

## APPENDIX B

## Turbine Specifications



we power the future

info@endurancwindpower.com

1-888-440-4451

Dealers Corner Login

Home

Windpower 101

Products

About

Windpower For You

Contact

News & Media



S Series  
S-250 & S-343



E-3120  
50 KW



G-3120  
35 KW

**E-SERIES 50KW**

green energy that works

The G and E Series Endurance Wind Turbines are designed for larger farms, irrigation pivots, schools, hospitals, manufacturing and fabrication companies and any other applications requiring 125,000 – 250,000 kWh per year of electricity.

Register for More Information

**E-3120 50kw model**

- 1 Anemometer & wind vane
- 2 Lightning protection
- 3 Control panel
- 4 Induction Generator
- 5 Fail-safe disk braking system
- 6 Main shaft with two bearings
- 7 Gearbox
- 8 Access ladder
- 9 Yaw damper
- 10 Pitch control safety system(patent pending)
- 11 Fiberglass blade



**SPECIFICATIONS**

**TURBINE**

Configuration	3 blades, horizontal axis, downwind
Rated power @ 11 m/s	55 kW
Applications	Direct Grid-Tie
Rotor speed	42 rpm
Cut-in wind speed	3.5 m/s (7.8 mph)
Cut-out wind speed	25 m/s (56 mph)
Survival wind speed	52 m/s (116 mph)
Design lifetime	30 years *
Overall weight	3,990 kg (8,800 lbs)

**ROTOR**

Rotor diameter	19.2m (63 ft)
Swept area	290m <sup>2</sup> (3120 ft <sup>2</sup> )
Blade length	9m (29.53 ft)
Blade material	Fiberglass / Epoxy
Power regulation	Stall control (constant speed)

**GENERATOR**

Type	Induction Generator
Configuration	3Φ, 480 VAC or 600 VAC @ 60 Hz 3Φ, 400 VAC @ 50 Hz Single phase available, please enquire

**BRAKE & SAFETY SYSTEMS**

Main brake system	Rapid fail-safe dual mechanical brakes
Secondary safety	Pitch control system (for over speed regulation) using passive spring loaded mechanism (patent pending)
Automatic shut down triggered by :	- High wind speed - Grid failure - Over-speed - All other fault conditions

**CONTROLS**

Control System	Programmable logic controller (PLC)
User Interface	Wireless or wired networked software interface for remote monitoring and control

**WARRANTY**

Turbine, controls	5 years
-------------------	---------

**TOWERS**

Types and heights	Free-standing monopole: 30.5 m (100 ft), 36.5 m (120 ft), 42.7 m (140 ft) Free-standing lattice: 30.5 m (100 ft), 36.5 m (120 ft), 42.7 m (140 ft)
Maintenance Access	Safe climbing system Working space inside the nacelle Tower-top work platform

\*Provided service and maintenance schedules are strictly followed

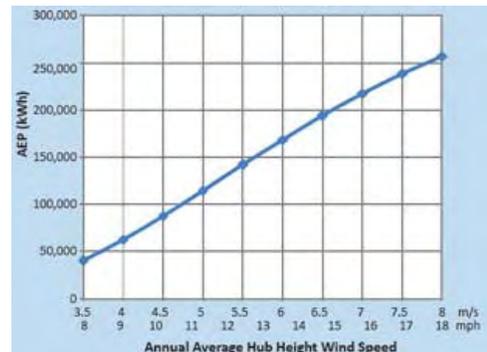
Contact our Sales Department

**POWER CURVE**



Wind Speed (m/s)	Power Output (kilowatts)
3	0.0
4	2.2
5	8.1
6	15.2
7	24.8
8	35.8
9	43.8
10	50.9
11	54.8
12	57.3
13	59.3
14	59.3
15	58.6
16	57.1
17	54.9
18	51.4

**ANNUAL ENERGY PRODUCTION (AEP)**



WS (m/s)	HH ref (kWh/yr)
3.5	40,064
4.0	62,526
4.5	87,951
5.0	114,927
5.5	142,240
6.0	168,927
6.5	194,253
7.0	217,664
7.5	238,751
8.0	257,234



Toll Free 1-888-440-4451

[info@endurancwindpower.com](mailto:info@endurancwindpower.com)

[endurancwindpower.com](http://endurancwindpower.com)

[Home](#)

[Windpower 101](#)

[Products](#)

[About](#)

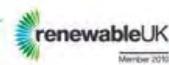
[Windpower For You](#)

[Contact](#)

[News & Media](#)

Copyright 2010 Endurance Wind Power All Rights Reserved.

Site Promotion by Relentless Technology  
Search Engine Optimization Vancouver

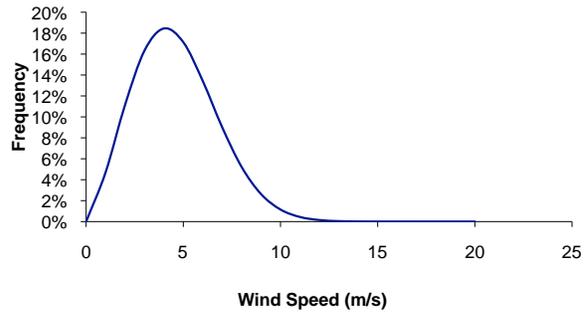


Wind Speed Data from CWEST

## Wind Project System Summary Report

Customer Name: Allen Farm Nominee Trust  
 System Designer: Gary Harcourt  
 Report Date: 1/6/11

Allen Farm Nominee Trust Project Annual Wind Speed Distribution

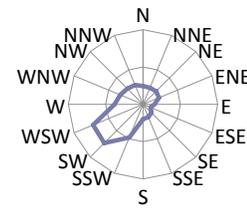
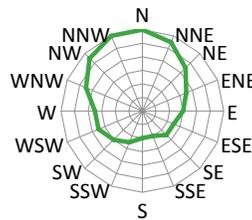


### Site Information

Latitude (Tower Location): 41.3852  
 Longitude (Tower Location): -70.5424  
 Annual Avg. Wind Spd: 6 m/s  
 Avg. Wind Shear Exp: 0.43 m  
 Avg. Obstacle Height: 11  
 Avg. Hub Height Wind Spd: 4.7 m/s  
 Conversion Losses: 11%  
 Misc. Losses: 0%  
 Wind Speed Derate Factor: 10%  
 Weibull K Factor: 2.37

Obstacle Height by Direction  
10 ft/division

Site Wind Rose (5% per division)



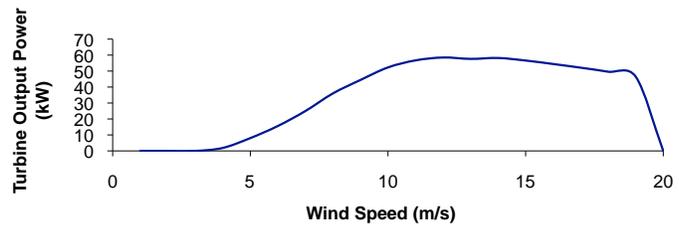
### Wind Map Wind Speed Point

Latitude:	41.3855063
Longitude:	-70.5416651

### System Information

Turbine Manufacturer: Endurance  
 Turbine Model: E-3120  
 Tower Height: 118 Feet  
 Rated Output Power: 56.74 kW  
 Rated Wind Speed: 11 m/s

Endurance E-3120 Power Curve



### Energy Production Estimates

#### As Proposed

Estimated Annual Energy Output:	78,182 kWh/yr
Estimated Annual Capacity Factor:	15.7%

#### Increase Hub Height by 20 Feet (6 meters)

Estimated Annual Energy Output:	98,700 kWh/yr
Estimated Annual Capacity Factor:	19.9%
Production Increase vs. Proposed System	26%

### Environmental Benefits of Small Wind System

Annual Pounds of CO2 Emissions Offset	95,851
Equivalent Acres of Trees Planted	11.88
Equivalent Cars Taken Off Road	8.4

### MCEC Minimum Technical Requirements

Turbine Hub Height is 30+ Feet Above All Surrounding Obstacles? Yes

### Report Generated Using CWEST

Developed by The Cadmus Group, Inc.  
 For questions/comments, send email to:

[www.cadmusgroup.com](http://www.cadmusgroup.com)  
[PTS@cadmusgroup.com](mailto:PTS@cadmusgroup.com)



**MCEC Commonwealth Wind Site Resource Report**

**Report Date:** 1/18/2011  
**Report Completed By:** EEE  
**Site Name:** Town of Chilmark

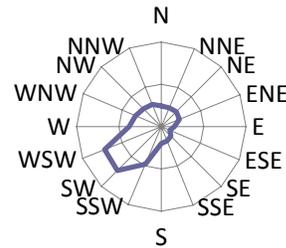


**Site Information**

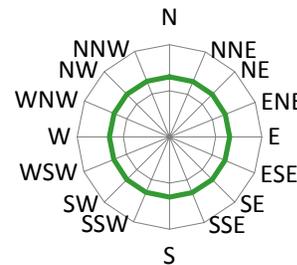
<b>Latitude (Tower Location)</b>	41.3852	(decimal degrees)
<b>Longitude (Tower Location)</b>	-70.5424	(decimal degrees)
<b>Elevation (m)</b>	9	

Direction	Frequency	Obstacle Height (m)	Description
N	4.90%	4	Tree Cover
NNE	4.81%	4	Tree Cover
NE	4.96%	4	Tree Cover
ENE	4.63%	4	Tree Cover
E	3.05%	4	Tree Cover
ESE	2.21%	4	Tree Cover
SE	3.16%	4	Tree Cover
SSE	3.69%	4	Tree Cover
S	4.00%	4	Tree Cover
SSW	9.63%	4	Tree Cover
SW	14.68%	4	Tree Cover
WSW	14.47%	4	Tree Cover
W	7.63%	4	Tree Cover
WNW	6.62%	4	Tree Cover
NW	5.95%	4	Tree Cover
NNW	5.61%	4	Tree Cover
Avg Obstacle Height (m)		4	

**Site Wind Rose (5% frequency/division)**



**Obstacle Height (10 ft/division)**



**Wind Resource Statistics**

Weibull k Value	2.37
Average Site Wind Shear Exponent	0.37

Wind Map Reference Height (m)	Wind Map Wind Speed (m/s)	Corrected for Site Factors (m/s)
30	5.8	5.6
50	6.6	6.5
70	7.2	7.1

**Wind Map Wind Speed Point**

Latitude	41.385506
Longitude	-70.541665

Note: The average site wind shear exponent is based on empirical data for various terrain types and is calculated based on user inputs. It is recommended that the user use this value to estimate hub height wind speeds, rather than calculating a wind shear exponent based upon the wind speeds from the wind map, as these values are based on large scale computer models and do not accurately account for micro-siting conditions. The wind shear exponent is a mathematical representation of terrain roughness and is used to calculate wind speed as a function of height.

*The data displayed in this report is intended for preliminary assessment purposes only and should be combined with an appropriate feasibility study to determine project viability. This tool has been developed by the Cadmus Group, Inc., on behalf of the Massachusetts Clean Energy Center. Wind resource data is derived from AWS Truewind New England Wind Map.*

# WindPRO Report (E-3120)

Project:  
**Allen Farm**

Printed/Page  
1/18/2011 7:26 AM / 1  
Licensed user:  
**Tighe & Bond, Inc.**  
53 Southampton Road  
US-01085 Westfield, MA  
4736  
Ellen Ebner / eeebner@tighebond.com  
Calculated:  
1/18/2011 7:26 AM/2.7.468

**METEO - Main Result**

**Calculation:** E-3120 (50m CWEST Data)

**Name** CWEST Meteo

**Site Coordinates**

UTM NAD 83 Zone: 19 East: 371,039 North: 4,582,667

**Air density calculation mode** Individual per WTG  
Result for WTG at hub altitude 1.243 kg/m³  
Air density relative to standard 101.5 %  
**Hub altitude above sea level (asl)** 39.9 m  
**Annual mean temperature at hub alt.** 9.5 °C  
**Pressure at WTGs** 1,008.4 hPa

Calculation is based on "CWEST Meteo", giving the Weibull distribution for the wind speed on the site.  
Using the selected power curve, the expected annual energy production is calculated.

**Weibull data 50 m above ground level**

Sector	A- parameter [m/s]	Wind speed [m/s]	k- parameter	Frequency [%]	Wind gradient exponent
0 0	6.77	6.00	2.370	100.0	0.300
All	6.77	6.00	2.370	100.0	

**Calculation Results**

Key results for height 36.0 m above ground level

Wind energy: 1,492 kWh/m²; Mean wind speed: 5.4 m/s;

**Calculated Annual Energy**

WTG type			Power curve					Annual Energy			
Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator	Name	Result [MWh]	Result-13.0% [MWh]	Mean wind speed [m/s]	Capacity factor [%]
No	Endurance	E-3120-50	50	19.2	36.5	USER	E-3120 Power Curve	139.9	122	5.46	31.9

Project:  
**Allen Farm**

Printed/Page  
1/18/2011 7:26 AM / 2  
Licensed user:  
**Tighe & Bond, Inc.**  
53 Southampton Road  
US-01085 Westfield, MA  
4736  
Ellen Ebner / eebner@tighebond.com  
Calculated:  
1/18/2011 7:26 AM/2.7.468

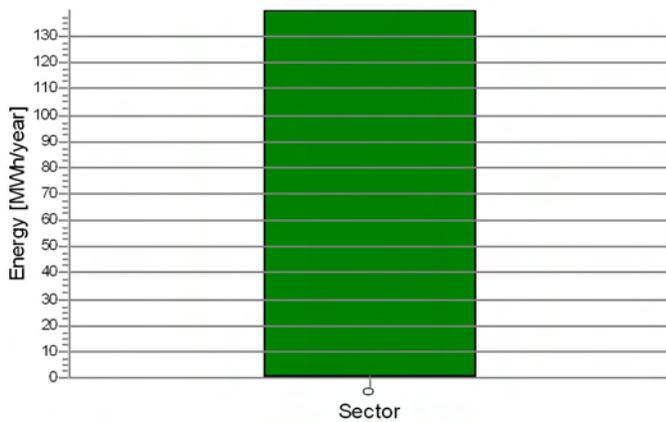
**METEO - Production Analysis**

**Calculation:** E-3120 (50m CWEST Data) **WTG:** Endurance E-3120 50 19.2 !O!, Hub height: 36.5 m, Air density: 1.243 kg/m<sup>3</sup>

