ASTGU ANNUAL REPORT - 2023

Godfrey Dual Use Solar – 13A Gate Street, Carver, MA

PURPOSE

This Annual Report form is required to be completed and submitted annually for all projects with the MA Department of Energy Resources (DOER) which received qualification as an Agricultural Solar Tariff Generation Unit (ASTGU) under the SMART program. The form is provided to demonstrate conformance with the general provisions required for ASTGUs in 225 CMR 20.00; in particular pertaining to Section 20.06(1)(d) therein as well as associated ASTGU Guidelines; and specifically pertaining to annual reporting requirements.

The completed form will be reviewed by DOER and the MA Department of Agricultural Resources (MDAR) to determine that the farm is in conformance with all ASTGU provisions in general under the SMART Program, although more specifically to the annual production requirements.

BASIC FARM INFORMATION

Farm Contact Person Name: Hank Ouimet ☒ Farm Owner
Bill Manganello ☒ Farm Operator
Farm Name: Brookside Farm c/o REDP Services, LLC
Legal Structure: ☐ Sole Proprietor ☒ LLC ☐ Corporation
☐ Partnership ☐ Other _____
Mailing Address: 99 Derby Street, Suite 200 Hingham, MA 02043
Street Address (if different): 13A Gate Street, Carver, MA
Contact Phone: Bill 781-831-8496 Hank 603-770-5034
Contact E-mail: Bill Wjmang@hotmail.com Hank houimet@redpllc.com
Check all that apply: ☐Solar facility owner ☐Landowner ☒Applicant

Current Type of ASTGU Farm Operation (Check all that apply):
☐ Vegetables ☐ Fruit ☐ Livestock ☐ Poultry ☒ Hay
☐ Nursery ☐ Other _____

Total Acreage in ASTGU Farm Production: approximately 12 acres

Gross Annual Revenue for ASTGU Farm Production: $4,370

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 _____

BASIC SOLAR PROJECT INFORMATION

Solar System Company Owner: Standard Solar, Inc.

Solar System Company Address: 530 Gaither Road, Suite 900 Rockville, MD 20850
Solar Company Contact Person/email/tel#:
Jay Smith/jay.smith@standardsolar.com/301.944.5177

ASTGU Project Start-Up/History Information:

Date ASTGU Approved by DOER: 11/30/2018

Date Solar Portion of ASTGU Project Commenced Construction: 8/1/2020

Date Solar Portion of ASTGU Project was Completed & Operational: 6/11/2022

Date Original Agricultural Portion of the ASTGU Project Commenced: 5/1/2021

Date Original Agricultural ASTGU Portion of Project Harvested/Sowed Products:
Sowed: 5/1/2021
Over Seeding: 9/5/21
First Mowing: 9/6/21 (grass left to decompose and create more organic matter)
First Harvest: 7/5/2022
Second Harvest: 10/1/2022

How many complete years, that is both solar and agricultural production, has the ASTGU been in operation? Two

SOLAR ARRAY DESIGN – PLEASE PROVIDE AS-BUIILT SYSTEM INFORMATION

Please provide the following information regarding the solar array design:

Nameplate capacity AC (in MW): 2.0 MWac *(Note: 1 MW=1000 kW)*
Expected annual generation AC (MWh): 2.7 MWh *(Note: 1 MWh=1000 kWh)*
Acreage of farmland over which array is installed: approximately 12 acres
System type: ☒ Fixed ☐ Tracking ☐ Other_____
Height of lowest panel edge (in feet): 8' above grade
Height of lowest elevated horizontal mounting (in feet): N/A

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

Steel racking system supported by steel piles (see attached photos)

Description of materials and process used for ground penetration:

Galvanized steel piles (see attached photos)

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

7,344 JA Solar 385W PV modules.
Module spacing along rows <2"; module spacing between rows ~25'

If you wish to provide additional descriptive information regarding the solar array design, including any system changes since original completion, you may include this information below, or in a typed attachment labeled "Solar Array Design."

The solar array was constructed as permitted by the Town of Carver and approved by DOER.

