

Solar Energy Proposal



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Executive Summary

By harnessing power from the sun with a solar energy system you could realize tremendous economic and environmental benefits immediately, hedge against rising rates for decades, increase the value of your property (with no additional property tax), while helping reduce dependence on increasingly expensive imported energy.

The proposed 50 KW (DC) solar energy system presented here is designed to maximize energy production and economic returns, while reducing some of the major environmental impacts that can come with utility supplied energy. This system size would off-set about 90% of your current electrical bills. The system uses Evergreen solar modules. These panels are very cost competitive and reliable and come with a 25 year production warranty.

The following table summarizes the system size, production estimates, installation costs, as well as some of the environmental and economic returns that come with the proposed system.

System Summary

System Size (DC Rating)	50.4 kW
System Size (AC-CEC Rating)	42.3 kW
Solar Generated kWh/year	58,949 kwh
Percent of Current Bill Eliminated	90%
1st Year Utility Bill Savings	\$10,611

Equipment Summary

Boston Only Evergreen Solar ES-180-SL 180-Watt Solar Module	280
PVI13KW-480V Solectria Inverter	4

Environmental Summary

Carbon Offsets CO2/tons	1,169
Number of trees planted to absorb equivalent CO2	5,205
Nitrogen Oxide & Nitrogen Sulfur Oxide Offsets (lbs)	1,600

Financial Summary

Total Project Cost	\$390,865
State Rebate - MTC CSR	(\$157,450)
Quickpay Discount	\$0
Supplement Rebates	(\$12,600)
Tax Credit	(\$118,260)
Net Cost (Prior to Utility Savings)	\$102,556

First Year Avoided Utility Bill	\$10,611
Total Avoided Utility Bill over 30 years at 9% annual rate increase	\$1,307,101

Simple Payback - System Purchase (years)	4
Year 1 Return on Investment	10%
30 Year Internal Rate of Return (IRR)	21%
Net Present Value of Investment (30 years)	\$481,754.01
Total Cumulative Cash Flow (30 years)	\$1,325,072.78

Borrego Solar can custom design and professionally install virtually any high quality solar energy system. Borrego has been in business for 28 years, with fourteen NABCEP certifications, and has installed over 8 mega-watts of solar in California.

System Details

Polly Kornblith
Wildstar Farm
401 Sandy Valley Rd
Westwood, MA

September 29, 2008

Proposal for Materials, Design and Installation of 50.40 kW DC Rated Photovoltaic System

42.26 kW AC CEC Rated Solar Electric System

Item	Quantity	Model
Module 1	280	Evergreen Solar 180-Watt Solar Module
Inverter 1	4	PV113KW-480V Solectria Inverter
Misc	1	Fat Spaniel PV2WEB

Electrical and Structural Installation - includes all labor, wiring, conduit, breakers, disconnects, materials and mounting hardware. Does not include the cost for stamped engineering drawings - if required by the city or county.

Turnkey System Includes:

280 x Evergreen Solar 180-Watt Solar Module (25 Year Warranty)
4 x PV113KW-480V Solectria Inverter (10 Year Warranty)
1 x Fat Spaniel PV2WEB
Approximately 4,472 square feet of solar modules
All Installation Labor
Borrego Solar 5 Year Full System Warranty
All User Manuals, "How to" Guide, and Owner's Manual

Total Project Cost	\$390,865.39
Rebates (\$3.75 / watt)	-\$170,050
Net System Cost	\$220,815.39
Tax Credit	-\$118,259.62
Value of REC (first 7 years only)*	-\$6,004.32
System Cost after Incentives	\$96,551.45

Notes

- *Price includes all related sales tax
- *Quote valid for 15 days, after which prices may change up until the signing of Sales Order and Contract.
- *System production estimates are for discussion purposes only and do not reflect a performance guarantee by Borrego Solar
- *Our estimates show that this system will offset 90% of current electrical Charges
- *Cost of Building Permit is included in price above.

