

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
DEPARTMENT OF ENERGY RESOURCES
DEPARTMENT OF AGRICULTURAL RESOURCES

PRE-DETERMINATION FORM

**DESIGN ELIGIBILITY AND FARM PLAN FOR A DUAL-USE AGRICULTURAL
SOLAR TARIFF GENERATION UNIT UNDER THE SOLAR MASSACHUSETTS
RENEWABLE TARGET (SMART) PROGRAM**

Purpose

This pre-determination form is required for all solar PV units in advance of submitting a Statement of Qualification Application to the MA Department of Energy Resources (“Department”) for qualification of a Dual-use Agricultural Solar Tariff Generation Unit (“ASTGU”) under the SMART program. The form is provided to demonstrate conformance with the provisions required for ASTGUs in 225 CMR 28.07(5)(b)3 and in the *Guideline Regarding the Definition of Dual-use Agricultural Solar Tariff Generation Units*.

The UMass Amherst Clean Energy Extension advises farmers and project developers to assist in the completion of this form and to provide the required collaboration with UMass Center for Agricultural, Food and the Environment, in advising the farm plan. In preparing your ASTGU pre-determination form, it is recommended that you review the information and fact sheets available on the UMass Clean Energy Extension (CEE) website (<https://ag.umass.edu/clean-energy/current-initiatives/solar-pv-agriculture>) and contact CEE with any questions regarding this information. Before submitting your final pre-determination form to the Department, submit a draft version of the form to CEE, at energyextension@umass.edu. CEE will review the document with Agricultural Extension staff, and provide a letter to the applicant with any recommendations or comments regarding the proposed project plans.

Following CEE review, applicants seeking to be eligible as an ASTGU must submit the ASTGU pre-determination form, including the letter from CEE, to doer.smart@mass.gov.

This form is used by the Department and the MA Department of Agricultural Resources (“MDAR”) to determine 1) that the farm site is eligible to host an ASTGU, 2) that the solar array and racking design conform with the requirements of an ASTGU, 3) that the farm plan is appropriately integrated with the shading profile determined by the required Shading Tool analysis, and demonstrates that an applicable range of productive agriculture can be maintained throughout the land covered by the array; and 4) that the farmer agrees to file annual reports on agricultural production and changes in the farm plan throughout the period of receiving the SMART tariff.

Pre-Determination Request Type

☐ Project meets the design criteria set forth for Agricultural Solar Tariff Generation Units in 225 CMR 28.07(5)(b)3 and the *Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units*, and the attached design materials demonstrate compliance.

☐ Project seeks a waiver to the design criteria set forth for Agricultural Solar Tariff Generation Units in 225 CMR 28.07(5)(b)3 and the *Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units*.

A. BASIC FARM INFORMATION

Farm Contact Person Name: _____ ☐ Farm Owner ☐ Farm Operator

Farm Name: _____

Legal Structure: ☐ Sole Proprietor ☐ LLC ☐ Corporation
☐ Partnership ☐ Other _____

Mailing Address: _____

Street Address (if different): _____

Contact Phone : _____ Contact E-mail: _____

Check all that apply: ☐ Solar facility owner ☐ Landowner ☐ Applicant

Current Type of Operation (Check all that apply):

☐ Vegetables ☐ Fruit ☐ Livestock ☐ Poultry
☐ Nursery ☐ Other _____

Total Acreage in Production: _____

Estimated Annual Sales: ☐ Less than \$5,000 ☐ \$5,000-\$24,999 ☐ \$25,000-\$249,999
☐ \$250,000-\$499,999 ☐ \$500,000 or more

Are any major modifications to the farm business expected in the next 5 years? ☐ Yes ☐ No

(Check all that apply.)

