic Initiatives for Renewable Energy on Farms

Initiative Number	Strategy	Strategic Action Steps	Lead Organization(s)
3.1	Expand opportunities for renewable energy systems in the agriculture sector.	<ol style="list-style-type: none"> 1. Identify barriers and opportunities for the sector to participate in greater installation of renewable energy systems. 2. Seek the best ways for the sector to participate in NYSERDA programs and other potential opportunities for further advancing installation of sustainable renewable energy systems. 3. Evaluate and develop impactful approaches to significantly advance renewable installations. 	NYS DAM and NYSERDA with Anaerobic Digestion (AD) and Other Renewables Working Groups
3.2	Expand financial, operational, and legal resources to support expansion of community-based development of renewable resources.	<ol style="list-style-type: none"> 1. Identify recommended actions considering an inventory of existing community-based resources, such as Community Distributed Generation, Community Choice, Property Assessed Clean Energy Financing, Solarize NY, renewables training, resources for smart siting and land use planning, and model documents. 2. Develop recommended information and actions addressing identified gaps and opportunities. 3. Deliver information to communities through existing and new outreach channels in coordination with Outreach and Education Working Group and the NYSERDA Communities program. 	NYSERDA and NYS DAM
3.3	Identify, evaluate, and develop recommendations for greater monetization of renewable energy benefits.	<ol style="list-style-type: none"> 1. Document the nature and extent of on-farm generation benefits. 2. Identify potential approaches to fairly value these benefits and to allow customers to monetize these benefits at prices reflecting their higher voluntary valuation. 3. Provide input to REV-related proceedings and other programs to provide fair values and higher voluntary valuation for these benefits. 	AD and Other Renewables Working Groups
3.4	Increase transparency in renewable electricity pricing.	<ol style="list-style-type: none"> 1. Document challenges resulting from the lack of transparency in existing renewable pricing. 2. Develop proposed changes to standardize documentation for easy, straightforward explanations. 3. Seek consensus on changes with utilities and other stakeholders, and present recommendations to DPS. 	AD and Other Renewables Working Groups

2.4 Anaerobic Digestion

One type of renewable energy on farms is anaerobic digestion (AD) of animal manure, other farm byproducts, and organic wastes from other sources. AD systems produce biogas containing methane that can be used to produce heat and electricity for farm use and electric grid export. By treating manure and other organics, AD systems reduce odors and greenhouse gases, and also allow for better use of nutrients. At the time of this Strategic Plan, there are 21 operational AD systems on farms in the State. Additional farms could become good candidates if ways were found to reduce costs, increase the monetary value of benefits, and change business models to reduce risks and complexities of AD installation and operation. The following initiatives highlight activities identified by the AD Working Group to preserve, promote, and expand the application of AD.

Table 2-4. Strategic Initiatives for Anaerobic Digestion

Initiative Number	Strategy	Strategic Action Steps	Lead Organization(s)
4.1	Provide information and coaching for existing and prospective AD projects through the ongoing Cornell AD Assistance Initiative (ADAI) funded by NYSERDA.	<ol style="list-style-type: none"> 1. Continue to assist farm host sites and project developers with project development and optimization. 2. Standardize project documentation to reduce soft costs. 3. Ensure that AD project support information is incorporated into Outreach and Education channels. 	Cornell PRO-DAIRY with AD Working Group
4.2	Provide funding for market development analysis to advance AD project implementation.	<ol style="list-style-type: none"> 1. Work with stakeholders to identify promising opportunities for market development analysis. 2. Secure funding for the work through NYSERDA's ADAI, CEF, and/or other sources. 3. Develop and circulate results throughout the NYS dairy community and to other relevant stakeholders. 	NYSERDA and Cornell PRO-DAIRY
4.3	Provide cost-sharing for development and evaluation of new AD business models.	<ol style="list-style-type: none"> 1. Identify promising business models and their market readiness. 2. Prepare a Clean Energy Fund Investment Plan Program for Anaerobic Digestion in collaboration with relevant stakeholders. 3. Implement approved program to pilot business models. 	NYSERDA with AD Working Group
4.4	Consider impacts on AD of potential legislative, regulatory, tariff, and program changes.	<ol style="list-style-type: none"> 1. Identify provisions affecting AD and ensure stakeholders are informed of potential impacts. 2. Evaluate significance of potential benefits and challenges of proposed changes considering the potential for impacting the scale of AD installation. 3. Assist stakeholders in providing sound inputs to processes for change as appropriate. 	NYSERDA and NYS DAM with AD Working Group