AGRICULUTRAL PLAN FOR DUAL-USE AREA

Planned agricultural use, Year 2. Check all that apply.
☐Vegetable, fruit, grains, for human consumption
☒ Hay
☐ Livestock production
☐ Poultry production
☐ Horticulture
☐ Floriculture
☐ Aquaculture
☐ Other, please describe:_____

Please fill the Crop Table results following this section for horticulture, flowers, vegetable, fruit, grain, and hay crops for your present year of operation. Fill out one Crop Narrative for each crop, detailing anticipated crop management (planting, irrigation, soil amendments, harvesting) and equipment to be used. **Crop Table – Current Season** follows this section. Also, please also fill out a **Crop Table – Next Season** and corresponding narrative at the end of this section with your best information available.

Please fill out the Grazing Table results following this section for livestock and poultry production for your present year of operation. Please also fill out the Grazing Narrative, detailing anticipated pasture and animal management and equipment to be used. **Grazing Table – Current Season** follows the Crop Table section. Also please fill out a **Grazing Table – Next Season** and corresponding narrative at the end of this section with your best information available.

Additional comments regarding agricultural production for Year 2:

How did the Agricultural Production perform versus expectations? Please explain why/why not if you can:

Agricultural production significantly improved compared to the first season, most likely due to our continued focus on building soil health through soil amendments. It should also be noted that there was above average rainfall during the growing season. Soil amendments included

additional lime application in early spring, and a mid-season application of urea to build soil nitrogen. This resulted in an overall more robust yield including significantly more alfalfa growth.

Did you plant the crops/graze the animals as you originally intended when your Pre-Determination Application was approved? If not please explain.

As described in last year's report, REDP partnered with Brookside Farm in Plympton for both the Godfrey site and the Swan Holt site. Brookside Farm operates a local grass-fed beef operation, and needs hay and forage area in order to expand its operation. Accordingly, growing forage grasses was selected as the initial crop plan for this site. With increased alfalfa growth, additional markets are being explored.

Were the products marketable anticipated? Please explain how the production values (weight/bushels etc) were determined.

During this pat growing season, the first cut of marketable hay was harvested on July 11th, 2023 and a second cut of marketable hay was harvested September 26th, 2023. Total yield was 440 bales of hay (an increase of over 45% from the first season), at an average weight of 50 lbs/bale.

What occurred during the current season that wasn't anticipated? Positive & Negative.

Early in the season we continued to be challenged by frequent trespassing onto and surrounding the dual use area by ATVs and dirt bikes, causing some crop damage and rutting within the planting area which required repairs. This issue was resolved with the installation of perimeter fencing midway through the season, as described below.

During the 2023 season we saw a significant increase in the alfalfa content of the hay. Due to this, HedgeHog Hill Farm, a local mother/daughter goat milking operation which breeds Finnsheep and pedigreed Nubian for milk products and wool, purchased a significant portion of the hay produced on-site. According to HedgeHog Hill Farm, the hay produced under the array had a high nutrient content and was highly palatable for the goats. This years unusually wet conditions made harvesting hay difficult. The second cut of hay was removed from the field only minutes before another rain event.

As mentioned in last year's report, the cranberry farming employees began establishing a vegetable operation between several rows of panels. This being the first year, soil preparation occurred at the beginning of the season and an irrigation pump and distribution infrastructure was acquired. Unfortunately, the later planting date, pressure from deer prior to the permanent fence installation and the exceedingly wet weather resulted in no yield of the planted sweet corn, peppers or squash. With the permanent wildlife fence now installed, earlier soil preparation and more normal moisture conditions this coming growing season, there is optimism we will be able to report on a successful vegetable harvest in 2024.

What Changes/Modifications do you expect to make to improve on production if needed?

During the 2023 growing season, REDP continued investing in the project by installing a perimeter wildlife fence around the entire eastern ASTGU array and around the portion of the western ASTGU array to be used as a vegetable plot. The fence has already limited damage due to trespassers on ATVs and will be critical for future cattle grazing and vegetable farming.

In the coming season we expect to install an irrigation system for the farm. Phase I of the irrigation system will provide irrigation for vegetable crops to be grown in the vegetable plot in the western ASTGU area and will be operational during the 2024 season. Phase II will include a well and distribution header for portable livestock watering troughs to be used within the eastern ASTGU area.