☐ Business Legal Structure ☐ Operation Type ☐ Expansion ☐ Diversification
☐ Retirement ☐ Sale ☐ Subdivision ☐ Other _____

SOLAR FACILITY OWNER CONTACT INFORMATION

(IF DIFFERENT FROM ABOVE)

Name: _____ Business (if applicable): _____

Mailing Address: _____

Street Address (if different): _____

Contact Phone : _____ Contact E-mail: _____

Check all that apply: ☐ Landowner ☐ Applicant

LANDOWNER CONTACT INFORMATION

(IF DIFFERENT FROM ABOVE)

Name: _____ Business (if applicable): _____

Mailing Address: _____

Street Address (if different): _____

Contact Phone : _____ Contact E-mail: _____

Check all that apply: ☐ Applicant

APPLICANT CONTACT INFORMATION

(IF DIFFERENT FROM ABOVE)

Name: _____ Business (if applicable): _____

Mailing Address: _____

Street Address (if different): _____

Contact Phone: _____ Contact E-mail: _____

B. SITE INFORMATION

Street Address: _____ Approximate Latitude/Longitude: _____
Assessors Map/Parcel/Lot Number: _____

Total Acreage: _____

Land Status: For qualifying under 61A, please provide proof of either current or previous enrollment; attach the proof to this application per below.

- ☐ currently enrolled in Chapter 61A
- ☐ enrolled in Chapter 61A in previous 5 years
- ☐ Important Agricultural Farmland: *Please attach MassGIS MassMapper map showing important farmland soils*
- ☐ Fallow Farmland
- ☐ Newly Created Farmland

Will the project be implemented on APR-restricted land? ☐ Yes ☐ No

If yes, please list: Name on APR restriction: _____ Year APR recorded: _____

Will the project be implemented on land restricted by an Agricultural Covenant under the Farm Viability Enhancement Program? ☐ Yes ☐ No

Note: Please label and provide the following REQUIRED ATTACHMENTS as part of APPENDIX A: REQUIRED ATTACHMENTS, defined and found at the end of this application.

REQUIRED ATTACHMENTS for this section –

- Property map
- Soils map, if applicable
- Map of APR-restricted area, if applicable
- 61A current or previous enrollment documentation, if applicable
- CEE Letter for DOER.SMART submission

C. EXCEPTION REQUEST

Please check off the design criteria requirement(s) the Applicant is seeking an exception from:

- ☐ Panel Height Requirements
- ☐ Sunlight Requirements
- ☐ Growing Season Hours Considerations
- ☐ Other
- ☐ N/A

The Department recognizes the variety and, in some cases, the uniqueness of farming operations where some of the ASTGU project specification requirements may not be required to achieve the objectives of the ASTGU. To address these specific cases, an applicant may request that the Department, in consultation with MDAR, issue an exception from any of the project specification requirements. All exception requests should be submitted to DOER.SMART@mass.gov. In no case will an exception be approved by the Department if it is contrary to the intent of the regulations.

An exception request shall include the following:

i. An Alternative Plan that:

1. details how the applicant will integrate the ASTGU into their farming operation;
2. demonstrates that the Alternative Plan does not result in a diminishment in the agricultural production capacity of the land; and
3. demonstrates that the primary use of the land is for agricultural or horticultural production, as defined by M.G. L. c. 61A.

ii. Justification and Substantiation: An applicant must provide justification as to why an alternative ASTGU design is necessary for the proposed agricultural operations on the relevant parcel of land with supporting documentation.

iii. Additional Documentation: An applicant must provide documentation for each specific aspect of the project specification requirements set forth below for which the ASTGU is requesting an exception:

1. Panel Height Requirements: Explain below and provide documentation demonstrating how the proposed design will allow for the variety and flexibility of a range of potential farming operations at the farm throughout the entire SMART tariff term.

2. Sunlight Requirements

- a. Explain below and provide documentation demonstrating how the proposed dual-use design will provide equal or greater total agricultural yields than if both the agricultural crop and solar array were grown and installed separately, utilizing the same amount of total land area for the comparison;

- b. Explain below and provide documentation demonstrating how each square foot of land will be used for agriculture production, including at least 51% of the area directly beneath the solar modules; and
- c. Explain below and provide documentation demonstrating how the design will be able to accommodate a variety of potential agricultural products throughout the SMART tariff term.

3. Growing Season Hours Considerations: Explain below and provide documentation on how the time of season and time of day data in the project specification requirements are not relevant to the farming practice and operation, currently, and for the term of the SMART Tariff.

4. Maximum Direct Current (DC) Rating: Explain below and provide documentation on the reasoning for the maximum DC rating being exceeded, if the design will result in a larger Project Footprint, and how the design will meet the intent of the ASTGU requirements in the SMART Regulation and Guideline.

