DRAFT

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 AN 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 (DOER) for qualification of an 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 20.06(1)(d) and in the *Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units*.

The UMass Amherst Clean Energy Extension is available to farmers and project developers to assist in the completion of this form and to provide the required collaboration with UMass agricultural extension in advising the farm plan. This form is used by DOER and MA Department of Agricultural Resources (MDAR) to determine 1) that the farm site is eligible to host a 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 the *Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units*.

☐ Project seeks a waiver to the design criteria set forth for Agricultural Solar Tariff Generation Units in the *Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units*.

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 ☐ Greenhouse
☐ 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:_____

SITE INFORMATION

Street Address:_____ Approximate Latitude/Longitude:_____
Assessors Map/Plat Number:_____ Parcel/Lot Number_____
Total Acreage:_____
Land Status: ☐ currently enrolled in Chapter 61A
☐ enrolled in Chapter 61A in previous 5 years
☐ Prime Agricultural Farmland: *Please attach MassGIS OLIVER map showing prime farmland soils*

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

ATTACHMENTS

- Property map
- Soils map, if applicable
- Map of APR-restricted area, if applicable

WAIVER REQUEST

Please check off the design criteria requirement(s) the Applicant is seeking a waiver from:

- ☐ Panel Height Requirements
- ☐ Maximum Direct Sunlight Reduction Requirements
- ☐ Growing Season/ Time of Day Considerations
- ☐ Other
- ☐ N/A

DOER recognizes the variety and, in some cases, the uniqueness of farming operations where some of the Additional Provisions for an ASTGU may not be required to achieve the objectives of the ASTGU. To address this issue, a landowner may request that DOER issue a waiver from any of the Additional Provisions for an ASTGU that is not contrary to the law or the intent of the regulations. All waiver requests should be submitted to DOER.SMART@mass.gov. In order to request a waiver, the applicant must provide the Department with the following:

1. Plan Development

Develop a plan that:

a. describes how the applicant will integrate the ASTGU into their farming operation;

b. demonstrates that a waiver does not result in a diminishment in the agricultural production capacity of the land; and

c. demonstrates that the primary use of the land is for agricultural or horticultural production, as defined under M.G.L. Chapter 61A.

2. Justification and Substantiation

An applicant must provide justification as to why an ASTGU design is necessary for the proposed agricultural operations on the relevant parcel of land. An applicant must provide documentation for each specific aspect of the design parameters from the *Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units,* for which the ASTGU requires a waiver as follows:

a. Panel Height Requirements: Provide documentation demonstrating how the proposed design will allow for the variety and flexibility of a variety of potential farming operations at the farm throughout the term of the SMART Tariff.

b. Maximum Direct Sunlight Reduction Requirements:

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

ii. Demonstrate how each square foot of land will be used for agriculture production;

iii. Demonstrate how the design will be able to accommodate a variety of potential agricultural products throughout the twenty year term of the SMART Tariff.

c. Growing Season/Time of Day Considerations: Provide documentation on how the time of season and day data in Section A is not relevant to the farming practice and operation, currently, and for the term of the SMART Tariff.

Other: For all other requirements for which a waiver is being sought, please describe the waiver(s) requested, why the proposed alternatives require a waiver, and how these alternatives will meet the intention of the ASTGU regulations

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: _____
System type: ☐ Fixed ☐ Tracking ☐ Other_____
Height of lowest panel edge (in feet):_____
Height of lowest elevated horizontal mounting (in feet):_____

Type of mounting (mono poles, racking, etc.): _____

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

Number of panels, capacity per panel, and panel spacing: : _____

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."

ATTACHMENTS
Please attach 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.
- 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.

SHADING ANALYSIS

An ASTGU must demonstrate it is in compliance with the 50% maximum shading allowance through the use of the ASTGU Shading Analysis Tool provided by DOER. 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 from the Shading Analysis Tool, including a site map to clearly demonstrate the simulated percent of shading over the simulated growing season of all farm land impacted by the array. The map should be discernable down to at least a per square foot scale.

AGRICULUTRAL 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 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). Fill out one Crop Narrative for each crop, detailing anticipated crop management (planting, irrigation, soil amendments, harvesting) and equipment to be used.

Please 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). Please also fill out the Grazing Narrative, detailing anticipated pasture and animal management and equipment to be used.

