ASSOCIATED ENERGY DEVELOPERS

Prepared for: **Redacted**
Redacted for Sample
Redacted
Mendon, MA 01756

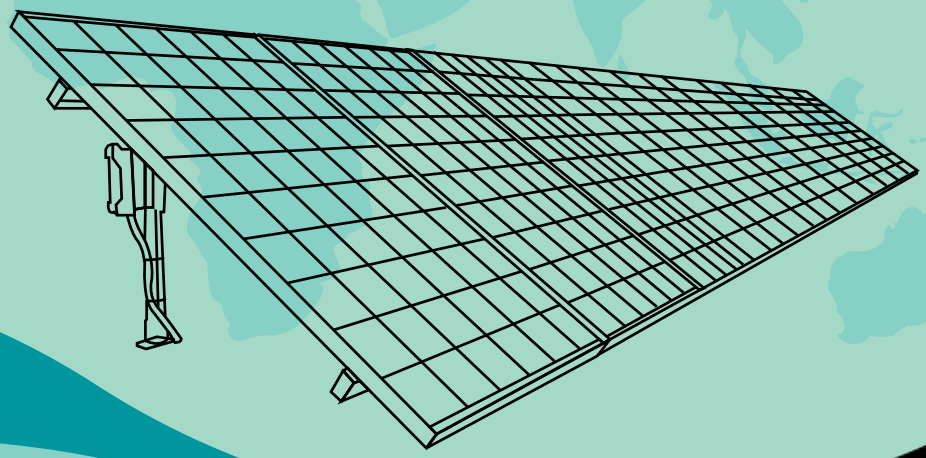
Subject Property: **Commercial/Agriculture Facility**
Mendon, MA

Date: **1/2/09**

CONFIDENTIAL

SAMPLE (EQUESTRIAN FACILITY), MENDON, MA

Solar Photovoltaic Energy Study & Appraisal



Contents

1. Overview

(Note: This sample solar appraisal is based on an actual appraisal. Certain information has been redacted from the document.)

This appraisal was performed to provide an initial evaluation of the potential to utilize solar energy to produce electricity at the subject location. It was undertaken at the request of the owners of the property.

The report provides an initial assessment of the suitability of the proposed site for a photovoltaic solar (PV) array. It is designed to provide the owner with enough basic information about the potential of a solar project at the site to allow them to make an educated decision as to whether the acquisition of a solar project is warranted for this site.

While the report indicates typical energy output values (KwHrs/yr) for various size solar projects, it does not promote specific solar panels unless noted. It presents the various sizes of PV arrays as a guide to the owner in order to gage the potential revenue/savings of various sized solar investments. .

The appraisal uses published solar insolation data in order to determine the potential value as a solar energy site. A site visit was made to the site and measurements were taken in order to determine shading and potential interconnection issues. Various computer programs were used to simulate both power production (PV Watts) and the business model (FOCUS).

The report will also attempt to spotlight broad "fatal flaws" which might preclude the owner from moving forward in considering this type of power project. While it takes a broad look at the zoning process, it does not get into the details of micro-siting or the permitting process. These are typically found in the domain of a full feasibility study or pre-development contract with a developer.

The appraisal concludes with some excellent consumer information published by many sources which the owner should find of value in considering this sort of energy project.

Use of this report

This report is considered proprietary to the owner, and is intended to be used in consultation with the owner as they develop plans to utilize the solar resource.

The results of this appraisal may be seen in the table below, which is also found in Section 7 of this report.

Description		
Project Size	250	kW
Project Capital Cost	$614,304	
Installed cost/kW	$2,457	$/kW
Electrical Generation	287,870	Per year
	23,989	Per Month
First Year Gross Revenue	$118,890	$/yr
25 Year Gross Revenue	$2,000,661	
First Year Net Revenue	$44,528	(After Exp. and Fin.)
25 Year Net Revenue	$1,024,721	(After Exp. and Fin.)
Internal Rate of Return	15.9%	(unleveraged, 25 yr)
Years to Recover Investment	5.4	Years (payback)

Table OV1 – Summary of Financial Results

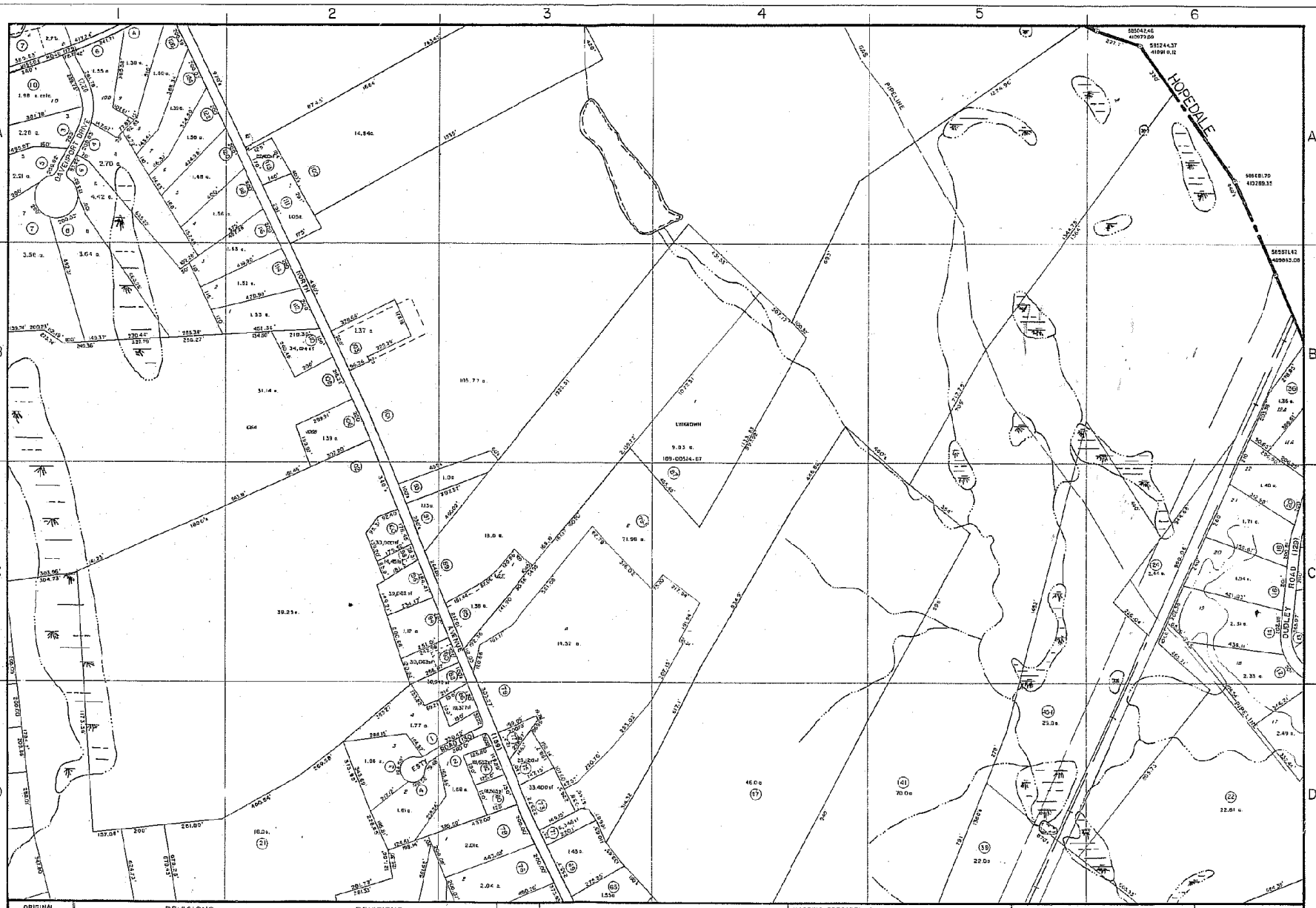
2. The Site

The property consists of a parcel of 30+ acres of rolling pasture and wooded land which is currently being used as a horse farm and Equestrian training center. Buildings on the main property are used for stables, offices and maintenance functions. The load from these buildings has been included in this appraisal under the assumption that these buildings may be physically or virtually included in the overall site load. The property use is Rural Residential/Agricultural (RR Zoning). The parcel is shown as lot [redacted] on map [redacted] of the [redacted] assessor's maps. A plot plan is included for reference.

General observations:

1. The site is located approximately 1 mile from the center of [redacted].
2. Two potential sites are located in a generally cleared area, but the entire 30 acres itself is mostly treed.
3. The equestrian center and on site loads are minimal compared to the available area for potential solar arrays.
4. There are only a few residences in the vicinity. These are not expected to be an issue or influenced by any solar arrays.
5. The town of [redacted] does NOT have a specific zoning ordinance regarding solar PV systems.
6. The state of Massachusetts does have net metering regulations available that will accommodate these solar projects. This will allow all of the power used by the on-site loads (including the residence) to be provided by the solar array, with net excess generation (NEG) supplied to the grid under the Net Metering regulations.
7. The site is located at the end of a National Grid distribution line, which appears capable of accepting either 100 – 250kW (single and three phase, respectively) of generation. Three phase lines are available at the street.
8. The appears to be an excellent location for the installation of a 'Ranchette' type of solar PV array.

Aerial View of Subject Property with Potential PV Array location.



ORIGINAL		REVISIONS						REVISIONS					
DATE 1979	BY	REV.	DATE	DESCRIPTION	MADE	CHK'D	APV'D	REV.	DATE	DESCRIPTION	MADE	CHK'D	APV'D
DESIGNED		1	2/81	1980 UPDATING - SAC	SMB	AML	LSJ	7	2/95	1988 UPDATING-JALBERT ENG.	PJD	SMB	LSJ
CHECKED		2	6/82	1981 " - SAC	SMB	AML	LSJ	8	2/96	1985 UPDATING-JALBERT ENG.	PJD	SMB	LSJ
SUPERVISOR		3	5/83	1982 " - SAC	SMD	NLK	LSJ	9	1/01	1990 UPDATING-JALBERT ENG.	PJD	LSJ	LSJ
REVIEWED		4	7/84	1983 "	SMB	NLK	LSJ	10	1/02	1991 UPDATING-JALBERT	PJD	LSJ	LSJ
REVIEWED		5	6/87	1987 UPDATING JALBERT ENG.	PJD	SMB	LSJ	11	1/03	1992 UPDATING-JALBERT ENG.	PJD	LSJ	LSJ
APPROVED		6	4/88	1987 UPDATING JALBERT ENG.	PJD	SMB	LSJ	12	1/10	2009 UPDATING-JALBERT ENG.	PJD	LSJ	LSJ

NORTH

NOTE

THE AREAS, BOUNDARIES AND DIMENSIONS SHOWN ON THIS TAX MAP ARE DERIVED FROM AERIAL PHOTOGRAPHS, GROUND SURVEYS AND RECORDED PLANS, MAPS, DEEDS AND WILLS AND ARE TO BE USED FOR TAX ASSESSMENT PURPOSES ONLY AND NOT FOR CONVEYANCE.

MAPPING PREPARED BY:

JALBERT ENGINEERING

STURBRIDGE ABSTRACT CO.