5. Other: For all other requirements for which an exception is being sought, please describe the exception(s) requested, why the proposed alternatives require an exception, and how these alternatives will meet the intent of the ASTGU requirements in the SMART Regulation and Guideline.

D. SOLAR ARRAY DESIGN

Please provide the following information regarding the solar array design:

Nameplate capacity AC (in MW): _____ (Note: 1 MW=1000 kW)

Expected annual generation (in MWh): _____ (Note: 1 MWh=1000 kWh)

Acreage of farmland over which array is to be installed: _____

Nameplate capacity DC (in MW): _____

System type: ☐ Fixed ☐ Tracking ☐ Other _____

Height of lowest panel edge (in feet): _____

Height of lowest elevated horizontal mounting (in feet): _____

Type of mounting structure and proposed materials (mono poles, I-Beams, racking, etc.): _____

Description of materials and process to be used for ground penetration: _____

Number of panels: _____

Capacity per panel: _____

Panel dimensions: _____

Panel spacing: _____

Number of rows: _____

Distance between row mounting columns: _____

For fixed systems horizontal tip-to-tip distance between top of panel in row in front and bottom of panel in the row behind _____

For tracking systems distance between panels tip-to-tip in the horizontal position: _____

If you wish to provide additional descriptive information regarding the solar array design, you

may include this information below, or in a typed attachment labeled "Solar Array Design."

Note: Please label and provide the following REQUIRED ATTACHMENTS as part of APPENDIX A: REQUIRED ATTACHMENTS, defined and found at the end of this application.

REQUIRED ATTACHMENTS for this section.

The following system drawings:

- A site plan (as viewed from above) of the impacted farmland with clear depiction of the layout of all array modules, including dimensions of the overall array, each module, and all applicable spacing. Site plan should also include energy storage system if applicable.
- A design drawing (from the side) of a representative module with dimensions showing panel tilt and elevations from ground.
- A design drawing of the mounting structure with details showing dimensions and all materials of the ground penetrations.
- Panel Specification sheet
- Energy Storage System specification sheet, if applicable

E. SHADING ANALYSIS

An ASTGU must demonstrate it is in compliance with the 50% maximum shading allowance through the use of a shading analysis tool approved by the Department. This shading analysis should be completed prior to the completion of this pre-determination form.

Provide all solar array design and layout information and input data used by the shading analysis tool to conduct the shading analysis for the project.

Provide all output in the form of a screenshot from the shading analysis tool, including a site map to clearly demonstrate the simulated percent of shading over the simulated growing season of all farmland impacted by the array. The map should be discernable down to at least a per square foot scale.

Note: Please label and provide the following REQUIRED ATTACHMENTS as part of APPENDIX A: REQUIRED ATTACHMENTS, defined and found at the end of this application.

REQUIRED ATTACHMENTS for this section

- Shading Tool Screenshot
- Shading Tool Export Spreadsheet

F. AGRICULTURAL PLAN FOR DUAL-USE AREA

Planned agricultural use, Year 1. Check all that apply.

☐ Vegetable, fruit, grains, for human consumption

☐ Hay

☐ Livestock production

☐ Poultry production

☐ Horticulture

☐ Floriculture

☐ Aquaculture

☐ Other, please describe: _____

Please fill out one Crop Narrative for each crop, detailing anticipated crop management (planting, irrigation, soil amendments, harvesting) and equipment to be used. Please also fill out the Crop Table for horticulture, flowers, vegetable, fruit, grain, and hay crops. Complete one line for each crop to be grown under the solar array, including the area to be planted within the array, and expected productivity using specific units (e.g., lbs./acre, quarts per row).

Please fill out the Grazing Narrative, detailing anticipated pasture and animal management and equipment to be used. Please also fill out the Grazing Table for livestock and poultry production. Complete one line for each type of livestock or poultry to be raised under the solar array, including the area to be grazed within the array, and expected productivity using specific units (e.g. lbs of milk per year).

For all agricultural uses, please fill out the Farm Equipment Table. Complete one line for each farm vehicle to be used within the solar array.

