



COREworks Registry Application

“Solar Array at Boxerwood”

Date: December 16, 2021

Project Applicant: Boxerwood Education Association

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I. Project Description

A. Project Summary

Summarize the project in no more than five paragraphs. Describe the current situation and indicate how the proposed project will address it. Describe the results of project intervention, referencing emission reductions and co-benefits.

Boxerwood Education Association (BEA) is a nonprofit 501 (c) (3) organization that provides environmental education programming in Rockbridge County, Virginia, and maintains an extensive 15-acre woodland garden and nature center for public use. Prior to the installation of the **Solar Array at Boxerwood**, the nature center was powered by carbon-intensive electricity purchased from the Dominion Energy grid.

The **Solar Array at Boxerwood** project involves the installation of a ground-mounted solar photovoltaic system at Boxerwood Nature Center and Woodland Garden (963 Ross Rd, Lexington). A regional solar provider, AltEnergy, installed the array in January 2021 and the array began generating energy on March 1, 2021. This installation will generate carbon-free electricity for use on site, thereby permanently avoiding future greenhouse gas (GHG) emissions associated with the organization's subscription to the Dominion grid.

In addition to realizing approximately twenty-five years of continuous carbon emission reductions, the solar array will have signage that educates Boxerwood visitors about climate change, clean energy alternatives to fossil fuels, and COREworks. The solar array joins other existing conservation innovations (rain gardens, composting, alternate wastewater treatment, and more) that support Boxerwood's mission, "to educate and inspire people of all ages to become successful stewards of the earth." Open to the public without charge, Boxerwood welcomes thousands of people each year to its grounds, including local families, area visitors, and hundreds of schoolchildren from all three local school divisions.

Once approved, this project will be the first listed project in the COREworks registry, as showcased in the online marketplace. COREworks will solicit and direct donations associated with this project to the COREworks Fund, which in turn will help launch future projects for the COREworks registry. COREworks will not use revenue from this specific project to reimburse BEA or the project financiers, [REDACTED], for installation expenses. BEA is in effect donating the

quantified offsets from this project to COREworks in order to generate financial donations from the public via the COREworks marketplace.

B. Project Details

1. General Information






- a. **Project Title:** Solar Array at Boxerwood
- b. **Project Type:** COREworks Solar Project
- c. **Project Site Address:** 963 Ross Road, Lexington, VA
- d. **Project Applicant:** Boxerwood Education Association, 963 Ross Road, Lexington, VA. Contact: Ben Eland, Facility & Garden Manager, ben@boxerwood.org
- e. **Project Host**
Identify the project host and lead contact. Establish host eligibility where necessary. Define responsibilities.

The project host, Boxerwood Education Association (BEA), is a local 501(c)(3) nonprofit organization, and therefore by its IRS status may participate in COREworks Solar, per COREworks' own standards of eligibility. Ben Eland, the lead BEA contact for this project, can be reached at ben@boxerwood.org.

Project Host Signature:  Date: 2/24/21

f. Project Partners

List all project partners and contact information if relevant. Define and describe roles and responsibilities. Establish expertise where necessary.

Lexington residents  are the project financiers and owners. The  have a power purchase agreement (PPA) with BEA, whereby BEA purchases power directly from  , as if paying utility bills, for the duration of the PPA.  will be responsible for all repairs not covered by warranty.

Altenergy is the project contractor: the company is responsible for the design, installation, interconnection, monitoring, and maintenance of the

solar photovoltaic system. The regional base is in Staunton, VA. Project leader is: Joe Moore, jmoore@altenergyinc.com. 540-809-6929.

2. Technical Information

a. System Details

Identify the solar PV system components.

The solar PV system consists of:

- (26) QCell 425W Modules - 25 year manufacturer's warranty
- (2) SMA 5.0-US Inverters - 10 year manufacturer's warranty
- Unirac GFT Ground Mount Racking
- Online Monitoring

b. Project Start Date and Emission Reduction Period

Clearly define the project start date and emission reduction period.

Start Date: March 1, 2021, the day the solar photovoltaic system began generating electricity for use on site.

Emission Reduction Period: 25 years, i.e. in other words, the guaranteed lifetime of the solar photovoltaic panels, as stated by the manufacturer's warranty.¹

3. Timeline

Include the dates of system installation, the day the project starts generating electricity, any monitoring checkpoints, and the day the emission reduction period ends and the system is retired.

PV System Installation: January 15, 2021

Project Start Date: March 1, 2021

Project Monitoring Checkpoint(s): March 1, 2026 and March 1, 2031 by AltEnergy, and shared with Boxerwood. In addition, the project host (Boxerwood) will share with COREworks by March 1 each year the previous calendar year's data (note: this is checkpoint date common to all COREworks solar projects). COREworks will publicize this annual data on its website.

Project End Date: March 1, 2046

¹ Stated on page 3 of the Altenergy Proposal (see attached).

II. Demonstration of Project Eligibility

A. COREworks Programmatic Criteria

1. Local:

Attest that the project is located within Rockbridge County.

The **Solar Array at Boxerwood** project is located on the grounds of Boxerwood Nature Center and Woodland Gardens, 963 Ross Road, Lexington, VA; it is within Rockbridge County, VA.

2. Inclusive:

Projects must enact COREworks programmatic goals by engaging diverse stakeholders as agents and/or recipients of conservation benefits. List project stakeholders and address how their engagement supports COREworks programmatic goal of inclusivity.

1. Local Youth: The project host is a well-known and respected local non-profit recognized for its inclusive programmatic outreach to all local public schools and preschools. Boxerwood's "systemic" partnership model ensures 100% participation of children at various grade levels across all schools, thus reflecting local demographics in those served by its educational program. Furthermore, Boxerwood retains detailed records of all schools, grades, and classrooms served each year, along with associated free and reduced lunch rates; more than 50% of students served each year are eligible for free/reduced lunch.
2. Boxerwood visitors: Hundreds of people visit Boxerwood each year. Many are families of the students served; some are travelers and visitors. From observation and conversation, we know these visitors to be a diverse group in terms of age, economic status, race/ethnicity, and area of residence. All are welcome to stroll the woodland property without charge--and do so. The solar array is visible and walking accessible. Signage at the array will include a QR code that enables visitors to learn more about the unit and COREworks.
3. The general public: Whether or not they visit the grounds of the nature center, many people will learn of the solar innovation (as well

as COREworks) through COREworks press releases and marketing. This marketing is itself an educational strategy in that it teaches and engages others in concepts such as sustainability, alternative energy, and climate action. The general public will connect with this project through social media, the COREworks website, press releases, and so on. We must assume the general public, by definition, includes people from various walks of life.

3. Bountiful:

State project co-benefits (ecological, social, educational) and describe how the project achieves these co-benefits.

1. **Solar Energy Education:** The solar PV system at Boxerwood will be an important component of Boxerwood's implicit and explicit educational programming. Boxerwood will provide signage detailing a) how the system generates clean electricity, b) why the transition to renewable energy is important and c) how the array connects to the COREworks marketplace. Visitors to the garden will have access to the array and accompanying information. Boxerwood will also incorporate the array and solar energy education as appropriate in its educational programs for local school children.
2. **Strengthened "Green Culture:"** Solar photovoltaic systems are currently uncommon in the local region. Exposure to this project and educational content surrounding it (as described above) normalizes green efforts and technology in the area, as well as encourages conversations and thoughtfulness surrounding environmental practices to those who come into contact with this project.

B. Industry GHG Project Standards

1. Additional

COREworks projects must be additional, meaning they must occur beyond what would have happened in a business as usual or baseline scenario. Put differently, a project is only additional if it would not have occurred without funding from the COREworks marketplace. Donation revenue must effectively cause or enable project intervention.

*Directions: Attest and/or describe how the project meets **each of the following three criteria**:*

- a. *The project is beyond regulatory requirements. In other words, the project is initiated on a voluntary basis and is NOT mandated by law.*

The project is *beyond regulatory requirements* and has been initiated voluntarily. There is no state or federal law requiring 501 (c) (3) organizations in Virginia to install their own solar PV systems, or switch to solar energy providers.