Bill Analysis

Kornblith - 401 Sandy Valley Rd Energy Usage & Billing with a 50.4 kW (44.7 kW CEC Rated) System

Month	Current Usage		Solar Production		Usage with Solar Production	
	Energy Usage kWh	Cost \$	Energy Production kWh	Value \$	Energy Usage kWh	Cost \$
January	5,472	\$985	3,698	\$666	1,774	\$319
February	5,472	\$985	4,302	\$774	1,170	\$211
March	5,472	\$985	5,057	\$910	415	\$75
April	5,472	\$985	5,812	\$1,046	-340	-\$61
May	5,472	\$985	5,435	\$978	37	\$7
June	5,472	\$985	5,435	\$978	37	\$7
July	5,472	\$985	5,736	\$1,033	-264	-\$48
August	5,472	\$985	5,812	\$1,046	-340	-\$61
September	5,472	\$985	5,133	\$924	339	\$61
October	5,472	\$985	4,906	\$883	566	\$102
November	5,472	\$985	4,000	\$720	1,472	\$265
December	5,472	\$985	3,623	\$652	1,849	\$333
Total Usage:	65,664		58,949		6,715	
Total Cost:	\$11,820	\$11,820	\$10,611	\$10,611	\$1,209	\$1,209
Total Annual Grid Electricity Cost Without Solar:						\$11,820
Total Annual Grid Electricity Cost With Solar:						\$1,209
Total Annual Savings:						\$10,611

*System production estimates are for discussion purposes only and do not reflect a performance guarantee by Borrego Solar

Borrego Solar Systems, Inc.
Financial Summary of PV Investment
Annual Savings and Return

BUY OUTRIGHT								
Year	System Costs	Rebates (after tax)	Avoided Utility Bill	Tax Credits	Depreciation Savings	Renewable Energy Credits	Annual Cash Flow	Cumulative Cash Flow
0	(\$390,865)	\$113,934	\$0	\$0	\$0	\$0	(\$276,932)	(\$276,932)
1	\$0	\$0	\$10,611	\$118,260	\$76,358	\$1,768	\$206,997	(\$69,935)
2	\$0	\$0	\$11,508	\$0	\$20,362	\$1,760	\$33,630	(\$36,305)
3	\$0	\$0	\$12,481	\$0	\$12,217	\$1,751	\$26,449	(\$9,856)
4	\$0	\$0	\$13,536	\$0	\$7,318	\$1,742	\$22,596	\$12,740
5	\$0	\$0	\$14,681	\$0	\$7,318	\$1,733	\$23,732	\$36,471
6	\$0	\$0	\$15,922	\$0	\$3,691	\$1,725	\$21,337	\$57,809
7	\$0	\$0	\$17,268	\$0	\$0	\$1,716	\$18,984	\$76,793
8	\$0	\$0	\$18,728	\$0	\$0	\$1,708	\$20,436	\$97,229
9	\$0	\$0	\$20,312	\$0	\$0	\$1,699	\$22,011	\$119,240
10	\$0	\$0	\$22,029	\$0	\$0	\$1,690	\$23,720	\$142,959
11	\$0	\$0	\$23,892	\$0	\$0	\$1,682	\$25,574	\$168,533
12	\$0	\$0	\$25,912	\$0	\$0	\$1,674	\$27,585	\$196,118
13	\$0	\$0	\$28,103	\$0	\$0	\$1,665	\$29,768	\$225,886
14	\$0	\$0	\$30,479	\$0	\$0	\$1,657	\$32,136	\$258,022
15	\$0	\$0	\$33,056	\$0	\$0	\$1,649	\$34,704	\$292,726
16	\$0	\$0	\$35,850	\$0	\$0	\$1,640	\$37,491	\$330,217
17	\$0	\$0	\$38,882	\$0	\$0	\$1,632	\$40,514	\$370,730
18	\$0	\$0	\$42,169	\$0	\$0	\$1,624	\$43,793	\$414,523
19	\$0	\$0	\$45,734	\$0	\$0	\$1,616	\$47,350	\$461,874
20	\$0	\$0	\$49,601	\$0	\$0	\$1,608	\$51,209	\$513,083
25	\$0	\$0	\$74,429	\$0	\$0	\$1,568	\$75,997	\$839,472
30	\$0	\$0	\$111,683	\$0	\$0	\$1,529	\$113,213	\$1,325,073
Totals	-\$390,865	\$113,934	\$1,307,101	\$118,260	\$127,263	\$49,381	\$1,325,073	