Additional comments regarding agricultural plan for Year 1: _____

Do you expect to grow the same crops on the land in years 2 and 3? Briefly describe your crop rotation plan and what you expect to be growing on the land for the next 5 years. Will the same equipment be used? If not, is current array design compatible with future crop management needs and equipment? _____

SPECIFIC FARM INFORMATION RELATIVE TO THE ASTGU LOCATION

Please List Specific Crops Grown for the past five years with approximate acreage for the area beneath the newly proposed ASTGU array:

☐ Vegetables: _____

☐ Fruits: _____

☐ Livestock: _____

☐ Poultry: _____

☐ Nursery: _____

☐ Other: _____

SPECIFIC FARM INFORMATION RELATIVE TO FARMLAND COMPLIANCES

For eligible existing farmland/newly created farmland, please confirm meeting the following items per 225 CMR 28.07(5)(b)3.c. and Section 3 of the *Guideline Regarding the Definition of Dual-use Agricultural Solar Tariff Generation Units*.

Eligible Farmland. A Dual-use Agricultural STGU must be sited on Land in Agricultural Use, land classified as Important Agricultural Farmland, Fallow Farmland, or on Newly Created Farmland.

Please indicate which of the eligible farmland definitions the project site meets:

- ☐ Land in Agricultural Use
- ☐ Important Agricultural Farmland
- ☐ Fallow Farmland
- ☐ Newly Created Farmland

Newly Created Farmland. To be deemed Newly Created Farmland, the Applicant must demonstrate the viability of agricultural production and an agricultural business plan at the time a Pre-Determination Application is submitted to the Department and MDAR. Applicants ~~shall~~may demonstrate the viability of agricultural production through soil tests, water availability, site history, farm business plans, established crop production, and/or other relevant evidence.

a. Please describe how the Newly Created Farmland was developed, including your commercial farming experience. Please submit the supporting documentation as described above to demonstrate the viability of agricultural production.

a.b. Within the agricultural business plan, please provide the short- and long-term goals for your commercial farm operation and the steps you need to get there. Please describe how and where the products grown/produced on the parcel will be marketed and sold, including

| a demonstration of the availability of these markets to your operation.

Clearcutting Prohibition. No Newly Created Farmland Project Footprint shall be a result of the clearing or conversion of forest land that does not qualify as permissible tree clearing. Permissible tree clearing may include routine maintenance of existing field boundaries or roads, removing isolated trees in an existing cleared space, or other instances of routine agricultural activity as determined by the Department, in consultation with MDAR.

- a. Please document with an existing site map that no Newly Created Farmland was the result of forest clearing or conversion.

Soil Test Requirement. For Newly Created Farmland, Applicants must provide soil tests from the UMass Amherst Soils Testing Laboratory or equivalent, demonstrating pH and macronutrients are within optimum ranges for the crops proposed to be grown.

- a. Please provide soils tests as an attachment in APPENDIX A as noted at the end of this section.

Fallow Farmland. Open arable land that has not been cultivated or used in agriculture for a period of one to five years preceding the Pre-Determination Application for a Dual-use Agricultural STGU.

- a. Please document with an existing site map where any of the proposed ASTGU project utilizes fallow farmland and approximate acreage.

Transitioning Greater than 10 Acres of Farmland. If, as part of its agricultural plan, the Dual-use ASTGU is proposing to transition greater than 10 acres of farmland to grazing or hay production that has not been used for those agricultural purposes during the five crop years prior to the Pre-Determination Application, the agricultural plan must demonstrate that there will be concurrent growing of Comparable Crops to the existing operation for at least the first five years of the STGU operation, consistent with the following practices:

- (1) For grazing projects, a rotational plan should be included with at least 33% of the ASTGU footprint devoted to Comparable Crops.
 - a. Please provide a mapping plan as noted at the end of this section, and please note the Comparable Crops proposed.
- (2) For hay projects, at least 50% of the ASTGU footprint must be devoted to Comparable Crops.
 - a. Please provide a mapping plan as noted at the end of this section, and please note the Comparable Crops proposed.

New Commodities. For the purposes of meeting the requirements above, the agricultural plan may include new commodities in the place of Comparable Crops. The agricultural plan should include the farmer's previous experience with or a working knowledge of the new commodity, an estimate or other information detailing the market viability of the new commodity, or a comparison of the economic value of the new commodity relative to current production.

