

BOARDMAN HILL SOLAR FARM CASE STUDY

a Community Solar Success Story

The Boardman Hill Solar Farm case study is not only a strong representation of green values, but it's a stellar economic investment for participants too. This people-powered community-owned solar success story is such a great example of what's possible when you combine values, vision and hard work that it has become a model both the Vermont Law School and Vermont Natural Resources Council are celebrating and promoting. VLS and VNRC have been working with BHSF leaders to put together guidance and model documents for others who might be interested in pursuing such an approach. They include:

- [VLS' Guidance Document for How to Advance This Type of Project — Including a Model “Certificate of Public Good Application”](#)
- [Model Land Lease Agreement](#)
- [Model LLC Operating Agreement](#)
- [Model Subordination, Non-disturbance and Attornment Agreement](#)

Project Overview:

Boardman Hill Solar Farm (BHSF) is a 150 kW AC project ... one of the largest single-phase PV arrays in Vermont ... and perhaps the first community-owned solar array of its size in Vermont to be truly green.

What makes BHSF distinctive is that its remarkably low cost, offers big dollar savings and is truly green too. BHSF responds to Vermont's renewable energy goals because BHSF retains the solar environmental attributes with the project and does not sell the RECs (Renewable Energy Credits).

The cost per watt is \$2.87 -- a dollar or more less than most others -- and panel owners can claim the 30% federal tax credit too. BHSF participants own the panels and financed the entire \$512,000 project, without any third-party. A non-profit, member-managed LLC handles financial and administrative matters, thereby eliminating customary markups and profit margins.

This revolutionary yet simple approach required preparation of original documentation for LLC operating agreement, site land lease (landowner receives lease payments as energy credits) and other legal, insurance and service agreements – all of which, including the structural model itself, have been accepted by the Institute for Energy and the Environment at VLS and VNRC for replication and expansion to other communities in Vermont. (see documentation later)

Creating the project took the combined efforts of a team working together – committed local leaders representing the panel owners and members of BHSF LLC; the engineering, technology and construction of the installer, Aegis Renewable Energy; and the farm site and environmental passion of the visionary, organic farmer, Greg Cox.

How it began:

Two residents of Mount Holly complemented each other in this effort – one a strategic planner, who had developed programs for a solar hot water initiative and then a school PV purchase with no money

upfront, costs offset by energy credits, and long-term savings of over \$100,000. The other a community organizer, who had encouraged over 50 households to make weatherization and energy efficiency savings, won Mount Holly state and national recognition, and awards of over \$20,000 for town and school improvements.

This team – Roland Marx and Marcy Tanger – held a town meeting on Vermont community scale solar, 56 people showed up, expressed overwhelmingly positive reaction and signed on for a solar farm. But there was no site. Three-phase power (which is often needed for projects of this size) was very limited in town, and no single-phase site could be found that was properly respectful of town beauty and environment and that met landowners’ personal criteria.

Then it was learned that the town of Cavendish expected to build a 150 kW project for 30-35% less than typical costs by managing the project themselves. They had a CPG on a town land site, a town manager and an energy committee, and because they were going to oversee everything other than installation, they anticipated cost savings for the project of \$200,000, even \$250,000 if they sold the RECs, as they intended to do.

Great model – except that the citizens interested in going solar weren’t a municipality, or any sort of entity, and they didn’t have a land site. But the Cavendish town manager gave them installer names, both of whom proved to be solid candidates ... and one had a possible land site.

Creating the Structure -- BHSF LLC

What was needed was an entity with a structure to manage the project. The answer: a Limited Liability Company (LLC), which would enable them – the local organizers, and not a third-party developer – to take on responsibility for the future of the project.

BHSF LLC filed Articles of Organization with the Vermont Secretary of State, simply and online, and is guided by an Operating Agreement, a plain-English, five-page document that governs operations. In brief, BHSF LLC is a “non-profit” member-managed entity and its business purpose is to represent its members in administrative and financial matters (such as land lease, taxes, insurance, maintenance & service) in connection with their separate purchase of solar panels from an installer.

The land site – Greg Cox and Boardman Hill Organic Farm

The organizers couldn’t find a land site in their town, Mount Holly. But they found one in their utility area – which is a key component for a group net metered project – owned by an organic farmer, Greg Cox, a well-known-and-respected community leader with a deep passion and commitment to environmental protection and helping achieve Vermont’s renewable energy goals, but only if a solar project on his property did not sell the renewable energy credits (RECs) (which, because of their financial value, solar developers often sell.) Interestingly, the bulk of Greg’s 70-acre farm is in a conservation easement with the Vermont Land Trust, yet VLT accepted having the solar farm on the family farm parcel, seemingly influenced by the fact that it was truly green.