STURBRIDGE, MASSACHUSETTS

ASSESSORS TAX MAP
TOWN OF MENDON

WORCESTER COUNTY, MASSACHUSETTS

0 200' 400' 600'

SCALE: 1" = 200'

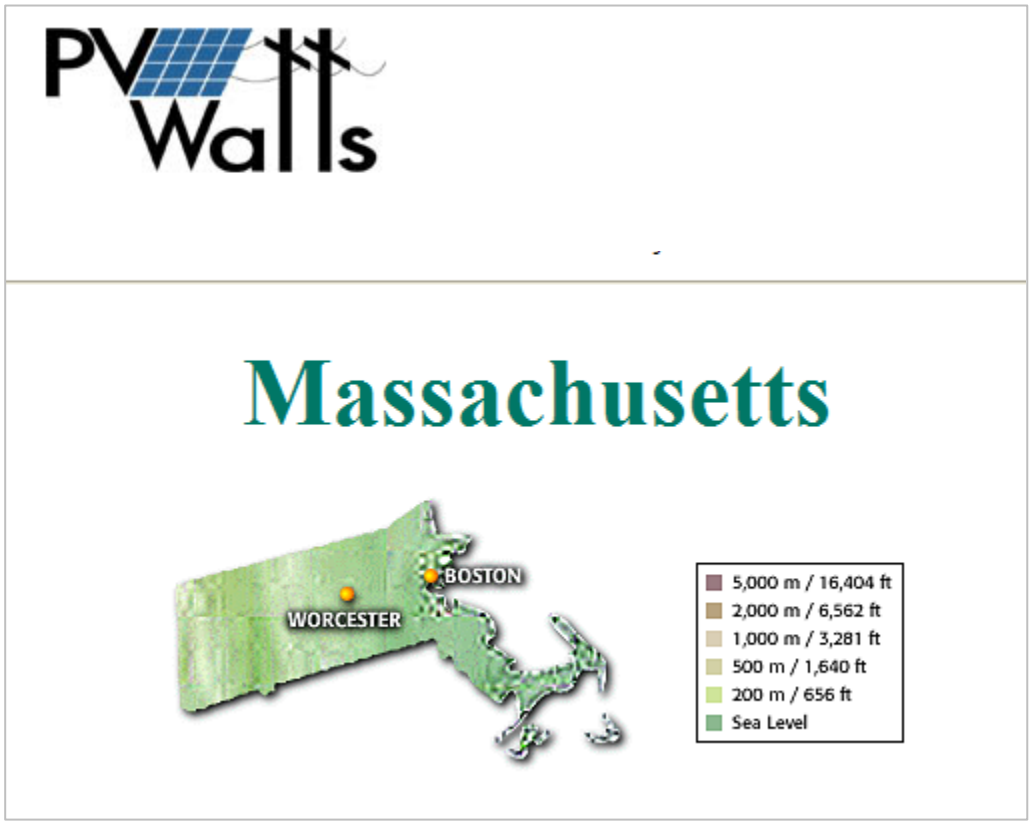
MAP NUMBER

3
4 5 6
7
8

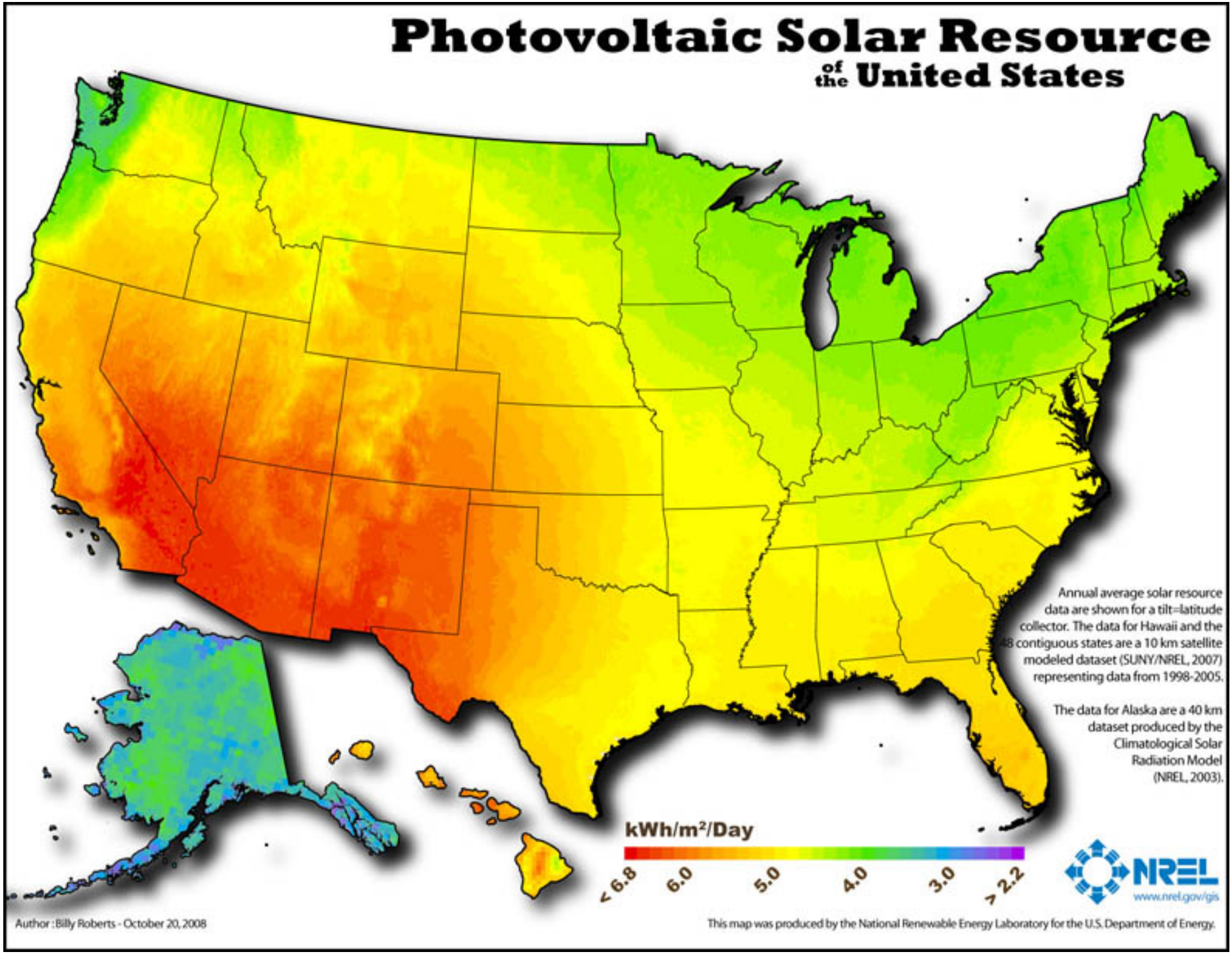
3. The Solar Resource

The site's overall solar resource was estimated using both the National Renewable Energy Laboratory's Photovoltaic Solar Resource map data and 'PV Watts', a PV modeling software published by NREL's Renewable Resource Data Center. For PV Watts, the ***'Worcester'*** data set used. Except for extraordinary land mass changes, such as those near seashores or high ridgelines, the amount of solar radiation falling on the earth's surface within a given 30-40 mile radius does not change very much from site to site, and this data set is considered reliable.

Variations due to tilt angle and seasonality will be covered below.



Photovoltaic Solar Resource of the United States



Annual average solar resource data are shown for a tilt=latitude collector. The data for Hawaii and the 48 contiguous states are a 10 km satellite modeled dataset (SUNY/NREL, 2007) representing data from 1998-2005.

The data for Alaska are a 40 km dataset produced by the Climatological Solar Radiation Model (NREL, 2003).

NREL
www.nrel.gov/gis

Author : Billy Roberts - October 20, 2008

This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy.

Adjustments to Solar Radiation

Orientation: Average solar radiation will vary according to the tilt angle of the array – both up/down and east/west - and by the season. For this reason many arrays can be adjusted between summer and winter sun angles in order to improve performance. However, most mechanical tracking systems add considerable cost to the overall system, and racks that allow for twice annual adjustments of the collectors are often charged for in annual maintenance agreements. Often the cost of adjusting the system is not worth the added expense of moving the array. This analysis assumes an array where the pitch angle is fixed, and is therefore considered a reasonable model of performance.

Month	Average Daily kWhr/m2/day
1	3.37
2	4.35
3	4.85
4	4.86
5	5.26
6	5.34
7	5.60
8	5.31
9	4.98
10	4.32
11	3.21
12	2.87
Total	4.53

Table 1. Solar Radiation for Fixed Tilt Array at Site

From PV Watts, the estimated annual daily solar resource at the project site (without shading) is: ***4.61 kWhr/m2/day***. This is confirmed by the NREL Solar Radiation map.

Shading: Photovoltaic solar panels are designed to work most efficiently when they are are not shaded. Shading can occur from vegetation, buildings or any other fixed object. (Shading from clouds is taken into account in the PV Watts estimate, which includes a local monthly 'cloudiness' factor.) Tools are available to allow the solar Professional to accurately calculate the amount of shading on any solar array. One such common, non-electronic tool is named the 'Solar Pathfinder™'. A Pathfinder was used in this study to

predict losses at the site due to shading. Due to the size of some PV arrays, multiple locations of projected panel locations were studied and the results combined.

Diagram 1. The Solar Pathfinder allows potential shading sources to be identified and quantified.

According to the Manufacturer: *The Solar Pathfinder™ uses a highly polished, transparent, convex plastic dome to give a panoramic view of the entire site. All the trees, buildings or other obstacles to the sun are plainly visible as reflections on the surface of the dome. The sunpath diagram can be seen through the transparent dome at the same time.*

The Pathfinder tool was employed during this study and provided the following shading coefficients at the subject site:

Month	Average Daily kWhr/m2/day	Shading Factor
1	3.37	87%
2	4.35	92%
3	4.85	95%
4	4.86	97%
5	5.26	100%
6	5.34	100%
7	5.60	100%
8	5.31	100%
9	4.98	97%
10	4.32	95%
11	3.21	92%
12	2.87	86%
Total	4.53	95%

Table 2. Solar Shading Factors at the Site

Net Effect: Combined with the PV Watts data, the Shading Factors at the site allow the following projection of average monthly and annual radiation on the PV array.

Month	Average Daily kWhr/m2/day	Shading Factor	Actual kWhrs/m2/day
1	3.37	87%	2.93
2	4.35	92%	4.00
3	4.85	95%	4.61
4	4.86	97%	4.71
5	5.26	100%	5.26
6	5.34	100%	5.34
7	5.60	100%	5.60
8	5.31	100%	5.31
9	4.98	97%	4.83
10	4.32	95%	4.10
11	3.21	92%	2.95
12	2.87	86%	2.47
Total	4.53	95%	4.34

Table 3. Actual Solar Insolation at the Site (kWhr/m2/day)

Therefore this site can expect to receive an average, annual solar radiation value of ***4.34 kWhrs/m2/day***.

4. Potential Energy Production

The energy production from any PV system is a function of the area of the panels that comprise the array, the size and efficiency of the panles, and the electrical efficiency of the inverter used to convert the Direct Current (DC) voltage from the panels to Alternating Current (AC) to feed the grid or building requirements. These factors combine to determine values for an individual site's 'capacity factor' (the percent of time the array can be thought of as generating at its full rated output over the course of the year). When multiplied by the number of hours in a year (8,760), this allows us to produce an 'energy curve' for the project, which shows the overall energy output in kilowatt hours per month or year.

While various panels will operate at slightly better or worse capacity factors, in general they will fall within a range of values which can be used to illustrate the amount of power from various standard size arrays. Similarly, the inverters used in most PV installations to convert DC to AC power operate at approximately the same efficiency – called a 'de-rating' factor. (77% de-rating was used in this study.) Taken together with the area of the array, these values allow the owner to see how much electricity could be produced by different sized arrays.

The following table represents the potential energy output of a number of common size arrays that are typical for commercial/industrial and farm applications. Later in the report we will look at other factors which might preclude many array sizes for issues such as single vs. three phase interconnection, land restraints, etc.

Size of Array (kW)			Output	
Config.	Kilowatts	Acres (approx.)	Panels[1]	kWhrs/yr
A	50	1/8	179	57,574
B	100	1/4	357	115,148
C	250	3/4	893	287,870
D	1000	2-1/2	3571	1,151,480
E	2000	5	7143	2,302,960
1. Assumes typical 285w per panel. TSM - PC05.05 used as example.				

Table 4. Output of various size arrays at site (kWhr/yr)

Notes:
1. The sizing example reflects a ground mounted array, located approximately on the site as shown. This location has an effect on the shading coefficients used.
2. The solar output values represented in this report should be taken as estimates and should in no way be interpreted as a guarantee of the average annual wind speed or the average annual output of any specific solar panel used at this site.
3. Many of the array sizes depicted in Table 4 may not be suitable for the site in other respects. See following sections.

5. Use of the Power and Interconnection Configurations

Usage on the site:

Based on current electric bills, the buildings on the site (Equestrian Center, Stables and Residence) as currently constructed and occupied use approximately 87,080 kWHrs/yr. The average monthly usage over the year is 7,256 kWhrs/mo, and usage does increase during the summer months when air conditioning is in use.

Approximately $12,060 per year is currently being spent on this electricity, including the monthly customer account charges (which were NOT included in the calculation of energy usage costs). The customer pays for delivery from National Grid and receives Energy from a contract with Constellation New Energy, which is billed through the National Grid invoice. Energy (alone) under the current contract is being billed at $.101 per kWhr.

The customer is on a non-demand General Service rate, G-1. This information was derived from a current electric bill, which is included for reference.

For the purposes of this appraisal, the average cost per kWhr(delivery and energy) is taken to be $.165 per kilowatt hour.