- a. If transitioning to new commodities, please provide the supporting documentation as described above as attachments to this application.

Note: Please label and provide the following REQUIRED ATTACHMENTS as part of APPENDIX A: REQUIRED ATTACHMENTS, defined and found at the end of this application.

REQUIRED ATTACHMENTS for this section

- Please attach a *Crop or grazing diagram overlay on the shading analysis map.*
- Please attach a copy of *Soils Tests.* (if applicable)
- Please attach a mapping plan. (if applicable)
- Please attach an agricultural business plan. (if applicable)

FARM EQUIPMENT TABLE

Equipment Type	Equipment Make & Model	Clearance (ft)	Width (ft)	Turning radius (ft)	Purpose(s) for Use within Solar Array

G. CROP NARRATIVE

*Please detail anticipated crop management, including approximate **dates** and **equipment** to be used. We recognize management is subject to weather, disease pressure, worker availability, etc. The purpose of this form is to demonstrate the solar array design is compatible with anticipated equipment usage and crop management needs. If you need additional space, please include a typed attachment labeled "Crop Narrative."*

Crop: _____

Planting Plan: _____

Soil Amendment Plan: _____

Cultivation Plan: _____

Irrigation Plan: _____

Pesticide/Herbicide Plan: _____

Harvest Plan: _____

CROP TABLE

Crop	Area to be planted <i>(Row length and width or acreage, as appropriate)</i>	Planting date(s) <i>(approximate)</i>	Harvest date(s) <i>(approximate)</i>	Expected productivity, in absence of shading	Expected productivity, with shading

H. GRAZING NARRATIVE

*Please detail anticipated animal and pasture management, including **dates** and **equipment** to be used. We recognize management is subject to weather, disease pressure, worker availability, etc. The purpose of this form is to demonstrate the solar array design is compatible with anticipated equipment usage and production needs. If you need additional space, please include a typed attachment labeled "Grazing Narrative."*

Type(s) of Animals to Be Grazed: _____

Pasture Management Plan: List any anticipated seeding, soil amendment, irrigation, pesticide, mowing, etc., including approximate dates and equipment to be used.

Animal Management Plan:

For each type of animal to be grazed, describe anticipated management regarding housing/shelter, water source, fencing, movement, disease treatment, harvest, etc. that is expected to be carried out within the solar array area. Describe equipment to be used in these activities, and list equipment in the Farm Equipment Table.

Describe any modifications to the solar array design made in order to reduce the risk of animal damage to the solar array, or risk of electrocution to animals.

GRAZING TABLE

Type(s) of animal to be grazed	Area to be grazed (<i>acreage</i>)	Grazing pressure (# <i>animals per acre</i>)	Purpose (e.g. meat, dairy, eggs)	Grazing period(s)	Harvest date(s) (<i>if applicable</i>)	Expected productivity (without solar array)	Expected productivity (with solar array)

I. Compliance with Requirements of 225 CMR 28.00.

Please respond to each of the following relevant Regulatory requirements to demonstrate compliance with all eligibility requirements for ASTGUs. You may refer to other sections within this document if you feel you have previously appropriately addressed a specific line item.

225 CMR 28.07(5)(b)3. contains the following special provisions pertaining specifically to the eligibility of ASTGUs:

a. Project Design Requirements.

- i. the STGU will not impede the continued use of the land beneath the solar photovoltaic modules for agricultural purposes;
- ii. the STGU is designed to optimize a balance between the generation of electricity and the agricultural productive capacity of the soils beneath;
- iii. the STGU allows for continuous agricultural activities underneath the solar photovoltaic modules, with height enough for labor or machinery as it relates to tilling, cultivating, soil amendments, harvesting, and grazing animals;

b. Project Specification Requirements.

- i. **Panel Height Requirements.** The panels of Dual-use Agricultural STGUs shall meet the following height requirements.
 - (i) **Fixed Tilt STGUs.** For fixed tilt STGUs, the minimum height of the lowest panel point shall be eight feet above ground.
 - (ii) **Tracking STGUs.** For tracking STGUs, the minimum height of the panel at its horizontal position shall be ten feet above ground. This minimum height may be reduced to eight feet if the maximum sunlight reduction requirement under 225 CMR 28.07(5)(b)3.b.ii. is still met in all tilt positions and the farm operator has functional control of the tracker control system to accommodate agricultural activities.