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?_____
_____
_____
_____
_____
_____
_____

ATTACHMENTS
Please attach a *Crop or grazing diagram overlay on the shading analysis map.*

FARM EQUIPMENT TABLE

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

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** *(Row length and width or acreage, as appropriate)*	**Planting date(s)** *(approximate)*	**Harvest date(s)** *(approximate)*	**Expected productivity, in absence of shading**	**Expected productivity, with shading**

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** ***(acreage)***	**Grazing pressure** ***(# animals per acre)***	**Purpose (e.g. meat, dairy, eggs)**	**Grazing period(s)**	**Harvest date(s)** ***(if applicable)***	**Expected productivity (without solar array)**	**Expected productivity (with solar array)**

Compliance with Requirements of 225 CMR 20.00 and *Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units.*

Please respond to each of the following relevant Regulatory and Guideline 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 20.06(1)(d) contains the following special provisions pertaining specifically to the eligibility of ASTGUs:

(d) Special Provisions for Agricultural Solar Tariff Generation Units. In order to qualify as an Agricultural Solar Tariff Generation Unit, a Solar Tariff Generation Unit must submit documentation itemized in 225 CMR 20.06(1)(d) below. All final determinations regarding the eligibility of such facilities will be made by the Department, in consultation with MDAR. A Solar Tariff Generation Unit must also submit satisfactory documentation to the Department as detailed in the Department's *Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units*.

1. the Solar Tariff Generation Unit will not interfere with the continued use of the land beneath the canopy for agricultural purposes;

2. the Solar Tariff Generation Unit is designed to optimize a balance between the generation of electricity and the agricultural productive capacity of the soils beneath;

3. the Solar Tariff Generation Unit is a raised structure allowing for continuous growth of crops underneath the solar photovoltaic modules, with height enough for labor and/or machinery as it relates to tilling, cultivating, soil amendments, harvesting, *etc.* and grazing animals;

4. crop(s) to be grown to be provided by the farmer or farm agronomist in conjunction with UMass Amherst agricultural extension services, including compatibility with the design of the agricultural solar system for such factors as crop selection, sunlight percentage, *etc.*;

5. annual reporting to the Department and MDAR of the productivity of the crop(s) and herd, including pounds harvested and/or grazed, herd size growth, success of the crop, potential changes, *etc.*, shall be provided after project implementation and throughout the SMART incentive period;

_____

_____

_____

6. other system design information, which shall include, but not be limited to:
   a. dual-use type, *e.g.*, ground mount racking, pole towers, tracking, *etc.*;

   _____

   b. total gross acres of open farmland to be integrated with the project;

   _____

   c. type of crop(s) to be grown, including grazing crops;

   _____

   d. pounds of crop(s) projected to be grown and harvested, or grazed;

   _____

   e. animals to be grazed with herd size(s); and

   _____

   f. 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.* **Please attach.**

Additional Provisions for ASTGUs (from the *Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units*):

Provided a Solar Tariff Generation Unit meets all program eligibility criteria in 225 CMR 20.00, in particular the provisions relating to ASTGUs prescribed in 225 CMR 20.02 and 20.06(1)(d), a Solar Tariff Generation Units must also satisfy the following provisions to qualify as an ASTGU. Note that these provisions take into account the entire useful life of the solar photovoltaic array with consideration for the variety of possible agricultural activities and crops that could take place on farm land over that timeframe. In other words, they do not simply consider present use.

The parameters defined in Section A below will allow for the variety and flexibility of potential farming operations at any given farm throughout the life of the solar photovoltaic array. These parameters are stated as minimums, giving farms the flexibility to determine and finalize farming operations. Applicants complying with the additional provisions in Section A below will be reviewed in an expedited process.

A. System Design Parameters:

1. Panel Height Requirements

   a. For fixed tilt ASTGUs, the minimum height of the lowest panel point shall be eight (8) feet above ground;

   b. For tracking ASTGUs, the minimum height of the panel at its horizontal position shall be 10 feet above ground;

2. Maximum Direct Sunlight Reduction Requirements

   All ASTGUs must demonstrate that the maximum sunlight reduction from the panel shading on every square foot of land directly beneath, behind and in the areas adjacent to and within the ASTGU's design shall not be more than 50% of baseline field conditions;

3. Growing Season/Time of Day Considerations

   The typical growing season shall be considered to be March through October, with sunlight hour conditions with maximum 50% sunlight reduction to be between 10AM and 5PM for March and October, and from 9AM to 6PM from April through September;

4. Maximum Size

   The maximum AC rated capacity of an ASTGU shall be two MW in the first two Capacity Blocks of each Distribution Company's service territory. The Department, in consultation with MDAR, will make an evaluation as to whether or not this provision shall be adjusted in subsequent Capacity Blocks.

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