Applying the power to the site:

It is important for the land owner to understand how the interconnection of a solar array can affect the economics of the installation so that the proper sized unit can be installed. The economics of solar power are maximized by several factors:

- The installed cost, which includes permitting and engineering costs related to regulatory issues and public resistance through the zoning laws. Many projects which propose the largest projects are the hardest (and costliest) to get approved, simply because of resistance from the neighbors, restrictive zoning laws, or the required cutting of wooded areas.

- How the array is connected to the load use and how excess power is conserved, sold or wasted. At this site the most popular types of service configurations will include:

    - **Behind the Meter** – the array is simply used to service the on-site load, and displaces electricity drawn from the grid. Unless Net Metering regulations are available (and they ARE at this site), the array is carefully

sized so that there is little excess power produced, because any such power is wasted.

- **Net Metering** – the most popular and profitable approach. In net metering, the array is connected 'behind the meter' but the power company regulations allow net excess generation (NEG) to 'run the meter backwards' (or the site is dual-metered). This typically results in the highest financial benefit, since the power used for on-site purposes is first displaced by power from the array at full cost, with NEG compensated according to the Net Metering guidelines (below).

In July 2008, net metering in Massachusetts was significantly expanded to establish three separate categories of net-metering facilities. The order instituting rulemaking was issued in March 2009 and proposed rules have been issued. "Class I" facilities are generally defined as systems up to 60 kW in capacity. "Class II" facilities are generally defined as systems greater than 60 kW and up to one megawatt (mW) in capacity that generate electricity from agricultural products, solar energy or wind energy. "Class III" facilities are generally defined as systems greater than 1 mW and up to 2 mW in capacity that generate electricity from agricultural products, solar energy or wind energy. In addition, a 'Municipal Net Metering' category was recently added which allows up to 10mW projects for towns which act as 'Host Customers' which buy all of the output of a project (or if the project is within the town limits).

The state's investor-owned utilities must offer net metering. Municipal utilities are not obligated to offer net metering, but they may do so voluntarily. (There are no electric cooperatives in MA.) The aggregate capacity of net metering for non-municipal net metering is limited to 3% of each utility's peak load.

NEG output is handled more as a billing exercise, where the customer could 'assign' the excess power to other meters within the local distribution company's service area. These meters could presumably be owned by the turbine owner, or could be friends or other neighbors, with whom some financial arrangements could be made for the sale of excess power.

This report assumes that the most advantageous method of connection and use of a PV array at this site would be a 'behind the meter' application, with any excess assigned to other meters via net metering, either to other owner meters or credit worthy accounts with whom deals can be made. Therefore, the largest array that could be accommodated physically on the site, within the constraints of interconnection and land area availability (which follow), should be utilized.

6. Concerns and Sizing

The above illustrates the fact that when judging the desired size of a solar array, it is not simply a matter of 'how big of an array will fit on the land'. Rather, it becomes a balancing act between trying to find the right sized array for the site which balances all concerns. For instance, smaller mid-scale arrays (50 kW – 250 kW) may ultimately be more cost effective if they are easier to permit (because of their smaller size and easier interconnection rules, and the ability to put the power onto single phase distribution lines) than a larger array, even if all of the power could be absorbed behind the meter.

The following issues would affect the size of arrays on this site. These concerns should be investigated and confirmed before any solar project is undertaken.

Land Area – The land at the site consists of one parcel totaling 30 acres. The land is generally irregular in shape. The geometry of the land does present a number of potential turbine sites. *One of the most promising sites is about 1 acre in size and does not interfere with current operations*. In addition, no clear cutting of wooded areas would be required, a fact that many town boards are sensitive to and which serves to negate the use of renewable energy in the first place. There are two alternative sites on the property if required.

Zoning – The town of [redacted] does not have a specific zoning bylaw that addresses wind turbines. The zoning designation that is assigned to this property would allow solar arrays, through a typical construction permit application. The zoning ordinance does specify and setback requirements.

Specific Environmental Permitting - Any solar site must adhere to any rules and regulations pertaining to wetlands and other environmentally sensitive issues. Such specifics would be covered in more depth in a full Engineering Study or the Permitting process.

Access to the Site – the two favored sites appear fully accessible for the delivery of any equipment of the sizes found to be suitable. Equipment of solar arrays are usually shipped on standard flatbed or container trucks and should present no problem to delivery.

Offtaking of Power – the site is serviced by a three phase distribution line. ***This is the limiting factor for the site, and will determine the maximum sized array which can be implemented.*** In general, three phase interconnection must be limited to 250kW or less in order to not create expensive interconnections, interconnection studies and upgrading of distribution lines. By keeping the project below approximately 300kW this type of interconnection is relatively straight-forward with most utilities and will

probably NOT require a lengthy interconnection study. Should discussions with the utility determine that a larger array could be utilized at this site, the project could be scaled up as desired.

Potential Siting Locations –

Given the large land area, at least one prospective site becomes apparent. Diagram 1 indicates these sites. The Orange area indicates approximately a 3/4 acre area where a 250kW array may be located .

The array site will be located in close proximity to the utility service, but also located in a low area that will be hidden from the main road and most neighbors.

The preferred site is located away from current operations and is not in an area where growth is planned.

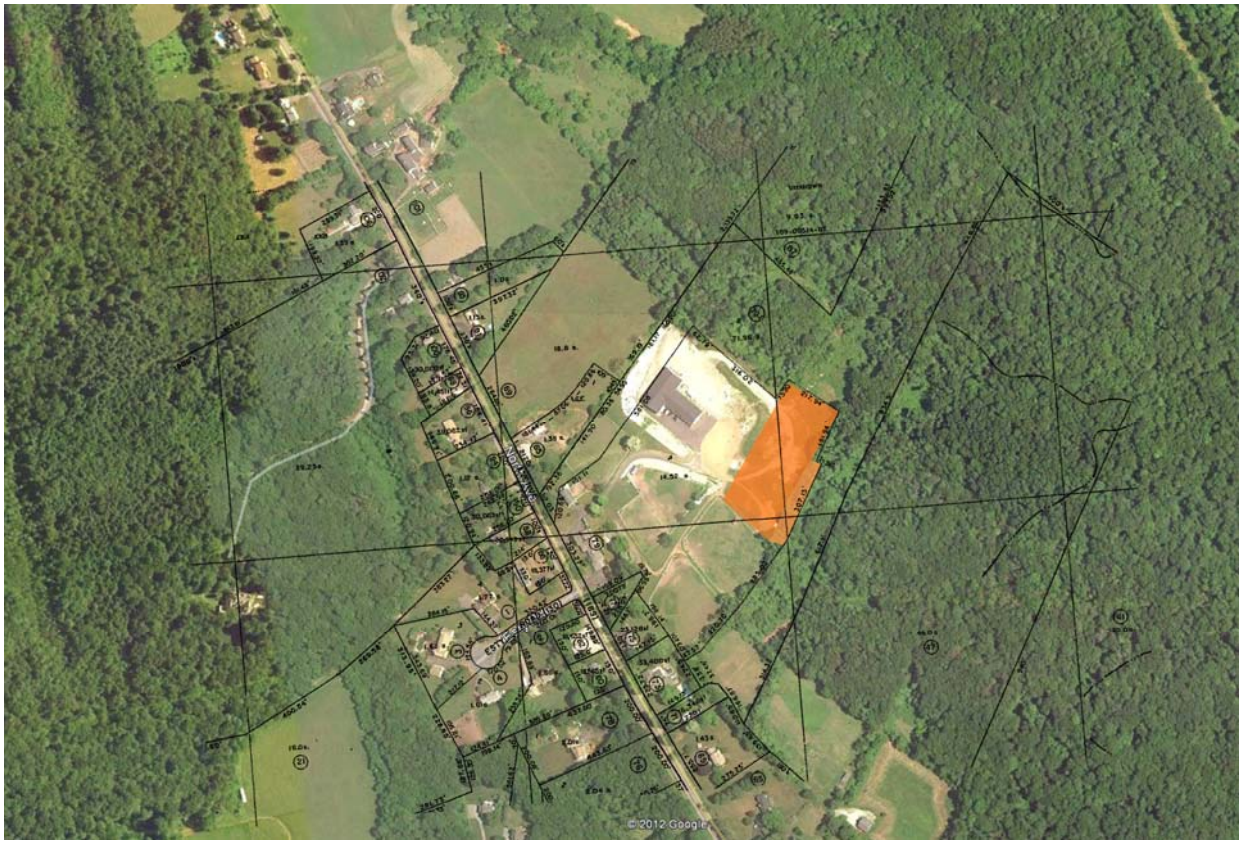


Diagram 1 – Site location of Array showing assessor's plan superimposed.

7. Financial Analysis

Value of Electricity:

Under the assumed 'behind the meter' and net metered arrangement available from National Grid, the electricity produced by the array will have several values, depending on how it is 'sold'.

1. For energy used on-site, the current retail cost of the energy as delivered from the utility can be considered to be the value of the power produced by the array, since this energy is directly displaced.

   According to recent bills, the current price being paid for power by the owner is $.165 /kWhr.

2. Any Net Excess Generation produced beyond the on-site load could be sold to others within the National Grid service area under the Net Metering regulations. Since the array appears to have limiting factors (interconnection) that lead to a 100kW maximum size, the project would fall under the 'Class II' net metering designation. This designation means that the credits received by the owner will be valued at almost full retail value, based on the meter rate structure that the array is tied into. This means that the $.165/kWhr rate will be used to value the NEG (less approximately $.005 for certain items in the rate structure which are not counted in Class II Net Metering). These credits however, need to then be sold to another party in order to be monetized, presumably at some discount. For the purposes of this study the value of the NEG will be taken to be:

   $.165 - $.005 = $.16, less a 25% discount to a buyer of credits = $.12/kWhr.

   It is assumed that electric rates will rise 2% per year, which is a conservative number compared to the 3.3% average annual increase experienced over the past 20 years in New England.

3. The value of Solar Renewable Energy Credits (SRECs) or 'Green Tags' as they are sometimes called, constitute the main revenue component of solar electricity projects. SRECS represent the 'Green Attribute' of the solar array's electricity, and can be sold independently of the actual electrons produced. Utilities are required by the state to obtain a portion of the energy they sell from renewable energy sources. Buying SRECs is one way utilities meet this obligation, which creates value for the SREC

market. Of that portion of renewable energy purchases, a smaller portion must come from solar energy (the "solar carve out"). Due to the 'carve out' for solar projects from the Commonwealth's Renewable Portfolio Standards, significant value can be obtained by selling the SRECS. At the time of this writing (July 2013) the Commonwealth is about to announce a new 'Tier' for SREC sales, due to the oversubscription of the first offering. In that offering the Commonwealth expected to generate 250MW of electricity by the year 2016, but ended up with over 260MW of projects 3 years before the deadline. The resulting influx of solar electricity created a surplus of SREC related power, and depressed the SREC prices from over $.50/kWhr to less than $.20/kWhr. The new round of SRECs will have a 'floor' of $.285/kWhr, and this will be the value used in this analysis. It is important to note that this value does change over time, and must be 'locked in' in order to be realized. Readers of this study in the future may not be able to count on these values. RECs generally have a life of 10 years, and can also be sold to many other companies looking to 'buy' their way into being green through the purchase of these vehicles from many power brokers.

The sale of SRECs in this study is taken to be the floor value of the next SREC offering, or $.285

In summary therefore, the value of the electricity sold from the array proposed in this study is comprised of the following values. These values are then used in the Financial Analysis to calculate earnings/savings for the system.

Description	Value of Electricity per kWhr
On-Site usage (behind the meter)	$.165
Class II Net Metering NEG	$.12
MA SRECs	$.285

Table 5 – Value of Electricity from this project.

Other valuable considerations which affect the effective rate of produced power from a Solar system are shown in Appendix B. Note that some of these only apply to taxable entities, and some to only residential properties.

Other Factors:

Typical Installed Costs of Solar PV Systems:

Given the estimated production value of the site, we may now compare this to the estimated costs of today's solar projects in order to gage economic return on the investment in the Financial Model.

At this time, Solar PV projects being quoted in the range of between $3 and $4 per watt (DC), installed. The main variation in the cost depends on the mounting system employed: ground mounted vs. roof mounted. Each have pros and cons associated with the mounting system:

Ground Mounting	Roof Mounting
PROS:	PROS:
Space limited only to land area	Uses otherwise wasted space
Ease of Maintenance, adjustments	Less expensive racking and foundation
	No land coverage issues
CONS:	
Land 'Tied Up'	CONS:
Subject to zoning, coverage issues	Limited, smaller areas
Expense of foundations	Roof Penetrations, Shingle issues
	Structural stability and analysis costs

Table 6 – Pros and Cons of Mounting Methods.