- b. *The project is beyond common practice. In other words, the project technology or practice is NOT already widely diffused within the region or sector.*

The project is *beyond common practice*. Solar photovoltaic technology is not already widely diffused within the region. According to the Solar Energy Industries Association (SEIA), only 2.57% of electricity in Virginia is generated by solar panels at this time.²

- c. *The project faces at least one of the following implementation barriers:*
- i. **financial:** *barriers such as high costs, capital constraints, lack of financier incentives, etc.*
 - ii. **institutional:** *barriers such as social or cultural opposition or unfamiliarity with project technology/activity, lack of organizational capacity to implement project technology/activity, lack of consensus, etc.*
 - iii. **technological:** *barriers such as insufficient infrastructure/supporting technology for project implementation, lack of personnel, etc.*

The project faces a *financial barrier*. BEA was not able to purchase and install an array on its own and needed an incentivized third party to do so. This project's financiers (██████████) report that donating to COREworks the Anticipated Emission Reductions (AERs) generated by the anticipated project was a main incentive to moving forward with the project. The financiers understood (correctly) that the donated AERs would in turn enable COREworks to solicit donations from the public, ton-for-ton, with all proceeds supporting the

² Solar Energy Industries Association. "Virginia Solar." <https://www.seia.org/state-solar-policy/virginia-solar>. Accessed: 27 October 2021.

COREworks Fund, the engine that supplies capital for the next carbon-reducing project. In effect, the financiers' donation to COREWorks of this project's AERs will double the financiers' positive environmental impact and thus was a *major incentive* for them. Ultimately, the opportunity to generate revenue for the COREworks Fund was a crucial incentive to securing project financing for the project, **Solar Array at Boxerwood**.

2. **Permanent**

COREworks projects must not be subject to significant risk of reversal, by which captured carbon emissions may be re-released into the atmosphere at some point in the future.

Directions: Establish whether or not the emission reductions face a risk of reversal. If emission reductions do face risk of reversal, describe any strategies implemented to mitigate such risk.

The **Solar Array at Boxerwood** project will result in permanent emission reductions. Once installed, the solar photovoltaic system will consistently generate solar electricity throughout its 25-year lifespan, thereby mitigating the need of the project host (Boxerwood) to purchase carbon-intensive electricity from the local grid. As a result, fossil fuel energy consumption and associated GHG emissions will be permanently avoided.

3. **Resilient**

COREworks projects must function effectively throughout their emission reduction period. Therefore projects must be resilient to factors which might alter their predicted emission reductions, such as project abandonment or underperformance.

Directions: To avoid overissuance of Anticipated Emission Reductions, provide reassurance that the project is more than likely to yield the number of AERs proposed. State the plan for demonstrating project resilience, or how the project will continue to function effectively throughout the proposed emission reduction period. Provide evidence such as:

- *Evidence of operational activity (e.g. utility bills, photos)*
- *Operations and maintenance contracts & warranty periods*
- *Evidence of continued implementation:*
 - *energy services contracts with solar PV performance guarantees*
 - *long term service contracts for continued system monitoring, maintenance, and periodic inspections*

To demonstrate project resilience, BEA has provided in Appendix D evidence of continued implementation in the form of

1. an attestation of solar operational activity from the project host,
2. a 25-year manufacturer’s warranty for the Boxerwood solar panels,³ and
3. a Power Purchase Agreement between Boxerwood Education Association and the financiers which stipulates that [REDACTED] must pay for any repairs as long as they own the solar PV system.

III. Quantifying Anticipated Emission Reductions

A. Calculations

All COREworks Anticipated Emission Reductions (AERs) must derive from accepted methods of calculation; therefore each step in those calculations must be:

- **Measurable** - The process by which the proposed project activity reduces greenhouse gas emissions must be well understood and readily quantifiable. Applicant must employ broadly accepted formulas for calculating Anticipated Emission Reductions.
- **Transparent** - Applicant must explicitly disclose and justify all calculations and assumptions made during greenhouse gas accounting.
- **Accurate** - All calculations and assumptions made during greenhouse gas accounting and Anticipated Emission Reduction quantification must be accurate and account for leakage.

1. Forecast Baseline Emissions for this project by following these steps:

- a. Define baseline emissions and method of calculation.
 - b. Estimate Solar PV Power Generation.
 - c. Quantify baseline emissions, using data from Appendix B and the Appendix C worksheet.
 - d. State total baseline emissions for this project based on the above
-
- a. Define baseline emissions. Use the method of calculation adapted from Climate Action Reserve’s Climate Forward Solar Photovoltaic Forecast

³ Stated on page 3 of the Altenergy proposal. (See attached).

Methodology in which baseline emissions are equal to “the electricity generated by the individual solar PV systems (as calculated by PV watts) multiplied by the local grid greenhouse gas (GHG) emission factor.”⁴

Baseline emissions for this project represent the business-as-usual scenario, the amount of carbon that would have been emitted as a result of the fossil fuels burned to generate electricity if not for the intervention of this project. Without project intervention, Boxerwood would have continued to purchase power from Dominion Energy for the next 25 years. The amount of energy generated by the **Solar Array at Boxerwood** can be used as a proxy for the amount of energy that would have been used in the business-as-usual scenario, as it is directly replacing fossil fuel-based energy.

The energy generated by the solar array will be used by Boxerwood as the customer of the Power Purchase Agreement and any extra energy generated will go back into the Dominion grid. Whether the energy is used by Boxerwood or goes into the grid, it is replacing fossil fuel-based energy and therefore all forecasted energy generation by the solar panels is included in the baseline emission calculations.

Dominion Energy is legally required to increase the amount of renewable energy in its portfolio each year until 2045 (when 100% of its energy will be renewable), and this application takes that scenario into account. To determine how much carbon-emitting energy the solar array is replacing, our calculations multiply the amount of forecasted energy by the published local grid greenhouse gas emission factor (the percentage of Dominion’s energy each year that is produced by fossil fuels as opposed to renewable energy). The table in Appendix C shows the baseline emissions for each year for the Solar Array at Boxerwood using this methodology.

- b. *Estimate Solar PV Power Generation for this project. Use this formula:*
*Baseline Emissions = Solar PV Power Generation * Emission Rate*

Altenergy, the solar contractor for the **Solar Array at Boxerwood** project, used the PVWatts calculator to estimate the annual electricity generation for the Boxerwood solar array, taking into account system specifications,

⁴ Climate Action Reserve. Climate Forward Solar Photovoltaic Forecast Methodology. Public Comment Webinar. June 27 2019. pg. 26

weather patterns, and potential system losses. As such, COREworks accepts Altenergy's annual solar PV power generation estimates, as recorded for 25 years in Appendix A.

- c. Using baseline changes in emission rates data from Appendix B, quantify baseline emissions, using the Appendix C worksheet.

See Appendix C worksheet.

- d. State total baseline emissions for this project based on the above.

Total Baseline Emissions: 104.7 metric tons of carbon dioxide equivalent (MTCO₂ eq)

2. Forecast Project Emissions following these steps:

- a. Define and quantify the Project Emissions.

Project Emissions for the **Solar Array at Boxerwood** project are any greenhouse gas (GHG) emissions associated with actively generating solar electricity via the newly installed solar PV system. Project Emissions are therefore zero.

- b. State the total Project Emissions based on the above.

Total Project Emissions: 0 metric tons of carbon dioxide equivalent.

3. Calculating Forecasted GHG Emission Reductions

- a. Quantify gross forecasted GHG emission reductions. Provide calculations using this formula:

Gross Forecasted GHG Emission Reductions = Total Baseline Emissions - Total Project Emissions

Gross Forecasted GHG Emission Reductions = Total Baseline Emissions - 0

Gross Forecasted GHG Emission Reductions = Total Baseline Emissions

Gross Forecasted GHG Emission Reductions = 104.7 MTCO₂eq

- b. Quantify leakage. Provide calculations.