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?

In year 3, Brookside Farm expects to continue to grow mixed grasses for hay and forage in the eastern area and a portion of the western area. The same equipment will continue to be used for cutting, teddering, raking and baling the hay. It is Brookside Farm's goal to introduce their grass-fed livestock for rotational grazing within the eastern area in the next 2 to 3 years. Prior to the introduction of livestock, electric fencing will be installed beneath the PV array along the western ends of the rows of PV modules to prevent the livestock from damaging themselves or the PV equipment and cabling located at the western end of each row.

In year 3, we also expect to continue the partnership with the landowner's cranberry farming employees to grow mixed vegetables within an approximately 1-acre portion of the western ASTGU area. As discussed during our on-site visit with MDAR staff in early 2022, the goal of the partnership is to develop an "employee garden" for the benefit of the landowner's farmworkers. These farmworkers are primarily southeast Asian farmworkers who live in urban areas in southeastern MA and do not typically have access to cultivated land for their personal use, and who likely are facing the food insecurity challenges that are on the rise nationwide. This partnership commenced during the 2023 season and included the installation of a perimeter wildlife fence around the proposed mixed vegetable plot, and the procurement of an irrigation system for the vegetable plot. In year 3, we expect to contribute resources towards the installation of that irrigation system and additional hand-held tools. The farmworkers will select the vegetable crops based on their needs and expertise and will dictate the planting and cultivation methods. We are optimistic that we will be able to report on vegetable yields from the site in our 2024 report.

Table A: Crop Production – Current Season (2023)					
Crop	**Area planted** ***(Row length and width or acreage, as appropriate)***	**Planting date(s)** ***(approximate)***	**Harvest date(s)** ***(approximate)***	**Expected productivity, total pounds harvested with dual use**	**Actual productivity, pounds, with dual use**
Mixed Grasses*	**12 acres**	**May 1st, 2021,**	**July 11th, 2023** **September 26th, 2023**	**15,600 lbs****	**22,000 lbs**

***Mixed grasses include the following species: Climax Timothy, Orchard Grass VNS, Teton II Tall Fescue, TetraSween Perennial Ryegrass (Tetraploid), White Clover (Stamina Intermediate) – OMRI Nitro Coated.**

****As noted in our Swan Holt application, Brookside Farm typically expects a hay yield of approximately 0.93 tons/acre from its existing 40 acres of managed hay fields. A reduction factor of 30% has been applied to account for PV system impacts (beneath the columns, shading, etc.) as well as slower biomass accumulation for a new hay field.**

CROP NARRATIVE – Current Season

*Please detail the crop management for this past season, including approximate **dates** and **equipment** used. The purpose of this form is to provide empirical data regarding compatible equipment usage and crop management needs. If you need additional space, please include a typed attachment labeled "Crop Narrative."*

Crop: Mixed grasses for hay

Planting Plan:

No additional grass seed was applied during the 2023 growing season.

Soil Amendment Plan:

Pelletized lime was applied to the entire array area on April 2nd at the rate of 500lbs/acre to improve the soil pH. On April 29th, 65lbs/ac of 19-19-19 was applied to the entire array area. Urea was applied at 30lbs/ac on the hay area of the array on July 15th (after the first cut of hay) to help increase nitrogen availability and encourage alfalfa growth.

Cultivation Plan:

No specific cultivation activities were conducted in the 2023 growing season.

Irrigation Plan:

Excessive rainfall and healthy grass growth throughout the growing season, as well as spot soil moisture checks, indicated that irrigation was not necessary during the 2023 season.

Pesticide/Herbicide Plan:

Given the healthy grass growth and the lack of substantial pest or disease damage, no pesticides or herbicides were applied during the 2023 season.

Harvest Plan:
The hay crop was harvested by Brookside Farm using their existing equipment, including a tractor-pulled mower, tedder, rake and baler. Brookside's equipment easily navigated the widely spaced rows of PV panels and within the perimeter wildlife fence, and all grass up to within a foot or so on either side of each column line was successfully harvested.

Photos from the 2023 season's farming activities are included in Exhibit A.