Many solar projects are sold under a 'develop-to-own' scenario, where the land owner assumes the responsibility of tracking credits, selling power, maintenance, financing, etc.

Alternatively, many developers will 'develop-to-own', and will lease the land (or rooftop) from the landowner. Typical lease values range from 5 to 8% of gross sales revenue, or a fixed monthly payment. The developer then pays all development costs and provides the financing for the system.

The cash flow difference between owning the system and leasing space can be significant, and is usually reflected in the risk being assumed by the parties.

The performance of a photovoltaic solar cell will degrade over time. The amount of degradation is typically 1% of output per year, to a limit of about 20%. The financial

lifetime of a solar cell is not truly known, as some cells have been operating for more than 40 years.

Although many grants are available for solar projects, none are included in the Financial Model.

Financial Analysis Summary:

Given the electrical output, value of electricity, and regulatory environment that can be expected for the project site, we can now create an economic model for the suggested configuration of the project. The summary page of the model is shown below. ***The complete financial model is shown in the Appendix.***

Description		
Project Size	250	kW
Project Capital Cost	$614,304	
Installed cost/kW	$2,457	$/kW
Electrical Generation	287,870	Per year
	23,989	Per Month
First Year Gross Revenue	$118,890	$/yr
25 Year Gross Revenue	$2,000,661	
First Year Net Revenue	$44,528	(After Exp. and Fin.)
25 Year Net Revenue	$1,024,721	(After Exp. and Fin.)
Internal Rate of Return	15.9%	(unleveraged, 25 yr)
Years to Recover Investment	5.4	Years (payback)

Table 7 – Summary of Financial Results

8. Conclusions/Next Step

The subject property appears to have enough attributes to be considered a commercially viable site for a commercial sized photovoltaic array. Net Metering could be employed in order to create an attractive investment. Arrays larger than 250kW kW were ruled out at this site due to the inability to connect to the local power lines and readily available land area.

Site Recommendations

1. ***Since a 100-250kW array would appear to be an economical decision for the owner, development of the project is suggested. (AED will be happy to assist you in this process if desired.)***

2. Due to the limiting factor of three phase interconnection availability and the land area readily available, a 250kw system is recommended for this site.

3. A ground-mounted racking system appears to be most favorable for this site, in order to maximize the size of the array. This takes advantage of otherwise unused land on the site.

4. In order to maximize the economics and take advantage of tax credits, etc., various development options should be considered for this project. Both 'Develop-to-Own' and 'Develop-for-Hire' options should be considered.

Next steps:

Since the site appears to meet the basic requirements of having an adequate solar resources, interconnection potential, and an adequate load to create positive economics, we would suggest moving ahead with a more complete *Permitting and Development process*.

The information expressed in this Appraisal has been collected and presented in such a manner as to 'roll into' such a Development process. It can be thought of as a 'first phase' of the development process.

In addition, AED also offers a grant writing service that will conduct a search of applicable grants and make application to such granting authorities on behalf of the owner, should this service be desired. The typical cost of such a service is $5,000.

Appendix A - FOCUS Financial Model

The following pages represent a financial modeling of the project site, using software named 'FOCUS'. This software allows the project to be modeled to show a 25 year proforma analysis, and the tax implications of the project. It is modeled from the point of view of the land owner being the sole partner in any such development project. As such there is no land 'rental' involved. Assumptions not addressed specifically in this report that are used in the model are based on industry standards at the time the study was performed.

FOCUS Wind Site Evaluator

[redacted]rm
AWD

0 [redacted]

[redacted]

Latitude:
Longitude: [redacted]
Elevation (ASL): 0

8/6/2013 17:59

Notes:
Project utilizes MA Net Metering and selling NM credits at 20% discount. 250kW system economics. Uses floor of $.285/kWhr for SREC sales.

System:	
Model of Panels:	TSM-PC05.05
Quantity of Panels:	893
Panel and Rack Portion of Project:	$298,304
Balance of Plant Portion:	$316,000
Total Project Cost:	$614,304

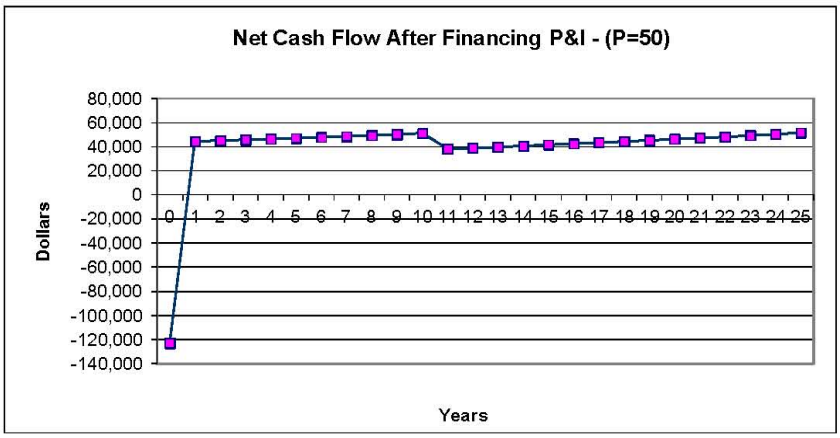
Environmental:	
kW/panel:	0.28
Solar input Location:	per lat/long

Greenhouse Gas Savings Equivlent (CO2) 198.50 metric tons/yr

Investment Ratings (at P-50):		
Simple Paybacks:	w/NO grants	5.44 years
	w/FED grants	5.44 years
	w/ALL Grants	5.44 years
Cost/kW: (Inst. cost/nameplate rating)		$2,457

	Before Fin.	*After Fin.*
Year 1 Cash Flow:	$112,890	$44,528
Year 2 Cash Flow:	$113,567	$45,205
IRR (Excl. salv., 25 yr)		15.9%
Property Taxes Pd. (1 yr/25 yr:	$0	$0

Net Present Value (NPV)	$399,742	(w/out salv. value)
Avg. Annual ROI over 25 yrs	11.9%	(w/o fin. and depr.)
Ann. Ret. on Inv. Capital (over 25 yrs)	59.6%	(Infinite = $0 down)
Min. Cum Cash Position after Expenses:	$44,528	(Min position over 25 yrs)



Produotion:		
Energy	287,870	kWhrs/yr
	23,989	kWhrs/mo
Revenue (25 yr. avg.)	$73,248	$/year
(25 yr. avg.)	$6,104	$/mo
Land Rental (1st year):	$0	$/year

Power Cost Assumptions:		
Percent of Power Mix: Retail vs. Resale	100%	Retail
Retail:		
Current value of Retail Electricity (BTM c	$0.160	$/kWhr
Contracted Disc. over Current Price:	20.0%	
Adjusted Retail Rate	$0.128	$/kWhr
Retail Escalators:	2.0%	per year
0.0% 0.0% 0.0%	0.0%	0.0%
Resale:		
Value of Resale (Sold to grid):	$0.000	$/kWhr
Resale Escal.	0.0%	per year
Value of RECs or Green Tags	$ 0.285	$/kWhr
Escalator:	0.00%	per year

Finanoing Struoture:			
Is Project Financed? (Y/N	Y	Interest Rate	6.50%
Down payment	20%	Loan term (years)	10
Total Invested Capital			$122,861
Grants Applied against Financing:			$ -
Total Financed			$ 491,443

Net Cash Flow:

Net kWhrs/yr 287,870

Year	*Net Cash Flow (from Ann. Proformas)*
1	$44,528
2	$45,205
3	$45,896
4	$46,602
5	$47,322
6	$48,057
7	$48,808
8	$49,574
9	$50,356
10	$51,155
11	$38,289
12	$39,121
13	$39,970
14	$40,837
15	$41,722
16	$42,626
17	$43,548
18	$44,489
19	$45,450
20	$46,431
21	$47,432
22	$48,454
23	$49,497
24	$50,562
25	$51,648
totals	$1,147,581

Basic Input Values

(input in GREEN cells only)

Site Information:	[redacted]		
Owner Name:	AWD		
	[redacted]	Latitude	[redacted]
		Longitude	
Developer Name:	AWD		
Point of Contact, Phone	[redacted]	POC Phone	[redacted]
Facility:			
Select the Solar Panel Desired:	**TSM-PC05.05**	0.28	kW/Panel
Nameplate Rating of Array (kw):	250	**892.9**	No. of Panels
Wind & Environmental			
Average Annual Solar Output:		287,870	

Project Costs:			*Sched. Date*
A. Turbine Costs:			
Panel base cost:	(price/watt)	300	
Shipping to site ($/panel):		$5	
Duties and Fees:		$0	
Racking cost/panel		$0	
Other options:		$0	
Per panel total from Mfgr:		**$305**	
Foundation design cost:		$7	
Per Panel foundation and racking constr.cost		$22	
Total per panel cost:	(price/watt)	**$334** $	*1.19*
No. of Panels: **892.857**	*Array Cost, $/kw:*	***$298,304*** $	*1,193*
B. Balance of Plant:			
B1. PreDev and Permitting			
Studies:		$0	
Feasibility Study:		$0	
Site Plans:		$5,000	
Soil Geotechnic Study:		$5,000	
Interconnection Studies:		$5,000	
Reflection Studies:			
Avian, Environmental Studies:			
Road Surveys			
Other:			
Legal:		$5,000	
Total (B1) PreDev and Permitting:		**$20,000**	
B2. Construction:			
Excavation:		$10,000	
Site and Road Upgrades:		$8,500	
Dewatering:		$0	
Electrical - Array to Grid		$100,000	
Grid Upgrades:		$0	
Array Wiring:		$5,000	
Erection team costs:		$10,000	
Cranes/lifts		$7,500	
Storage costs:		$0	
Landscaping:		$2,500	
Commissioning (operational date):		$2,500	
Security and Details:		$0	
Other:	dev fee/mu	$100,000	
Contingency:		$50,000	
Total (B2) Construction:		***$296,000***	
Total Bal of Plant		***$316,000***	
Total Installed Cost		***$614,304***	
Salvg Value (% of inst cost)	10.00%	**$61,430**	

Power Cost Assumptions:						
Percent of Power Mix: Retail vs. Resale					100%	Retail
Value of RETAIL Electricity (BTM or NM):					$0.160	$/kWhr
Contracted Disc. over Current Price:					**20.0%**	
Adjusted Retail Rate					$0.128	$/kWh
Escalate:	(A or B, A is default if enetered.) A:				2.0%	
B:	0.0%	0.0%	0.0%	0.0%	0.0%	per term
	(* allows rates like: 4% inc. for 5 years, then 2% for next 5 years...)					
Value of RESALE (Merchant Electric sold to grid):					$0.000	$/kWhr
Resale escalator					0.0%	per year
Value of RECs or Green Tags					$ 0.285	$/kWhr
Annual escalator					0.00%	
Value of PTCs					0	$/kWHr

Expenses by Month					
Land Costs (choose 1):				**0.00%**	%Gr.Rev.
		Payment/Turbine:		**$0**	$/mo/kW
Management Fee (Choose 1. Applied in January)				**0%**	%Gr. Rev.
				$0	$/yr/kW

Month	O&M	Insurance	Land	Mgt/Other	Financing
January	2,500	3,500	0	0	5,697
February			0	0	5,697
March			0	0	5,697
April			0	0	5,697
May			0	0	5,697
Jun			0	0	5,697
July			0	0	5,697
August			0	0	5,697
September			0	0	5,697
October			0	0	5,697
November			0	0	5,697
December			0	0	5,697
Totals	**2,500**	**3,500**	**0**	**0**	**68,362**

	O&M $/kWhr	% of Cost/yr	Mgt $/Mo
Total:	0.00868	0.57%	$0

Used in Annual Proforma:		
O&M	0.00868	$/kWh based on Net Ann. Output
Land Cost	0	% of Rev unless 0, then $/turb
Mgt Fee:	$0	$/mo
Insurance	0.57%	of Installed Cost/yr.
Inflation rate	1.00%	per year (affects ann. costs)