Based on a life cycle analysis of the QCell solar modules conducted by the manufacturer, the carbon footprint of a QCell solar module is approximately **29.5 grams CO₂eq/kWh**. This amount includes emissions from raw material extraction and processing, Qcell module production, packaging, transport, installation, use, and disposal.

$$\text{Leakage} = \text{Total Solar PV Power Generation (kWh)} * 29.5 \text{ gCO}_2\text{e/kWh}$$

$$\text{Total Solar PV Power Generation (kWh)} = 335,683.3$$

$$\text{Leakage} = 335,683.3 * 29.5 = 9,902,657.35 \text{ gCO}_2\text{e}$$

$$\text{Leakage} = 9.903 \text{ MTCO}_2\text{eq}$$

- c. *Quantify net forecasted GHG emission reductions, taking into account leakage. Clearly indicate the total number of net forecasted GHG emission reductions. Use this formula:*

$$\text{Net Forecasted GHG Emission Reductions} = \text{Gross Forecasted GHG Emission Reductions} - \text{Leakage}$$

$$\text{Net Forecasted GHG Emission Reductions} = 104.7 - 9.903$$

$$\text{Net Forecasted GHG Emission Reductions} = 94.797 \text{ MTCO}_2\text{eq}$$

4. Total Project Anticipated Emission Reductions (AERs)

Clearly indicate the total number of COREworks AERs generated by the project. Round down.

Solar Array at Boxerwood will generate **94 COREworks AERs**, equivalent to preventing 94 metric tons of carbon emissions, over the course of its 25-year operational period.

B. Ownership and Double Counting

COREworks projects must demonstrate ownership of AERs and the avoidance of double counting. In order to avoid double counting, COREworks maintains exclusive right to all Anticipated Emission Reductions and never transfers ownership.

*COREworks Solar projects also may not generate **Renewable Energy Credits** in addition to carbon AERs, as this would be considered an instance of double counting.*

Directions: *Please affirm and provide evidence of a contractual agreement with relevant project parties—in particular with the project host—that grants COREworks the exclusive right to all AERs and prohibits the concurrent generation of RECs.*

The project applicant and host (BEA) understands and affirms that:

- COREworks retains all claim to the **Solar Array at Boxerwood** emission reductions.
- BEA as host **cannot** hold or sell Renewable Energy Offsets associated with this project;
- BEA as host must report significant deviations from projected solar electricity generation to COREworks if BEA is alerted of such deviations by Altenergy.

As stipulated in the Addendum to the Power Purchase Agreement with BEA (see Appendix D), the project financiers have granted to COREworks sole ownership of all AERs generated by the project; the financiers cannot sell any Renewable Energy Credits (RECs) associated with this particular solar PV system.

IV. Monitoring and Evaluation

A. Technical Monitoring

COREworks assigns Solar AERs using a rigorous forecasting method. As a result, any technical monitoring after installation is expected to be limited and informal. To the extent that technical post-installation monitoring does occur, please detail the metrics and monitoring plans in this section.

The project host (Boxerwood) will report solar array production data on an annual basis to COREworks. Boxerwood will submit its brief written report of the previous calendar year's data no later than March 1 each year (note: the annual March 1

reporting date is common to all COREworks solar projects). Alternatively, Project Host may choose to share array inverter dashboard login info with COREworks and request that COREworks monitor production data on an annual basis instead. COREworks will annually review and post the data on its website.

Directions: Describe plans for technical monitoring after project implementation. Address metrics, frequency and duration of monitoring, reporting timelines and products, and responsible parties.

1. Metrics

Data Type	Data Unit	Data Source	Data Collection Frequency	Data Monitoring Checkpoint(s)
Annual Solar Electricity Generation	kWh	Altenergy Monitoring	Monthly	Feb. 1, 2026 & Feb. 1, 2031
Annual Solar Electricity Generation	kWh	BEA	Monthly	March 1 each year

2. Monitoring and Reporting Plan

The solar contractor, Altenergy, is responsible for monitoring solar electricity generation on an ongoing basis for the first ten years of the solar PV system lifetime. As stipulated in the Altenergy Proposal, Altenergy will alert the project host, Boxerwood, if solar electricity generation has deviated significantly from the projected 14,781 kWh/Year after 5 and 10 years of system operation.⁵ Significant deviation from projected solar electricity generation is reported to COREworks by the project host, via email.

Boxerwood will send an annual report each March to COREworks showing how much energy the array generated. This will ensure that any issues that arise with the array can be fixed in adequate time. This report will be published on the COREworks website in the “Projects” section.

⁵ See Altenergy Proposal, System Overview, attached.

B. Program Incorporation and Evaluation

1. Educational Objectives

***Directions:** Describe applicant plans for incorporating this project as an aspect of educational programming, if any. Identify goals, products, and responsible parties.*

Boxerwood Education Association (BEA) will include the solar array in its portfolio (and map) of garden-based innovations that demonstrate methods of sustainable living and design. This goal is to ensure more people from all walks of life learn about the value of protecting the planet (and our own well-being) by reducing energy consumption and/or switching to clean renewables. This goal is in keeping with BEA's mission "to educate and inspire people of all ages to become environmentally successful stewards of the Earth."

To promote public interest and learning, BEA will include signage at the installation site, as mentioned previously in this document. BEA will also feature and explain the array on its website among other sustainable innovations at Boxerwood.. A brief solar "shout-out" from the stage will accompany each night of the upcoming 2022 Music In the Garden season, since the array powers the sound system. In addition, brief recognition and explanation of this project--and the value of clean energy--will be included in every flier that goes home with schoolchildren following each Boxerwood visit. This flier is a standard BEA feature that is distributed to hundreds of families each year.

Finally, BEA will incorporate the solar array in specific educational programming both during the school year and in the informal afterschool, weekend, and summer program seasons. Its incorporation will depend on needs and interests of the audience, which vary, as well as the still uncertain pandemic landscape. Elise Sheffield, BEA Education Director, will be responsible for creating and/or coordinating this ongoing educational element as part of her overall duties.

2. Monitoring and Evaluation Plan

Incorporation of the solar array will become part of ongoing BEA programming. For the purposes of this application, however, BEA proposes

the following time-bound milestones and outcomes along with 1 year of quantified evaluation:

Milestones:

- Signage including QR code (and its related BEA webpage) for additional information: by June 30, 2022.
- Incorporation into program take-home fliers: starting March 2022
- Music in the Garden Solar Shout-Out Series: June - Aug. 2022

Quantifiable Evaluation:

BEA Education Director Elise Sheffield will track and report in writing to COREworks for the 2022 year (ending 12/31/22): the number of take-home fliers sent to families that include information about the array (as well as schools, grades, and free/reduced number); the number of people attending the summer music in the garden series who would have received the solar shout-out info; and the number of BEA press releases and or public presentations occurring during 2022 in which the Solar Array and its benefits are mentioned.

C. Public Dissemination

***Directions:** Describe any plans to share news and results of the specific project with the public. Detail how the communication connects with stakeholders and furthers COREworks' educational and/or programmatic goals. Define and describe all milestones and deliverables.*

Plans for Public Dissemination:

- BEA (applicant) will create educational signage to accompany the solar array, giving visitors the opportunity to see and learn about the Boxerwood solar PV system for the next 25 years.
- BEA (applicant) will also disseminate solar shout-outs via its school fliers and music in the garden events, per above.
- BEA (applicant) announced the installation of the solar array in the monthly Boxerwood Newsleaf publication. (February 2021)
- W&L Athletics is partnering with COREworks in Fall 2021. As part of this initiative via social platforms, COREworks and W&L teams will highlight the **Solar Array at Boxerwood** COREworks project. The initiative will have an

explicitly educational focus and will primarily engage the W&L student body.
(Fall 2021)

- COREworks will feature Information about **Solar Array at Boxerwood** and its relationship to carbon reductions/climate change in the “Projects” section of the COREworks website, scheduled to go live in beta form by October 2021 and officially in January 2022. The audience is the general public.
- COREworks will feature the project in various press releases related to COREworks public roll-out in January 2022. Articles will highlight the value of switching to renewable energy and its impact on climate and other ecological issues.