Model Assumptions

Assumed Federal Tax Bracket	33%	Rebate Program	MTC CSR
Assumed State Tax Bracket	8%	Job Type	Commercial
Discount Rate	5.0%	Federal Depreciation Basis	\$332,236
Annual Utility Escalation	9.0%	State Depreciation Basis	\$220,315
Annual System Degradation Factor	0.50%	Year 1 Production	58,949 kWh

Financial Analysis

First Year ROI	10%	Property Value Increase	\$212,217
30 Year IRR	21%	Cost Per STC Watt	\$7.76
Net Present Value of Investment	\$481,754	Cost Per AC-CEC Rated Watt	\$9.25

Please consult your CPA or lawyer in order to verify how the tax savings will affect you.

All numbers are for discussion purposes only. Borrego Solar makes no guarantee in regards to actual system performance.

Environmental Benefits of Your 50.4 KW System

Impact on Global Warming Emissions



Your system will reduce CO₂ emissions by 83,788 lbs annually, or 2,337,398 lbs over the lifetime of the system



This is equivalent to removing the CO₂ emissions from driving 4,695,188 miles.



This is also equivalent to the CO₂ that would be removed by planting 5,285 mature trees.

Impact on Other Emissions



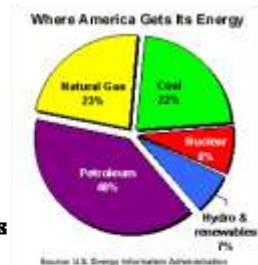
Your system will also reduce Nitrogen oxide emissions by 756 lbs. over the life of the system. Nitrogen oxides are a major contributor to smog and air induced respiratory problems.



A combined reduction of Nitrogen and Sulfur oxide emissions by 832 lbs. will also be achieved over the life of the system. These are the primary components of acid rain.

Current Energy Supply, Global Warming, and Need for Renewables

America currently gets the overwhelming majority of its power from fossil fuel-burning power plants. That means every time you turn on a light or use an appliance, somewhere coal, oil, or natural gas is being consumed in order to produce that power. Our reliance on fossil fuels causes a multitude of environmental problems. These include global warming, acid rain, and smog. The emission of carbon dioxide and other green house gases enhances the heat trapping properties of the Earth's atmosphere. This in turn causes a global increase in the Earth's temperature. The Earth's temperature has risen 1 °F since the onset of the Industrial Revolution, and some scientists believe that it could rise as much as 10 °F in the next century!*



Americans emit about 15,000 pounds of Carbon per person annually.* This makes us the world's largest per capita contributor to global warming. 82% of these emissions are the result of burning fossil fuels for either automobiles or generating electricity. By generating your own solar power you will be doing your part to lessen America's dependence on fossil fuels, and will be significantly reducing your personal contribution to global warming.

Company Snapshot

Borrego Solar specializes in designing and installing reliable, long-lasting, high quality residential and commercial solar energy systems. Over the past 28 years, Borrego Solar has designed, installed, and commissioned over eight mega-watts of solar. Our engineers, designers, installation crews, and support staff employ a consistent, diligent, and precise approach with expert experience in all phases of installing, commissions, and maintaining solar energy systems. Our efforts are squarely aimed at achieving the most energy production possible, successful processing of all municipal and utility paperwork, and a standing commitment to the long term performance of the system.

Borrego Solar's highly trained staff includes fourteen NABCEP certified solar installers –more than any company of comparable size. We are practicing green business with offices, crews, and warehouses in Lowell, San Francisco Bay Area, and Southern California.