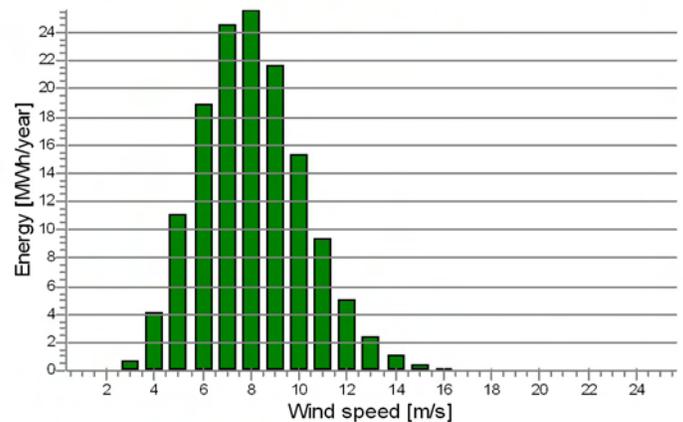
**Directional Analysis**

Sector		0	0	Total
Roughness based energy	[MWh]	139.9	139.9	
<b>Resulting energy</b>	<b>[MWh]</b>	<b>139.9</b>	<b>139.9</b>	
Specific energy	[kWh/m <sup>2</sup> ]			483
Specific energy	[kWh/kW]			2,799
Directional Distribution	[%]	100.0	100.0	
Utilization	[%]	32.0	32.0	
Operational	[Hours/year]	7,198	7,198	
Full Load Equivalent	[Hours/year]	2,799	2,799	
A- parameter	[m/s]	6.2	6.2	
Mean wind speed	[m/s]	5.5	5.5	
k- parameter		2.26	2.26	
Frequency	[%]	100.0	100.0	
Power density	[W/m <sup>2</sup> ]			172

Energy vs. sector



Energy vs. wind speed



Project:  
**Allen Farm**

Printed/Page  
1/18/2011 7:26 AM / 3

Licensed user:  
**Tighe & Bond, Inc.**  
53 Southampton Road  
US-01085 Westfield, MA  
4736  
Ellen Ebner / eebner@tighebond.com  
Calculated:  
1/18/2011 7:26 AM/2.7.468

**METEO - Power Curve Analysis**

**Calculation: E-3120 (50m CWest Data)WTG: Endurance E-3120 50 19.2 !O! E-3120 Power Curve, Hub height: 36.5 m**

**Name:** E-3120 Power Curve  
**Source:** Endurance Wind Power

Source/Date	Created by	Created	Edited	Stop wind speed [m/s]	Power control	CT curve type
1/10/2011	USER	1/10/2011	1/15/2011	25.0	Stall	Standard stall

**HP curve comparison** - Note: For standard air density and weibull k parameter = 2

Vmean	[m/s]	5	6	7	8	9	10
HP value	[MWh]	0	0	0	0	0	0
Endurance E-3120 50 19.2 !O! E-3120 Power Curve	[MWh]	115	169	218	257	285	302
Check value	[%]	0	0	0	0	0	0

The table shows comparison between annual energy production calculated on basis of simplified "HP-curves" which assume that all WTGs performs quite similar - only specific power loading (kW/m<sup>2</sup>) and single/dual speed or stall/pitch decides the calculated values. Productions are without wake losses.  
For further details, ask at the Danish Energy Agency for project report J.nr. 51171/00-0016 or see WindPRO manual chapter 3.5.2.  
The method is refined in EMD report "20 Detailed Case Studies comparing Project Design Calculations and actual Energy Productions for Wind Energy Projects worldwide", jan 2003.  
Use the table to evaluate if the given power curve is reasonable - if the check value are lower than -5%, the power curve probably is too optimistic due to uncertainty in power curve measurement.

**Power curve**

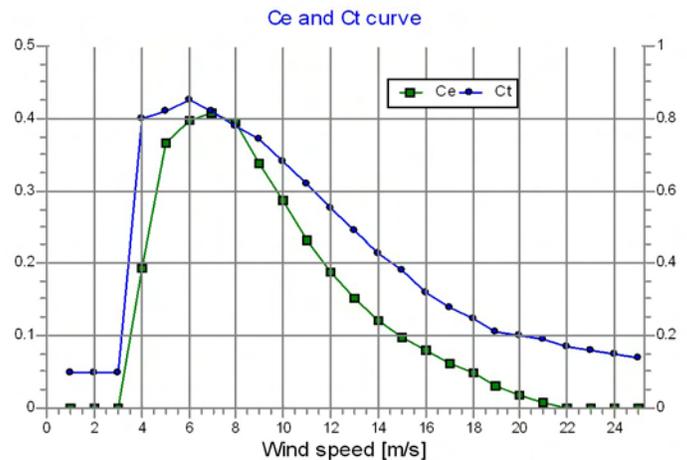
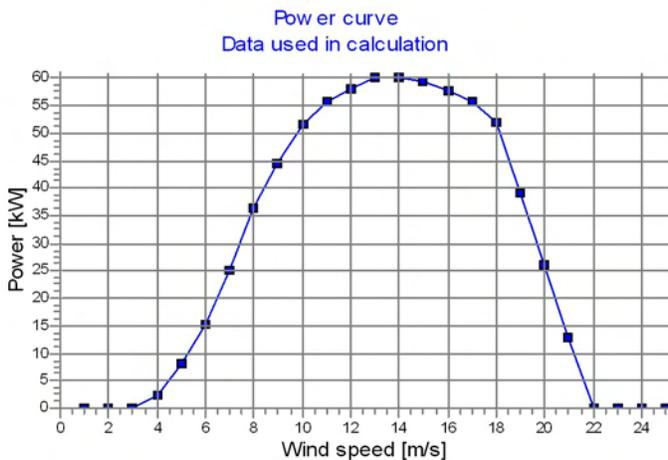
Original data from Windcat, Air density: 1.225 kg/m<sup>3</sup>

Wind speed [m/s]	Power [kW]	Ce	Wind speed [m/s]	Ct curve
3.0	0.0	0.00	1.0	0.10
4.0	2.2	0.19	2.0	0.10
5.0	8.1	0.37	3.0	0.10
6.0	15.2	0.40	4.0	0.80
7.0	24.8	0.41	5.0	0.82
8.0	35.8	0.39	6.0	0.85
9.0	43.8	0.34	7.0	0.82
10.0	50.9	0.29	8.0	0.78
11.0	54.8	0.23	9.0	0.74
12.0	57.3	0.19	10.0	0.68
13.0	59.3	0.15	11.0	0.62
14.0	59.3	0.12	12.0	0.55
15.0	58.6	0.10	13.0	0.49
16.0	57.1	0.08	14.0	0.43
17.0	54.9	0.06	15.0	0.38
18.0	51.4	0.05	16.0	0.32
22.0	0.0	0.00	17.0	0.28
			18.0	0.25
			19.0	0.21
			20.0	0.20
			21.0	0.19
			22.0	0.17
			23.0	0.16
			24.0	0.15
			25.0	0.14
			26.0	0.13
			27.0	0.12
			28.0	0.11
			29.0	0.10

**Power, Efficiency and energy vs. wind speed**

Data used in calculation, Air density: 1.243 kg/m<sup>3</sup> New WindPRO method (adjusted IEC method, improved to match turbine control) <RECOMMENDED>

Wind speed [m/s]	Power [kW]	Ce	Interval [m/s]	Energy [MWh]	Acc. Energy [MWh]	Relative [%]
1.0	0.0	0.00	0.50-1.50	0.0	0.0	0.0
2.0	0.0	0.00	1.50-2.50	0.0	0.0	0.0
3.0	0.0	0.00	2.50-3.50	0.7	0.7	0.5
4.0	2.2	0.19	3.50-4.50	4.1	4.8	3.4
5.0	8.2	0.37	4.50-5.50	11.1	15.8	11.3
6.0	15.4	0.40	5.50-6.50	18.9	34.7	24.8
7.0	25.2	0.41	6.50-7.50	24.6	59.3	42.4
8.0	36.3	0.39	7.50-8.50	25.6	84.9	60.7
9.0	44.4	0.34	8.50-9.50	21.6	106.5	76.1
10.0	51.6	0.29	9.50-10.50	15.3	121.8	87.0
11.0	55.6	0.23	10.50-11.50	9.3	131.1	93.7
12.0	58.1	0.19	11.50-12.50	5.0	136.0	97.2
13.0	60.2	0.15	12.50-13.50	2.3	138.4	98.9
14.0	60.2	0.12	13.50-14.50	1.0	139.4	99.6
15.0	59.5	0.10	14.50-15.50	0.4	139.8	99.9
16.0	57.9	0.08	15.50-16.50	0.1	139.9	100.0
17.0	55.7	0.06	16.50-17.50	0.0	139.9	100.0
18.0	52.2	0.05	17.50-18.50	0.0	139.9	100.0
19.0	39.1	0.03	18.50-19.50	0.0	139.9	100.0
20.0	26.1	0.02	19.50-20.50	0.0	139.9	100.0
21.0	13.0	0.01	20.50-21.50	0.0	139.9	100.0
22.0	0.0	0.00	21.50-22.50	0.0	139.9	100.0
23.0	0.0	0.00	22.50-23.50	0.0	139.9	100.0
24.0	0.0	0.00	23.50-24.50	0.0	139.9	100.0
25.0	0.0	0.00	24.50-25.50	0.0	139.9	100.0



Project:  
**Allen Farm**

Printed/Page  
1/18/2011 7:26 AM / 4  
Licensed user:  
**Tighe & Bond, Inc.**  
53 Southampton Road  
US-01085 Westfield, MA  
4736  
Ellen Ebner / eeebner@tighebond.com  
Calculated:  
1/18/2011 7:26 AM/2.7.468

**METEO - Wind profile detailed**

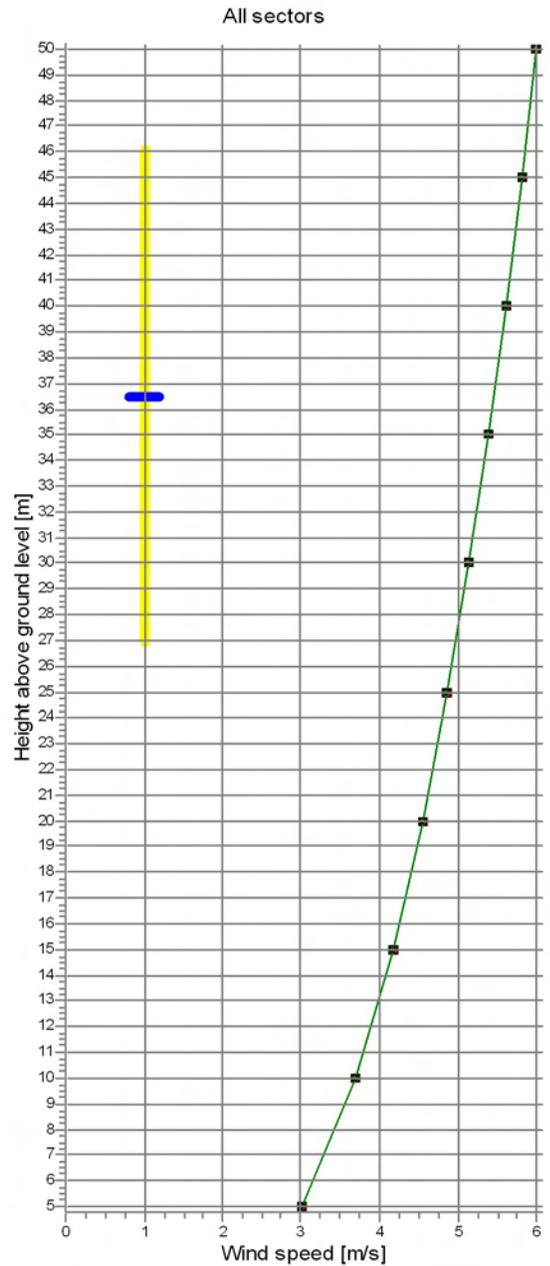
**Calculation:** E-3120 (50m CWest Data) **WTG:** Endurance E-3120 50 19.2 !O! E-3120 Power Curve, Hub height: 36.5 m

**Site Data** CWest Meteo  
**Site Coordinates** UTM NAD 83 Zone: 19 East: 371,039 North: 4,582,667

**Air density calculation mode** Individual per WTG  
Result for WTG at hub altitude 1.243 kg/m<sup>3</sup>  
Air density relative to standard 101.5 %  
**Hub altitude above sea level (asl)** 39.9 m  
**Annual mean temperature at hub alt.** 9.5 °C  
**Pressure at WTGs** 1,008.4 hPa

**All sectors**

Height	Mean wind speed	A- parameter	k- parameter	Wind energy	Yield	Yield change
	[m/s]	[m/s]		[kWh/m <sup>2</sup> ]	[MWh]	[MWh]
5	3.01	3.4	2.01	282	24	-116
10	3.70	4.2	2.05	515	50	-90
15	4.18	4.7	2.09	728	72	-68
20	4.55	5.1	2.13	926	91	-49
25	4.87	5.5	2.17	1,113	108	-32
30	5.14	5.8	2.21	1,290	123	-17
35	5.39	6.1	2.25	1,459	136	-4
40	5.61	6.3	2.29	1,621	148	9
45	5.81	6.6	2.33	1,778	160	20
50	6.00	6.8	2.37	1,929	171	31



Project:

Allen Farm

Printed/Page

1/18/2011 7:26 AM / 5

Licensed user:

**Tighe & Bond, Inc.**

53 Southampton Road

US-01085 Westfield, MA

4736

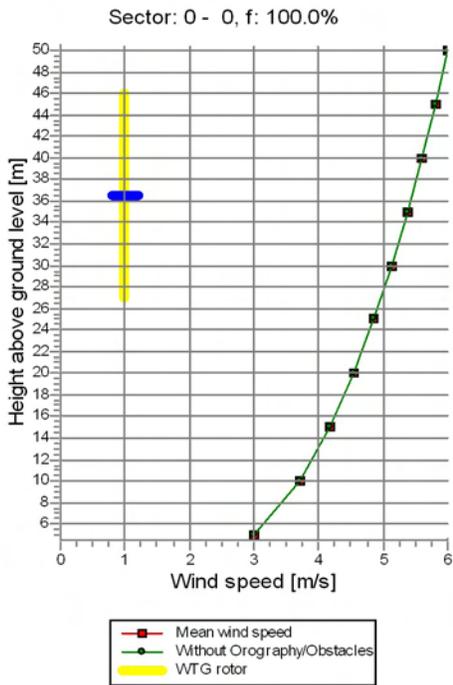
Ellen Ebner / eebner@tighebond.com

Calculated:

1/18/2011 7:26 AM/2.7.468

### METEO - Wind profile detailed

Calculation: E-3120 (50m CWEST Data)WTG: Endurance E-3120 50 19.2 !O! E-3120 Power Curve, Hub height: 36.5 m