V. Appendices

A. Appendix A: Solar Array at Boxerwood Power Generation over 25 Years

Year	Solar PV Power Generation (kWh)	Year	Solar PV Power Generation (kWh)	Year	Solar PV Power Generation (kWh)
2021*	12,317.5	2030	13,750	2039	12,791
2022	14,663	2031	13,640	2040	12,689
2023	14,545	2032	13,531	2041	12,587
2024	14,429	2033	13,423	2042	12,487
2025	14,314	2034	13,315	2043	12,387
2026	14,199	2035	13,209	2044	12,288
2027	14,086	2036	13,103	2045	12,189
2028	13,973	2037	12,998	2046**	2,014.8
2029	13,861	2038	12,894	Total	335,683.3

*Solar Power PV Generation for 2021 reflects only 10 months of power generation, since the solar PV system at Boxerwood began actively generating electricity on March 1, 2021.

**Solar Power PV Generation for 2046 reflects only 2 months of power generation, since the emission reduction period ends on March 1, 2046.

B. Appendix B: Forecasted Emission Rates

The Virginia Clean Economy Act (SB851) requires that Dominion Energy Virginia produce its electricity from 100% renewable energy sources by 2045. The mandatory Renewable Portfolio Standard (RPS) program established renewable energy targets for Dominion Energy from now until 2045 (recorded in the table below). The Emission Rates in this application align with these mandatory renewable energy targets in accordance with the standard of additionality.

Year	Percentage of Dominion Electricity Produced from Renewable Sources (Mandatory RPS Targets)	Forecasted CO2 Emission Rate (lbs/mWh)
2019	7.7%	1,349.3
2021	14%	1,257.2
2022	17%	1,213.3
2023	20%	1,169.5
2024	23%	1,125.6
2025	26%	1,081.8
2026	29%	1,037.9
2027	32%	994.1
2028	35%	950.2
2029	38%	906.4
2030	41%	862.5
2035	59%	599.4
2040	79%	307.0
2045	100%	0

C. Appendix C: Calculating Baseline Emissions

Year	Solar PV Power Generation (kWh)	Solar PV Power Generation (mWh)	Forecasted SRVC CO2 Emission Rate (lbs/mWh)	Baseline Emissions (lbs)	Baseline Emissions (MTCO2)
2021	12,317.5	12.318	1,257.2	15,486.190	7.024489522
2022	14,663	14.663	1,213.3	17,790.6179	8.069771342
2023	14,545	14.545	1,169.5	17,010.3775	7.715856618
2024	14,429	14.429	1,125.6	16,241.2824	7.366997369
2025	14,314	14.314	1,081.8	15,484.8852	7.02389785
2026	14,199	14.199	1,037.9	14,737.1421	6.684723805
2027	14,086	14.086	994.1	14,002.8926	6.351670416
2028	13,973	13.973	950.2	13,277.1446	6.022473283
2029	13,861	13.861	906.4	12,563.6104	5.698816293
2030	13,750	13.750	862.5	11,859.3750	5.379377211
2031	13,640	13.640	809.9	11,047.0360	5.010902658
2032	13,531	13.531	757.3	10,247.0263	4.648020639
2033	13,423	13.423	704.6	9,457.8458	4.290050712
2034	13,315	13.315	652.0	8,681.3800	3.937848136
2035	13,209	13.209	599.4	7,917.4746	3.591342919
2036	13,103	13.103	540.9	7,087.4127	3.214829311
2037	12,998	12.998	482.4	6,270.2352	2.844160029
2038	12,894	12.894	424.0	5,467.0560	2.479840334

2039	12,791	12.791	365.5	4,675.1105	2.120616212
2040	12,689	12.689	307.0	3,895.5230	1.766997641
2041	12,587	12.587	245.6	3,091.3672	1.402234963
2042	12,487	12.487	184.2	2,300.1054	1.043320965
2043	12,387	12.387	122.8	1,521.1236	0.6899771387
2044	12,288	12.288	61.4	754.4832	0.3422313345
2045	12,189	12.189	0	0	7.024489522
2046	2,014.8	2.015	0	0	8.069771342
Total	335,683.3	335.683	N/A	230,864.1	104.7204467

D. Appendix D: BEA Supporting Documents

Implementation Statement

COREworks Solar Project

The proposed COREworks Solar project, "Solar Array at Boxerwood," has been implemented as of March 1, 2021. All project implementation details are consistent with those laid out in the project proposal.

Implementation Details:

Project Location:

963 Ross Road, Lexington, VA 24450

System Details:

(26) QCell 425W Modules
(2) SMA 5.0-US Inverters
Unirac GFT Ground Mount Racking
Online Monitoring

Performance:

Average estimated annual energy production based on site conditions: 14,781 kWh

Project Start Date:

March 1, 2021

Attestation:

In signing this project implementation statement, I certify that the information contained herein is true, accurate and complete.

Project Host Signature:



Date: 03/01/2021

Ben Eland, BEA Grounds and Facilities Manager

Project Applicant Signature:



Date: 03/01/2021

Rosalie Bull, BEA COREworks Environmental Fellow



National experience. Hometown service.
COMMERCIAL & RESIDENTIAL SOLAR ENERGY SOLUTIONS





Letter of Introduction

Altenergy, Inc. was founded in 2004, and since then has earned a reputation for delivering exceptionally designed, high quality, maximum efficiency solar PV systems. We strive to provide each of our customers with an experience that builds trust. We take the time to answer questions, explain design options, and outline costs, so our customers make informed decisions on a solar PV system that will work to meet their needs for years to come.

Altenergy's long experience includes:

- Extensive portfolio of Federal, State and local government contracts
- 15 year track record of on-time projects
- Long-term employees include electricians, engineers, procurement managers and install technicians
- 21MW total installed PV capacity
- Multi-state jurisdiction working with utilities, financial and government stakeholders

Altenergy Overview

Altenergy is a national company building solar energy systems for commercial and residential customers. We are deeply invested in the communities we serve and look to inspire growth of solar energy across America.

Our design team, project management, supply chain and development skills are second to none. Altenergy has been performing turn-key installations for more than fifteen years, with over 1,600 completed projects.

Altenergy is committed to finding and training the best qualified people to put to work on every project. Our team includes licensed electricians and NABCEP certified installers. We provide continuing education in construction and solar, OSHA safety training, professional certification classes, plus provide professional design and engineering resources in-house for our employees. Qualified engaged employees who remain with Altenergy translates to creating a superior solar product for customers, and a responsible corporate citizen in our communities.

We appreciate the opportunity to earn your business.

Thank you,

Paul Risberg, President



STAUNTON BRANCH

Joe Moore, Branch Manager
540-809-6929
jmoore@altenergyinc.com



PROJECT: Boxerwood Nature Center 11.05kW Solar PV Project

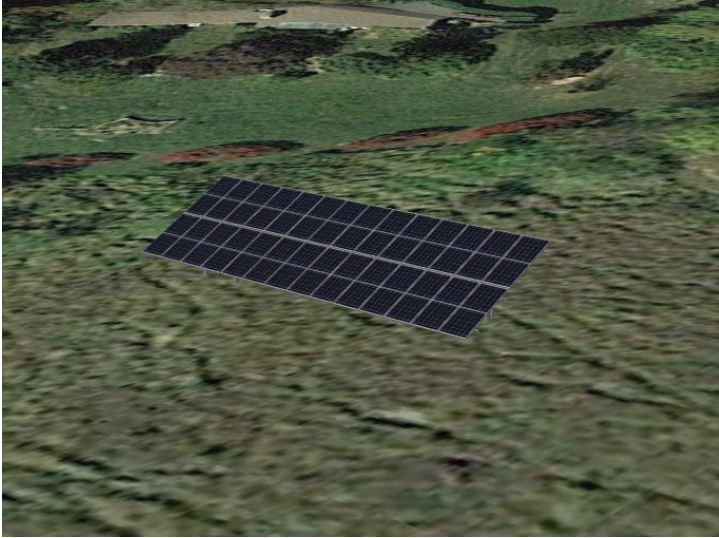
DATE: 11/18/20

CLIENT: Ben Eland

CLIENT EMAIL: ben@boxerwood.org

PROJECT LOCATION: 963 Ross Rd, Lexington, VA 24450

PHONE: 540-319-8180



SYSTEM

- (26) QCell 425W Modules - 25 year manufacturer's warranty
- (2) SMA 5.0-US Inverters - 10 year manufacturer's warranty
- Unirac GFT Ground Mount Racking
- Online Monitoring
- 10 year Altenergy warranty on parts and labor

PERFORMANCE

14,781 kWh
Average estimated annual production based on site conditions.