The installer – Aegis Renewable Energy

Aegis Renewable Energy provided professional and responsive engineering, technology and construction expertise, and a fully-functioning “turnkey” system of solar panels and components,

including permitting, installation and commissioning with GMP. Participants in BHSF contracted directly with Aegis for the purchase of their panels and became owners of their panels and members of BHSF LLC.

The solar energy output or electricity production from those panels is fed into the grid and GMP purchases that output at a premium price that includes a “solar adder” of 6 cents and issues credits on a pro-rata basis to owners’ meters via net metering to offset owners’ electric use.

Cost control

BHSF leaders knew that to control costs they had to eliminate middlemen, packagers and other forms of overhead and markups. Participants buy panels directly from Aegis and own them, and then the non-profit LLC manages administrative and financial matters in connection with that ownership.

For BHSF, Aegis prepared cost estimates and financials for a 150 kW AC, 187.88 kW DC solar installation with costs of \$512,000, or \$2.73 per watt. That’s a good price, but it didn’t include site land lease budgeted at 5% of output or \$70,000 over the 25-year term... or taxes, insurance and service & maintenance of a similar amount. Most interested participants saw opportunity for reducing costs by selling RECs, which were valued at better than \$40,000 for the first 5 years. But the landowner stipulated that the land lease was contingent on not selling RECs.

Solution: Pay the land lease through energy credits to landowner’s GMP electric bill from the output of panels bought by the solar farm. The landowner would get the same amount annually from 5% of project’s output. But now it would only cost participants \$25,000 up front, rather than \$70,000 over time -- a savings of \$45,000 that more than compensated for not selling the RECs. (Note: This did increase the cost per watt, but only by \$0.14 per watt, from \$2.73 to \$2.87. That’s still more than a \$1.00 less than others at \$3.75 or \$4.00 or more (and some of those take the 30% federal tax credit themselves and sell the RECs too).)

As an example, for an “average” consumer who spends about \$1,000 per year on electricity and wants to offset that with solar PV, BHSF provides panels at a cost of \$11,375, rather than \$15-16,000. And the tax credit brings cost down to \$7960. Energy output from this array is an estimated \$923 per year in energy credits, return on investment is 12% after tax credit, payout is in 8 years and long term cost savings add more than \$15,000 over the life of the panels.

Businesses do even better (and BHSF has 2 business participants) with additional state incentives and federal accelerated depreciation that can bring Return on Investment (ROI) and payout to even more compelling levels.

For those who wish to finance costs, loans could be set up with local lending institutions (like Green Mountain Credit Union or VSECU) using energy credits to pay off the loan with no upfront costs, no out-of-pocket costs and good long term savings too.

Operating expenses

Other operating expenses were not able to be assessed accurately at start-up. BHSF leaders estimated those to be \$5,000 for year 1, which included some start-up costs. So they decided to bill these to panel owners on an annual basis at a rather modest cost of \$28 per kW.

State taxes are \$4 per kW with a 50kW exclusion, so these are \$400. Municipal taxes are at the option of the municipality. The state has suggested an approach, and on that basis, they budgeted \$1,000. They hope to appeal locally on the grounds of having given up substantial benefits by upholding Vermont's environmental goals and not selling RECs.

Insurance was budgeted at \$1000 for commercial liability, which everyone carries. Yet they found a property damage policy (which seemingly no one carries because of high cost and high deductible) that covers \$409,000 with a \$1000 deductible for only \$1332 per year. (For information, contact Ray Sherman at Murphy Insurance, 800-222-8711, for coverages at Acadia Insurance)

Title search on the project site cost just under \$500, and they decided not to take out title insurance. Filing documents for the LLC ran \$160. There are no maintenance & service costs for year 1, as these were covered by Aegis.

Documentation

This revolutionary yet simple approach required preparation of original documents that confirmed understandings, including:

- LLC articles of organization
- LLC operating agreement
- LLC land lease agreement with site landowner
- SNDA agreement (LLC, landowner & bank/credit union/lender)
- Aegis solar panel purchase contract
- BHSF estimated annual operating expenses

Find these or model transactional documents like these at www.VECAN.net -- Going Solar!

Keys to success

- Strategic planning plus community organization
- Competitive advantage -- lowest costs ever, yet truly green
- Member-managed non-profit LLC
- Entirely financed by panel owners
- Landowner with environmental passion & good site
- Strong partnership – LLC, installer & landowner

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