## Energy Consumption Calculations

Equipment	Allen Farm Estimate	Tighe & Bond Estimate				
	kWh/year	kWh/day	days/ year	kWh/year	Percent of Total Consumption (for All Equipment)	Assumptions/Comments
<b>EXISTING EQUIPMENT</b>						
Farm House, Store, Horse Barn, Home Office Total	See subtotal below, estimate not broken out.	See detail below				The Farmhouse (office, root cellar storage), Store (freezer and AC), and Horse Barn (heat Lamps, irrigation pumps) are all on one meter. This meter's total annual average use (for 2008, 2009, 2010) is 11,685 kWh. The analysis required that the residential electricity consumption be subtracted from the Allen Farm Agricultural use estimate. Since Allen Farm is very energy efficient, the total consumption on this meter (including business uses) is less than the National Electric Code or Federal Energy Information Agency would estimate for a typical household electrical consumption. Since the Allens have a uniquely low residential consumption, it is difficult to estimate and extract this amount from the total meter reading by standard practices. Therefore, estimates for the Horse Barn, Shop and home office were calculated according to standard electrical engineering practices and included in the Agricultural use estimate. Average annual usage (for 2008, 2009, 2010) from meter is 11,686 kWh. Meter Data in Appendix A.
House barn, heat lamp for baby chicks	See subtotal below, estimate not broken out.	4	60	216	0.17%	Typical large heat lamp of the type used for hatching chicks uses approximately 150W. Assume 24 hr/day operation for 2 months.
Store Air Conditioner & Lighting	See subtotal below, estimate not broken out.	26	200	5,200	4.15%	Retail lighting = 2.5W/sq.ft., HVAC = 5.5W/sq.ft. (RS Means 2011), Assume HVAC actually 4W/sq.ft. due to Allen Farm energy conservation efforts. Assume the Store = 500 sq.ft. (therefore, 3.25 kW average demand). Assume operation is an average 8 hours a day May - June, approximately 200 days per year.
Store Freezer	See subtotal below, estimate not broken out.	6	210	1,260	1.01%	Standard home freezer use is approximately 500 W, assume 12 hours of cooling a day and operation May - June, approximately 200 days per year.
Home office	See subtotal below, estimate not broken out.	Based on data above. See Comments		1002	0.80%	As described by the Allen Farm in a letter submitted "As is Very Typical of New England Farms," it is difficult for farms to separate business and residential spaces because the two are constantly overlapping. The Allen Farm describes many instances where the home becomes much more than an office and is an essential asset to their business. To maintain a conservative estimate, we have estimated that 20% of the home is used as a home office space (approx. 950 sq.ft. of 4656 total home sq. footage). This includes a root cellar and basement area for product storage, kitchen and dining areas used extensively for food processing activities and lambing, space for typical office items such as computer, printer and business records, and use of the home freezer. IRS regulations were used to determine the 20% estimate. Therefore, 20% of the Farm House/Store/Horse Barn meter total not including the Store and Horse barn will be included for home office use. Home office use = (11686-216-5200-1260 kWh)*0.2. This equates to 2.7 kWh per day of Home Office use, a conservative number.
<b>Store, Horse Barn, Home Office Subtotal</b>	<b>5,411.5</b>	Based on data above. See Comments		<b>7,678</b>	<b>6.12%</b>	<b>This is the total use associated with the Store, Horse Barn and Home Office. This number does not include the residential use (4007 kWh/yr).</b>
North Side Barns	25,507.0	Meter Reading Average, no demand assumption		25,300	20.18%	Both North Side Barns are on one NSTAR account. Average use (for 2008, 2009, 2010) is 25,300 kWh/yr. This includes Maintenance shop, woodworking and welding equipment, seasonal refrigerator/freezers, large chest freezer, 8x8x8' walk-in freezer, 2 x 250 gal compost tea brewers.
South Side Barn	No Estimate Included	Meter Reading Average, no demand assumption		5,446	4.34%	The South Side Barn NSTAR meter is on a small building that the Allen Farm rents to a family who comes to the Farm to participate in agricultural activities. The family brings horses, and use the Allens' facilities and participate in farming activities during the summer months. Based on the description provided, this building's electrical usage is a part of the agricultural business that the Allen Farm encompasses. The Allens also use the freezer in this building for storage of their products in the fall months when freezer space is high in demand. The electrical use pattern (low December - March, Medium April - August, High September - December) illustrates that these are the main uses of the building. The average annual usage (for 2008, 2009, 2010) is 5,446 kWh.
<b>Existing Equipment Total</b>	<b>30,918.5</b>			<b>38,424</b>	<b>30.65%</b>	

Equipment	Allen Farm Estimate		Tighe & Bond Estimate				Assumptions/Comments
	kWh/year		kWh/day	days/ year	kWh/year	Percent of Total Consumption (for All Equipment)	
<b>PLANNED &amp; COMMITTED EQUIPMENT - Purchase Orders submitted for Equipment or Materials</b>							
1700 gal Compost Tea Brewer	23,566.5		103	245	21,450	17.11%	The 1,700 gallon brewer (equipment purchased in May and June 2010) has a circulation pump and an airblower. The circulation pump has 1.5 kW demand and airblower has 2.8 kW demand (total 4.3 kW). Assume tea brewer use during 85% of the time, March - October (Time was reduced to 85% for down-time between batches).
Winter Greens Geenhouse (30'x48') - Water Heater	3,659.0		257	60	15,437	12.31%	The Greenhouse building materials (polycarbonate) were purchased by the Allen Farm in March 2010. Design of hot water in-ground heating completed and materials quoted by Delta T, January 2011. Bosch electric tankless water heater (AE125 or equivalent at least 22 kW recommended by Delta T). The AE125 uses 26.85 kW (Manufacturer's specifications). Heater will run continuously in cold months (no storage so assume constant heating at average 40% of the time during 60 days per year, conservatively)
Winter Greens Geenhouse (30'x48') - Circulation Pump	Pump was included in above estimate		9	60	540	0.43%	Delta T Solutions designed a 7gpm circulation pump for the system (typically between 0.25 - 0.75 hp, say 0.5 hp). It is likely that the pump will run on the same schedule as the heater, 60 days per year but at 100% of the time (24 hr/day).
Compost Tea Brewer Heater	2,160.0		36	60	2,160	1.72%	Evidence that the equipment was purchased from the vendor was provided in an email dated Dec. 30, 2010. Email indicated plans for possible further purchase. Brewer heater will come on line in Spring 2011. Vendor indicated that a heater is 1.5 kW (120 V single phase, 12.5A). Assume heater is required for 60 days a year (15 days in March, April, October and November).
<b>Planned &amp; Committed Equipment Total</b>	<b>29,385.5</b>				<b>39,587</b>	<b>31.58%</b>	
<b>PLANNED EQUIPMENT - Plans submitted, no materials purchased at this time. Some items dependent on installation/permitting of wind turbine.</b>							
Polaris EV	2,190.0		7	365	2,701	2.15%	To reduce their greenhouse gas emissions, Allen Farm intends to trade their 26 hp Diesel vehicle for an electric vehicle if the wind turbine is permitted. Polaris EV is 48V at 110A, 30 hp - for 1 hr use, 6 kWh is conservative. Assume 1 hr per day at 10 hp average use.
Walk in Refrigerator - N. Side Barns	9,855.0		28	365	8,176	6.52%	8x12x8' refrigeration (1500 W is typical demand for 8x12'). Walk-in condenser/compressor is typically 1500W. Assume 80% daily use on average (use pattern from US Cooler, Quincy IL).
Walk in Freezer - N. Side Barns	19,710.0		58	365	21,170	16.89%	8x12x8 Walk in freezer (3000 W typical of 8x12). Walk-in freezer condenser/compressor is typically 2000W - 4000W. Assume 3000 W demand and 80% daily use on average (use pattern from US Cooler, Quincy IL).
3-Door Freezer - Store	10,935.0		36	365	13,140	10.48%	Commercial freezer (3000 W). Large Freezer condenser is typically 2000W - 4000W. Use 3000W conservatively. Assume 12 hours of operation per day, average.
Compost Tea Brewer Heater	2,160.0		36	60	2,160	1.72%	Plans exist to add another heater to compost tea operations. Evidence that future equipment may be purchased from the vendor was provided in an email from Compostwerks dated Dec. 30, 2010. Vendor indicated that a heater is 1.5 kW (120 V single phase, 12.5A). Heater is required for 60 days a year (15 days in March, April, October and November).
Irrigation	592.8		No estimate. Current irrigation is included in meter data			0.00%	No details submitted on future irrigation expansion
<b>Planned Equipment Total</b>	<b>45,442.8</b>				<b>47,347</b>	<b>37.77%</b>	

**Allen Farm**  
 Schedule of Electrical Usage Comparison

Equipment	Allen Farm Estimate	Tighe & Bond Estimate				Assumptions/Comments
	kWh/year	kWh/day	days/ year	kWh/year	Percent of Total Consumption (for All Equipment)	
<b>TOTAL (Existing Equipment)</b>	<b>30,918.5</b>			<b>38,424</b>	<b>30.65%</b>	
<b>TOTAL (Existing and Planned &amp; Committed Equipment)</b>	<b>60,304.0</b>			<b>78,010</b>	<b>62.23%</b>	
<b>TOTAL (All Equipment)</b>	<b>105,746.8</b>			<b>125,357</b>	<b>100.00%</b>	

Energy Calculation, as submitted by the Allen Farm



As is very typical of New England family farms. The kitchen and dining room of the Farmhouse is used extensively as "office space". Although we have a formal office in one of our barns where our records are kept and our bookkeeper works, the kitchen is really the hub of the farm. Telephones, another computer, another fax machine and another printer are all situated on the kitchen table and/or the dining room table. Papers and journals are piled high. Reference books are spread out; seed catalogs, ordering forms for lambing supplies and various farm tools make their way to all these surfaces.

Ideas are hatched, plans are made and consultants are sometimes fed and housed in the farmhouse. Fruits and vegetables, pickles, jams and jellies are all "put up" in the late summer and early autumn. Winter vegetables are stored over the winter in the root cellar in the basement. Compost produced by our Clivus Multrum composting system is applied to our land. Eggs are sold from our mudroom in the off-season.

Farm workers eat many of their breakfasts and most of their lunches in the farmhouse. Our lambs are born in the spring, and every year there are several that need to be revived, bottle-fed and kept warm. That, along with everything else, happens in our kitchen.

Our farmhouse, including somewhat finished basement and attic is about 4656 square feet. The attic and basement are about 1472 square feet. Our root cellar is about 190 square feet, and is located in our basement. Our Clivus Multrum system is also located in the basement and uses a minimal amount of electricity to keep the ventilating fans running.

As I mentioned to you on the telephone, it is difficult to say where farming and living begin and end.

Every room in our house, including the basement has bookcases. Our collection of books is overwhelmingly a reference library on farming, agriculture and the natural world. I think it would be fair to say that we use approximately 921 square feet of our house for our business

All of the above happens in the farmhouse for ten months of the year. Our house is rented during the months of July to a family from Pittsburgh, and in August to a family from Washington, D.C. Both families very much participate in the farm experience and enjoy the products from the farm.

The main water pump for the entire farm is run of the farmhouse meter. We completed our irrigation system last summer, and now water can be pumped to all the different paddocks, when needed. My shop, where we sell the farm's products is also run off the house's meter. The store has a freezer and an air conditioner that run particularly during the summer months. We typically use that small freezer until about Christmas. My shop is open from May to January. It is open daily from mid-June until mid-October, then we open on weekends, until the second week of December, and then we are open daily thru the winter holidays.

The house meter also covers our horse barn. For several months each spring we brood our baby chicks in that building. At that time we use a heat lamp to keep them warm.

We also have a wood working shop/barn/farm office/ weaving studio/ apartment (used only for help and family/ inventory storage/ and general all purpose building.

On this meter are the two significant farm buildings, the one mentioned above and what we refer to as the back barn/maintenance building. On this meter is our walk-in freezer, a large chest freezer and two seasonally used refrigerators with small freezers. In the barn, we also weave and finish our blankets. The blankets are washed, trimmed and ironed before they are either shipped or sold through the farm shop. All the woodworking tools are used exclusively for farm building and repair. We no longer have a commercial woodworking shop. We also set up grow lights in the spring and have a seed starting heater mat going in the late winter.

In the back barn, the compost tea is brewed, and the tractors and machinery are repaired. We have compressors in both barns and metal halide lighting in both buildings. We also have a mig and an arc welder.

My husband, Mitchell is working on the energy calculations. I hope this overview is helpful to you.

Sincerely,

Clarissa Allen

# THREE YEAR ENERGY CALCULATION- draft

## North Side Farm Barns (two)

2- 250 gal. compost tea brewers (airblower-1/2 HP, 5.6 amps, 115 V, 471W, 2000 watts during startup)

1- Mig welder	2- Refrigerators
Metal Halite Lights	8'X8'X8' Walk-in freezer
1-A/C Arc Welder	1- chest freezer
1- Washer/Dryer	Storage (wool)
Growlites	Iron (blanket weaving)
Office	

(NSTAR- Mitchell Posin acct # 15306850015)

	<u>2010</u>	<u>2009</u>	<u>2008</u>
Nov	1689	1786	1717
Oct	2356	2536	2018
Sept	3079	2760	2178
Aug	2796	3357	2423
July	3400	2958	2597
June	3482	3132	2454
May	2376	2706	1727
Apr	1882	2247	1328
Mar	1165	1503	1176
Feb	1062	1240	1681
Jan	1093	1554	1766
Dec	1127	1723	1825
<u>Total</u>	<u>25,507</u>	27,502	22,890

(intended expansion)

1500 gal Compost tea/Biodynamic Brewer  
(vortex- 3ph, 2HP, 6.8 amps, 230 V, 1564W  
(airblower- 2HP, 12 amps, 230 V, 2800 W)

annual kWh's

225 days X (daily use)  
1.564 + 2.8 kWh = 4.364 X  
24 = 104.74 kWh  
= 23,566.5 kWh

Walk-In refrigerator, 8' x 12' X 8', 1.5 HP (plus fans), 3 ph, 1500 W,

365 days = 13,140 X 75%  
= 9855 kWh

Walk-In Freezer, 8' x 12' X 8, 3 HP plus fans),  
3 ph, 3000W

365 days = 26,280 X 75%  
= 19,710 kWh

Polaris Ranger EV Electric Utility Vehicle

365 days x 6kw = 2190 kWh

1 Greenhouse

90 days x 40.66 kw = 3659.4 kWh

Total

~~100,989.2 kWh~~

2 250gal Compost Tea Brewer Heater

60 days x 36kw = 4320 kWh +-

88,807.9 kWh

# THREE YEAR ENERGY CALCULATION- *draft*

## Electricity Usage

Farm House (Office, freezer)-Store (freezer, AC)-Horse Barn (chicken brooder)