REBATES

26% Federal Tax Credit

Total Project Cost:	\$ 30,915
26% Federal Tax Credit:	\$ 8,038

Total Project Cost After Incentives: \$ 22,877

**Includes costs for second conduit run from array to meter in case of future expansion.*



SYSTEM OVERVIEW



SYSTEM OVERVIEW

Altenergy will provide a complete, turnkey installation including but not limited to design and engineering, permitting, procurement, installation, and interconnection. This system will be installed in accordance with all applicable national electrical codes, inspected and verified by local inspection processes. The permit and net metering agreement will be administered and created by Altenergy Incorporated, but will be authorized and executed by the system owner. We provide a turnkey solution, which includes all equipment, permitting and net metering agreements.

In addition to the environmental benefits, your solar system will create immediate revenue by offsetting the amount of monthly power purchased from the Utility Company (through net metering). The system's revenue is outlined in the chart below. It represents a detailed review of cash flows, with a 3.8% energy cost inflation factor.

By installing solar panels, you are reducing your carbon footprint while at the same time insulating your residence or business from rising electrical costs. Solar energy systems are elegant, have no moving parts and will provide years of pollution-free power.

Altenergy Incorporated will maintain workers' compensation, general liability, warehouse/office fire and theft and adequate commercial vehicle insurance throughout the duration of this contract.

Note: If electrical service upgrades are required to meet National Electrical Code requirements, there may be an additional fee. Internet connectivity is required for remote monitoring services. Altenergy Inc warrants all materials and installations for a period of ten years starting after the final installation date. Please see specific equipment warranty information in the proposal.

Altenergy Inc. will guarantee the annual production of this system as shown in the ROI Analysis for 10 years. If your installation fails to produce the annual production estimates at the end of the first 5 years, Altenergy will correct the deficiency with a payment. If the annual production estimates at the end of the 10-year period falls short of the annual production estimates, Altenergy Inc will correct the deficiency minus any previous payments. Altenergy Inc will compensate you with the difference of the cost per kilowatt hour for the previous 12 months for each kWh the system failed to produce. Specific site conditions may void any production guarantees not limited to the following: increasing shade, excessive soiling of solar arrays, solar system being shutdown or system issues that may not be detected as a result of lack of internet connectivity, and any issues that should arise outside of Altenergy Inc's control.



Residential Investment Analysis

Prepared for: **Ben Eland**
 Project Name: Boxerwood Nature Center Solar PV
 System Size (kW): 11.05
 Price Per Watt: \$2.80

Total System Cost: \$30,915
 26% Federal Tax Credit: \$8,038
 Total Net Cost: \$22,877

Current Price per Kilowatt Hour: \$0.110
 Max. Annual Module Degradation: 0.80%
 *Annual Electric Rate Escalator: 3.80%

Return on Investment: 3.52%
 Payback Period (Years): 11.9

**Inflation rate based on the national average as determined by the U.S. Energy Information Administration.*

*25 Year Cost of Electricity at 3.8% Annual Inflation Rate: \$59,043
 25 Year Cost of Elec. by Going Solar + Inv. Replacement: \$24,877
 Total Expected Savings Over 25 Years: \$34,166

Year	System Cost	Federal Tax Credit	kWh Production	*kWh Price	Annual Savings	Annual Cashflow	Cumulative Cashflow
	(\$30,915)					(\$30,915)	(\$30,915)
1		\$8,038	14,781	\$0.110	\$1,626	\$9,664	(\$21,251)
2			14,663	\$0.114	\$1,674	\$1,674	(\$19,577)
3			14,545	\$0.119	\$1,724	\$1,724	(\$17,853)
4			14,429	\$0.123	\$1,775	\$1,775	(\$16,078)
5			14,314	\$0.128	\$1,828	\$1,828	(\$14,250)
6			14,199	\$0.133	\$1,882	\$1,882	(\$12,368)
7			14,086	\$0.138	\$1,938	\$1,938	(\$10,430)
8			13,973	\$0.143	\$1,996	\$1,996	(\$8,435)
9			13,861	\$0.148	\$2,055	\$2,055	(\$6,380)
10			13,750	\$0.154	\$2,116	\$2,116	(\$4,264)
11			13,640	\$0.160	\$2,179	\$2,179	(\$2,085)
12			13,531	\$0.166	\$2,243	\$2,243	\$158
13			13,423	\$0.172	\$2,310	\$2,310	\$2,468
14			13,315	\$0.179	\$2,379	\$2,379	\$4,847
15	<u>Inverter(s) Replacement Cost</u>		13,209	\$0.185	\$2,449	\$2,449	\$7,296
16	(\$200)		13,103	\$0.192	\$2,522	\$2,322	\$9,618
17	(\$200)		12,998	\$0.200	\$2,597	\$2,397	\$12,015
18	(\$200)		12,894	\$0.207	\$2,674	\$2,474	\$14,488
19	(\$200)		12,791	\$0.215	\$2,753	\$2,553	\$17,042
20	(\$200)		12,689	\$0.223	\$2,835	\$2,635	\$19,677
21	(\$200)		12,587	\$0.232	\$2,919	\$2,719	\$22,396
22	(\$200)		12,487	\$0.241	\$3,006	\$2,806	\$25,202
23	(\$200)		12,387	\$0.250	\$3,095	\$2,895	\$28,097
24	(\$200)		12,288	\$0.259	\$3,187	\$2,987	\$31,085
25	(\$200)		12,189	\$0.269	\$3,282	\$3,082	\$34,166
		\$8,038	336,134		\$59,043	\$65,081	\$34,166

Altenergy Inc does not guarantee the above tax information. Please consult your tax advisor for tax advice.



RESULTS

14,781 kWh/Year*

System output may range from 14,175 to 15,265 kWh per year near this location.

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at <https://sam.nrel.gov>) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Alliance for Sustainable Energy, LLC ("Alliance") for the U.S. Department Of Energy ("DOE") and may be used for any purpose whatsoever.

The names DOE/NREL/ALLIANCE shall not be used in any representation, advertising, publicity or other manner whatsoever to endorse or promote any entity that adopts or uses the Model. DOE/NREL/ALLIANCE shall not provide

any support, consulting, training or assistance of any kind with regard to the use of the Model or any updates, revisions or new versions of the Model.

YOU AGREE TO INDEMNIFY DOE/NREL/ALLIANCE, AND ITS AFFILIATES, OFFICERS, AGENTS, AND EMPLOYEES AGAINST ANY CLAIM OR DEMAND, INCLUDING REASONABLE ATTORNEYS' FEES, RELATED TO YOUR USE, RELIANCE, OR ADOPTION OF THE MODEL FOR ANY PURPOSE WHATSOEVER. THE MODEL IS PROVIDED BY DOE/NREL/ALLIANCE "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. IN NO EVENT SHALL DOE/NREL/ALLIANCE BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO CLAIMS ASSOCIATED WITH THE LOSS OF DATA OR PROFITS, WHICH MAY RESULT FROM ANY ACTION IN CONTRACT, NEGLIGENCE OR OTHER TORTIOUS CLAIM THAT ARISES OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE MODEL.