- ii. Sunlight Requirements. A Dual-use Agricultural STGU shall propose a sunlight reduction plan for the STGU based upon the compatibility of the STGU with the proposed agricultural crops and productivity. The plan shall utilize the best available information as indicators, including, but not limited to, photosynthetic active radiation and light saturation data and qualitative information. The maximum sunlight reduction from a Dual-use Agricultural STGU's panels on every square foot of land directly beneath, behind, and in areas adjacent to and within the STGU's design shall not be more than 50% of baseline field conditions during the Growing Season Hours, unless the Applicant can demonstrate that an exception should be granted pursuant to 225 CMR 28.07(5)(b)3.b.iv.

- iii. Maximum Direct Current (DC) Rating. The maximum DC capacity rating of a Dual-use Agricultural STGU shall be no more than twice the AC capacity rating of the STGU and shall not exceed 7,500 kW DC.

Note: Please label and provide the following REQUIRED ATTACHMENTS as part of APPENDIX A: REQUIRED ATTACHMENTS, defined and found at the end of this application.

- Design drawing including mounting system type (fixed, tracking), panel tilt, panel row spacing, individual panel spacing, for pole towers tower spacing and mounting height, *etc.*

J. SIGNATURES AND ATTESTATIONS

Prior to submitting the Pre-Determination Form, please read and sign as directed below.

Landowner

I hereby certify that I have personally examined and am familiar with the information submitted herein, and, based upon my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete.

Signature of Landowner

Date

Farm Operator and Landowner

I/we hereby certify that the information submitted regarding the current farm conditions and practice and the Agricultural Plan for the Dual-Use Area is accurate and complete to the best of my/our knowledge and intentions, and that I/we have engaged with the University of Massachusetts Amherst Clean Energy Extension and thereby its agricultural extension service to review the Agricultural Plan and its compatibility with the solar array structures and shading. Further, I/we agree, conditional on being provided eligibility to the SMART program as an ASTGU, to submit a report, through a template provided by the University of Massachusetts Clean Energy Extension, annually throughout the duration of the SMART incentive with ASTGU adder, on the operations and productiveness of the solar array and agriculture along with any changes to the Agricultural Plan for the following year. I/we understand that failure to maintain productive agricultural activities and annual reporting may result in the disqualification of the facility as an ASTGU in the SMART program.

Signature of Farm Operator

Date

Signature of Landowner

Date

Solar Facility Owner

I hereby certify that the information submitted regarding the Solar Array Description and inputs and outputs of the Shading Analysis is accurate and complete to the best of my/our knowledge and intentions.

Signature of Solar Facility Owner

Date

APPENDIX A - REQUIRED ATTACHMENTS:

Please provide all required attachments referenced in this application under this section, labelled as follows:

A. SITE INFORMATION:

- A1** - Property map
- A2** - Soils map, if applicable
- A3** - Map of APR/FVEP-restricted area, if applicable
- A4** - 61A current or previous enrollment documentation
- A5** – CEE Letter for DOER.SMART submission

B. SOLAR ARRAY DESIGN

The following system drawings:

- B1** - A site plan (as viewed from above) of the impacted farmland with clear depiction of the layout of all array modules, including dimensions of the overall array, each module, and all applicable spacing.
- B2** - A design drawing (from the side) of a representative module with dimensions showing panel tilt and elevations from ground.
- B3** - A design drawing of the mounting structure with details showing dimensions and all materials of the ground penetrations.
- B4** - Panel specification sheet

C. SHADING ANALYSIS

- C1** - Shading Tool Screenshot

D. AGRICULTURAL PLAN FOR DUAL-USE AREA

- D1** - Please attach a *Crop or grazing diagram overlay on the shading analysis map.*
- D2** - Soils Tests (if applicable)
- D3** - Please attach a mapping plan (if applicable)

E. Compliance with Requirements of 225 CMR 28.00.

- E1** - design drawing including mounting system type (fixed, tracking), panel tilt, panel row spacing, individual panel spacing, for pole towers tower spacing and mounting height, *etc.*