2.5 Farms and Energy Efficiency

Significant work has been performed to identify and implement energy efficiency opportunities on farms. However, many opportunities remain for expanding into additional subsectors within agriculture and for identifying additional savings opportunities. Implementing efficiency measures directly impacts farm profitability, as farms are able to reduce their energy consumption per unit of production. To continue making progress in energy efficiency on farms, a best practices guide is needed to inventory existing energy practices, help with decision-making processes, and support implementation and evaluation of on-farm improvements.

Table 2-5. Strategic Initiatives for Farms and Energy Efficiency

Initiative Number	Strategy	Strategic Action Steps	Lead Organization(s)
5.1	Develop energy-related farm management best practices guide.	<ol style="list-style-type: none"> 1. Conduct a gap analysis of existing farm management best practices information. 2. Identify decision-making criteria primarily used for on-farm investments. 3. Develop measurement criteria for evaluation of farm management best practices by farms and their advisors. 4. Prepare a guide for farm management best practices specific to the agriculture sector. 	NYSERDA

2.6 Controlled Environment Agriculture

New York State has over 1,500 controlled environment agriculture (CEA or greenhouse) operations, including vegetable, floriculture, and small fruits, estimated to contribute over \$230 million in annual wholesale value. Greenhouses represent a significant growth opportunity as they present opportunities to extend the growing season. CEA can enable farms to better compete with out-of-state suppliers to increase their market share and improve the reach of locally grown produce throughout the State. The strategic initiatives for CEA include benchmarking energy efficiency practices, investigating combined heat and power (CHP) solutions for greenhouses, and a continued focus on greenhouse lighting and controls to improve energy efficiency and plant productivity.

Table 2-6. Strategic Initiatives for Controlled Environment Agriculture

Initiative Number	Strategy	Strategic Action Steps	Lead Organization(s)
6.1	Benchmark practices for energy efficiency in greenhouses.	<ol style="list-style-type: none"> 1. Identify variables affecting energy use and appropriate performance metrics. 2. Collect and analyze data for a sample of greenhouses throughout NYS. 3. Develop a scaled system for ranking normalized greenhouse energy use intensity (EUI). 4. Share results of sample, and encourage all greenhouse farmers in NYS to benchmark their operations. 	NYSERDA and Cornell University
6.2	Explore the potential for combined heat and power (CHP) systems for greenhouses.	<ol style="list-style-type: none"> 1. Survey European market for co-located greenhouse and CHP plants to identify the extent of transferrable applications and their projected environmental impacts and economic viability. 2. Develop case studies of pilot projects demonstrating feasibility, building on resources available through existing CHP incentive programs at NYSERDA and LIPA. 3. Deliver information leveraging existing outreach channels and actively marketing the combination of CEA and CHP systems to NYS farms. 	NYSERDA and Cornell University
6.3	Transform greenhouse lighting to optimize energy efficiency, productivity, and returns through systems management approach.	<ol style="list-style-type: none"> 1. Organize a consortium of leading greenhouse LED and control system specialists to spearhead research and development. 2. Research and assess emerging opportunities for LED and control systems applications for greenhouses. 3. Deliver results and promote education and implementation of the most promising applications. 	NYSERDA

2.7 Clean Energy Financing

While clean energy improvements present many attractive opportunities, from generating renewable energy to improving the energy used per yield of crop produced, there are barriers to financing such improvements. The upfront costs of improvements necessitate financing solutions, but traditional lenders are often unfamiliar with some on-farm technologies, resulting in difficulties acquiring low-cost capital based on projected benefits. The strategies in Table 2-7 are aimed at providing financial resources to farms, as well as encouraging new and emerging financial structures to gain more traction within the agricultural community. There is no single financing option that is a best fit for all. Increasing the variety of solutions can be an effective way to spur clean energy project implementation.