The energy output range is based on analysis of 30 years of historical weather data for nearby , and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Value (\$)
January	3.87	1,045	115
February	4.79	1,124	124
March	5.38	1,391	154
April	5.65	1,350	149
May	5.80	1,396	154
June	6.12	1,394	154
July	5.89	1,361	150
August	5.91	1,375	152
September	5.50	1,239	137
October	4.74	1,177	130
November	4.15	1,024	113
December	3.44	905	100
Annual	5.10	14,781	\$ 1,632

Location and Station Identification

Requested Location	rose road lexington va
Weather Data Source	Lat, Lon: 37.77, -79.46 1.1 mi
Latitude	37.77° N
Longitude	79.46° W

PV System Specifications (Residential)

DC System Size	11.05 kW
Module Type	Standard
Array Type	Fixed (open rack)
Array Tilt	30°
Array Azimuth	180°
System Losses	16.65%
Inverter Efficiency	96%
DC to AC Size Ratio	1.2

Economics

Average Retail Electricity Rate	0.110 \$/kWh
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Performance Metrics

Capacity Factor	15.3%
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THE ALTENERGY MANAGEMENT TEAM

Paul Risberg, President

Paul founded Altenergy in 2004, after working for 11 years as a Securities Operations and Investment Manager at a New York Stock Exchange Company. Altenergy, Inc. was created to address the growing need for thoughtful and realistic solar energy applications driven by economic feasibility. Identifying operational challenges, market opportunities and intellectual capital are his responsibility. Prior to his work in the securities industry, Mr. Risberg was a small business owner, project manager for a general contractor, furniture maker and carpenter.

Matthew Dunay, VP, Chief Technology Officer

Matthew joined Altenergy in 2005 as the first employee of the company and has developed many of the company's departments and operating processes. He is involved in product and technology selection, R&D, and continues to build, educate, and improve the team's efficiency in system design and engineering. Matthew graduated Magna Cum Laude with a BA in Industrial Design from North Carolina State University and is a licensed Spec PV Journeyman electrician and NABCEP certified solar installer.

Rob Cooke, Chief Financial Officer

Rob joined Altenergy in 2015 after spending 18 years with General Electric and 7 years running a water technology business. At GE, he held numerous finance and accounting roles in addition to spending 3 years leading the M&A group for GE's Automation Business. Rob has a BS degree in Accounting & Finance from Penn State University, has graduated from GE's Financial Management Program and holds an MBA from James Madison University.

Shawn Cooke, Director of Commercial Development

Shawn oversees commercial sales and development for all Altenergy branches in the US. Shawn has been working with PV for over 8 years and provides extensive knowledge and experience for the Altenergy team. Shawn has installed over 400 residential and commercial systems, equaling over 4 megawatts of power.

Joe Moore, Staunton Branch Manager

Joe has 6 years of installation and project management experience in the photovoltaic (PV) solar power industry, having overseen over 3 megawatts of PV installations. As a part of Altenergy's team, Joe has seen that all of these projects were built on time, and he served as the main point of contact with the respective customers for these projects. He draws from his experience in various roles of the installation process to ensure that our jobs are installed efficiently, on time, and in accordance with industry best practices.

Phil Lennon, Assistant Branch Manager

Phil has joined the team as an installer in 2018. He executed dozens of high quality commercial and residential PV installations before moving into the Branch Manager Assistant role. Drawing on his experience as a Marine ('04-'08) and Small Business Owner, he provides project management for the branch, overseeing logistics and administration for all projects.



MUNICIPAL & COMMERCIAL CLIENTS

City of Charlottesville
Artisan Construction
University of Virginia
VA Supportive Housing
Hale and White Construction
St. Anne's – Belfield School
Alexander Nicholson Construction
County of Albemarle
Abrahamse Construction
2RW Engineering
Alterra Construction Management
F7 Engineering
Moores Electrical Contracting
Wolf Ackerman Design
Martin Horn Construction
RP2 Design Dovetail Construction
Green Valley Builders
StoneHaus Construction
Barton-Malow Construction
Greer and Associates
Piedmont Housing
Railside Industries
Bradford Staffing
Shenandoah Fiber Co.
Mt. Airy Winegrowers
Didawick & Comapny PC
Marlyn Development
Van Ness Center Associates, LLC

Redlight Management
City of Bowie, MD
Madison Investments
Army Corp of Engineers
U.S. Fish and Wildlife Service
Westminster Presbyterian Church
Knights Gambit Vineyard
Hagan Vet Clinic
Farm Choice Country Store
S&W Appliance
Stables at Six Penny Farm
Flower Fields
Berriedale Farms
Afton Mountain Bed & Breakfast
Modernboy Woodshop Bejo Seeds
Boise Coop
Energy Seal Systems
Idaho Conservation League
The Flicks Theatre
Twenty Mile South Farm
Building Goodness Foundation
Charlottesville Energy House
Radical Roots Farm
Arundel Parks & Recreation
Sun Valley Animal Center
United Medical Labs
Tiger Fuel Company

Petra Development
Kilaurwen Winery
Hillside Grain
Sawtooth Crane LLC
Brookside Farm
Cascadia Property Owners Association
BARC Electric Cooperative
Shenandoah Valley Electric Co-Op
Huston Vineyards
Journey Home

COMMERCIAL PROJECT PORTFOLIO



Van Ness Center Associates, LLC - 200.265 kW
Washington, D.C. 2020



Wood River Inn - 73.4 kW
Hailey, ID 2017



Wood River Animal Shelter - 140 kW
Hailey, ID 2018



Virginia Tech - 104.4 kW
Blacksburg, VA 2005



UVA Hospital - Thermal System
Charlottesville, VA 2020



Marlyn Development - 187.44 kW
Culpeper, VA 2018



Mt. Airy Winegrower's - 40.32 kW
Fort Defiance, VA 2015



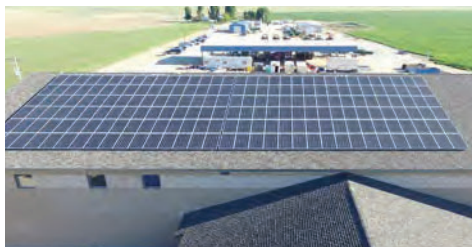
United Medical Labs - 42.35 kW
Vienna, VA 2017



Hillside Ranch Irrigation - 99.74kW
Bellvue, ID 2020



Crozet Storage - 502.2 kW
Crozet, VA 2015



Twenty Mile South Farm - 56.43 kW
Kuna, ID 2016



Railside Industries - 234.05 kW
Weyers Cave, VA 2016



13th ST LLC- 66.96kW
Washington D.C 2020



Dept. Of Mines, Minerals, Energy - 139.84kW
Big Stone Gap, VA 2019



EyeOne - 41.42kW
Staunton, VA 2019

“After considering several options, including self-performing the installation, we determined that Altenergy was the best value option for a smooth design and installation process. Altenergy's team far surpassed our best expectations. The team's communication and coordination efforts were some of the best I have experienced, from any specialty trade subcontractor, in my 16 years in the industry.” David Walsh, Brite Electrical Systems.

Q.PEAK DUO L-G8.2

415-430

ENDURING HIGH PERFORMANCE



Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY

Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 20.3%.



INNOVATIVE ALL-WEATHER TECHNOLOGY

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology, Hot-Spot Protect and Traceable Quality Tra.Q™.



EXTREME WEATHER RATING

High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (2400 Pa).



A RELIABLE INVESTMENT

Inclusive 12-year product warranty and 25-year linear performance warranty¹.



STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative 12-busbar design with Q.ANTUM Technology.