Office  
Chest Freezer  
Livestock water

(NSTAR- Clarissa Allen acct # 15306860014)

	<u>2010</u>	<u>2009</u>	<u>2008</u>
Nov	919	850	1103
Oct	761	816	1040
Sept	784	802	927
Aug	1037	1368	1078
July	1042	1414	1260
June	816	949	880
May	1235	1003	862
Apr	858	960	748
Mar	797	977	848
Feb	752	1041	879
Jan	793	1273	850
Dec	1029	1418	888
<b>Total</b>	<b>10,823 ÷ 2 = <u>5,411.5</u></b>	<b>12,871</b>	<b>11,363</b>

(intended use)

annual kWh's

Store - 75 in wide, 3-door freezer (3000 W)

243 (days open) X  
45 kWh (75% daily use) =  
10,935 kWh

Irrigation -

.76 kWh X 12 hrs. =  
9.12 kWh /day X  
65 days = 592.8 kWh

88,807.9 kWh

16,939.3 kWh

105,747.2 kWh

16,939.3 kWh

- d. MassCEC's overall obligation under this Agreement, and the cumulative value of the Rebate, shall not exceed \$130,000 for public projects or \$100,000 for non-public projects.
- e. Wind Project Location Change. Changes to the physical location of some or all of the components, except in the case of warranty replacements, of an installed Wind Project at any time during its 20 year useful life is prohibited (a "Location Change"). In the event that MassCEC receives information concerning a Location Change and confirms that a Location Change has occurred, MassCEC shall rescind Rebates that have not yet been paid to Rebate Recipient or seek repayment of the Rebate. Rebate Recipient agrees that if it has received the Rebate and any of the Applicant Parties subsequently causes a Location Change that Rebate Recipient shall return the full amount of the Rebate to MassCEC. Examples of a prohibited Location Change include but are not limited to moving the specific site of an installation or transferring a Wind Project to a property other than the one set forth in the Wind Project definition. The Applicant Parties shall work cooperatively to achieve Wind Project completion not later than the "Project Completion Deadline." For purposes of the Agreement, "Project Completion" shall mean that the installation has been (i) completed and interconnected in accordance with the Minimum Technical Requirements, (ii) inspected and approved by the authorities having jurisdiction over official permitting and interconnection, and (iii) inspected for safety by MassCEC's independent consultant. Failure to achieve Project Completion by the Project Completion Deadline shall result in forfeiture of all or a portion of the Rebate. MassCEC shall consider, at its sole discretion, written requests for an extension of the Project Completion Deadline submitted by the Rebate Recipient in advance of the Project Completion Deadline. Consideration of a requested time extension shall be strictly limited to circumstances that are beyond the control of the Applicant Parties.
4. Rebate Recipient. As designated in the Community Wind Incentive Program Application form dated December 20, 2010, the Rebate Recipient will be Allen Farm.
5. Payment Schedule. The Rebate Recipient will receive payment pursuant to either Rebate Structure Type A or Type B, as defined in this Section 5. The Project's Rebate Structure will be determined by MassCEC at the time of award. The Rebate Recipient has elected to receive the Standard (Type A) Rebate Structure, as described in this Section 5.
- a. Type A: Standard Rebate. The total standard rebate will be determined as the sum of the following two rebates:
- i. Installation Rebate. The Installation Rebate will be in the amount of \$29,300.40, as determined at the time of award.
- ii. Estimated Performance Rebate. The Estimated Performance Rebate will be in the amount of \$0.87 for every kWh expected to be produced, the ("Expected Production"), of 82,388 kWh, in the first year of operation which shall be no more than the overall obligation stated in Section 3.d. of this Agreement. The total Estimated Performance Rebate will be in the amount of \$70,699.60.

MassCEC shall pay 90% of the Standard Rebate, in the amount of \$90,000.00 ("Initial Rebate"), to the Rebate Recipient within 60 days of MassCEC's receipt and acceptance (as determined in its sole discretion) of the requirements listed in 3.e, including the Project Completion Form and related deliverables.

MassCEC shall pay the remaining 10% of the Standard Rebate ("Final Rebate") within 60 days of MassCEC's receipt and acceptance (as determined in its sole discretion) of 12 months reporting to the Production Tracking System of electricity production and of system monitoring data. Upon meeting the aforementioned requirements, the Rebate Recipient shall be paid a Rebate in the amount of \$10,000.00. If applicable, MassCEC may simultaneously pay an additional Bonus



Natural Resources Conservation Service  
270 Communication Way, Suite 1-G  
Hyannis, MA 02601

508-771-6476  
fax 508-771-6509  
[www.ma.nrcs.usda.gov](http://www.ma.nrcs.usda.gov)

---

January 12, 2011

To: Allen Farm  
421 South St.  
Chilmark, MA. 02535

RE: Allen Farm Program Participant

To whom it may concern,

Mitchell Posin and Clarissa Allen have been long standing USDA Farm program participants and Dukes Conservation District Cooperators since 1988.

They have worked with my agency the USDA Natural Resource Conservation Service implementing their farm conservation plan and participating in the Farm Bill Environmental Quality Incentives Program.

Recent land management activities include the installation of livestock watering system and paddock fencing to facilitate a state of the art prescribed rotational grazing plan. Mr. Posin also utilizes a compost tea liquid nutrient management system for efficient nutrient uptake for his pasture forage. The "tea" is applied to his pastures based on soil analysis and plant tissue tests, thereby supplementing only the required nutrients for plant growth and to eliminate excessive nutrient use.

Mr. Posin is currently working with my agency on the latest air quality energy efficiency Farm Bill program that involves greenhouse technology that extends the season for locally grown produce and wind power to supplement his farm electrical energy needs. Mr. Posin is contracted with the Cape Cod Light compact to develop a whole farm energy assessment and audit.

Sincerely,

Donald Liptack  
District Conservationist  
USDA NRCS  
Hyannis, MA

VISIT THE "SAFETY" SECTION OF WWW.NSTAR.COM FOR MORE IMPORTANT SAFETY INFORMATION.

Account Number  
1530 685 0015

Billing Date  
Nov 16, 2010

Next Read Date  
Dec 15, 2010

Service Provided to

MITCHELL POSIN  
421 SOUTH RD SHOP  
CHILMARK MA 02535

*North Side Barns*

Account Summary

Previous Bill	229.94
Payment - Thank You	-229.94
Other Charges	2.11
Total Delivery Charges	178.53
<b>Delivery Svcs Balance</b>	<b>\$180.64</b>

Electricity Used

Rate 33-General - Annual  
Meter 5097499  
Nov 08, 2010 Actual Read 90483  
Oct 08, 2010 Actual Read - 88127  
31 Day Billed Use 2356

5097499	KWH	DMD
11/08	2356	9.6
10/08	3079	13.2
09/08	2796	11.0
08/08	3400	12.5
07/08	3482	13.0
06/08	2376	8.2
05/08	1882	5.5
04/08	1165	4.1
03/08	1062	4.9
02/08	1093	7.7
01/08	1127	5.3
12/08	1786	10.3
11/08	2536	12.3

Cost of Electricity

Delivery Services			
Customer Charge			5.53
Distribution Demand Charges			
1st 10 KW	No Charge	9.6 KW	0.00
Distribution Energy Charges			
1st 2300 KWH	.04765 X	2300 KWH	109.60
Over 2300 KWH	.01838 X	56 KWH	1.03
Transition *	.01589 X	2356 KWH	37.44
Transmission	.01600 X	2356 KWH	37.70
Renewable Energy	.00050 X	2356 KWH	1.18
Energy Conservation	.00250 X	2356 KWH	5.89
Farm Discount			-19.84

**Delivery Services Total 178.53**

Other Charges or Credits

Sales Tax 2.11

\* PART OF WHAT WE COLLECT IN THE TRANSITION CHARGE IS OWNED BY CEC FUNDING LLC.

CHARGES ARE SUBJECT TO 0.87% INTEREST AFTER 25 DAYS.



CUSTOMER SERVICE CENTER 800-692-2000  
FOR BUSINESS CUSTOMERS 800-340-8822

DIGGING? HITTING AN UNDERGROUND WIRE OR PIPE CAN BE DANGEROUS.  
 THAT'S WHY STATE LAW REQUIRES YOU OR YOUR CONTRACTOR TO CALL  
 DIG SAFE AT 888-DIG-SAFE AT LEAST THREE BUSINESS DAYS PRIOR TO  
 DIGGING. FOR MORE INFORMATION VISIT WWW.DIGSAFE.COM.

VISIT THE "SAFETY" SECTION OF WWW.NSTAR.COM FOR MORE  
 IMPORTANT SAFETY INFORMATION.

Account Number  
 1530 686 0014

Billing Date  
 Nov 16, 2010

Next Read Date  
 Dec 15, 2010

Service Provided to

CLARISSA ALLEN  
 421 SOUTH RD  
 CHILMARK MA 02535

*Farmhouse, Store, Horse Barn & Water*

Account Summary	
Previous Bill	68.58
Payment - Thank You	-68.58
Total Delivery Charges	66.67
<b>Delivery Svcs Balance</b>	<b>\$66.67</b>

Electricity Used

Rate 32-Residential Nonheat - Annual  
 Meter 2342843  
 Nov 15, 2010 Actual Read 47719  
 Oct 14, 2010 Actual Read - 46958  
 32 Day Billed Use 761

2342843	KWH
11/15	761
10/14	784
09/15	1037
08/13	1042
07/15	816
06/15	1235
05/14	858
04/14	797
03/16	752
02/12	793
01/14	1029
12/15	850
11/14	816

Cost of Electricity

Delivery Services			
Customer Charge			3.73
Distribution			44.02
Transition *	.05785 X	761 KWH	12.08
Transmission	.01587 X	761 KWH	11.97
Renewable Energy	.01573 X	761 KWH	0.38
Energy Conservation	.00050 X	761 KWH	1.90
Farm Discount	.00250 X	761 KWH	-7.41

**Delivery Services Total** **66.67**

\* PART OF WHAT WE COLLECT IN THE TRANSITION  
 CHARGE IS OWNED BY CEC FUNDING LLC.

6  
 3  
 9

DIGGING? HITTING AN UNDERGROUND WIRE OR PIPE CAN BE DANGEROUS.  
 THAT'S WHY STATE LAW REQUIRES YOU OR YOUR CONTRACTOR TO CALL  
 DIG SAFE AT 888-DIG-SAFE AT LEAST THREE BUSINESS DAYS PRIOR TO  
 DIGGING. FOR MORE INFORMATION VISIT WWW.DIGSAFE.COM.

VISIT THE "SAFETY" SECTION OF WWW.NSTAR.COM FOR MORE  
 IMPORTANT SAFETY INFORMATION.

Account Number  
 1530 687 0013

Billing Date  
 Oct 15, 2010

Next Read Date  
 Nov 15, 2010

Service Provided to

ROGER ALLEN  
 421 SOUTH RD  
 CHILMARK MA 02535

*South Side Barn*

Electricity Used

Rate 68-Residential Nonheat-Optional  
 Meter 2331214  
 Oct 14, 2010 Actual Read 21436  
 Sep 15, 2010 Actual Read - 20023  
 29 Day Billed Use 1413

2331214	KWH
10/14	1413
09/15	862
08/13	703
07/15	720
06/15	730
05/14	485
04/14	403
03/16	80
02/12	74
01/14	76
12/15	78
11/14	707
10/14	1179

Account Summary

Previous Bill	77.06
Payment - Thank You	-77.06
Total Delivery Charges	120.92
<b>Delivery Svcs Balance</b>	<b>\$120.92</b>

Cost of Electricity

Delivery Services				
Customer Charge				3.73
Distribution	.05785 X	1413 KWH		81.74
Transition *	.01587 X	1413 KWH		22.42
Transmission	.01573 X	1413 KWH		22.23
Renewable Energy	.00050 X	1413 KWH		0.71
Energy Conservation	.00250 X	1413 KWH		3.53
Farm Discount				-13.44

**Delivery Services Total 120.92**

\* PART OF WHAT WE COLLECT IN THE TRANSITION  
 CHARGE IS OWNED BY CEC FUNDING LLC.

AHIS CIS PROD P297

ACCOUNT HISTORY

North Side Barging

1530-685-0015 DIV 72 E A  
MITCHELL POSIN  
421 SOUTH RD SHOP  
CHILMARK 02535  
H (508) 645-9064

RATE: 3533 ASC  
OPEN BAL 293.43  
AVG BILL 155.00  
COMMENTS A  
MAIL

NXT/RD/DT 01/13/11  
CY 10 RTE 854

2010  
↓

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
1	5	12/08	92172	A		1689	30 12/17	130.44	1.57	133.96	180.64	314.60	122010	180.64-	
	D		1005			10.1		0.44					121710	1.57	LP
2	5	11/08	90483	A		2356	31 11/16	178.53	0.00	180.64	0.00	180.64	121710	1.51	ST
	D		960			9.6		0.00					111610	2.11	ST
3	5	10/08	88127	A		3079	30 10/15	213.20	0.00	229.94	0.00	229.94	102810	229.94-	
	D		1321			13.2		13.99					101510	2.75	ST
4	5	09/08	85048	A		2796	31 09/16	199.63	0.00	206.50	0.00	206.50	92810	206.50-	
	D		1100			11.0		4.37					91610	2.50	ST
5	5	08/08	82252	A		3400	31 08/16	228.59	0.00	242.56	0.00	242.56	90210	242.56-	
	D		1254			12.5		10.93					81610	3.04	ST
6	5	07/08	78852	A		3482	30 07/16	222.08	0.00	238.31	0.00	238.31	80210	238.31-	
	D		1299			13.0		13.12					71610	3.11	ST
7	5	06/08	75370	A		2376	31 06/16	169.77	0.00	171.89	0.00	171.89	70810	171.89-	
	D		820			8.2		0.00					61610	2.12	ST

CS09101 MORE...

PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

1530-685-0015 DIV 72 E A  
MITCHELL POSIN  
421 SOUTH RD SHOP  
CHILMARK 02535  
H (508) 645-9064

RATE: 3533 ASC  
OPEN BAL 293.43  
AVG BILL 155.00  
COMMENTS A  
MAIL

NXT/RD/DT 01/13/11  
CY 10 RTE 854

2009  
↓

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
8	5	05/08	72994	A	1882	30	05/17	137.09	0.00	138.77	0.00	138.77	52410	138.77-	
		D	545		5.5			0.00					51710	1.68	ST
9	5	04/08	71112	A	1165	31	04/15	86.75	0.00	87.79	0.00	87.79	50310	87.79-	
		D	411		4.1			0.00					41510	1.04	ST
10	5	03/08	69947	A	1062	28	03/17	79.53	0.00	80.48	0.00	80.48	40610	80.48-	
		D	493		4.9			0.00					31710	.95	ST
11	5	02/08	68885	A	1093	31	02/16	81.71	0.00	82.69	0.00	82.69	30110	82.69-	
		D	768		7.7			0.00					21610	.98	ST
12	5	01/08	67792	A	1127	31	01/18	84.01	0.00	85.22	0.00	85.22	20210	85.22-	
		D	534		5.3			0.00					11810	1.21	ST
13	5	12/08	66665	A	1786	30	12/16	130.16	0.00	133.50	37.81-	95.69	11110	95.69-	
		D	1029		10.3			1.31					121609	2.03	ST
14	5	11/08	64879	A	2536	31	11/16	176.53	0.00	189.47	227.28-	37.81-	120709		
		D	1229		12.3			10.06					111609	2.88	ST

CS09101 MORE...

PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

1530-685-0015 DIV 72 E A  
 MITCHELL POSIN  
 421 SOUTH RD SHOP  
 CHILMARK 02535  
 H (508) 645-9064

RATE: 3533 ASC  
 OPEN BAL 293.43  
 AVG BILL 155.00  
 COMMENTS A  
 MAIL

NXT/RD/DT 01/13/11  
 CY 10 RTE 854

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
15	5	10/08	62343	A	2760	30	10/15	186.32	0.00	199.08	426.36-	227.28-	111009		
		D	1215		12.2			9.62					101509	3.14	ST
16	5	09/08	59583	A	3357	31	09/15	212.44	0.00	227.19	653.55-	426.36-	101409		
		D	1249		12.5			10.93					91509	3.82	ST
17	5	08/08	56226	A	2958	31	08/14	194.99	2.04	209.34	216.82	426.16	91109	653.55-	
		D	1215		12.2			9.62					82709	426.16-	
18	5	07/08	53268	A	3132	30	07/16	202.59	0.00	216.82	0.00	216.82	81409	2.04	LP
		D	1262		12.6			11.38					81409	2.69	ST
19	5	06/08	50136	A	2706	31	06/16	183.96	0.00	196.48	0.00	196.48	71609	2.85	ST
		D	1226		12.3			10.06					71009	196.48-	
20	5	05/08	47430	A	2247	30	05/18	162.47	0.00	165.82	0.00	165.82	61609	2.46	ST
		D	1026		10.3			1.31					61509	165.82-	
21	5	04/08	45183	A	1503	31	04/15	110.33	0.00	112.14	0.00	112.14	51809	2.04	ST
		D	1012		10.1			0.44					42709	112.14-	

CS09101 MORE...

PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

AHIS CIS PROD P297

ACCOUNT HISTORY

1530-685-0015 DIV 72 E A  
MITCHELL POSIN  
421 SOUTH RD SHOP  
CHILMARK 02535  
H (508) 645-9064

RATE: 3533 ASC  
OPEN BAL 293.43  
AVG BILL 155.00  
COMMENTS A  
MAIL

NXT/RD/DT 01/13/11  
CY 10 RTE 854

2008  
↓

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
22	5	03/08	43680	A	1240	28	03/17	91.89	1.14	94.16	121.00	215.16	41509	1.37	ST
	D		867		8.7			0.00					41009	94.16-	
23	5	02/08	42440	A	1554	31	02/13	113.90	0.00	121.00	0.00	121.00	32609	121.00-	
	D		1131		11.3			5.69					31709	1.14	LP
24	5	01/08	40886	A	1723	31	01/15	119.59	0.00	128.62	0.00	128.62	31709	1.13	ST
	D		1169		11.7			7.43					21309	1.41	ST
25	5	12/08	39163	A	1717	30	12/15	117.08	0.00	125.69	0.00	125.69	20209	128.62-	
	D		1160		11.6			7.00					11509	1.60	ST
26	5	11/08	37446	A	2018	31	11/17	136.73	0.00	142.55	0.00	142.55	10809	125.69-	
	D		1085		10.9			3.93					121508	1.61	ST
27	5	10/08	35428	A	2178	30	10/15	147.17	0.00	157.96	0.00	157.96	121108	142.55-	
	D		1202		12.0			8.75					111708	1.89	ST
28	5	09/08	33250	A	2423	31	09/15	159.93	0.00	166.57	0.00	166.57	110608	157.96-	
	D		1098		11.0			4.37					101508	2.04	ST

CS09101 MORE...

PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

1530-685-0015 DIV 72 E A  
 MITCHELL POSIN  
 421 SOUTH RD SHOP  
 CHILMARK 02535  
 H (508) 645-9064

RATE: 3533 ASC  
 OPEN BAL 293.43  
 AVG BILL 155.00  
 COMMENTS A  
 MAIL

CHILMARK  
 NXT/RD/DT 01/13/11  
 CY 10 RTE 854

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
29	5	08/08	30827	A	2597	31	08/14	166.70	0.00	178.75	0.00	178.75	100308	166.57-	
	D		1217					12.2					91508	2.27	ST
30	5	07/08	28230	A	2454	30	07/16	161.12	0.00	169.11	0.00	169.11	91008	178.75-	
	D		1132					11.3					81408	2.43	ST
31	5	06/08	25776	A	1727	31	06/16	117.73	0.00	122.85	0.00	122.85	80108	169.11-	
	D		1077					10.8					71608	2.30	ST
32	5	05/08	24049	A	1328	30	05/15	91.67	0.00	95.54	0.00	95.54	70908	122.85-	
	D		1062					10.6					61608	1.62	ST
33	5	04/08	22721	A	1176	31	04/15	81.76	0.00	82.86	0.00	82.86	60308	95.54-	
	D		619					6.2					51508	1.24	ST
34	5	03/08	21545	A	1681	29	03/17	114.72	0.00	116.30	0.00	116.30	51508	82.86-	
	D		814					8.1					41508	1.10	ST
35	5	02/08	19864	A	1766	31	02/14	120.28	0.00	121.93	0.00	121.93	40208	116.30-	
	D		988					9.9					31708	1.58	ST

CS09101 MORE...

PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

AHIS CIS PROD P297

ACCOUNT HISTORY

1530-685-0015 DIV 72 E A  
MITCHELL POSIN  
421 SOUTH RD SHOP  
CHILMARK 02535  
H (508) 645-9064

RATE: 3533 ASC  
OPEN BAL 293.43  
AVG BILL 155.00  
COMMENTS A  
MAIL

GRUB HILL INV  
NXT/RD/DT 01/13/11  
CY 10 RTE 854

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
36	5	01/08	18098	A E	1825	31	01/15	111.79	0.00	116.18	0.00	116.18	30308	121.93-	
	D		1072		10.7			3.06					21408	1.65	ST
													20108	116.18-	
													11508	1.33	ST
													10908	88.09-	

CS00078 CURRENTLY ON LAST PAGE  
PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

AHIS CIS PROD P297

ACCOUNT HISTORY

1530-686-0014 DIV 72 E A  
CLARISSA ALLEN  
421 SOUTH RD  
CHILMARK 02535  
H (508) 645-9064

RATE: 1832 ASC  
OPEN BAL 173.19  
AVG BILL 76.00  
COMMENTS P A  
MAIL

*Farm House, Store,  
Horse Barn and Water*

NXT/RD/DT 01/13/11  
CY 10 RTE 854

	HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
2010 ↓	1	E	12/16	48638	A		919 31	12/17	79.82		79.82	0.00	79.82	120610	66.67-	
	2	E	11/15	47719	A		761 32	11/16	66.67		66.67	0.00	66.67	102510	68.58-	
	3	E	10/14	46958	A		784 29	10/15	68.58		68.58	0.00	68.58	100410	89.64-	
	4	E	09/15	46174	A		1037 33	09/16	89.64		89.64	0.00	89.64	83010	90.06-	
	5	E	08/13	45137	A		1042 29	08/16	90.06		90.06	0.00	90.06	80210	68.94-	
	6	E	07/15	44095	A		816 30	07/16	68.94		68.94	0.00	68.94	71210	99.00-	
	7	E	06/15	43279	A		1235 32	06/16	99.00		99.00	0.00	99.00	60310	69.81-	
	8	E	05/14	42044	A		858 30	05/17	69.81		69.81	0.00	69.81	51410	65.08-	
	9	E	04/14	41186	A		797 29	04/15	65.08		65.08	0.00	65.08	33110	61.59-	
	10	E	03/16	40389	A		752 32	03/17	61.59		61.59	0.00	61.59	22610	64.75-	
	11	E	02/12	39637	A		793 29	02/16	64.75		64.75	0.00	64.75	12610	152.01-	
	12	E	01/14	38844	A		1029 30	01/15	82.95		82.95	69.06	152.01	120409	66.42-	
2009 ↓	13	E	12/15	37815	A		850 31	12/16	69.06		69.06	0.00	69.06	110209	65.34-	
	14	E	11/14	36965	A		816 31	11/16	66.42		66.42	0.00	66.42	92209	109.08-	
	15	E	10/14	36149	A		802 30	10/15	65.34		65.34	0.00	65.34	82809	189.33-	

CS00207 ALREADY ON THE FIRST PAGE

PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

1530-686-0014 DIV 72 E A  
 CLARISSA ALLEN  
 421 SOUTH RD  
 CHILMARK 02535  
 H (508) 645-9064

RATE: 1832 ASC  
 OPEN BAL 173.19  
 AVG BILL 76.00  
 COMMENTS P A  
 MAIL

NXT/RD/DT 01/13/11  
 CY 10 RTE 854

2008  
 ↓

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
16	E	09/14	35347	A	1368	32	09/15	109.08		109.08	0.00	109.08	62409	158.42-	
17	E	08/13	33979	A	1414	29	08/14	112.64		112.64	76.69	189.33	50409	78.87-	
18	E	07/15	32565	A	949	30	07/16	76.69		76.69	0.00	76.69	32609	185.54-	
19	E	06/15	31616	A	1003	31	06/16	80.87		80.87	77.55	158.42	20209	109.20-	
20	E	05/15	30613	A	960	31	05/18	77.55		77.55	0.00	77.55	10809	83.52-	
21	E	04/14	29653	A	977	29	04/15	78.87		78.87	0.00	78.87	121108	78.94-	
22	E	03/16	28676	A	1041	32	03/17	83.80		83.80	101.74	185.54	103008	152.42-	
23	E	02/12	27635	A	1273	29	02/13	101.74		101.74	0.00	101.74	91008	94.92-	
24	E	01/14	26362	A	1418	33	01/15	109.20		109.20	0.00	109.20	80108	67.31-	
25	E	12/12	24944	A	1103	29	12/15	83.52		83.52	0.00	83.52	71508	66.01-	
26	E	11/13	23841	A	1040	30	11/17	78.94		78.94	0.00	78.94	61208	129.88-	
27	E	10/14	22801	A	927	32	10/15	70.72		70.72	81.70	152.42	33108	125.20-	
28	E	09/12	21874	A	1078	30	09/15	81.70		81.70	0.00	81.70	21408	138.71-	
29	E	08/13	20796	A	1260	29	08/14	94.92		94.92	0.00	94.92			
30	E	07/15	19536	A	880	32	07/16	67.31		67.31	0.00	67.31			

CS09101 MORE...

PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

AHIS CIS PROD P297

ACCOUNT HISTORY

1530-686-0014 DIV 72 E A  
CLARISSA ALLEN  
421 SOUTH RD  
CHILMARK 02535  
H (508) 645-9064

RATE: 1832 ASC  
OPEN BAL 173.19  
AVG BILL 76.00  
COMMENTS P A  
MAIL

NXT/RD/DT 01/13/11  
CY 10 RTE 854

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
31	E	06/13	18656	A	862	30	06/16	66.01		66.01	0.00	66.01			
32	E	05/14	17794	A	748	30	05/15	57.72		57.72	72.16	129.88			
33	E	04/14	17046	A	848	31	04/15	64.98		64.98	7.18	72.16			
34	E	03/14	16198	A	879	30	03/17	67.24		67.24	65.14	132.38			
35	E	02/13	15319	A	850	30	02/14	65.14		65.14	0.00	65.14			
36	E	01/14	14469	A E	888	30	01/15	63.58		63.58	75.13	138.71			

CS00078 CURRENTLY ON LAST PAGE  
PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

# South Side Barn

AHIS CIS PROD P297

ACCOUNT HISTORY

1530-687-0013 DIV 72 E A  
 ROGER ALLEN  
 421 SOUTH RD  
 CHILMARK 02535  
 H (508) 645-9064

RATE: 1868 ASC  
 OPEN BAL 16.24  
 AVG BILL 45.00  
 COMMENTS P A  
 MAIL

NXT/RD/DT 01/13/11  
 CY 10 RTE 854

2010  
↓

2009  
↓

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
1	E	12/16	21984	A		79 31	12/17	9.93		9.93	0.00	9.93	120610	42.37-	
2	E	11/15	21905	A		469 32	11/16	42.37		42.37	0.00	42.37	102510	120.92-	
3	E	10/14	21436	A		1413 29	10/15	120.92		120.92	0.00	120.92	100410	77.06-	
4	E	09/15	20023	A		862 33	09/16	75.09		75.09	1.97	77.06	80910	121.11-	
5	E	08/13	19161	A		703 29	08/16	61.86		61.86	59.89-	1.97	71910	59.89-	
6	E	07/15	18458	A		720 30	07/16	61.22		61.22	59.89	121.11	60310	40.91-	
7	E	06/15	17738	A		730 32	06/16	59.89		59.89	0.00	59.89	51410	34.57-	
8	E	05/14	17008	A		485 30	05/17	40.91		40.91	0.00	40.91	33110	9.84-	
9	E	04/14	16523	A		403 29	04/15	34.57		34.57	0.00	34.57	22610	9.84-	
10	E	03/16	16120	A		80 32	03/17	9.84		9.84	0.00	9.84	12610	19.68-	
11	E	02/12	16040	A		74 29	02/16	9.84		9.84	0.00	9.84	120409	58.00-	
12	E	01/14	15966	A		76 30	01/15	9.84		9.84	9.84	19.68	110209	94.48-	
13	E	12/15	15890	A		78 31	12/16	9.84		9.84	0.00	9.84	100909	75.70-	
14	E	11/14	15812	A		707 31	11/16	58.00		58.00	0.00	58.00	90209	77.41-	
15	E	10/14	15105	A		1179 30	10/15	94.48		94.48	0.00	94.48	81309	63.64-	

CS09101 MORE...

PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORM PF09:G+E PF11:ABAL NEXT TRANS AHIS

AHIS CIS PROD P297

ACCOUNT HISTORY

South Side Barn

1530-687-0013 DIV 72 E A  
ROGER ALLEN  
421 SOUTH RD  
CHILMARK 02535  
H (508) 645-9064

RATE: 1868 ASC  
OPEN BAL 16.24  
AVG BILL 45.00  
COMMENTS P A  
MAIL

NXT/RD/DT 01/13/11  
CY 10 RTE 854

2008  
↓

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
16	E	09/14	13926	A	936	32	09/15	75.70		75.70	0.00	75.70	62409	29.09-	
17	E	08/13	12990	A	958	29	08/14	77.41		77.41	0.00	77.41	60309	9.45-	
18	E	07/15	12032	A	780	30	07/16	63.64		63.64	0.00	63.64	50409	9.84-	
19	E	06/15	11252	A	328	31	06/16	28.70		28.70	0.39	29.09	32609	19.68-	
20	E	05/15	10924	A	22	31	05/18	9.84		9.84	0.00	9.84	20209	9.85-	
21	E	04/14	10902	A	20	29	04/15	9.84		9.84	0.00	9.84	10809	9.84-	
22	E	03/16	10882	A	22	32	03/17	9.84		9.84	9.84	19.68	121108	45.66-	
23	E	02/12	10860	A	22	29	02/13	9.84		9.84	0.00	9.84	103008	158.26-	
24	E	01/14	10838	A	5	33	01/16	9.85		9.85	0.00	9.85	91008	60.19-	
25	E	12/12	10833	A	44	29	12/15	9.84		9.84	0.00	9.84	80108	67.09-	
26	E	11/13	10789	A	582	30	11/17	45.66		45.66	0.00	45.66	71508	33.95-	
27	E	10/14	10207	A	1254	32	10/15	94.50		94.50	63.76	158.26	61208	48.29-	
28	E	09/12	08953	A	831	30	09/15	63.76		63.76	0.00	63.76	21408	19.69-	
29	E	08/13	08122	A	782	29	08/14	60.19		60.19	0.00	60.19			
30	E	07/15	07340	A	877	32	07/16	67.09		67.09	0.00	67.09			

CS09101 MORE...

PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS

ACCOUNT HISTORY

1530-687-0013 DIV 72 E A  
 ROGER ALLEN  
 421 SOUTH RD  
 CHILMARK 02535  
 H (508) 645-9064

RATE: 1868 ASC  
 OPEN BAL 16.24  
 AVG BILL 45.00  
 COMMENTS P A  
 MAIL

NXT/RD/DT 01/13/11  
 CY 10 RTE 854

HS	MT	RDATE	READG	T O S	USE	DAYS	BDATE	MTR AMT	LPC	CUR TOT	PREV BAL	AMT DUE	PDATE	PAY AMT	PC
31	E	06/13	06463	A	421	30	06/16	33.95		33.95	0.00	33.95			
32	E	05/14	06042	A	212	30	05/15	18.77		18.77	29.52	48.29			
33	E	04/14	05830	A	47	31	04/15	9.84		9.84	19.68	29.52			
34	E	03/14	05783	A	46	30	03/17	9.84		9.84	9.84	19.68			
35	E	02/13	05737	A	45	30	02/14	9.84		9.84	0.00	9.84			
36	E	01/14	05692	A E	46	30	01/15	9.85		9.85	9.84	19.69			

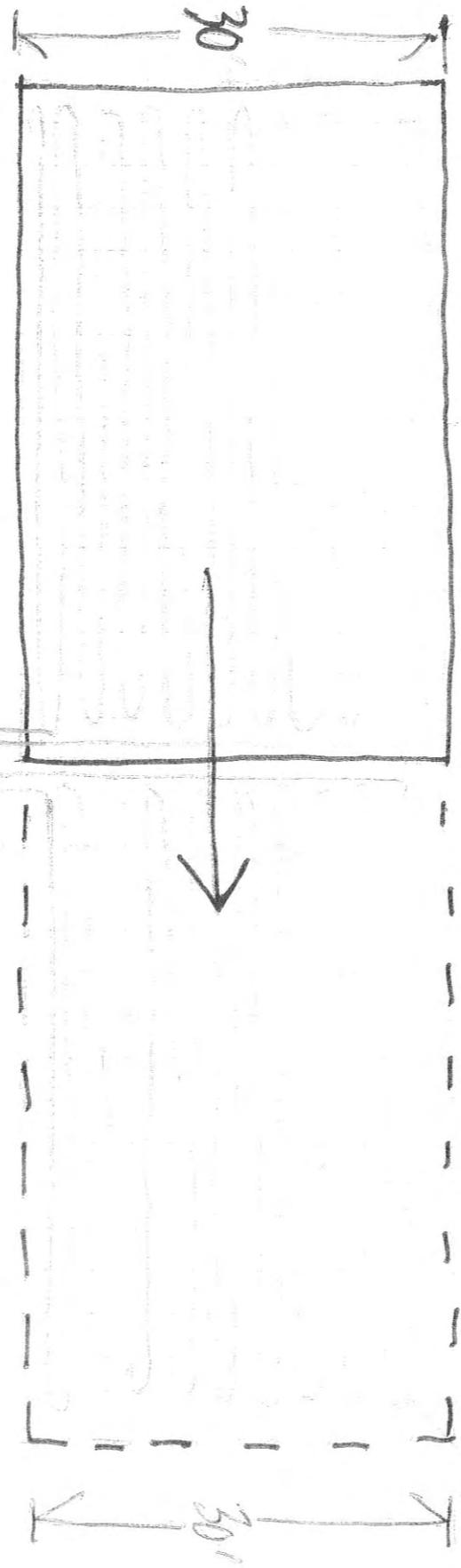
CS00078 CURRENTLY ON LAST PAGE  
 PF01:HELP PF02:FIND PF03:PAFS

PF05:SUB DOC

PF07:BACK PF08:FORW PF09:G+E PF11:ABAL NEXT TRANS AHIS



Radiant heat pipe



electric circulator pump

Winter-Greens

Allen Farm Solar Greenhouse on track 30'x96'

30'x48' double plastic

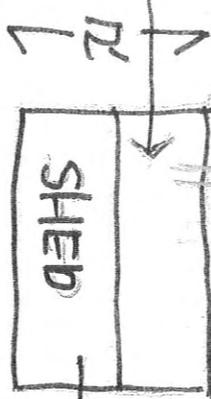
radiant piped

Solar Hot Water

w/ Electric on Demand

Hot Water Heater

Back up

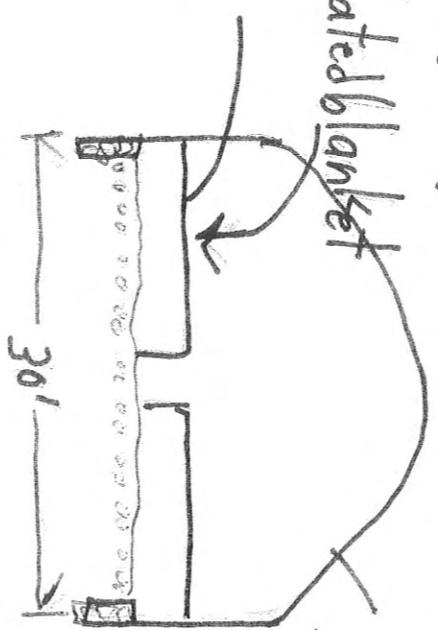


Solar Hot Water on roof w/ electric and demand Hot Water Heater

Greenhouse slides

retractable insulated blanket

galv. steel pipe



double plastic w/ electric fan

rigid 4" insulation 3' deep

Invented for life



[Startpage Bosch Hot Water](#)

## Electric Tankless Water Heaters



### Consumer Information

- [Gas Products](#)
- [Electric Products](#)
- [PowerStar AE115 & AE125](#)
- [Point-of-Use Products](#)
- [Online Warranty/Registration](#)
- [Find a Service Agent/Installer](#)

### Helpful Resources

- [Technical Support](#)
- [Purchase Reconditioned Units](#)
- [Purchase Parts](#)
- [Product Selector](#)
- [FAQs](#)
- [Brochures & Manuals](#)
- [Search](#)

### Retailer Listings

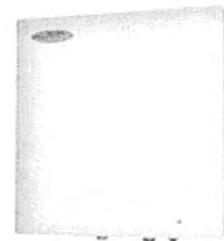
[Where to Buy](#)

### PowerStar Whole House Electric Tankless Water Heater

- 90% efficiency rating
- Durable poly heating elements
- Electronic flow switch
- ¾" brass NPT fittings
- External temperature control knob
- Activation rates of .6 gallons per minute (AE115) and .8 gpm (AE125)
- Filter screen on inlet
- Thermal cut-out for safety
- No temperature/pressure relief valve necessary (check local codes)
- Flow sensor to provide a constant output temperature

MODEL	AE115	AE125
Efficiency	90%	94%
Weight	20 lbs.	22 lbs.
Dimensions	15½"x15¼"x4½"	15½"x15¼"x4½"
Water Fittings	¾" male NPT	¾" male NPT
Volts	240/208v	240/208v
Kilowatts	17.25/13 kW	26.85/20 kW
Amps*	80 US: 2x40 amps CAN: 1x80 amps	120 US: 3x40 amps CAN: 1x120 amps
Wire Size	US: minimum #8 AWG (4 conductors & ground)  Canada**: minimum #4 AWG (2 conductors & ground)	US: minimum #8 AWG (6 conductors & ground)  Canada**: minimum #2 AWG (2 conductors & ground)

- PowerStar AE115 & AE125
- ▶ [Features and Specs](#)
  - ▶ [Energy Savings Chart](#)
  - ▶ [Warranty Info](#)
  - ▶ [National Listings/Approvals](#)
  - ▶ [Manufacturing Information](#)



\*Recommended service to home for AE115 is 150 amps; 200 amps for AE125.  
 \*\*In Canada unit must be wired to a single breaker. AE Canada Kit required and included.  
 Always check local codes.

**Maximum Flow Rate at Given Temperature Rise**  
 Average ground water temperature in the United States is 55°F

Model	AE115	AE125
-------	-------	-------

From: "Mike Kovalycsik" <Mkovalycsik@deltatsolutions.com>  
Subject: **RE: estimated kwh per season**  
Date: January 14, 2011 8:02:26 AM EST  
To: "Clarissa Allen" <allenfarm@vineyard.net>

Mitch,

At a 32° ΔT and basing the number on the Boston area degree days (I didn't have a degree day # for MV) you're looking at 40.66 kW.

Thanks,

Mike Kovalycsik  
National Sales & Marketing Director  
Delta T Solutions  
Ph / Cell: (216) 854-6335  
Fax: (330) 294-0711  
"DTS" / CA: (800) 552-5058 Ext: #13  
mkovalycsik@deltatsolutions.com  
Visit: www.deltatsolutions.com

This communication and all attachments are the property of Delta T Solutions and may contain confidential or privileged information. If the reader of this message is not an intended recipient, you are hereby notified that any unauthorized review, use, disclosure, dissemination, distribution, or copying of this communication, or any of its contents, is strictly prohibited. If you have received this communication in error, please contact the sender by reply email and destroy all copies of the original message.

-----Original Message-----

From: Clarissa Allen [mailto:allenfarm@vineyard.net]  
Sent: Friday, January 14, 2011 5:11 AM  
To: Mike Kovalycsik  
Subject: estimated kwh per season

Yes, thank you very much can't wait to get going on this. could you kindly help w/ this? A guess would ok.  
Mitchell

Winter Greens

Greenhouse - winter greens plant Aug./Sept.

$$40.66 \text{ kW} \times 90 \text{ days} = 3659.4 \text{ kWh per season}^{+-}$$

If we did 2 of these greenhouses

7,318.8 kWh

From: Peter Schmidt <peter@compostwerks.com>  
Subject: **Re: electric heater electric usage**  
Date: December 30, 2010 7:04:34 PM EST  
To: Clarissa Allen <allenfarm@vineyard.net>

Hi Mitch;

1,500 Watts  
120 Volts, Single Phase  
12.5 Amps

Heater 250 gal. Compost Tea Brewer

You may want to figure on another heater or two if you think the one you bought is working out.

I hope that the info helps.

On Thu, Dec 30, 2010 at 4:23 PM, Clarissa Allen <[allenfarm@vineyard.net](mailto:allenfarm@vineyard.net)> wrote:  
Thanks

--  
Peter Schmidt  
Compostwerks LLC  
Mobile (914) 837-2364  
[www.compostwerks.com](http://www.compostwerks.com)  
NOFA Accredited Organic Land Care Professional  
ISA Certified Arborist  
Certified Soil Foodweb Advisor

possible usage for heaters

$$1.5 \text{ Kw} \times 24 = 36 \text{ Kwh per day}$$

15 days March

15 days April

---

$$30 \text{ days} \times 36 = 1080 \times 2 (\text{Brewers}) = 2160 \text{ Kwh}^{+-}$$

15 days Oct

15 days Nov.

---

$$30 \text{ days} \times 36 = 1080 \times 2 (\text{Brewers}) = 2160 \text{ Kwh}^{+-}$$

---

4320 Kwh<sup>+-</sup>

From: "Mike Kovalycsik" <Mkovalycsik@deltasolutions.com>  
 Subject: **Delta T Quotation**  
 Date: January 12, 2011 3:43:46 PM EST  
 To: "Clarissa Allen" <allenfarm@vineyard.net>  
 Cc: "Greg Garbos" <greg@smallfarmtools.com>, "Armando Echavarria" <aechavarria@deltasolutions.com>  
 3 Attachments, 636 KB

Mitch,

It's been great speaking with you. Attached is everything you need less the electric water heater for the ground heating system, but I believe you have that covered. That Bosch AE125 should do the trick. At 26.85 kW that equates to approximately 91,612 BTUH. For a 32° ΔT in the 30' X 48' you need 67,631 BTUH. Our LD tube floor heating system (on 6" c/c) will provide 72,288 BTU -so you are well covered. Attached is the quotation which is priced to you, using Greg as your distributor. Also attached is a drawing for the plumbing we'd provide off the electric water heater which is included within the quotation- less the water heater. Please feel free to contact me if you need any further info..