Ownership and Financing Structure:					
Type of Ownership	'S-Corp', LLC, Partnership			Comb. Fed. & ST Tax bracket:	35%
Target DSC	1.5			Show Depreciation as:	20yr S/L
Prop. Tax:	Land Valuation ($)		$0	Land Mil Rate ($/'000)	$0.00
	Equipment Valuation ($):		$552,874	Equip. Mil Rate ($/'000)	$0.00
	or Payment in Lieu of Taxs (PILOT):			Show PropTx as 'Oth. Exp' (Y/N)	Y
Fed Tax Credit type	ITC	Grants to:	FINANCING	Fed Tax Grant:	$0
Financing Type:	Equity/Debt	Loan Term	10	Financed Amount:	$491,443
Down Pmt/Equity	20%	Int. Rate	6.50%	Down Paym't Amt.	$122,861
If Lease: Mo. Pmt.	12	Resid. Value	12000		
Resid. Pmt.	10	Resid. Years	3		

Version 1.00

25 year Financial Proforma

Project: [redacted]

Revenue Proformas - Cash Basis - w/out Tax Implications

	Base Energy Value (Cash Revenue)							Expenses						Financing Costs			Results		
Year	Retail Revenue	Resale Revenue	Gross Elect. Revenue	REC Revenue	Federal Tax Grant [3]	Other Grants/Inc.	*Gross Revenue*	O&M	Insurance	Land Costs	Other Mgt	Other Exp.	*Net Revenue (EBITDA)*	Loan Interest	Loan Principal	Tot. Pmts. (CMLTD)	*Net Cash after CMLTD*	*Cum Net Cash Flow*	DCS w/RECs
0															Down Pmt.>	-122,861	-122,861		
1	36,847	0	36,847	82,043	0		*118,890*	-2,500	-3,500	0	0		*112,890*	-31,944	-36,418	-68,362	*44,528*	*44,528*	1.65
2	37,584	0	37,584	82,043			*119,627*	-2,525	-3,535	0	0		*113,567*	-29,577	-38,785	-68,362	*45,205*	*89,733*	1.66
3	38,336	0	38,336	82,043			*120,379*	-2,550	-3,570	0	0		*114,258*	-27,056	-41,307	-68,362	*45,896*	*135,630*	1.67
4	39,103	0	39,103	82,043			*121,146*	-2,576	-3,606	0	0		*114,964*	-24,371	-43,991	-68,362	*46,602*	*182,231*	1.68
5	39,885	0	39,885	82,043			*121,928*	-2,602	-3,642	0	0		*115,684*	-21,511	-46,851	-68,362	*47,322*	*229,553*	1.69
6	40,682	0	40,682	82,043			*122,725*	-2,628	-3,679	0	0		*116,419*	-18,466	-49,896	-68,362	*48,057*	*277,611*	1.70
7	41,496	0	41,496	82,043			*123,539*	-2,654	-3,715	0	0		*117,170*	-15,223	-53,139	-68,362	*48,808*	*326,419*	1.71
8	42,326	0	42,326	82,043			*124,369*	-2,680	-3,752	0	0		*117,936*	-11,769	-56,593	-68,362	*49,574*	*375,993*	1.73
9	43,173	0	43,173	82,043			*125,216*	-2,707	-3,790	0	0		*118,718*	-8,090	-60,272	-68,362	*50,356*	*426,349*	1.74
10	44,036	0	44,036	82,043			*126,079*	-2,734	-3,828	0	0		*119,517*	-4,172	-64,190	-68,362	*51,155*	*477,504*	1.75
11	44,917	0	44,917	0			*44,917*	-2,762	-3,866	0	0		*38,289*	0	0	0	*38,289*	*515,793*	
12	45,815	0	45,815	0			*45,815*	-2,789	-3,905	0	0		*39,121*	0	0	0	*39,121*	*554,914*	
13	46,731	0	46,731	0			*46,731*	-2,817	-3,944	0	0		*39,970*	0	0	0	*39,970*	*594,884*	
14	47,666	0	47,666	0			*47,666*	-2,845	-3,983	0	0		*40,837*	0	0	0	*40,837*	*635,722*	
15	48,619	0	48,619	0			*48,619*	-2,874	-4,023	0	0		*41,722*	0	0	0	*41,722*	*677,444*	
16	49,592	0	49,592	0			*49,592*	-2,902	-4,063	0	0		*42,626*	0	0	0	*42,626*	*720,070*	
17	50,584	0	50,584	0			*50,584*	-2,931	-4,104	0	0		*43,548*	0	0	0	*43,548*	*763,618*	
18	51,595	0	51,595	0			*51,595*	-2,961	-4,145	0	0		*44,489*	0	0	0	*44,489*	*808,107*	
19	52,627	0	52,627	0			*52,627*	-2,990	-4,187	0	0		*45,450*	0	0	0	*45,450*	*853,558*	
20	53,680	0	53,680	0			*53,680*	-3,020	-4,228	0	0		*46,431*	0	0	0	*46,431*	*899,989*	
21	54,753	0	54,753	0			*54,753*	-3,050	-4,271	0	0		*47,432*	0	0	0	*47,432*	*947,421*	
22	55,848	0	55,848	0			*55,848*	-3,081	-4,313	0	0		*48,454*	0	0	0	*48,454*	*995,875*	
23	56,965	0	56,965	0			*56,965*	-3,112	-4,357	0	0		*49,497*	0	0	0	*49,497*	*1,045,372*	
24	58,105	0	58,105	0			*58,105*	-3,143	-4,400	0	0		*50,562*	0	0	0	*50,562*	*1,095,933*	
25	59,267	0	59,267	0			*59,267*	-3,174	-4,444	0	0		*51,648*	0	0	0	*51,648*	*1,147,581*	
Totals			*1,180,232*	*820,430*	*0*	*0*	*2,000,661*	*-70,608*	*-98,851*	*0*	*0*	*0*	*1,831,202*	*-192,177*	*-491,443*	*-683,621*	*1,024,721*		

Results:

Net Annual Energy Output	**287,870**	kWh/yr
20 yr ROI	**298.1%**	(Cum NP over 25 yrs/Installed Cost)
Avg. Annual ROI over 25 yrs	**11.9%**	(25 yr ROI / 25 years)
Avg. Annual Return on Invested Capital over 25 yrs	**59.6%**	(If financed, ROIC uses Downpayment, else Capital Cost. Shows DIV/0 if no invested capital (no downpayment))
Minimum Cum Cash Flow:	**44,528**	

InvestmentAnalysis:

Net Present Valu $399,742 (does not include a salvage value)

10 Year IRR: 13.48% 25 Year IRR: 15.9%

Simple Payback (deducts grants from Installed Cost)

	yr 1 savings	inst cost	yrs
w/NO grants	112,890	614,304	**5.44**
w/ FED grants	112,890	614,304	**5.44**
w/ALL Grants	112,890	614,304	**5.44**

Ownership and Tax Implications - Pass Thru Tax Entity (S-Corp, LLC, Partnership)

Company: *Hood Farm* *Based on P-50*

Corporate View

	Revenue From Proforma (P50)			Tax Credit and Deduction Pass Throughs						Taxes Incurred		
Year	Net Elect Revenue	Other Revenue	*Total Net Revenue (NP)*	Depreciation Amount	Depreciation Value	Fed. PTC/ITC Credits	State Tax Credits	Other Credits	*Total Dep. & Crs. Available*	Property Tax or PILOT	Fed & ST Taxes Owed	Cum. F&S Tax Carry Forward
0										IN EXPENSES!!!		
1	44,528		44,528	27,644	9,675	18,429			28,104	0	$ 15,585	$ 15,585
2	45,205		45,205	27,644	9,675	18,429			28,104	0	$ 15,822	$ 31,407
3	45,896		45,896	27,644	9,675	18,429			28,104	0	$ 16,064	$ 47,470
4	46,602		46,602	27,644	9,675	18,429			28,104	0	$ 16,311	$ 63,781
5	47,322		47,322	27,644	9,675	18,429			28,104	0	$ 16,563	$ 80,344
6	48,057		48,057	27,644	9,675	18,429			28,104	0	$ 16,820	$ 97,164
7	48,808		48,808	27,644	9,675	18,429			28,104	0	$ 17,083	$ 114,246
8	49,574		49,574	27,644	9,675	18,429			28,104	0	$ 17,351	$ 131,597
9	50,356		50,356	27,644	9,675	18,429			28,104	0	$ 17,625	$ 149,222
10	51,155		51,155	27,644	9,675	18,429			28,104	0	$ 17,904	$ 167,126
11	38,289		38,289	27,644	9,675				9,675	0	$ 13,401	$ 180,527
12	39,121		39,121	27,644	9,675				9,675	0	$ 13,692	$ 194,220
13	39,970		39,970	27,644	9,675				9,675	0	$ 13,990	$ 208,209
14	40,837		40,837	27,644	9,675				9,675	0	$ 14,293	$ 222,503
15	41,722		41,722	27,644	9,675				9,675	0	$ 14,603	$ 237,105
16	42,626		42,626	27,644	9,675				9,675	0	$ 14,919	$ 252,024
17	43,548		43,548	27,644	9,675				9,675	0	$ 15,242	$ 267,266
18	44,489		44,489	27,644	9,675				9,675	0	$ 15,571	$ 282,838
19	45,450		45,450	27,644	9,675				9,675	0	$ 15,908	$ 298,745
20	46,431		46,431	27,644	9,675				9,675	0	$ 16,251	$ 314,996
21	47,432		47,432		0				0	0	$ 16,601	$ 331,597
22	48,454		48,454		0				0	0	$ 16,959	$ 348,556
23	49,497		49,497		0				0	0	$ 17,324	$ 365,880
24	50,562		50,562		0				0	0	$ 17,697	$ 383,577
25	51,648		51,648		0				0	0	$ 18,077	$ 401,654
Totals	1,147,581	0	1,147,581	552,874	193,506	184,291	0	0	377,797	0		$ 401,654

Participants View

Corporate Net Rev (above)		Individual Distributions - Participant Name and Ownership %																		
		Equity Partner			Land Owner			Developer/Mgt			Name 4			Name 5			Name 6		
Total Net		0.00%			100.00%			0.00%			0.00%			0.00%			0.00%		
Year	*Net Rev.*	Rev. Share	Tax Share	CR. Share	Rev. Share	Tax Share	CR. Share	Rev. Share	Tax Share	CR. Share	Rev. Share	Tax Share	CR. Share	Rev. Share	Tax Share	CR. Share	Rev. Share	Tax Share	CR. Share
0																			
1	44,528	0	0	0	44,528	15,585	28,104	0	0	0	0	0	0	0	0	0	0	0	0
2	45,205	0	0	0	45,205	15,822	28,104	0	0	0	0	0	0	0	0	0	0	0	0
3	45,896	0	0	0	45,896	16,064	28,104	0	0	0	0	0	0	0	0	0	0	0	0
4	46,602	0	0	0	46,602	16,311	28,104	0	0	0	0	0	0	0	0	0	0	0	0
5	47,322	0	0	0	47,322	16,563	28,104	0	0	0	0	0	0	0	0	0	0	0	0
6	48,057	0	0	0	48,057	16,820	28,104	0	0	0	0	0	0	0	0	0	0	0	0
7	48,808	0	0	0	48,808	17,083	28,104	0	0	0	0	0	0	0	0	0	0	0	0
8	49,574	0	0	0	49,574	17,351	28,104	0	0	0	0	0	0	0	0	0	0	0	0
9	50,356	0	0	0	50,356	17,625	28,104	0	0	0	0	0	0	0	0	0	0	0	0
10	51,155	0	0	0	51,155	17,904	28,104	0	0	0	0	0	0	0	0	0	0	0	0
11	38,289	0	0	0	38,289	13,401	9,675	0	0	0	0	0	0	0	0	0	0	0	0
12	39,121	0	0	0	39,121	13,692	9,675	0	0	0	0	0	0	0	0	0	0	0	0
13	39,970	0	0	0	39,970	13,990	9,675	0	0	0	0	0	0	0	0	0	0	0	0
14	40,837	0	0	0	40,837	14,293	9,675	0	0	0	0	0	0	0	0	0	0	0	0
15	41,722	0	0	0	41,722	14,603	9,675	0	0	0	0	0	0	0	0	0	0	0	0
16	42,626	0	0	0	42,626	14,919	9,675	0	0	0	0	0	0	0	0	0	0	0	0
17	43,548	0	0	0	43,548	15,242	9,675	0	0	0	0	0	0	0	0	0	0	0	0
18	44,489	0	0	0	44,489	15,571	9,675	0	0	0	0	0	0	0	0	0	0	0	0
19	45,450	0	0	0	45,450	15,908	9,675	0	0	0	0	0	0	0	0	0	0	0	0
20	46,431	0	0	0	46,431	16,251	9,675	0	0	0	0	0	0	0	0	0	0	0	0
21	47,432	0	0	0	47,432	16,601	0	0	0	0	0	0	0	0	0	0	0	0	0
22	48,454	0	0	0	48,454	16,959	0	0	0	0	0	0	0	0	0	0	0	0	0
23	49,497	0	0	0	49,497	17,324	0	0	0	0	0	0	0	0	0	0	0	0	0
24	50,562	0	0	0	50,562	17,697	0	0	0	0	0	0	0	0	0	0	0	0	0
25	51,648	0	0	0	51,648	18,077	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	1,147,581	0	0	0	1,147,581	401,654	377,797	0	0	0	0	0	0	0	0	0	0	0	0

Note: This program only provides an estimate of tax liability and revenue projections. Tax law and its application to wind projects is a complicated field, and you will need to consult a tax professional in the early stages of project planning to ensure that your financial projections are valid and accurately take into account the project's tax burden and benefits.