Table B: Grazing Production – Current Season							
Type(s) of animal grazed	**Area grazed *(acreage)***	**Grazing pressure # *animals per acre***	**Purpose (e.g. meat, dairy, eggs)**	**Grazing period(s)**	**Harvest date(s) *if applicable***	**Expected productivity with solar array**	**Actual productivity with solar array**
N/A							

GRAZING NARRATIVE – Current Season

*Please detail the past season animal and pasture management, including **dates** and **equipment** used. The purpose of this form is to provide empirical data regarding compatible equipment usage and production needs. If you need additional space, please include a typed attachment labeled "Grazing Narrative."*

Type(s) of Animals Grazed:

No grazing during 2023 season.

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

N/A

Animal Management Plan:
For each type of animal grazed, describe management regarding housing/shelter, water source, fencing, movement, disease treatment, harvest, etc. that was carried out within the solar array area. Describe equipment used in these activities.

N/A

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

N/A

Table A: Crop Production – Next Season (2024)					
Crop	**Area planted** ***(Row length and width or acreage, as appropriate)***	**Planting date(s)** ***(approximate)***	**Harvest date(s)** ***(approximate)***	**Expected productivity, total pounds harvested without dual use**	**Expected productivity, total pounds, with dual use**
Mixed grasses*	**~11 acres**	**N/A**	**July and late-September**	**20,400 lbs****	**14,300 lbs****
Mixed vegetables	**~ 1 acre**	**May 2024**	**Throughout Summer**	*******	*******

*** Mixed grasses include the following species: Climax Timothy, Orchard Grass VNS, Teton II Tall Fescue, TetraSween Perennial Ryegrass (Tetraploid), White Clover (Stamina Intermediate) – OMRI Nitro Coated.**

**** Expected yields are based on Brookside Farm's typical hay yield of 0.93 tons/acre on its existing managed hay fields. A reduction factor of 30% has been applied to account for PV system impacts (unharvested growth near the columns, shading, etc.) as well as slower biomass accumulation for a new hay field.**

*****As noted in the narrative, specific vegetable crops in the farmworker community garden will be selected by the farmworkers. Yield estimates will be provided in consultation with the farmworkers and reported in the next annual report.**

CROP NARRATIVE – Next Season (2024)

*Please detail the crop management planned for next season, including approximate **dates** and **equipment** used. The purpose of this form is to provide planned data for the upcoming season regarding compatible equipment usage and crop management needs. If you need additional space, please include a typed attachment labeled "Crop Narrative."*

Crop: Mixed grasses for hay (~11 acres) and a variety of mixed vegetable row crops (~ 1acre)

Planting Plan:
The hay crop has been consistently getting better, specifically in the density of the grass being grown and the presence of alfalfa. The hay area of the array will be scouted while liming at the beginning of April and overseeding of any weak areas will be conducted.

The planting plan for the vegetable garden to be used by the bog owner's employees will be determined by the bog employees themselves. It is expected that we will learn from their permaculture type plantings and better be able to illustrate the planting plan in 2024's report.

Soil Amendment Plan:
Pelletized lime at a rate of 500 lbs/ac will be applied in April 2024. Similar to the 2023 growing season, 19-19-19 slow-release fertilizer is planned to be applied at the end of April or beginning of May at a rate of 65 lbs/ac and Urea is planned to be applied after the first cut at a rate of 30 lbs/ac. Brookside Farm will evaluate the area for weaker areas and may apply compost generated by their operation on those areas. Should grazing of cattle occur next season, rotational grazing will assist with adding organics to the soil.

For the employee vegetable garden, additional organic matter may be incorporated by hand into the soil based upon the selected vegetable crops.

Cultivation Plan:
For the hay crop, cultivation plan will include monitoring grass growth and soil moisture, and harvesting two cuts of hay using the typical mow, tedder, rake and bale process. Brookside Farm will continue to minimize tedding in order to reduce the number of broken stems during the drying process.

For the employee vegetable garden, the cultivation plan will include monitoring moisture, applying organic matter as needed, turning the soil as necessary and weed management. The work to be performed is anticipated to be performed with small equipment and hand tools.