Table 2-7. Strategic Initiatives for Clean Energy Financing

Initiative Number	Strategy	Strategic Action Steps	Lead Organizations
7.1	Mobilize financial resources for the agricultural sector.	<ol style="list-style-type: none"> 1. Continue and accelerate “Voice of the Customer” process to better understand sector needs. 2. Evaluate financial and cost models for agricultural applications. 3. Develop standardized transaction documents. 4. Engage stakeholder representatives to bring new business models and financing resources to the market. 	NYSERDA with Finance Working Group
7.2	Accelerate Property Assessed Clean Energy (PACE) financing in agricultural sector.	<ol style="list-style-type: none"> 1. Disseminate the benefits of PACE financing throughout new and existing partner networks within the agricultural sector. 2. Recruit additional municipalities to approve PACE funding. 3. Assess existing program parameters and recommend program modifications as needed. 	NYSERDA and Energy Improvement Corporation (EIC) with outreach organizations
7.3	“REV” up participation in the USDA Rural Energy for America Program (REAP).	<ol style="list-style-type: none"> 1. Increase understanding of REAP among renewable energy companies, farmers, and organizations that advise them. 2. Identify agricultural lenders, and reach out to them to increase their understanding. 3. Prepare simplified standardized documents for farmers and lenders. 	USDA Rural Development with NYSERDA

2.8 Technology Advancement and Research and Development Opportunities for Clean Energy and Managing Greenhouse Gas Impacts

Advancements in new and underutilized technologies and research and development (R&D) are core components for future clean energy advancements on farms and managing greenhouse gas (GHG) impacts. R&D strategies cut across all of the focus areas in this Strategic Plan. Many universities and public- and private-sector organizations are actively pursuing new and underutilized technologies with near-term potential for on-farm application. These opportunities include technologies and methods for energy efficiency improvements, AD enhancements, increased use of algae as feed or to capture carbon dioxide, and many other approaches for advancing clean energy, reducing GHG, and adapting to climate change impacts of GHG emissions. The CEATF R&D Working Group will facilitate collaboration among farm customers and the State’s active research institutions to help identify and prioritize technologies and research activities to meet the needs of farms. The strategic Technology Advancement and R&D initiative will establish a structured method for this review by the agriculture community and State organization representatives, meeting stakeholder interests and needs throughout the process.

Table 2-8. Strategic Initiatives for Technology Advancement

Initiative Number	Strategy	Strategic Action Steps	Lead Organization(s)
8.1	Implement a process to identify, highlight, and evaluate barriers and opportunities for technology advancement for clean energy and GHG reduction in agricultural applications.	<ol style="list-style-type: none"> 1. Identify and highlight needs and drivers that support clean energy, GHG reduction, and climate change adaptation in agriculture. 2. Establish a process for reviewing, vetting, and recommending potential opportunities within particular focus areas. 3. Implement the review and vetting process to identify barriers and particular opportunities, within the focus areas, with the most significant potential to advance clean energy and GHG reduction. 4. Identify potential actions, funding sources, and strategies to advance identified opportunities toward implementation. 	R&D Working Group, with representation from the agricultural community, leading NY R&D universities, and agricultural research centers

3. Next Steps for Strategic Plan

This Strategic Plan presents the initiatives recommended by the CEATF after an initial series of meetings. An MOU among the CEATF co-managing agencies NYSERDA and NYS DAM and the other CEATF participants is being executed to establish this Strategic Plan as a guiding document for advancing clean energy benefits for the agricultural sector.

As set forth in the MOU, the CEATF participants will continue to communicate and collaborate for the next two years in further exploration, development, and implementation of clean energy strategies in the Strategic Plan found to be within the missions and capabilities of their organizations. Lead organizations will collaborate with the designated working groups in the implementation of action steps. The Steering Group will host meetings and calls on at least a quarterly basis to track progress and consider working group recommendations.

As strategy implementation is pursued, it is anticipated that the CEATF participants may well find more effective approaches and will collaborate in changing strategies and action steps accordingly. As set forth in the MOU, the Strategic Plan may be updated to incorporate significant adjustments where appropriate and useful.

The CEATF co-managing organizations will work with the other participants to prepare two Annual Status and Update Reports on the work of the CEATF. The second report will include recommendations about the future of the CEATF.