Appendix B - Cited Regulations

This report references various regulations, which are cited here. The source of this information is www.dsireusa.org, the 'Database of State Incentives for Renewables and Efficiency', sponsored by the US Department of Energy.

National:

The Investment Tax Credit:

Note: The American Recovery and Reinvestment Act of 2009 allows taxpayers eligible for the federal renewable electricity production tax credit (PTC) to take the federal business energy investment tax credit (ITC) instead of taking the PTC for new installations. The eligible technologies listed above reflect this allowance in that they include PTC-eligible technologies/resources such as landfill gas and wave power that are now eligible for the ITC. In January 2013 the American Taxpayer Relief Act of 2013 (H.R. 8) revised the language governing the ability of PTC-eligible facilities to claim the ITC to allow projects that begin construction by the end of 2013 to qualify for the ITC. Prior to H.R. 8, the law required PTC-eligible facilities to be placed in service by the end of 2013 (or 2012 in the case of wind) in order qualify for the ITC. Please see the **DSIRE PTC summary** for further information regarding eligibility.*

The federal business energy investment tax credit available under 26 USC § 48 was expanded significantly by the Energy Improvement and Extension Act of 2008 (H.R. 1424), enacted in October 2008. This law extended the duration -- by eight years -- of the existing credits for solar energy, fuel cells and microturbines; increased the credit amount for fuel cells; established new credits for small wind-energy systems, geothermal heat pumps, and combined heat and power (CHP) systems; allowed utilities to use the credits; and allowed taxpayers to take the credit against the alternative minimum tax (AMT), subject to certain limitations. The credit was further expanded by the American Recovery and Reinvestment Act of 2009, enacted in February 2009.

In general, the following credits are available for eligible systems placed in service on or before December 31, 2016**:

- **Solar.** The credit is equal to 30% of expenditures, with no maximum credit. Eligible solar energy property includes equipment that uses solar energy to generate electricity, to heat or cool (or provide hot water for use in) a structure, or to provide solar process heat. Hybrid solar lighting systems, which use solar energy to illuminate the inside of a structure using fiber-optic distributed sunlight, are eligible. Passive solar systems and solar pool-heating systems are *not* eligible.

In general, the original use of the equipment must begin with the taxpayer, or the system must be constructed by the taxpayer. The equipment must also meet any performance and quality standards in effect at the time the equipment is acquired. The

energy property must be operational in the year in which the credit is first taken.

Significantly, the American Recovery and Reinvestment Act of 2009 repealed a previous restriction on the use of the credit for eligible projects also supported by "subsidized energy financing." For projects placed in service after December 31, 2008, this limitation no longer applies. Businesses that receive other incentives are advised to consult with a tax professional regarding how to calculate this federal tax credit.

** The American Recovery and Reinvestment Act of 2009, which allows PTC-eligible facilities to use the 30% ITC, has implications for some technologies that were already potentially eligible for either incentive in some form. Certain geothermal and open- or closed- loop biomass systems (which may include certain types of biomass CHP projects) now qualify for a 30% tax credit through December 31, 2013, the begin construction deadline for these technologies under the PTC. Wind-energy systems of all sizes -- not only systems of 100 kW or less -- also now qualify for the 30% ITC through the wind-energy PTC begin construction deadline of December 31, 2013. Applicants should refer to the eligibility definition contained in the PTC to determine if and how their project might qualify for this treatment.*

*** A number of changes to this credit are scheduled to take effect for systems placed in service after December 31, 2016. The credit for equipment that uses solar energy to generate electricity, to heat or cool (or provide hot water for use in) a structure, or to provide solar process heat will decrease from 30% to 10%. The credit for geothermal heat pumps, hybrid solar lighting, small wind, fuel cells, microturbines, and combined heat and power systems will expire. The credit amount for equipment which uses geothermal energy to produce electricity will remain at 10%.*

Corporate Depreciation:

Under the federal Modified Accelerated Cost-Recovery System (MACRS), businesses may recover investments in certain property through depreciation deductions. The MACRS establishes a set of class lives for various types of property, ranging from three to 50 years, over which the property may be depreciated. A number of renewable energy technologies are classified as five-year property (26 USC § 168(e)(3)(B)(vi)) under the MACRS, which refers to 26 USC § 48(a)(3)(A), often known as the energy investment tax credit or ITC to define eligible property. Such property currently includes*:

- a variety of solar-electric and solar-thermal technologies
- fuel cells and microturbines
- geothermal electric
- direct-use geothermal and geothermal heat pumps
- small wind (100 kW or less)
- combined heat and power (CHP)

- the provision which defines ITC technologies as eligible also adds the general term "wind" as an eligible technology, extending the five-year schedule to large wind facilities as well.

In addition, for certain other types of renewable energy property, such as biomass or marine and hydrokinetic property, the MACRS property class life is seven years. Eligible biomass property generally includes assets used in the conversion of biomass to heat or to a solid, liquid or gaseous fuel, and to equipment and structures used to receive, handle, collect and process biomass in a waterwall, combustion system, or refuse-derived fuel system to create hot water, gas, steam and electricity. Marine and hydrokinetic property includes facilities that utilize waves, tides, currents, free-flowing water, or differentials in ocean temperature to generate energy. It does not include traditional hydropower that uses dams, diversionary structures, or impoundments.

The 5-year schedule for most types of solar, geothermal, and wind property has been in place since 1986. The federal *Energy Policy Act of 2005* (EPAct 2005) classified fuel cells, microturbines and solar hybrid lighting technologies as five-year property as well by adding them to § 48(a)(3)(A). This section was further expanded in October 2008 by the addition of geothermal heat pumps, combined heat and power, and small wind under *The Energy Improvement and Extension Act of 2008.*

Bonus Depreciation

The federal *Economic Stimulus Act of 2008,* enacted in February 2008, included a 50% first-year bonus depreciation (26 USC § 168(k)) provision for eligible renewable-energy systems acquired and placed in service in 2008. The allowance for bonus depreciation has since been extended and modified several times since the original enactment, most recently in January 2013 by the *American Taxpayer Relief Act of 2012* (H.R. 8, Sec. 331). This legislation extended the placed in service deadline for 50% first-year bonus depreciation by one year, from December 31, 2012 to December 31, 2013. Currently, in order to qualify for bonus depreciation, a project must satisfy these criteria:

- the property must have a recovery period of 20 years or less under normal federal tax depreciation rules;
- the original use of the property must commence with the taxpayer claiming the deduction;
- the property generally must have been acquired during the period from 2008 - 2013; and
- the property must have been placed in service during the period from 2008 - 2013.

If property meets these requirements, the owner is entitled to deduct a significant portion of the adjusted basis of the property during the tax year the property is first placed in service. For property acquired and placed in service after September 8, 2010 and before January 1, 2012, the allowable first year deduction is 100% of the adjusted basis (i.e., the property is fully depreciated and additional deductions under MACRS cannot be claimed). For property placed in service from 2008 - 2013, for which the placed

in service date does not fall within this window, the allowable first-year deduction is 50% of the adjusted basis. In the case of a 50% first year deduction, the remaining 50% of the adjusted basis of the property is depreciated over the ordinary MACRS depreciation schedule.

The bonus depreciation rules do not override the depreciation limit applicable to projects qualifying for the federal business energy tax credit. Before calculating depreciation for such a project, including any bonus depreciation, the adjusted basis of the project must be reduced by one-half of the amount of the energy credit for which the project qualifies.

Bonus Depreciation History

The 50% first-year bonus depreciation provision enacted in 2008 was extended (retroactively for the entire 2009 tax year) under the same terms by the *American Recovery and Reinvestment Act of 2009* (H.R. 1), enacted in February 2009. It was renewed again in September 2010 (retroactively for the entire 2010 tax year) by the *Small Business Jobs Act of 2010* (H.R. 5297). In December 2010 the provision for bonus depreciation was amended and extended yet again by the *Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010* (H.R. 4853). Under these amendments, eligible property placed in service after September 8, 2010 and before January 1, 2012 was permitted to qualify for 100% first-year bonus depreciation. The December 2010 amendments also permitted bonus depreciation to be claimed for property placed in service during 2012, but reverted the allowable amount from 100% to 50% of the eligible basis. The 50% first-year bonus depreciation allowance was further extended for property placed in service during 2013 by the *American Taxpayer Relief Act of 2012* (H.R. 8, Sec. 331) in January 2013.

For more information on the federal MACRS, see *IRS Publication 946, IRS Form 4562: Depreciation and Amortization*, and *Instructions for Form 4562*. The IRS web site provides a search mechanism for forms and publications. Enter the relevant form, publication name or number, and click "GO" to receive the requested form or publication. For guidance on bonus depreciation, including information relating to the election to claim either 50% or 100% bonus depreciation, retroactive elections to claim 50% bonus depreciation for property placed in service during 2010, and eligible property, please see IRS Rev. Proc. 2011-26.

**Note that the definitions of eligible technologies included in this entry are somewhat simplified versions of those contained in tax code, which often contain additional caveats, restrictions, and modifications. Those interested in this incentive should review the relevant sections of the code in detail prior to making business decisions*

Personal Tax Credit:

Established by *The Energy Policy Act of 2005*, the federal tax credit for residential energy property initially applied to solar-electric systems, solar water heating systems and fuel cells. *The Energy Improvement and Extension Act of 2008* extended the tax credit to small wind-energy systems and geothermal heat pumps, effective January 1, 2008. Other key revisions included an eight-year extension of the credit to December 31, 2016; the ability to take the credit against the alternative minimum tax; and the removal of the $2,000 credit limit for solar-electric systems beginning in 2009. The credit was further enhanced in February 2009 by *The American Recovery and Reinvestment Act of 2009*, which removed the maximum credit amount for all eligible technologies (except fuel cells) placed in service after 2008.

A taxpayer may claim a credit of 30% of qualified expenditures for a system that serves a dwelling unit located in the United States that is owned and used as a residence by the taxpayer. Expenditures with respect to the equipment are treated as made when the installation is completed. If the installation is at a new home, the "placed in service" date is the date of occupancy by the homeowner. Expenditures include labor costs for on-site preparation, assembly or original system installation, and for piping or wiring to interconnect a system to the home. If the federal tax credit exceeds tax liability, the excess amount may be carried forward to the succeeding taxable year. The excess credit may be carried forward until 2016, but it is unclear whether the unused tax credit can be carried forward after then. The maximum allowable credit, equipment requirements and other details vary by technology, as outlined below.

Solar-electric property

- There is no maximum credit for systems placed in service after 2008.
- Systems must be placed in service on or after January 1, 2006, and on or before December 31, 2016.
- The home served by the system does *not* have to be the taxpayer's principal residence.

The Commonwealth of Massachusetts also offers additional tax incentives:
(taken from DSIREUSA.org)

Corporate Excise Tax Deduction:

In Massachusetts, businesses may deduct from net income, for state excise tax purposes, expenditures paid or incurred from the installation of any "solar or wind powered climatic control unit and any solar or wind powered water heating unit or any other type unit or system powered thereby," including labor expenditures. The installation

must be located in Massachusetts and used exclusively in the business or trade of the business. Certain criteria must be met, see the Massachusetts Department of Revenue guidance for more information.

Furthermore, a system or unit that qualifies for this deduction will not be taxed under the tangible property measure of the state's corporate excise tax. This exemption is effective for the length of the equipment's depreciation period.

Corporate Excise Tax Exemption:

Massachusetts law exempts any "solar or wind powered climatic control unit and any solar or wind powered water heating unit or any other type unit or system powered thereby," that qualifies for the state's excise tax deduction for these systems from the tangible property measure of the state's corporate excise tax. The exemption is in effect for the length of the system's depreciation period.