¹ See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:



Rooftop arrays on commercial/industrial buildings



Ground-mounted solar power plants

SUNNY BOY 3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US



SB3.0-1 SP-US-40 / SB3.8-1 SP-US-40 / SB5.0-1 SP-US-40
SB6.0-1 SP-US-40 / SB7.0-1 SP-US-40 / SB7.7-1 SP-US-40



**WORLD'S FIRST
SECURE POWER SUPPLY**



OUTLET NOT INCLUDED

Value-Added Improvements

- World's first Secure Power Supply now offers up to 2,000 W
- Full grid management capabilities ensures a utility-compliant solution for any market

Reduced Labor

- New Installation Assistant with direct access via smartphone minimizes time in the field
- Integrated disconnect simplifies equipment stocking and speeds installation

Unmatched Flexibility

- SMA's proprietary OptiTrac™ Global Peak technology mitigates shade with ease
- Multiple independent MPPTs accommodate hundreds of stringing possibilities

Trouble-Free Servicing

- Two-part enclosure concept allows for simple, expedited servicing
- Enhanced AFCI technology reduces false tripping while improving sensitivity in real arcs, greatly reducing unneeded service calls

SUNNY BOY 3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US

Reduce costs across your entire residential business model

The residential PV market is changing rapidly, and we understand that your bottom line matters more than ever. That's why we've designed a superior residential solution that will help you decrease costs throughout all stages of your business operations. The Sunny Boy 3.0-US/3.8-US/5.0-US/6.0-US/7.0-US/7.7-US join the SMA lineup of field-proven solar technology backed by the world's #1 service team, along with a wealth of improvements. Simple design, improved stocking and ordering, value driven sales support and streamlined installation are just some of the ways that SMA is working to help your business operate more efficiently.

GROUND FIXED TILT



GROUND FIXED TILT (GFT) is an engineered system of standard, lightweight ground mount components that are in stock and ready to ship from North America's largest ground mount distribution network. UNIRAC's unmatched commercial project support makes construction easy, from permitting through installation, including region-specific engineering. GFT's refined solution, including a new shared rail design, delivers enhanced system and labor optimization. Plus, enjoy peace of mind with **SOLARMOUNT** Mounting Technology and UNIRAC's industry-leading 25-year warranty.



#UNIRAC
25
YEAR
FULL-SYSTEM
WARRANTY



IN STOCK & READY TO SHIP
THE BEST SOLUTION IS AVAILABLE



COMMERCIAL PARTNERSHIP
EXPERIENCE THAT MAKES A DIFFERENCE



INSTALLATION EXPERIENCE
REFINED WITH YOU IN MIND

MAKE GROUND MOUNT SIMPLE

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

POWER PURCHASE AGREEMENT WITH OPTION TO PURCHASE

This Power Purchase Agreement (“Agreement”) is made effective on this _____ day of November, 2020, by and between [REDACTED] (collectively, “Seller”) and Boxerwood Education Association, Incorporated. (“Purchaser”).

WHEREAS, Seller is purchasing from Altenergy, Incorporated (“Altenergy”) a solar array consisting of twenty-six (26) Trina 425W modules, two (2) SMA 5.0-US Inverter, and one (1) Unirac GFT Ground Mount Racking system (“the Solar Array”); and

WHEREAS, Seller and Purchaser intend that Seller will install the solar array at an agreed-upon location on Purchaser’s land located at 963 Ross Road, Lexington, Virginia, 24450 (“the Property”); and

WHEREAS, Seller and Purchaser intend that Seller, at all times, will be the sole owner and operator of the Solar Array; and

WHEREAS, Seller wishes to own and operate the Solar Array as an alternative energy facility for the production of electricity; and

WHEREAS, Purchaser wishes to purchase the electricity produced by the Seller;

WHEREFORE, in exchange for and in accordance with the promises and covenants set forth herein, Purchaser agrees to purchase electricity from Seller on the terms and conditions set forth below:

1. **Term.** The term of this Agreement will commence on the first day of the first month after which the Solar Array begins producing electricity production and will expire on the last day of the two-hundred fortieth (240th) month after the commencement of the Agreement (“the Term”).
2. **Net Metering.** Effective at the beginning of the Term, Purchaser will enter into a billing arrangement with Virginia Electric and Power Company d/b/a Dominion Energy Virginia (“Dominion Energy”) whereby Purchaser will receive from Dominion Energy a monetary credit on Purchaser’s electricity bill for each kilowatt hour produced by the Solar Array (“Net Metering”).
3. **Electricity Payment.** Purchaser will make monthly purchases of electricity from Seller to be paid on the first day of each month at 9 Sellers Ave, Lexington, Virginia, 24450 or at any other address designated by Seller (“Electricity Payment”). The amount of the monthly Electricity Payment will be recalculated annually for each year of the Term, as follows:
 - a. For the initial twelve (12) month period of the Term, the monthly Electricity Payment will be \$144.11 per month.

- b. The monthly Electricity Payment for every month following the initial twelve (12) month period of the Term will be established in accordance with the following procedure:
- i. At the end of the initial twelve (12) month period, and at the end of each twelve (12) month period thereafter, Seller and Purchaser will recalculate the monthly Electricity Payments for the following twelve (12) month period, in accordance with the procedures set out in Paragraphs 3.b.ii, iii, and iv of this Agreement
 - ii. On or before the tenth (10th) day of the twelfth (12th) month of the initial twelve (12) month period following the commencement of the Term, Purchaser and Seller will provide to one another any documentation in their possession or control that reflects the Solar Array's total kilowatt hour production for the previous eleven (11) months. Seller will then calculate the upcoming year's monthly Electricity Payment by multiplying the Solar Array's total kilowatt hour electricity production during the previous eleven (11) months by the price per kilowatt hour as established in Schedule A of this Agreement, and dividing that product by eleven (11), which quotient will constitute the monthly Electricity Payment amount for each month of the second twelve (12) month period of the Term.
 - iii. For the third twelve (12) month period of the Term, and for every twelve (12) month period thereafter, on or before the tenth (10th) day of the twelfth (12th) month of the previous twelve (12) month period, Purchaser and Seller will provide to one another any documentation in their possession or control that reflects the Solar Array's total kilowatt hour production for the previous twelve (12) months. Seller will then calculate the upcoming year's monthly Electricity Payment by multiplying the Solar Array's total kilowatt hour electricity production during the previous twelve (12) months by the price per kilowatt hour as established in Schedule A of this Agreement, and dividing that product into twelve equal monthly payments, which quotient will constitute the monthly Electricity Payment amount for each month of the upcoming twelve (12) month period.
4. **Repairs.** If, during the Term, the Solar Array or any part of the Solar Array requires repair or replacement, Seller will be responsible for the cost of said repair or replacement, provided, however, that if, within five (5) years of any such repair or replacement, Purchaser exercises its purchase option pursuant to Paragraph 8 of this Agreement, Purchaser will pay to Seller an amount calculated as the cost incurred by Seller for any such repair or replacement, less one-fifth of that cost for every year passed since the repair or replacement cost was incurred. Any such payment by Purchaser to Seller pursuant to this Paragraph 4 will be made by Purchaser to Seller at or before the closing of the sale of the Solar Array to Purchaser, and will be in addition to the purchase price described in Paragraph 8 of this Agreement.

