

**South Cove Activity Center Pavilion Solar Project
Option #1: Financing through a commercial entity**

Eastman Plan 2020 states as a Strategic Goal that we shall reduce Eastman’s carbon footprint, reduce energy consumption by 25% and identify and implement ways that the community can work toward achieving these goals by the year 2020. In order to reach these goals, we will need to do more than just conserve energy. Energy efficiency, use of new technologies and local distributed energy production will all need to be part of the solution.

The Eastman Energy Committee has come up with a plan that will put a small Solar Photovoltaic (PV) system (“System”) in place in a visible location to be used as an educational opportunity and to demonstrate solar energy to the community. This plan also puts in place the groundwork for a model for community investor-based financing of a larger PV system that can have a significant impact on reducing the amount of energy that we purchase, reducing our CO2 emissions and meeting the Eastman Plan 2020 goals.

Eastman is a 501(c)(4) non-profit entity and therefore is not eligible for the significant tax credits that are presently available from the federal government to incent renewable energy development. In order to take advantage of these credits as well as other financial incentives that are not otherwise available to Eastman, we propose a Commercial Entity Financing Model whereby an investor funded commercial entity will finance, own, operate and install the System. The energy produced by this System will be sold to Eastman via a long term Power Purchase Agreement (PPA).

Project Summary

Project Name	Eastman Pavilion Solar	
Technology Employed	Photovoltaic (PV) system	
Brief Project Description	A 9.4 kW (DC), 8.2 kW (AC) roof mounted solar array to be installed on the roof of the Pavilion at the South Cove Activity Center.	
Capacity and Energy Production	9,360 watts (DC) 8,274 watts (AC)	10,410 kWhr / year
Total Project Cost*	\$10,222 (*after incentives)	\$1.09 /watt
Levelized Cost of Energy* (\$/kWh)	\$0.103 / kWh (vs \$0.249 PSNH)	
Environmental Benefits	Amount of fossil-fuel displaced/yr: 10,410 kWh Tons of CO2 avoided/yr: 3.742395	

**Levelized cost of electricity (LCOE) is often cited as a convenient summary measure of the overall competitiveness of different generating technologies.. More info at http://www.eia.gov/forecasts/aeo/electricity_generation.cfm, http://www.nrel.gov/analysis/tech_lcoe.html*

Ownership Structure

The South Cove Activity Center Pavilion Solar Project (“Project”) will be owned by Synnove Community Energy Project One, LLC (“SCEP1”), a New Hampshire limited liability company, which was formed on June 23, 2014 specifically for the purpose of financing and operating a solar PV project in Eastman. Funds to purchase and install the System will come from local qualified tax equity investors who can take advantage of the federal tax credits, depreciation and other financial benefits designed to incent renewable energy production.

The System will be installed on the roof of the Pavilion at the South Cove Activity Center. SCEP1’s primary source of revenue from the Project will be the sale of electricity produced by the Project through a fixed-term Power Purchase Agreement (PPA) with Eastman. Eastman will continue to own the property on which the project will be constructed, and SCEP1 will enter into a site lease with Eastman for \$1/year.

The length of this PPA (“Term”) will be 5 years. At the conclusion of the PPA term SCEP1 will donate the System to Eastman. SCEP1 will be responsible for the design, construction, installation and operation of the photovoltaic System during the Term. The System will be placed on the roof of the Pavilion at the South Cove Activity Center. The solar PV modules and micro inverters utilized for this Project are warranted by their manufacturers for 25 years, and this project should continue to produce energy for 30+ years.

Project Financing and Benefit to Investors

Investors in SCEP1 will benefit financially from the project in the following ways:

- The Federal Investment Tax Credit (ITC)- 30% of the total project cost.
- New Hampshire Commercial and Industrial solar rebate program - \$0.80 per watt.
- Depreciation - Modified Accelerated Cost Recovery System (MACRS) over 5 year period (* if deployed before December 31 2016)
- The sale of solar-generated energy to Eastman at \$0.159/kWh with no annual increase during the Term of the Power Purchase Agreement.
- Sale of Renewable Energy Credits (RECs).