Personal Tax Credit:

Massachusetts allows a 15% credit -- up to $1,000 -- against the state income tax for the net expenditure* of a renewable-energy system (including installation costs) installed on an individual's primary residence. If the credit amount is greater than a resident's income tax liability, the excess credit amount may be carried forward to the next succeeding year for up to three years. Eligible technologies include solar water and space heating, photovoltaics (PV), and wind-energy systems. The original use of the system must begin with the taxpayer, and the system should "reasonably be expected to remain in operation for at least five years."

The credit is available to any owner or tenant of residential property. For a newly constructed home, the credit is available to the original owner/occupant. Joint owners of a residential property shall share any credit available to the property under this subsection in the same proportion as their ownership interest. Any excess credit amount may be carried over to the next 1-3 taxable years. To claim the tax credit, complete Schedule EC.

Property Tax Incentive:

Massachusetts law provides that solar-energy systems and wind-energy systems used as a primary or auxiliary power system for the purpose of heating or otherwise supplying the energy needs of ***taxable property*** are exempt from local property tax for a 20-year period. Hydropower facilities are also exempt from local property tax for a 20-year period if a system owner enters into an agreement with the city or town to make a payment (in lieu of taxes) of at least 5% of its gross income in the preceding calendar year.

This incentive applies only to the *value added* to a property by an eligible system, according to the Massachusetts Department of Energy Resources (DOER). It does not

constitute an exemption for the full amount of the property tax bill.

Any components of the energy system that serve dual purposes (for example: structural and energy) are not eligible for the exemption. For instance, windows, thermal drapes and floors are not eligible for the exemption. However, thermal storage rods, storage boxes, fan systems, and duct work that function exclusively as part of the energy system are eligible for the exemption.

Sales Tax Incentive (Residential):

Massachusetts law exempts from the state's sales tax "equipment directly relating to any solar, windpowered; or heat pump system, which is being utilized as a primary or auxiliary power system for the purpose of heating or otherwise supplying the energy needs of an individual's principal residence in the commonwealth."

Massachusetts Tax Form ST-12 is available on the Massachusetts Department of Revenue web site. The form may be completed and presented to the vendor at the time of purchase.

State Rebate Program:

Block 15 is open at the same incentive levels as previous blocks. This summary is an overview only; interested applicants must consult with the official program manual. Block 15 is funded at $1,500,000 and is scheduled to be open until September 30, 2013, or until funding has been exhausted.

Commonwealth Solar II, offered by the Massachusetts Clean Energy Center (MassCEC), provides rebates for the installation of photovoltaic (PV) systems at residential, commercial, industrial, institutional and public facilities.* Commonwealth Solar II rebates are available to electricity customers served by the following Massachusetts investor-owned electric utilities: Fitchburg Gas and Electric Light (Unitil), National Grid, NSTAR Electric and Western Massachusetts Electric. In addition, customers of certain municipal lighting plant (MLP) utilities are now eligible including Ashburnham, Holden, Holyoke, Russell, and Templeton. Commercial projects are eligible for rebates for PV projects less than or equal to 15 kilowatts (kW) in capacity and the rebate will be based on the first 5 kW only. Funding is released in "blocks" every quarter. **All rebate applications must be approved BEFORE the project installation begins.**

Rebate amounts are based on the total PV system size per building, regardless of the number of electric meters in use and certain other characteristics of the project. The proposed Commonwealth Solar II rebate levels for residential and commercial PV systems are:

- Base incentive: $0.40/watt
- Adder for Massachusetts company components: $0.05/watt
- Adder for moderate home value: $0.40/watt (applicable to residential projects only), or
- Adder for moderate income: $0.40/watt (applicable to residential projects only)

- Natural Disaster Relief Adder (see program manual for detailed eligibility requirements): $1.00/watt

The rebate is available to the system owner, which may or may not be the host customer. In the case where the system owner is a third-party owner serving a residential host customer, the project is treated as a commercial project (and eligible for the commercial rebate amounts only). Solar renewable-energy credits (SRECs) associated with system generation belong to the system owner and may be sold via the Department of Energy Resources (DOER) SREC program. Note: appropriate, approved tracking must be utilized in order to qualify to sell SRECs. MassCEC reserves the right to conduct post-installation inspections of PV projects prior to approval for payments.

System installers are responsible for the application process and securing necessary permits. MassCEC has developed an online application system (called PowerClerk) for pre-approved installers. Only online applications will be accepted. An energy-efficiency audit is generally required. Required documentation generally includes electric utility interconnection approval, an energy-efficiency audit, paid invoices or equivalent, and, if applicable, evidence that automated reporting is functional. It is recommended, but not required, that installers or their subcontractors obtain or seek to obtain North American Board of Certified Energy Practitioners (NABCEP) PV installer certification.

This summary does not capture all of the requirements of the Commonwealth Solar II program. The MassCEC provides program manuals as well as appendices with full program requirements and you must read those materials carefully.

The Commonwealth Solar II program summary report provides an ongoing tally of number of systems and kW installed in the state.

MA SREC Carve Out Program:

NOTE: In February 2013, the Massachusetts Department of Energy Resources (DOER) issued proposed changes to its RPS Class I and RPS Solar Carve-Out programs. The DOER is soliciting comments from March 1 to March 25, 2013.

Massachusetts' renewables portfolio standard (RPS) requires each regulated electricity supplier/provider serving retail customers in the state* to include in the electricity it sells 15% qualifying renewables by December 31, 2020. The RPS was significantly expanded by legislation enacted in July 2008 (S.B. 2768), which established two separate renewable standards -- a standard for “Class I” renewables, and a standard for “Class II” renewables. The Massachusetts Department of Energy Resources (DOER) regulates the RPS and developed corresponding rules. In January 2011, final rules were implemented for the state's Solar Carve-Out program, which is the portion of the required renewable energy under the Class I Standard that must come from qualified, in-state, interconnected solar facilities.

Solar Renewable Energy Certificates (SRECs) represent the renewable attributes of solar generation, bundled in minimum denominations of one megawatt-hour (MWh) of production. Massachusetts' Solar Carve-Out provides a means for SRECs to be created and verified, and allows electric suppliers to buy these certificates in order to meet their solar RPS requirements. All electric suppliers must use SRECs to demonstrate compliance with the RPS. The price of SRECs is determined primarily by market availability, although the DOER has created a certain amount of market stability by establishing a state Solar Credit Clearinghouse Auction (where prices are fixed at $300/MWh minus a 5% administrative fee, for a total of $285/MWh), as well as the Solar Alternative Compliance Payment (SACP) for the state RPS (set at $550/MWh for 2012). The Solar Credit Clearinghouse will only be utilized if or when SREC generators cannot sell their SRECs on the open market. To date, the Solar Credit Clearinghouse has not been utilized.

Only solar-electric facilities built after January 1, 2008, may be qualified to generate SRECs. SRECs are generated on or after January 1, 2010, since that is the date the Solar Carve-Out program took effect. Generators must apply and receive a statement of qualification (SQ) from the DOER and must establish an account with NEPOOL GIS in order to participate in this program. Facilities that received funding prior to the effective date of the Solar Carve-Out from the Massachusetts Renewable Energy Trust or the Massachusetts Clean Energy Center, or received more than 67% of project funding from the American Recovery and Reinvestment Act of 2009, are ineligible.

The SACP is set at $550 (2012). The SACP will decrease only if DOER determines this is necessary based on market conditions; it will not be reduced by more than 10% in any year. The SACP was amended and now includes a 10-year schedule (final rules must be promulgated). The schedule is:

2012: $550
2013: $550
2014: $523
2015: $496
2016: $472
2017: $448
2018: $426
2019: $404
2020: $384
2021: $365

The Solar Carve-Out program is intended to support approximately 400 MW of solar facilities in Massachusetts. Once the state reaches that goal, and the opt-in term for all solar facilities has expired, SRECs will no longer be generated. Solar facilities will at that time generate renewable energy credits (RECs) and will be able to sell those for compliance under the Class I standard.

MA Net Metering Program:

In Massachusetts, the state's investor-owned utilities must offer net metering. Municipal utilities are not obligated to offer net metering, but they may do so voluntarily. (There are no electric cooperatives in Massachusetts.)

Class I, Class II, Class III net metering facilities
In Massachusetts, there are several categories of net-metering facilities. "Class I" facilities are generally defined as systems up to 60 kW in capacity. "Class II" facilities are generally defined as systems greater than 60 kW and up to one megawatt (MW) in capacity that generate electricity from agricultural products, solar energy or wind energy. "Class III" facilities are generally defined as systems greater than 1 MW and up to 2 MW in capacity that generate electricity from agricultural products, solar energy or wind energy. Massachusetts also allows "neighborhood net metering" for neighborhood-based Class I, II or III facilities that are owned by (or serve the energy needs of) a group of 10 or more residential customers in a single neighborhood and served by a single utility. The neighborhood facility may also serve additional customers (including commercial) as long as the base requirements are met. All net-metered facilities must be behind a customer's meter, but only a minimal amount of load located on-site is required. In aggregate, these "non-governmental facilities" may not exceed 3% of the distribution company's peak load.*

Municipal or Government net metering facility
Legislation in 2010 introduced an additional definition for "a net metering facility of a municipality or other governmental entity." This type of net metered facility must be either Class II or Class III, as defined above, and must be owned by a municipality or governmental entity or the entity must use all of the facility's output. Net metering facilities by a municipality or other governmental entity up to 10 MW are eligible. In aggregate, these municipal or governmental facilities may not exceed 3% of the distribution company's peak load. Massachusetts requires that the utilities report on their aggregate capacity of net metered facilities regularly, since in some instances utilities may be approaching the caps.

For explicit definitions of "facilities" and "units," applicable to all types of net metering facilities, see the Department of Public Utilities' (DPU) *Order on Definitions of Unit and Facility* Docket 11-11 from August 2012.

The treatment of customer net excess generation (NEG) varies by facility class and customer type. In all cases, the NEG is monetized and Net Metering Credits are calculated based on the excess kilowatt hours (kWh) produced. In summary, value of the Net Metering Credits at the end of a billing period is slightly less than the utility's full retail rate for Class I solar and wind facilities, Class II facilities, and Class III facilities used by government customers as they would receive credit for the default service, distribution, transmission, and transition charge (kilowatt hour, kWh). Net Metering Credits for Class III facilities and neighborhood facilities that are used by customers other than government entities differs only in that they do not receive credit for the

distribution component. Class II and Class III customers are required to install revenue-grade meters to measure kWh output.

Credits may be carried forward to the next month indefinitely, and credits from net metering facilities may be transferred to another customer of the same utility as long as they are within the same service territory and ISO-NE load zone. Utilities may choose to pay for the net metering credits for Class III facilities rather than allocating the credits. If a neighborhood facility has NEG at the end of a billing period, the credits are awarded to designated neighborhood customers. The amount of NEG attributed to each such customer is determined by the allocation provided by the neighborhood net metering facility.

Third-party owned systems may be net metered. Utilities are not granted the renewable energy credits or environmental attributes generated by a net-metered facility.

As part of the interconnection application, customers applying for net metering must complete "Schedule Z." See Massachusetts' Interconnection in DSIRE for more information.

Because net metering has an aggregate capacity cap, as described above, the DPU passed a "System of Assurance of Net Metering Eligibility" in May 2012 for customers of investor-owned utilities. This will serve as a net metering queue and help potential net metering customers know in advance if their system will be allowed to net meter or not. The company, The Cadmus Group, Inc., has been chosen as the administrator of the system of assurance. All investor-owned utility customers with systems greater than 10 kilowatts on a single-phase circuit and all systems great than 25 kilowatts on a three-phase circuit wishing to net meter must apply for a "cap allocation" online via the Massachusetts Application for Cap Allocations web site (www.MassACA.org). There is a $100 application fee and the applicant must have an executed Interconnection Service Agreement (ISA) from the utility.

History

Net metering was originally authorized for renewable-energy systems and combined-heat-and-power (CHP) facilities with a generating capacity up to 30 kilowatts (kW) by the Massachusetts Department of Public Utilities in 1982. In 1997, the maximum individual system capacity was raised to 60 kW and customers were permitted to carry any net excess generation (NEG) -- credited at the "average monthly market price of generation" -- to the next bill. In July 2008, net metering was significantly expanded by S.B. 2768 and the DPU adopted rules implementing the law in June 2009. The Massachusetts Department of Public Utilities (DPU) amended net-metering rules in July 2009 (see final order). These DPU rules were ordered in accordance with the legislative changes instituted in 2008. Furthermore in August 2009, the DPU issued its model net metering tariff and new utility net metering tariffs for the state's investor-owned utilities (Unitil, National Grid, NSTAR, and Western Massachusetts Electric Company) became effective December 2009. The law was amended again in 2010 (H.B. 5028), and new rules

promulgated in February 2012. A new model tariff and utility tariffs were finalized in July 2012 in Docket 12-01.