Irrigation Plan:
It is expected that an irrigation system will be installed for the western ASTGU array to serve the employee vegetable garden. The irrigation equipment (surface water pump, header and distribution piping, irrigation nozzles, etc.) has been procured and is onsite. The farmworkers will install and maintain the irrigation system to suit their needs, and the amount and timing of irrigation use will be at their discretion. No irrigation is anticipated to be needed for the hay crop this year.

Pesticide/Herbicide Plan:
For the hay crop, no pesticide or herbicide application is anticipated.

For the employee vegetable garden, it is not anticipated that any pesticides or herbicides will be applied. Weeding and insect control will be done by hand.

Harvest Plan:
The hay crop will be harvested by Brookside Farm using their existing equipment, including a tractor-pulled mower, tedder, rake, and baler. It is anticipated that there will be at least 2 hay cuts.

It is anticipated that the employee vegetable garden will be harvested by hand using hoes, shovels, potato diggers, buckets and wheeled carts. More details of the actual harvest plan will be recorded and reported next year.

Table B: Grazing Production – Next Season							
Type(s) of animal grazed	**Area 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**
N/A							

GRAZING NARRATIVE – Next Season

*Please detail the next season animal and pasture management, including **dates** and **equipment** used. The purpose of this form is to provide planned data for the upcoming season regarding compatible equipment usage and production needs. If you need additional space, please include a typed attachment labeled "Grazing Narrative."*

Type(s) of Animals Grazed:

No grazing is planned for next season.

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

N/A

Animal Management Plan:
For each type of animal grazed, describe management regarding housing/shelter, water source, fencing, movement, disease treatment, harvest, etc. that was carried out within the solar array area. Describe equipment used in these activities.

N/A

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

N/A

Waiver for Decreased Yield

i. Waiver for Decreased Yield
Due to unforeseen circumstances, such as but not limited to weather events, pests, or change in crops, the projected agricultural yield for any given year may be lower than stated in the agricultural plan or previous year's annual report. In these instances, an applicant can request a waiver to the Department for the decreased yields. The applicant must demonstrate to the satisfaction of the Department, and in consultation with MDAR, that a waiver is warranted for good cause. Waiver requests must be submitted by November 1st of the applicable calendar year and sent to DOER.SMART@mass.gov.

Response: With respect to the reporting obligations associated with qualification of this project as an Agricultural Solar Tariff Generation Unit (ASTGU) under the SMART program, we would note that this project was approved in November 2018 and is subject to the ASTGU guidelines in place at that time (Guideline effective date April 26, 2018). Accordingly, the Godfrey ASTGU project is not subject to this provision.

ii. Failure to Report
If the ASTGU fails to submit an annual report, the Department may declare the project ineligible for the ASTGU adder for one year. If the annual report is not completed for a second year, then the Department may permanently disqualify the ASTGU from continuing to receive the ASTGU Adder for the remainder of the STGU's tariff term.

SIGNATURES AND ATTESTATIONS

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

Farm Operator and Farm Owner

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.

12/18/23

Hank Ouimet, Manager
REDP Services, LLC
Farm Owner

Date

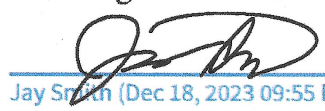
12/18/23

Bill Manganello
Brookside Farm, LLC
Farm Operator

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.



Jay Smith (Dec 18, 2023 09:55 EST)

Jay Smith, Director of Asset Management
Standard Solar, Inc.
Solar Facility Owner

Date

Exhibit A

Photos of 2023 farming activities

Godfrey ASTGU 2023

Early season growth
(early May 2023)

Godfrey ASTGU 2023

Early season growth
(late May 2023)

Godfrey ASTGU 2023

Ready for the first hay cut
(late June 2023)

Godfrey ASTGU 2023

Wildlife prevention fence installed around eastern array (June 2023)

Irrigation piping laid out for future vegetable plot (June 2023)

Godfrey ASTGU 2023

Healthy mid summer growth
(early August 2023)

Godfrey ASTGU 2023

After the 2nd hay cut, with pollinator species remaining along the column lines (late September 2023)

Godfrey ASTGU 2023

Wildlife prevention fencing around future vegetable plot in western array

Eastern array fenced and ready for spring 2024

Godfrey ASTGU

Godfrey Bogs (foreground) Godfrey ASTGU (background)