Our goal is to provide a sufficient rate of return on investment after the 5 year period in order to make the project attractive to qualified investors. We will be looking for 5 investors to each invest \$5,060 to the project. The financial benefit to each investor would be as follows:

- Federal Investment Tax Credit (ITC): **\$1,518 tax credit.**

- New Hampshire Commercial and Industrial Solar **Rebate: \$1,497**
- Depreciation: \$1,034 per year (year 1-5) totaling **\$4,301 depreciation expense.**
- **Income** from PPA for 10 years: **\$1,639**
- Estimated operating expenses: **\$800**
- **Total 5 year return on \$5,060 investment: \$6,478 (5.1% annualized return)**

PVCalc Cash Flow (Adjusted for Enhanced MACRS)	PVCalc									
Year	1	2	3	4	5	6	7	8	9	10
Energy produced (kWh)	10,410	10,358	10,306	10,254	10,202	10,150	10,098	10,046	9,994	9,942
Gross Income Year 1-5, Value of Energy Year 6+	\$1,655	\$1,647	\$1,639	\$1,630	\$1,622	\$1,871	\$1,917	\$1,964	\$2,013	\$2,062
Lease	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1	-\$1
Insurance	-\$300	-\$300	-\$300	-\$300	-\$300	-\$98	-\$100	-\$102	-\$104	-\$106
Maintenance	-\$500	-\$500	-\$500	-\$500	-\$500	-\$98	-\$100	-\$102	-\$104	-\$106
Interest	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Income bef. tax	\$854	\$846	\$838	\$829	\$821	\$1,673	\$1,715	\$1,759	\$1,803	\$1,849
Depreciation	\$4,301	\$4,301	\$4,301	\$4,301	\$4,301	\$0	\$0	\$0	\$0	\$0
Taxable income	\$0	\$0	\$0	\$0	\$0	\$1,673	\$1,715	\$1,759	\$1,803	\$1,849
Tax	\$0	\$0	\$0	\$0	\$0	-\$552	-\$566	-\$580	-\$595	-\$610
Net inc. after tax	\$5,156	\$5,147	\$5,139	\$5,131	\$5,122	\$1,121	\$1,149	\$1,178	\$1,208	\$1,239
Income cumul.	\$5,156	\$10,303	\$15,442	\$20,572	\$25,695	\$26,816	\$27,965	\$29,144	\$30,352	\$31,590
Net investment	-\$5,068	\$79	\$5,218	\$10,349	\$15,471	\$16,593	\$17,742	\$18,920	\$20,128	\$21,367
% amortized	-20.0%	0.3%	20.6%	40.9%	61.1%	65.6%	70.1%	74.8%	79.6%	84.4%

Power Purchase Agreement

We propose a flat rate purchase price of \$0.159 per kWh, with no annual increase. PSNH's anticipated annual increase is presently 3%. Under this pricing structure, Eastman should realize an energy savings of \$101 the first year of the PPA. This is the difference between expected utility costs at the time the System goes live and the PPA cost. Over the 5 year PPA, total energy cost savings (including first year) are expected to be \$499. After the 5 year PPA period ends, factoring in an annual cost of energy increase of 3%, the system will generate an estimated **\$63,479** in energy over the remaining 25 years of system operation.

Other Benefits to Eastman

This System will produce electricity to help offset the current electrical loads at the South Cove Activity Center as well as act as a demonstration system and educational opportunity for the community. Because of the small size of the System as compared to the actual energy usage at South Cove, this Project will not have a significant impact on the electrical usage of the South Cove Activity Center, but it will provide a visible demonstration of the technology, help raise awareness of energy issues within the community, and will help set the groundwork for a possible future large scale photovoltaic system which can have a substantial impact on reducing purchased energy and CO2 emissions by the community. If a larger project is developed here in Eastman, it could be set up as a Group Net Metering system that would allow for residents of Eastman to participate and purchase some of their electricity from the larger array.

Educational Opportunities

An informational display will be placed inside the South Cove Activity Center and will show current and historical energy production by the System. It will also include information about the System, energy usage throughout Eastman, information about CO2 reduction, weather and details on the various components of the System and how it works. This information will also be available to Eastman residents over the Internet. While a small system for the electric consumption at the Activity Center, this System is sized at what a typical Eastman household would need to provide 100% of their annual electric consumption. The Project will be used to raise awareness of energy issues, consumption, impacts and alternatives and show a working solar electric system in use. The cost of the information display is included in the Sustainable Eastman FY2015 budget.

Environmental Benefits

This Project is estimated to offset the purchase of electricity from PSNH by 10,410 kWh in the first year.