** For the purpose of calculating the aggregate capacity, the capacity of a net-metered solar facility is 80% of the facility's DC rating at standard test conditions (STC) and the capacity of a net-metered wind facility is the name plate capacity.*

Appendix C - AED Background

The following pages reflect the background of AED and its principal investigators.

Brian D. Kuhn

Founder and Principal
Associated Wind Developers, LLC
Aeronautica Windpower, LLC

Professional Bio:

Brian Kuhn is the Founder and a principal member of a number of renewable energy and real estate development related companies. Mr. Kuhn offers the perspective of over 30 years of project, product and service development in the fields of Wind, Solar, Heat Recovery, development and permitting.

Brian holds a *Bachelor of Science* degree in '*Renewable Energy Systems and Business',* from the University of Massachusetts, in Amherst, MA ('77), a mix of Mechanical Engineering and Business studies. During his time at UMass he studied under Professor *William Heronemus*, a noted naval architect and world renowned primary investigator for off-shore wind systems. He was a member of a small team of engineers that designed and built the first *UMass Solar Habitat and Wind Furnace* for the Department of Energy. This wind turbine introduced many innovations, including the use of a 3 bladed, variable pitch rotor and the use of a monopole tower – features that are now standard in today's modern wind turbine designs. The *Wind Furnace* turbine is currently heading to a new home at the Smithsonian Institute in Washington. The wind turbine and solar habitat later went on to become the highly respected *Renewable Energy Research Laboratory* at UMass.

In the 1980's Mr. Kuhn served as National Solar Specialist to Rheem Water Heaters, Inc., the world's largest manufacturer of water heaters. Mr. Kuhn was responsible for training Rheem's dealers and distributors on the proper design and installation of the company's solar systems.

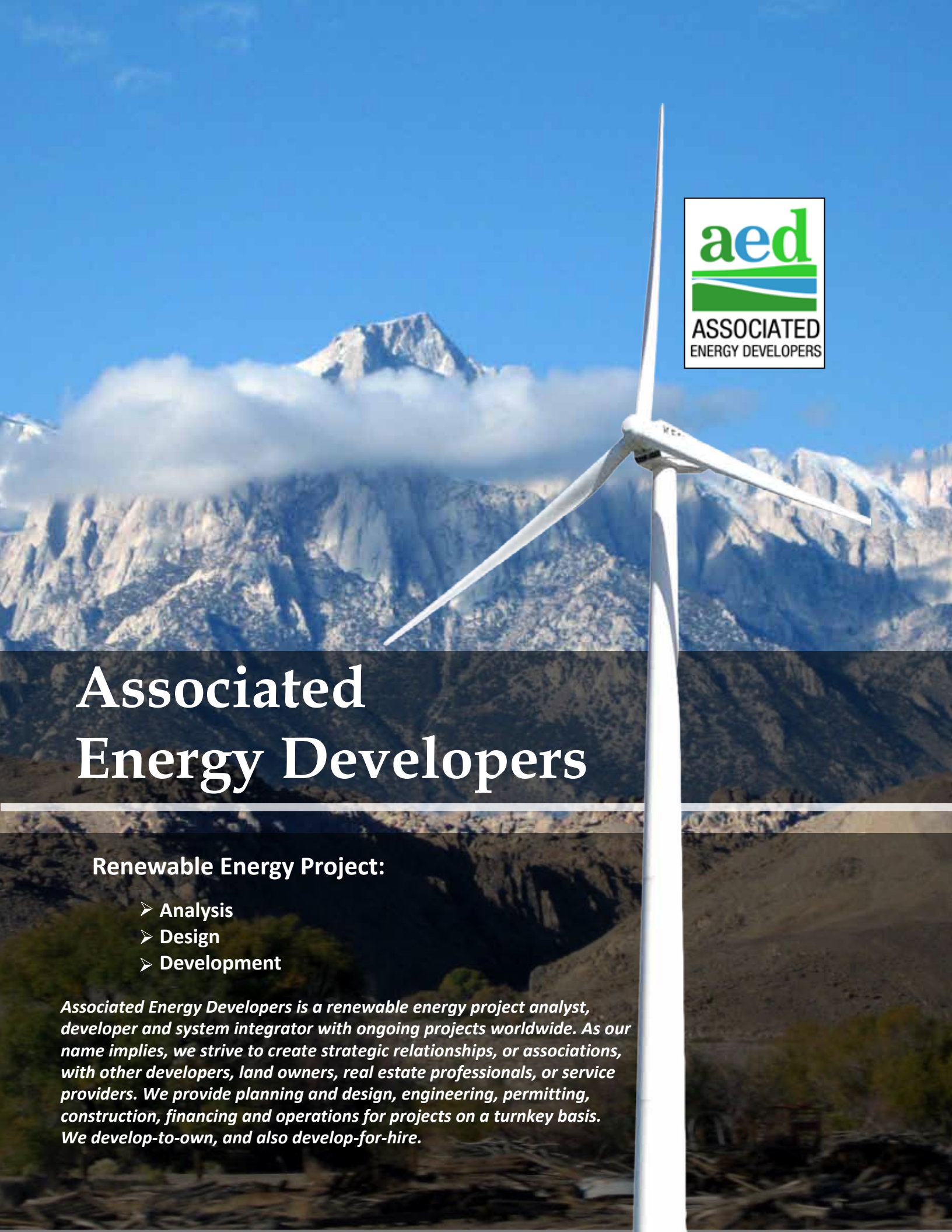
More recently, Mr. Kuhn founded and is actively involved in the management of 2 companies which provide services and products to the Renewable Energy market space.

- Associated Wind (Energy) Developers, LLC, of Plymouth, MA offers development and financing services to wind and soal energy project developers across the USA. AWD provide these services in a 'Developer-for-Hire' or 'Develop-to-Own' scenarios. The company is currently putting together a number of distributed generation wind energy sites which will be owned in $20Million portfolios. AWD has provided design, development and marketing services for more than 150 projects, including Wind Appraisals, Feasibility Studies, Development Services and more to Landowners, Industry, Municipalities and County Governments around the world.

- Aeronautica Windpower, a company designed to bring the manufacture and commercialize mid-scale wind turbines in the United States. Mr. Kuhn's responsibilities at Aeronautica currently include product and project development, new business development and R&D efforts.

From 2006 to 2008 Mr. Kuhn served as Chairman for the *Plymouth Energy Committee* (PEC), a volunteer advisory group which reports to the Board of Selectmen of Plymouth, Massachusetts. He is the principal author of *'Plymouth 2020'*, a plan which calls for virtually all of Plymouth's Municipal electricity to be produced by renewable sources in time for the town's 400th anniversary.

Mr. Kuhn has had several articles published about solar and wind power. He is an Adjunct Professor at Cape Cod Community College, where he teaches Wind and Solar Energy courses. He is a member of *AWEA*, the *Distributed Wind Energy Association (DWEA)*, the *National Association of Home Builders* and the *Northeast Sustainable Energy Association*. He is also a past member of the *National Association of Realtors*, and is licensed as a real estate broker involved in land procurement and development projects across the Northeast.



Associated Energy Developers

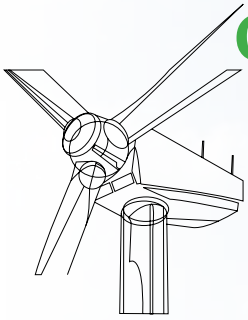
Renewable Energy Project:

- Analysis
- Design
- Development

Associated Energy Developers is a renewable energy project analyst, developer and system integrator with ongoing projects worldwide. As our name implies, we strive to create strategic relationships, or associations, with other developers, land owners, real estate professionals, or service providers. We provide planning and design, engineering, permitting, construction, financing and operations for projects on a turnkey basis. We develop-to-own, and also develop-for-hire.

A unique network of experienced industry experts, renewable solutions and development capabilities.

At Associated Energy Developers, we provide services to analyze, design, and develop renewable energy projects. For nearly 40 years, our members have participated in the renewables industry working to evaluate, construct, and operate sustainable innovations and sustainable solutions.



Our Services Include:

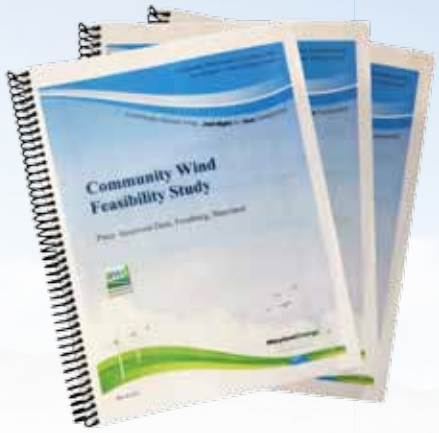
- Initial energy resource and site evaluation
- Appraisals and feasibility studies
- Wind resource equipment, analysis and evaluation
- Preparation of planning and permitting documentation
- Technical due diligence
- Interconnection studies and agreements
- Community outreach and education
- PPA negotiations and financial analysis
- Financial modeling
- Project financing

Financing:

Wind and sunlight may be free, but building the capital equipment to utilize this sustainable energy costs money.

We are proud to be able to provide our project partners with the ability to fund projects as they become permitted. We maintain relationships with a large number of private and institutional equity and debt investors who are aware of our expertise in the renewable energy field and have experience backing our projects. We are currently working on projects as small as one million dollars and as large as $100 million. We build portfolios of smaller projects in order to achieve economies of scale.

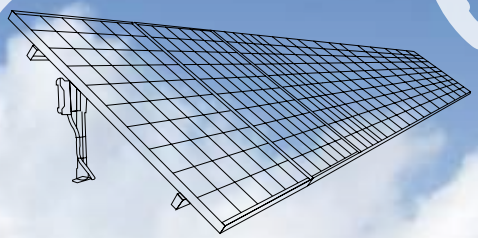
All AED projects undergo a strict qualifying process to determine profitability over a 25 year period. Qualified investors who are interested in investing in renewable energy projects are encouraged to contact us directly.



Like properties that sit on top of an oil field, properties that have a good wind or solar resource can be very valuable. Now you can order a renewable energy appraisal or feasibility study to find out just how valuable your property is.





Essential Utilities

In our efforts to provide renewable energy solutions around the world, we recognized that many developing markets, including island nations and remote villages, have a need not only for renewable energy to reduce fossil fuel energy costs, but also greater baseline energy production, grid stabilization, storage capacity, and access to fresh water. Our Essential Utilities Consortium is an outgrowth of that effort to provide solutions with a number of key technology partners.

Wind and Solar

Many isolated locations rely on expensive fossil fuels to provide their electrical needs. However, if they have a good wind or solar resource, they can generate power at VERY low costs compared to today's fossil fuel prices, thus stabilizing energy prices.

Grid Stabilization

Wind and solar sources—though an environmentally clean form of electricity—are inherently variable in their power output. This causes problems for grid operations. The solution to injecting large amounts of renewable energy—up to 100% penetration if the resource is available—on a small grid can be found in grid stability systems.

Backup Generation

AWD can supply wind- and solar-only projects, or combine these systems with standby generation for base load power. Diesel, heavy fuel oil, natural gas, and even biofuel options are available.

Energy Storage

The ability to store renewable energy on an hourly, daily, or longer basis is a critical aspect to producing completed solutions. AED works with storage solutions including flywheels, batteries, pumped water, hydrogen, and NH3.

Fresh Water Desalination

Fresh water is the essence of all life. Our Wind4Water systems use a highly efficient Reverse Osmosis process and proprietary controls to optimize wind energy sources, in order to deliver large volumes of fresh, inexpensive water from seawater or brackish sources to a town, resort or business development.





Contact Us:

INNOVATIVE THINKING

Associated Energy Developers, LLC is located in America's Hometown of Plymouth, Massachusetts. Please feel free to contact us with any questions or to receive further information about our services. Our office hours are from 8am to 5:30 pm Monday through Friday, or by appointment.

One Source... Multiple Solutions.

Associated Energy Developers
11 Resnik Road
Plymouth, MA USA

p: 888-800-2381

info@associatedenergydevelopers.com

AssociatedEnergyDevelopers.com