The picture on the right (above) is of a residential system Borrego Solar designed and installed to maximize Massachusetts Rebates. Sanyo modules were used in the system pictured on the left and will produce more energy per square foot versus traditional solar modules.



Of note on our commercial roster: 100 KW for Massachusetts Water Resource Authority's (MWRA) wastewater treatment facility on Deer Island in Winthrop and an impressive line up of others including, a system designed to achieve maximum energy production for The River 92.5 in Haverhill, bottom right.



Project Overview & Approximate Schedule

Your project team will include a highly experienced and skilled team of engineers, designers, installers, and project administration staff. They will work together to analyze every detail of your site to optimize energy production, aesthetics, utility and longevity, and put together the best system design for the site. We have a track record of outstanding experience and skills to complete the project: on budget, on time and with a high level of quality. The project is complete when the system is fully operational and has passed all municipal and utility inspections.

Typical Schedule

1) **Solar Installation Contract and Utility Paperwork:** Upon mutually agreed upon contracting signing and 10% deposit, Borrego Solar will have ready for your signature all the paperwork for the Commonwealth Solar Initiative (CSI) rebate application, and Interconnection paperwork (NSTAR/National Grid).



2) **Rebate Application:** Borrego submits the rebate and other paperwork within week of receiving all required documents from you.

3) **Rebate Processing:** Commonwealth Solar can take 3-6 weeks to confirm rebate. During this time the design and build team review the project details, and collect additional site information as needed.

4) **Project Planning:** While the rebate application is being confirmed by the CSI, a Borrego project team (including a designer, engineer, project manager, rebate specialist, and construction foreman, and project liaison) will begin formally designing, engineering, project planning, and scheduling the project with you. With the system design refined and drawn down to the last detail, we submit the drawings and project schedule for your review. 1-2 weeks.

5) **Municipal Permit:** Borrego Solar submits electrical schematics, structural drawings, and other documents necessary to obtain the permit from your municipality –the cost of the permit is also typically included in the price. Our construction permit applications for solar projects are usually accepted over the counter or within one week, though it can be take longer for jurisdictions with limited staffing or knowledge of solar.

6) **Installation:** The installation time is typically 2-3 days per 5 KW. A municipal inspection typically occurs within 10 days after installation. Upon passing municipal inspection, final payment is due. The Electric Company will change the meter for the site 1-6 weeks thereafter.

7) **Sunshine:** With your new solar system ready to go, the sunshine will begin to produce outstanding economic and environmental returns that will last for decades.

Rebates from MTC typically take 30-45 days to arrive after the electric company has approved your application.

System Maintenance and Operation

All the systems we install are designed to maximize energy production with the least amount of maintenance. We do this to reduce the need for maintenance calls and ensure the highest economic and environmental returns for our clients. We have worked hard to improve upon the best design and installation practices and build systems that can last up 30-40 years or longer. All mechanical and electrical components are selected with this in mind. From the quality of the smallest part to system's long term energy production, Borrego's designs and installs solar energy systems that are the among the very best.

Recommended maintenance of the module array is limited to periodic rinsing of modules with water. The inverters are purely solid state and do not require preventative maintenance. The inverter will likely need to be changed out between years 15-20 –each inveter is likely to cost between \$1-2K at current prices.

Upon completion of the project installation and permitting, Borrego Solar will provide:

- As built drawings of the roof layout
- As built electrical diagram
- Manuals for the modules and inverter
- Complete walk through with Instructions on how to monitor your system's performance

Warranty

Borrego Solar provides a full ten-year warranty for all materials and workmanship for every system we install. This warranty will cover all parts and installation. In the unlikely event of a problem with the system, Borrego Solar's **one day reliability guarantee** has you protected. If we are unable to fix any problem in one day we will compensate you for any lost production until we do fix it. This is our one day reliability guarantee and it is good for 10 years. In addition the solar modules come with a 25 years energy production warranty and inverters 10 years.

Contact Information

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References Available Upon Request
