

Dual-Use: Agriculture and Solar Photovoltaics



The Massachusetts Department of Energy Resources has established the Solar Massachusetts Renewable Target (SMART) program, which will regulate incentives associated with new solar photovoltaic (PV) development in the state. A series of fact sheets designed to help farmers navigate the program is available on the UMass Clean Energy Extension (CEE) website, <https://ag.umass.edu/clean-energy>.

What does dual-use mean?

In general, dual-use refers to agricultural production and electricity production from solar photovoltaic (PV) panels occurring together on the same piece of land. It is expected that in most cases individual crop yield (lbs/acre) or electricity output (kWh/acre) will be lower in dual-use than it would be if either activity was carried out alone, but that the combined value of crops and electricity produced will be equal to or higher than single-use of the land for production of crops or electricity alone.

In the state of Massachusetts, specific kinds of dual-use systems are known as “Agricultural Solar Tariff Generation Units,” and can qualify for financial incentives under the SMART program. In these systems, every square foot of land possible must be maintained in continuous agricultural production. The SMART regulation can be found on the MA DOER website: <https://www.mass.gov/files/documents/2017/10/16/225cmr20.pdf>.

The requirements to qualify for compensation as a dual-use system are further defined by two guidelines.

- Land Use and Siting Guideline: <https://www.mass.gov/doc/smart-land-use-and-siting-guideline-final>
- Agricultural Solar Tariff Generation Unit Guideline: <https://www.mass.gov/doc/agricultural-solar-tariff-generation-units-guideline-final>

What types of land can dual-use systems be installed on?

For a dual-use system to qualify for compensation as an Agricultural Solar Tariff Generation Unit under the SMART regulation, it must be installed on property officially defined as **Land in Agricultural Use** or **Prime Agricultural Farmland**:

- **Land in Agricultural Use** is defined under Mass General Law 61A. If your land is taxed as agricultural land under Chapter 61A, or has been within the last five years, it qualifies as Agricultural under the regulation. *If you are not sure of the tax status of your land, contact your town tax assessors' office.*
- **Prime Agricultural Farmland.** You may also qualify as Agricultural under the SMART program if your land is defined as having Prime Farmland Soils by the Natural Resources Conservation Service. You can find soil definitions for your property on the MassGIS OLIVER website (http://maps.massgis.state.ma.us/map_ol/oliver.php) using the following process:
 1. Under "Available Data Layers," select "Physical Resources," and then "Soils."
 2. Select "Prime Farmland Soils," which will add it to the list of "Active Data Layers" under "Legend."
 3. You can then find for your property by zooming in to the Massachusetts map, or entering a street address into the "Search for a location" box. To qualify as *Prime Agricultural Farmland*, the land must be in dark green – identified in the Legend as "All Areas are Prime Farmland."

If you have difficulty with this process, please contact CEE for assistance.

You can have an additional canopy or building-mounted PV system on the same parcel of land as a dual-use array, but there are significant restrictions regarding placement of additional ground-mounted PV arrays on the same property or parcels adjacent to a dual-use system.

What system parameters are required for dual-use arrays?

Under the Agricultural Solar Tariff Generation Unit Guideline, dual-use systems incorporating the following design parameters will be reviewed in an expedited process:

- **System Size.** The capacity (rated electricity production) of the system must be no more than 2 MW.
- **Height:** The lowest edge of the panel must be at least 8 feet above the ground for a fixed tilt panel system, or 10 feet at horizontal position for tracking systems.
- **Shading:** During the growing season, the maximum sunlight reduction due to shading from the panels on any square foot of land under the dual-use system may be no more than 50%. This shading analysis must be completed using the (forthcoming) Shading Analysis Tool provided by the state. Your solar developer and CEE can assist with this analysis.
- **Agricultural use:** The system should be designed to optimize a balance between electrical generation and agricultural production, and the land must be under continuous agricultural production over the 20-year SMART program period.

If you believe these design parameters are not appropriate for your particular situation, you can apply for a waiver for one or more provisions. However, the waiver application process requires submission of detailed documentation to MA DOER, demonstrating that the proposed alternative design parameters will meet the intention of the regulation (see the Agricultural Solar Tariff Generation Unit Guideline for further details).

What is the financial compensation associated with a dual-use system?

Qualifying solar PV systems receive a base compensation rate of \$0.14-\$0.26 per kilowatt-hour (kWh) of electricity produced, depending on the size of the system and the local utility supplier (e.g. National Grid, Eversource). Dual-use systems qualifying as Agricultural Solar Tariff Generation Units receive an additional \$0.06 per kWh. As capacity is added to the electric grid, this base rate declines at a rate of 4% per capacity block. For more details, please see the CEE Fact Sheet entitled *Comparing SMART Program Compensation for Solar Array Designs*.

What documentation do I need to apply?

All solar PV systems applying to qualify under the SMART program must submit a Statement of Qualification Application to the Massachusetts Department of Energy Resources (MA DOER). This application form will be available soon and must be submitted by the solar system owner, in consultation with the solar developer. In addition, dual-use systems applying to qualify as Agricultural Solar Tariff Generation Units must submit an Agricultural Plan (including Shading Analysis) which is currently being developed by CEE in conjunction with MA DOER, MDAR, and UMass Agricultural Extension.

What are the annual reporting requirements?

In order to continue to qualify for financial compensation over the 20-year SMART program period, the owners or managers of Agricultural Solar Tariff Generation Units must submit annual reports. The reporting form, which is currently under development, will require reporting of the following information:

- **Productivity of crop or herd:** Including pounds harvested or grazed, herd size growth and/or success of the crop, as applicable, and actual productivity relative to expectations.
- **Crop management:** Detailing any observable differences in necessary crop treatment relative to solely agricultural systems, including irrigation, soil amendments, disease and weed management, etc.
- **Potential changes for future years:** Including revised crop or grazing plans.

Newsletter and More Information

To stay up to date on the latest information from UMass Clean Energy Extension, please sign up for our newsletter at <https://ag.umass.edu/clean-energy>.

Contact River Strong (gcstrong@umass.edu, 413-545-8510) with any questions related to solar PV use on your farm.