Based on the offset of purchased electricity above we estimate that 3.74 tons of CO2 emissions will be eliminated.

<10,410 kWh x 0.719 lbs CO2/kWh ÷ 2000 lbs/ton = 3.742395 tons of CO2>

System Details

This Project will be a grid-interactive (grid-tie) micro inverter-based photovoltaic system. Interconnection with the electric service provider (PSNH) will be made at the electric sub-panel in Peppermint Patty's. Energy produced by the solar panels will be converted to 120VAC and "pushed" to the grid, reducing the electric consumption as read by the meter at the South Cove Activity Center.

All of the equipment chosen for this Project are top quality and come with warranties that are among the best in the industry. The main system components are:

PV Modules - 36 Canadian Solar CS6P-260M solar PV modules with a rating of 260 watts DC per module will be installed. These are black panels with black frames and each panel contains 60 solar cells. As mounted, each module is 38.7 inches high, 64.5 inches wide and are 1.57 inches tall. Each panel weighs 40.8 lbs. The array will have 36 modules for a total nameplate rating of 10,410 watts DC. These are high quality modules, manufactured by Canadian Solar in North America. They have a 25-year warranty that guarantees a high level of module performance throughout the life of the module. These modules were selected because they are manufactured in North America, are competitively priced, provide outstanding performance and carry a long term warranty.

Inverters – This System will use an Enphase M250-60 micro inverter mounted on the roof, behind each panel. Each of the 36 micro inverters is rated for 240 Watts continuous power output and 250 Watts peak. Four branches of 9 microinverters will be deployed, each with a rated output of 9 Amps AC. Each microinverter will be continuously monitored for performance and diagnostics and real time and historical production will be available at the information display at the South Cove Activity Center and accessible via the Internet. Micro inverters were selected for this Project to eliminate high voltage DC current and accessible electronics at ground level. The per-panel monitoring and diagnostics are also a factor in their selection.

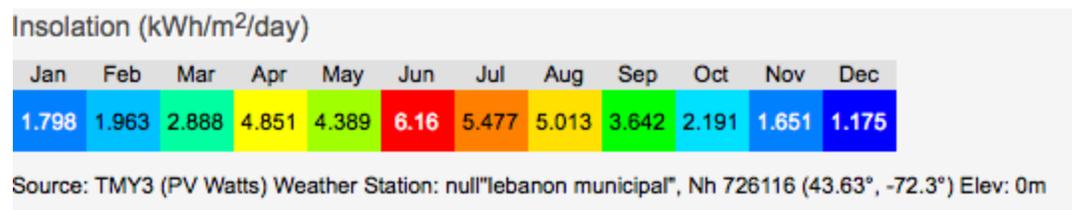
Racking – The Iron Ridge roof mount system provides a high quality rugged racking system at a low price point. The racking system weighs 280lbs.

Total installed System weight will be approximately 1,900 lbs.

Other equipment for the Project, such as wire, conduit, AC disconnect switches, utility grade production meter and circuit breakers are standard commodity electrical components and will all be UL listed and compliant with NFPA electrical code.

Solar Resource Availability

The South Cove Activity Center is at longitude 72° 6'47.74"W and latitude 43°30'52.80"N. The altitude is approximately 1,125 feet. We used Solar Design Tool (solaridesigntool.com) to design this System and calculate the annual production estimates. The monthly figures are as shown in the following chart.



Project Timeline

We expect that the project will take approximately 2 weeks to complete once approvals are received and materials arrive. If the Board approves this project, we will start the process of searching for investors immediately. Because we are headed into the winter months construction likely will need to be suspended until spring weather arrives.

Project Milestone	Timeline
Approval from Eastman Board	
Develop and Execute Lease	
Develop and Execute PPA	45 days
Final System Design	3-5 days
LLC Formation	Intend to use existing LLC
LLC Solicitation and investment	60 days
Building Permit	20 days
Submit application to NH PUC for rebate	5 days
Application to PSNH for net metering	5 days
Order Materials	
Materials delivered	Approximately 1 week after order
Construction start date	
Construction completion date	2 weeks after start
System commissioning	at completion of construction

Please note that this timeline is preliminary, and subject to change based on utility interconnection schedules, prolonged inclement weather, unforeseen site conditions and other factors outside the scope of our control.