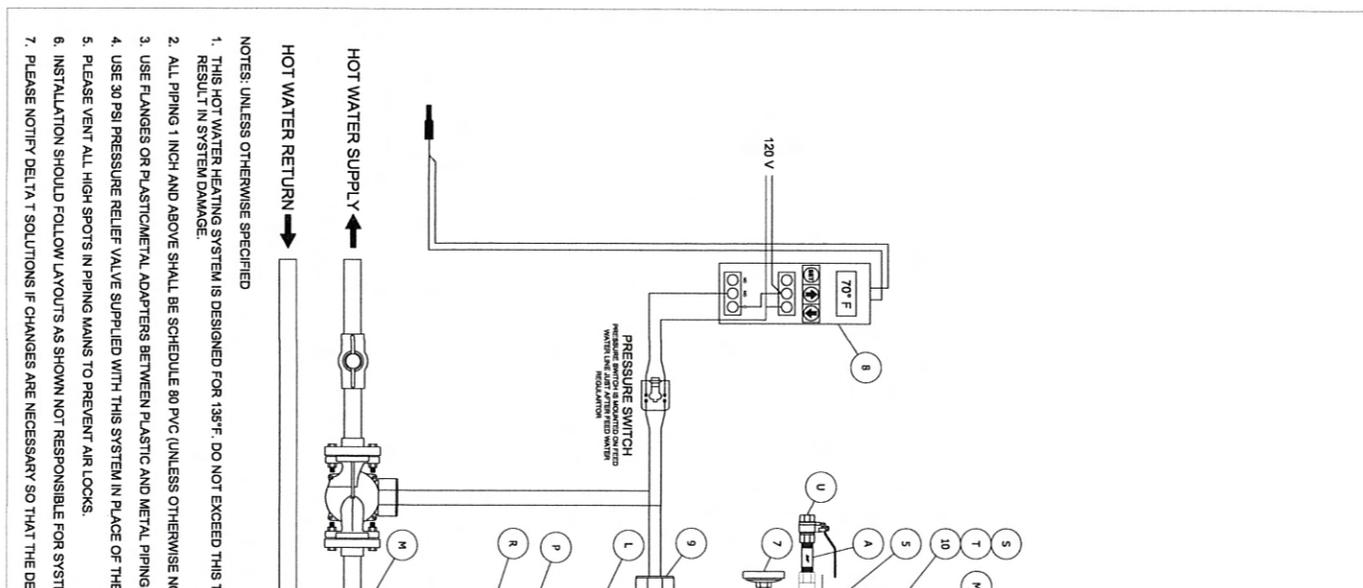
Thanks again ~ take care,

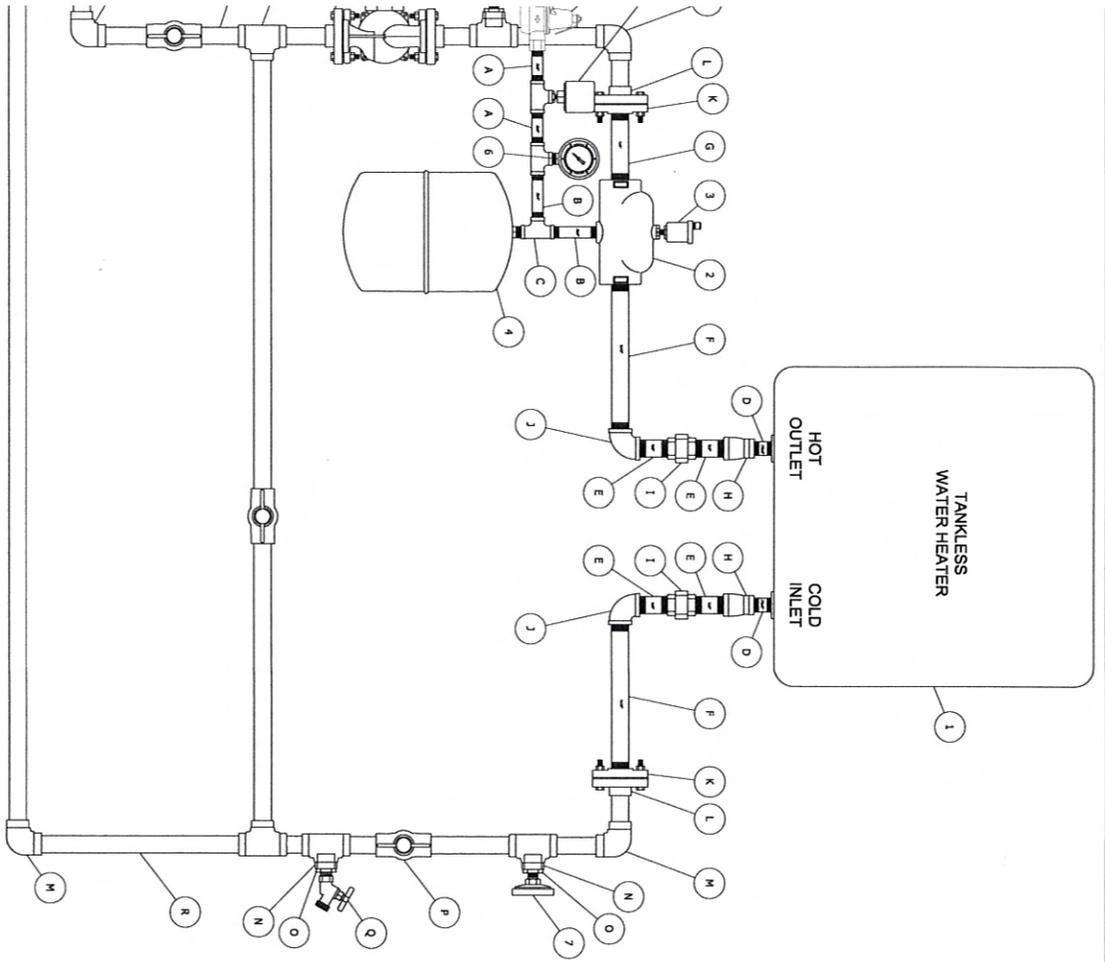
Mike Kovalycsik  
 National Sales & Marketing Director  
**Delta T Solutions**  
 Ph / Cell: (216) 854-6335  
 Fax: (330) 294-0711  
 "DTS" / CA: (800) 552-5058 Ext: #13  
[mkovalycsik@deltasolutions.com](mailto:mkovalycsik@deltasolutions.com)  
 Visit: [www.deltasolutions.com](http://www.deltasolutions.com)

This communication and all attachments are the property of Delta T Solutions and may contain confidential or privileged information. If the reader of this message is not an intended recipient, you are hereby notified that any unauthorized review, use, disclosure, dissemination, distribution, or copying of this communication, or any of its contents, is strictly prohibited. If you have received this communication in error, please contact the sender by reply email and destroy all copies of the original message.



[110044-341...pdf \(102 KB\)](#)





WHA-1 EQUIPMENT SCHEDULE			
ITEM	DESCRIPTION	PART NO.	QTY
1	TANKLESS WATER HEATER	BY OTHERS	1
2	AIR SEPARATOR	DEAS100	1
3	AIR VENT	DEAV02M	1
4	EXPANSION TANK	DEET10	1
5	FEED WATER REG.	DEWR600	1
6	PRESSURE GAUGE	DEGPR50	1
7	THERMOMETER	DETR5	2
8	CONTROLLER	DECI10	1
9	SYSTEM PUMP	DEPG1UP51546	1
10	PRESSURE SWITCH	DEPS15	1
11	PRESSURE RELIEF VALVE	DEVR900	1

WHA-1 PIPING SCHEDULE			
ITEM	DESCRIPTION	PART NO.	QTY
A	NIPPLE GALV. 0.50x1.00	DSNG05000	3
B	NIPPLE GALV. 0.50x1.00	DSNG05040	2
C	TEE GALV. FPT 0.50	DST0240	3
D	NIPPLE GALV. 0.75x1.00	DSNG07520	2
E	NIPPLE GALV. 1.00x1.25	DSNG10030	4
F	NIPPLE GALV. 1.00x1.25	DSNG100120	2
G	NIPPLE GALV. 1.00x1.25	DSNG100060	2
H	BELL REDUCER 1.00x0.75	DSRG100075	2
I	UNION GALV. FPT 1.00	DSUG100	2
J	ELBOW GALV. FPT 1.00	DSEGI100	2
K	CAST IRON 125# NPT FLANGE 1IN	DEFC10	2
L	1IN VAN STONE FLANGE	DEFT10	6
N	TEE PVC SCH80 1.00	DPT100	5
O	BUSHING PVC SCH80 1.00x0.50	DPB100005F	3
Q	HOSE BR88 0.50	DSHR8050025	1
S	BUSHING GALV. HEX 0.50x0.25	DSNG025015	1
T	NIPPLE GALV. 0.25x1.5	DSNG025015	1
U	BALL VALVE FPT 0.50	DSV050	1

BP-1 PIPING SCHEDULE			
ITEM	DESCRIPTION	PART NO.	QTY
M	ELBOW PVC SCH80 1.00	DPE100	4
P	BALL VALVE PVC SCH80 1.00	DPV100	2
R	PIPE PVC SCH80 1.00	DPH100	20

TEMPERATURE, FAILURE TO COMPLY WILL

(TED)

PRESSURE RELIEF VALVE SUPPLIED WITH THE WATER HEATER.

PERFORMANCE.

SIGN CAN BE MODIFIED AS REQUIRED.

**DELTA T SOLUTIONS**
  
 811 N. WILSON BLVD.
   
 SUITE 100
   
 WILSON, NC 27157
   
 (704) 255-2555

NO.	BY	DATE
1		
2		
3		
4		

REVISIONS: Total Heating Services - Change; Fabrication - Installation - Parts - Repair Services

DATE	BY	REVISION	APPROVED BY
5/18/10	SB	DELTA T	WHA-1

**PIPING DIAGRAM**
  
**TANKLESS WATER HEATER PACKAGE W/PRIMARY LOOP**

# Greenhouse Heating System Proposal

Mitchell Posin  
Allen Farm  
Allen Farm  
Martha's Vineyard, MA  
allenfarm@vineyard.net

Presented By  
Greg Garbos  
Small Farm Tools  
greg@smallfarmtools.com

**This Proposal Includes the Following Checked  Systems**

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Delta Tube SD            | <input type="checkbox"/> Sterling Gas Unit Heaters             | <input checked="" type="checkbox"/> System Pump                  |
| <input checked="" type="checkbox"/> Delta Tube LD | <input type="checkbox"/> Hydronic Unit Heaters                 | <input type="checkbox"/> Zone Valve with Flow Control            |
| <input type="checkbox"/> Delta Tube HD Slab Heat  | <input type="checkbox"/> Irrigation Water Tempering            | <input checked="" type="checkbox"/> Zone Set-Point Control       |
| <input type="checkbox"/> Delta Tube PEX Slab Heat | <input type="checkbox"/> Boiler Package                        | <input type="checkbox"/> System Piping - Steel                   |
| <input type="checkbox"/> Delta Fin TF-1           | <input type="checkbox"/> Boiler Controls                       | <input checked="" type="checkbox"/> System Piping - PVC - Option |
| <input type="checkbox"/> Delta Fin TF-2           | <input type="checkbox"/> Air & Water Control Package           | <input type="checkbox"/> System Piping - Copper                  |
| <input type="checkbox"/> Delta Fin SF-125         | <input checked="" type="checkbox"/> Boiler Loop Piping Package | <input checked="" type="checkbox"/> Water Treatment w/ Test Kit  |
| <input type="checkbox"/> Delta Fin SF-200         | <input type="checkbox"/> Flue Products Vent Package            | <input checked="" type="checkbox"/> CAD Drawings & System Manual |
| <input type="checkbox"/> 51 MM Steel Pipe         | <input type="checkbox"/> Combustion/Ventilation Louvers        |  |

**Summary of System Specifications**

Heated Area	1,440 SqFt	Max Hot Water Supply Temperature	135 F°
Indoor Temperature Required	40 F°	Max Hot Water Return Temperature	115 F°
Outdoor Design Temperature	0 F°	System Pumping Capacity	7 GPM
ΔT of the System	40 F°	System Volume	20 Gals
Calculated Heat Loss	67,631 BTUH	System Heating Potential	72,288 BTUH
		Available Hydronic Output	138,000 BTUH
		Fuel Type	NG

Electric Water  
Heater - Supplied  
by customer

---

---

## Greenhouse Heating System Summary

- ◆ The heat loss of the greenhouse with 1,440 Sq. Ft. and a  $\Delta T$  of 40°F will be 67,631 BTUs per hour.
- ◆ The Delta T Solutions' radiation can supply a total potential output of 72,288 BTUs per hour; and will maintain a soil temperature of 40°F and an air temperature of 40°F.
- ◆ The Delta T Solutions' radiation can supply a potential output of 72,288 BTUs per hour.

---

---

## Heat Source

### Water Heater

- ◆ Water Heater is NOT Included in this Proposal.
- ◆ A water heater Loop Piping Package is Included in this Proposal.

### Notes

- ◆ **System is designed to run off of owner supplied electric hot water heater. Unit must be at least 22kw and capable of supplying 73,000BTUH and 8 GPM of 135 degree water to the system.**

### Air & Water Controls for water heater

- ◆ Includes:
  - (2) Thermometer 2 1/2" Stem
  - (1) Air Separator 1.0 In, (1) Air Vent 1/8 MPT w/Shut Off, (1) Feed Water Regulator 1/2"NPT, (1) Pressure Guage 0-60#, (1) Pressure Switch 69WR3, (1) Expansion Tank 15

### Flue Products Vent Package

- ◆ A Flue Products Vent Package is NOT included in this proposal.

### Combustion/Ventilation Louver Package

- ◆ Is NOT included in this Proposal.

---

---

## Radiation

### Delta Tube™LD EPDM Tube System

- ◆ The Delta Tube LD shall supply 72,288 BTUs per hour to the system and 107% of the heating load.
- ◆ The 1,440 Sq. Ft. of growing area shall be covered with .30 inch ID EPDM tubing installed on 6 inch spacing using a spacer that will be the width of the bench up to 6 foot wide. The spacer shall be installed on top of the bench, or on the ground and will be spaced every 10 feet. The tubing shall be connected to a 1.5 inch schedule 80 PVC pre-cut manifold assembly with pressed-fit plastic tubing adapters.

---

---

## Zones

- ◆ There shall be 1 pump to deliver heated water from the heat source to the temperature zone.
- ◆ Each temperature zone shall be controlled using a Delta T 1-Zone Electronic Set Point Controller.