Permits and Approvals

The following permits and approvals are required for this Project.

Utility Engineering Review – PSNH will need to approve the project for interconnection.

Building Permit – The town of Grantham will need to review plans for this project and issue a building permit.

Work to be Performed for Installation

Professional labor for the physical installation of the panels and roof racking system is being provided at no cost by Home Comfort Warehouse. Electrical work will be performed by a licensed electrician. Ground work will be done by members of the community as a as an educational experience, modeled after the old New England tradition of barn raisings. Our intention is to involve members of the community so that they can get hands on experience with system components and see up close what the installation of a system at their own house might look like.

Operation and Maintenance Plan

The PV modules to be installed for this project have a warrantied life of 25 years, but we anticipate this Project will remain commercially operational for 30 years or longer. The equipment requires very little maintenance, rain takes care of most of

the cleaning requirements and manufacturer reimbursed warranty service will be provided by Home Comfort Warehouse. Any out of warranty service during the Term of the PPA will be paid for by SCEP1, which shall retain a reserve account for this purpose.

Projected Energy Generation

The Project is expected to generate 10,410 kilowatt hours in the first year, and a total of 51,529 kilowatt hours during the 5 year Project lifetime and then an additional 238,128 kilowatt hours for the remaining 25 years of production. These estimates are based on the output of Solar Design Tool and an annual constant for annual module degradation.

Project Cost

Project cost estimates are as follows:

Item Description	Category	Cost
PV Modules	Materials	\$9,324.00
Inverters	Materials	\$6,528.60
Management Gateway	Materials	\$504.01
Racking	Materials	\$2,245.47
Balance of System	Materials	\$3,022.51 (*Estimated)
Total Materials		\$21,624.59
PV Module Shipping	Shipping	\$400.41
Rack material shipping	Shipping	\$275.00
Total Shipping		\$675.41
Design	Labor	\$0
Engineering	Labor	\$0
Construction of Arrays	Labor	\$0
Electrician + Materials	Labor + Materials	\$3,000 (*Estimated)
Total Labor		\$3,000
Permits	Other	???????
Insurance	Other	???????
Total Other		
Total		\$25,300
Incentives		
Federal Tax Credit		-\$7,590.00
NH State Rebate		-\$7,488.00
Total Incentives		-\$15,078.00
Total Project Cost		\$10,222.00

Potential Conflicts of Interest

Bill Mathewson is a resident of Eastman and member of the Eastman Energy Committee. He owns Home Comfort Warehouse in White River Junction VT and has offered to assist with the purchase of materials at his cost. He has also offered labor at no cost for the physical installation of the system.

Community Members

In order to provide incentives for members of the community to invest in this Project, members of the community will benefit financially from this project. It is our intention to have all finances and accounting available for review by the Board. It is intended that this be a mutually beneficial arrangement whereby the Community can benefit from the PV System, and members of the community have sufficient incentive to invest and provide finances for this Project and a larger scale project down the road.

Participation will be open to all qualified community members, but due to the limited size of this initial Project, only a handful of investors will be able to participate. If a larger scale project is embarked upon, more members of the community would be able to participate, and a larger project can be available as a Group Net Metering system which would benefit even more members of the community.

Alternatives to our proposed Project financing model would be for Eastman to purchase the System itself, or to work with a third party financing company, or an independent Commercial Entity using a similar tax equity financing model.

Next Steps

If the Board approves this Project, the Eastman Energy Committee would immediately begin the work of securing investors, working on the Power Purchase Agreement and Lease as well as implementing the Project.

If the Board is interested in a larger scale project, we would also simultaneously commence the development of a proposal for a large PV system to be installed in Eastman. It would be financed using a similar commercial entity financing model in addition to bank financing. The large system would be between 100 kilowatts and 1 million watts.

A 100 kilowatt system would be 10 times the size of the South Cove Project and would be capable of generating roughly 25% of the energy South Cove Activity Center uses in a year.

A 1 million watt system would be 100 times the size of the South Cove Project. It would be capable of generating more than double the amount of energy that the South Cove Activity Center uses in a year, as well as enough energy to provide power for many other Eastman owned facilities and for individual homes within Eastman.

Financial Details

Spreadsheet of financial model for Commercial Entity Financing Model for the South Cove Activity Center Pavilion Project follows as well as financials for purchase of the System directly by Eastman for comparison.