## System Pipe & Fittings

### PVC Schedule 80 System Piping Package

- ◆ All piping shall be Schedule 80 PVC plastic pipe with solvent welded fittings. Piping package includes: Pipe & Fittings, Pipe hangers.
- ◆ The required PVC Piping Package is included as an OPTION for this system

## System Pricing

### Heat Source

- ◆ Air & Water Control Package
- ◆ Boiler Loop Piping Package
- ◆ Flue Products Vent Package
- ◆ Combustion/Ventilation Louver Set

Note	* Optional	Standard
1 Set	<input type="checkbox"/> \$ -	<input checked="" type="checkbox"/>
1 Loops	<input type="checkbox"/> \$ -	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Not Included		
<input checked="" type="checkbox"/> Not Included		

### Water Treatment

- ◆ Water Treatment w/Test Kit
- ◆ By-Pass Feeder Package

Qty/Size	* Optional	Standard
1 4 GALS (CASE) WATER	<input type="checkbox"/> \$ -	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Not Included		

### Radiation

- ◆ Delta Tube™ LD

Area/Qty	* Optional	Standard
1,440	<input type="checkbox"/> \$ -	<input checked="" type="checkbox"/>

### Zone Equipment

- ◆ Section and Zone Pumps
- ◆ Zone Setpoint Controls

Qty	* Optional	Standard
1	<input type="checkbox"/> \$ -	<input checked="" type="checkbox"/>
1	<input type="checkbox"/> \$ -	<input checked="" type="checkbox"/>

### System Piping Packages

- ◆ PVC - System Piping Package

Model	* Optional	Standard
Optional	<input checked="" type="checkbox"/> \$ 618.00	<input type="checkbox"/> \$ -

### Engineering

- ◆ System Design & Drawings

Model	* Optional	Standard
Standard	<input type="checkbox"/> \$ -	<input checked="" type="checkbox"/>

### System Equipment Totals

	Equipment	
	* Optional	Standard
Total Price	\$ 618.00	\$ 4,159.95
Customer Discount	23.0%	23.0%
Total Discounted Price	\$ 475.94	\$ 3,203.75

### Freight Estimate

Freight
<input checked="" type="checkbox"/> Not Included

---

---

## Terms

- ◆ All Pricing is in U.S. Dollars Is good for 60 days, excludes applicable sales taxes.
- ◆ All Pricing is subject to Distributor/Manufacturers terms.
- ◆ All Pricing is F.O.B. Factory unless otherwise noted.
- \* **All Optional equipment pricing is Not Included in the Standard equipment pricing total.**  
**Some Equipment Marked as an Optional (to Purchase) May be Required for the Operation of the System.**

---

---

## Installation Labor Estimates

- ◆ Heating System Installation

Labor Estimate

Not Included

---

---

## System Startup

- ◆ System Commissioning (System Evaluation and Startup *after* Installation)  
Note: System Startup is a separate charge from Installation Labor.

System Startup

Not Included

**Greenhouse Heat Loss**

Structure Dimensions	Heated Shapes					
	1	2	3	4	5	6
<b>Name</b>						
House Type	Curved					
Wall Height						
Upper Wall						
Lower Wall						
Width	30					
Length	48					
Gable Height	7.5	0.0	0.0	0.0	0.0	0.0
Total Height	7.5	0.0	0.0	0.0	0.0	0.0
Total Rafter Length	35.3	0.0	0.0	0.0	0.0	0.0
Total Number of Houses	1					
Peaks per House	1					
Gutter Connected	No					
Shape Total Area	1440.0	0.0	0.0	0.0	0.0	0.0
Heating Group	1					
<b>Design Temperatures</b>						
Indoor, °F	40 F°					
Outdoor, °F	0 F°					
	40 F°	0 F°	0 F°	0 F°	0 F°	0 F°
<b>Greenhouse Altitude</b>						
Altitude	< 2000 ft					
<b>Coverings</b>						
Single Wall Material						
U-Value	0.00	0.00	0.00	0.00	0.00	0.00
Upper Wall Material						
U-Value	0.00	0.00	0.00	0.00	0.00	0.00
Lower Wall Material						
U-Value	0.00	0.00	0.00	0.00	0.00	0.00
End Wall Material	Poly, Single					
U-Value	1.25	0.00	0.00	0.00	0.00	0.00
End Wall Material	Poly, Single					
U-Value	1.25	0.00	0.00	0.00	0.00	0.00
Roof Material	Poly, Dbl					
U-Value	0.70	0.00	0.00	0.00	0.00	0.00
<b>Other Criteria</b>						
Perimeter Insulation	No	No	No	No	No	No
Air Exchanges per Hour	1.0	1.0	1.0	1.0	1.0	1.0
Wind Velocity, MPH	15	15	15	15	15	15
<b>Heat Loss</b>						
Total Heat Loss per Shape, BTUH	67,631	0	0	0	0	0
BTUH per Sq Ft	47.0	0.0	0.0	0.0	0.0	0.0
<b>Heating Group</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Added Heat Loss per Group	0	0	0	0	0	0
Heating Group Totals, BTUH	67,631	0	0	0	0	0
<b>Total Heat Loss - BTUH</b>	<b>67,631</b>					

DeltaCalc ver. 8.12

**Distribution Summary**

Heated Areas	1	2	3	4	5	6
Name						
Qty	1					
Width, Ft	30.0					
Length, Ft	48.0					
Area, SqFt	1,440					
<b>Distribution</b>	<b>LD</b>					
Water Temperature, °F	135 F°					
Manifold Type	L					
Tube Spaced, In	6					
Loops, Ea	30					
Potential BTUH, Total	72,288					

**Heating Summary**

Heat Loss	67,631 BTUH	Total Heat Loss Met	106.9%
Hydronic Potential	72,288 BTUH	Total System Flow	7.2 GPM
		System Volume	20.0 Gals

DeltaCalc ver. 8.12

# DELTA T SOLUTIONS

## DELTA-TUBE™ LD EPDM Rubber Tube In Ground Heating

The DELTA-TUBE™ LD EPDM rubber tube heating system heats the greenhouse at the soil level where the heat is needed. Heat rising from the bed warms the soil and plant roots. By controlling the soil temperature both rooting and plant growth can be accelerated.

Growers that use our ground heating systems have shown 30% reduction of fuel usage along with shorter production times and superior product quality.

This material excels in the nursery industry for general growing and rooting of cuttings and is ideal for starter houses. Growers that use this material for heating soil or nutri-

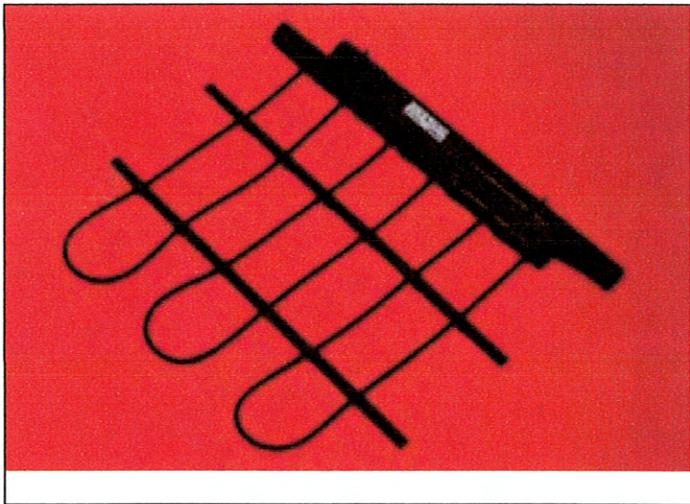
ent bags of tomatoes and cucumbers have shown a 50% increase in yield. Grape growers have found a quicker and more even callusing pattern by using bottom heat to callus grape stock.

DELTA-TUBE EPDM rubber tubing is ideal for use in a hot water heating system due to its resistance to temperature and chemicals and its superior heat transfer capabilities. Small tube design reduces the system water volume and enables it to respond quickly and efficiently.

Tubing spaced 4 to 6 inches apart provides even temperatures to the soil and the crop for optimum environment of all types of growing.

The Delta Tube manifolds use a unique plastic fitting that is pressed into the PVC pipe creating a water tight fit that is guaranteed not to leak. Each fitting is pressed into the top of the manifold so that the tubing is easily installed. Each manifold is custom manufactured for each system.

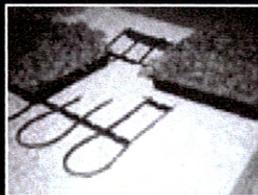
The exclusive tubing spacers secure the Delta T tubing at the optimum design spacing. They are cut to the bed width for ease of installation. Maximum length is 8 foot.



### Specifications:

The hydronic heating system is the DELTA-TUBE™ LD EPDM rubber tube system using 135°F water temperature and will consist of the following components:

- 1.5" Manifolds with plastic adapters pressed fit into SCH 80 PVC pipe cut to the bed width. All fittings shall be installed on top of manifold for easy connection of tubing.

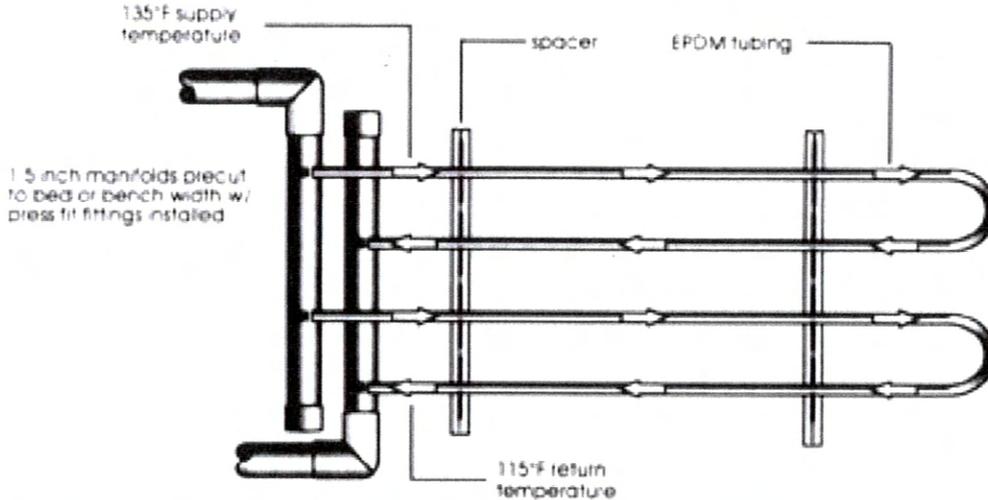


- Ridged plastic spacers with spaces every 2 inches holds the EPDM tube in place and space tube on 10 foot spacing. Spacers are cut to bed width up to 8 foot long.

- High quality EPDM rubber tubing 0.30" ID x 0.45" OD shall be on \_\_\_\_\_ inch centers. Tubing shall be able to resist ozone, chemicals, fertilizers and temperatures up to 230°F. Tubing shall be provided on 1,000 foot spools for easy handling.

# DELTA-TUBE™ LD EPDM Rubber Tube In Ground Heating

## Delta TUBE LD



### Some of the many advantages of the DELTA-TUBE™ LD systems are:

- Direct contact from tubing to root zone for maximum soil and plant temperature control.
- Even temperatures are maintained throughout the system resulting in even crop growth.
- Compatible with any type of hot water heat source.
- Different temperature zones for flexible growing.
- Cost effective system for the grower that wants to get into a hot water heating system inexpensively.
- 1.5" plastic manifolds make it easy to install on plastic mainlines.
- Special pressed fit barb fittings installed on top of manifold make installation of tubing neat and quick.
- Long rigid spacers can easily be installed without

- having to install more than two or three fasteners.
- High quality tubing withstands UV light, fertilizers, and high temperatures.
- Flexible tubing is easily installed and comes in 500 foot rolls.

Delta T Solutions can provide a performance engineered heating system that can meet the needs of any grower. Performance packages include: Heating system components (heat source, controls, radiation), performance engineered drawings (pipe layouts and electrical diagrams), installation supervision, installation (as required). Contact your local Delta T Solutions Representative for additional details.

### Delta Tube™ LD Ratings

Tube Spacing	BTU/SQ FT output (average water temp.)								Volume
	100°F	110°F	120°F	130°F	140°F	150°F	160°F	170°F	
4"	46	57	69	81	92	104	115	127	1.1 gal.
6"	30	38	46	54	61	69	77	84	.73 gal.

Maximum water temperature 140°F (when using PVC manifolds)  
 Maximum water pressure 30PSI (higher pressures available)  
 Elbows and caps available upon request.

Any temperature over 140°F supply water will require high temperature manifolds

Distributed By:

 Delta T Solutions

**NEW!**  
**RANGER EV**



**▶ ELECTRIC ADVANTAGE**

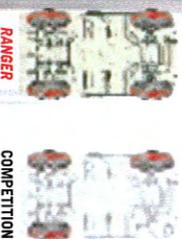
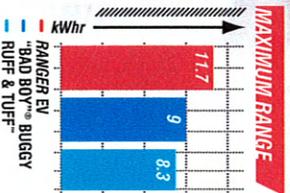
A quieter machine for operating inside barns the deer stand, the RANGER EV never needs maintenance, and works harder and rides smoother in its class.

**30 HP AND 25-MPH TOP SPEED**

It's the hardest-working, smoothest-riding mids cleanly and quietly with a 30 hp/48V AC electric category. Alternating Current (AC) is more efficient.

**▶ LONGEST RANGE**

With an 11.7 kW maximum-power battery pack system, the RANGER EV has the longest range Low, and Max Range modes provide greater performance, because the rider is able to switch maximum power or to achieve up to a 50-mile plugging into a 110V AC outlet is all it takes to be ready to ride.



**▶ ON-DEMAND TRUE ALL-WHEEL DRIVE (AWD) WITH**

True AWD keeps you moving, automatically engaging more forward traction and reverting back to 2WD. When in 2WD, the VersaTrac Turf Mode switch differential for easier, tighter turns to minimize sensitive terrain.

COMPARE THE FACTS	RANGER EV	'BAD BOY'®** BUGGY	RUFF & TUFF*
Engine	30 hp, AC ✓	26 hp, DC	14 hp, DC
Top Speed (mph) [kph]	25 [40.2] ✓	22 [35.4]	22 [35.4]
Suspension Travel (front/rear) (in.) [cm]	8/9 [20.3/22.9] ✓	5.25/5.25 [13.3/13.3]	6/8 [15.2/20.3]
All-Wheel Drive	On-Demand True AWD ✓	Full-Time AWD	Shift-on-the-Fly
Dump Box	Yes ✓	No	No
Independent Rear Suspension	Yes ✓	No	Yes ✓

\*\*Bad Boy® is a registered trademark of Bad Boy Enterprises. Ruff & Tuff™ is a trademark of Ruff & Tuff Electric Vehicles, Inc.



The 2011 Polaris EV-LSV is the most capable electric LSV available. It offers superior performance and all weather capability. Key features are:

- 30 HP 48-Volt High-Efficiency AC-Induction Electric Motor
- On-Demand True All Wheel Drive
- 4 Wheel Independent Suspension
- 1,000 lb. (453.6 kg) Payload Capacity
- 1,250 lb. (681 kg) Towing Capacity



[READ ABOUT US](#)

[CHANGE COUNTRY](#)



[OUR COMPANY](#)

[CONTACT US](#)

[TERMS & CONDITIONS](#) | [PRIVACY POLICY](#)

© 2011 POLARIS INDUSTRIES INC.

[SEE MORE INFORMATION](#)



[READ POLARIS NEWS](#)



[HOW TO PURCHASE](#)

We would trade in our Kubota 26HP diesel for one of these.