5. **Maintenance of Surrounding Property.** Purchaser will maintain the area of the Property around the Solar Array to ensure that the Solar Array is not subject to shading, overgrowth, or any other condition that may limit electricity production or damage the Solar Array. Purchaser will notify Seller any damage suffered by the Solar Array, and/or any condition that may limit production or damage the Solar Array. Purchaser must provide Seller with notice of any damage or condition within 24 hours of observing or becoming aware of it.
6. **Access to Solar Array and Internet.** Purchaser acknowledges that Seller, or Seller's designated agent, requires access to the Property to operate or repair the Solar Array or any of the Solar Array's parts. Purchaser will provide Seller, or Seller's designated agent, reasonable access to the Solar Array within twenty-four (24) hours after Purchaser receives notice of a request for access from Seller. Purchaser will also maintain internet access for the Solar Array's inverter to ensure Purchaser and Seller will have access to the Solar Arrays' electricity production data.
7. **Default.** Purchaser will be in default under this Agreement, if Purchaser fails to pay any Electricity Payment or other amount required under this Agreement within five (5) days after such Electricity Payment or other amount is due and payable, or if Purchaser otherwise fails to observe, keep, or perform its obligations under any other provision of this Agreement (collectively, "a default"). In the event of a default by Purchaser, Seller may exercise the following remedies:
 - a. Seller may give Purchaser written notice to cease Net Metering, and upon receipt of such notice Purchaser will immediately terminate Purchaser's Net Metering arrangement with Dominion Energy referred to in Paragraph 2 of this Agreement, and Purchaser will take all necessary steps to enter into an agreement (often referred to as a Power Purchase Agreement ("PPA")) with Dominion Energy, or any other entity that routinely purchases electricity, to sell the electricity produced by the Solar Array to Dominion Energy, or to any other entity who routinely purchases electricity, and Purchaser will execute any and all documents necessary to grant to Seller a security interest in the proceeds of such sale of electricity and any accounts receivable related to such sale of electricity, provided, however, that Purchaser's entry into a PPA in accordance with this Paragraph 7.a. will not modify or otherwise impact Purchaser's obligation to make Electricity Payments pursuant to this Agreement, nor will it limit Seller's opportunity to exercise any other remedy under this Paragraph 7 in the event of Purchaser's default;
 - b. Seller may terminate this Agreement and remove the Solar Array from the Property; and/or
 - c. Seller may pursue any other remedy available at law or equity.
8. **Option to Purchase.** During the period commencing the first day of the one hundred twenty-first (121st) month of the Term, and ending with the expiration or termination of

this Agreement, Purchaser will have the option to purchase the Solar Array from Seller for the fair market value of the Solar Array as calculated pursuant to Paragraph 8.a. of this Agreement. To exercise this option, at least 30 days prior to the date Purchaser intends to purchase the Solar Array, Purchaser will provide to Seller notice of Purchaser's intent to purchase the Solar Array. Upon receipt of notice and payment in full of the fair market value of the Solar Array in accordance with Paragraph 8.a. of this Agreement, Seller will convey the Solar Array to Purchaser. All expenses of the sale, including relevant filing and recordation fees, will be borne by Purchaser. Until the written exercise of the option and payment in full pursuant to this Paragraph 8, Seller will remain the sole owner and operator of the Solar Array.

- a. Seller and Purchaser agree that, for the purpose of establishing the fair market value of the Solar Array at the time of Purchaser's exercise of the option to purchase, the fair market value of the Solar Array will be calculated by using the following formula: $NPV = \left(\frac{FV}{(1+.01)^n} \right) * .9$, where FV stands for the total amount of future "projected payments" under this Agreement, .01 reflects the 1% inflation rate negotiated by Seller and Purchaser, n is the remaining life of the Solar Array at the time of Purchaser's exercise of the purchase option, and the .9 multiplier constitutes a reasonable discount rate to account for future risks, including but not limited to mechanical failure and decreased production capacity, that may arise over the remaining life of the Solar Array. For the purposes of this calculation, the parties agree that the life of the Solar Array is twenty-five (25) years from the date of the Solar Array begins generating electricity. Additionally, the parties agree that the total amount of future "projected payments" under this Agreement is calculated as the sum of the "projected payments" for the remaining life of the array. The "projected payments" will be calculated by multiplying the expected kilowatt hour production per year or partial year remaining in the life of the Solar Array (as set forth in Schedule B of this Agreement) by the applicable annual rate per kilowatt hour set forth in Schedule A of this Agreement.
9. **Termination.** In addition to Seller's right to terminate set forth in Paragraph 7 of this Agreement, Seller may terminate this Agreement in the event that Altenergy and Seller fail to enter into a contract for Seller's purchase of the Solar Array, or Altenergy fails to bill Seller for at least five (5) percent of the total cost of the Solar Array by the close of business on December 15, 2020.
 10. **Notice.** Purchaser will designate a point of contact to send and receive all notices, bills, consents, requests, and other communications provided for under this Agreement or related to this Agreement or the Solar Array ("point of contact"). Purchaser designates Ben Eland, Garden and Facilities Manager, as Purchaser's point of contact.

Any communication sent via email to an address set out in this Paragraph 10 will constitute notice under this Agreement and will be deemed to have been received immediately upon being sent. To constitute valid notice via email, Purchaser must send any notices to both email addresses listed below for Seller. Any communication sent via

U.S. Mail to an address set out in this Paragraph 10 will constitute notice under this Agreement and will be deemed to have been received five (5) days after it is sent.

To Purchaser: Boxerwood Education Association, Inc.
 963 Ross Road,
 Lexington, Virginia, 24450
 Ben@boxerwood.org

To Seller:



Should either Seller or Purchaser change the email address or the physical address at which they wish to receive notice under this Agreement, Seller or Purchaser will immediately notify the other party of the change. Purchaser may change its point of contact at any time, but must immediately give notice to Seller of that change and provide Seller with Purchaser's new point of contact and the contact information for the new point of contact, including the new point of contact's email address.

11. **Insurance.** Seller will maintain comprehensive general all-risk liability insurance that provides coverage for any loss or liability for damage to persons, property, or otherwise which might result from, arise from, or happen in connection with the operation, use, or condition of the Solar Array. Because the Solar Array will be located on Purchaser's Property, and Purchaser holds out the Property to the public for recreational and educational use, Purchaser will maintain insurance that provides coverage for any loss or liability for damage to the Solar Array or to Purchaser's employees, licensees, or invitees that may result from Purchaser's negligence, gross negligence or intentional misconduct with respect to Purchaser's maintenance of the property surrounding the Solar Array, Purchaser's conduct in relation to the Solar Array itself, or Purchaser permitting any person access to the Solar Array.
12. **Binding on Successors.** This Agreement is binding upon, and inures to the benefit of Seller and Purchaser, and their respective successors and assigns.
13. **Modifications.** No amendment or modification of this Agreement will be valid or binding unless expressed in writing and signed by both Seller and Purchaser.
14. **Severability.** If any portion of this Agreement is held by a court of competent jurisdiction to be invalid, illegal, or unenforceable, the remainder of this Agreement will not be affected and will remain binding on the Seller and Purchaser.
15. **Choice of Law.** This Agreement will be governed by the laws of the Commonwealth of Virginia.

Schedule A
Annual Price per Kilowatt Hour Increasing by 1% Annually:

Year	Price Per Kilowatt Hour in Dollars
1	\$.117
2	\$.118
3	\$.119
4	\$.121
5	\$.122
6	\$.123
7	\$.124
8	\$.125
9	\$.127
10	\$.128
11	\$.129
12	\$.131
13	\$.132
14	\$.133
15	\$.134
16	\$.136
17	\$.137
18	\$.139
19	\$.140
20	\$.141


Schedule B

Projected Annual Electricity Production by the Solar Array in Kilowatt Hours:

Year	Projected Electricity Production by the Solar Array (kwh)
1	14,781
2	14,663
3	14,545
4	14,429
5	14,314
6	14,199
7	14,086
8	13,973
9	13,750
10	13,640
11	13,531
12	13,423
13	13,315
14	13,209
15	13,103
16	12,998
17	12,894
18	12,791
19	12,689
20	12,587

ADDENDUM TO POWER PURCHASE AGREEMENT

Acknowledgement of Title and Covenant Not To Sell

 (the "Array Owners") and Boxerwood Educational Association, Inc. ("Boxerwood") on this 23rd day of April, 2021 agree, acknowledge, covenant, and attest to the following in connection with the solar array located at 963 Ross Road, Lexington, Virginia 24450 (the "Array").

WHEREAS, the Array Owners own and operate the Array; and,

WHEREAS, Boxerwood purchases the electricity produced by the Array from the Array Owners on the terms and conditions set forth in the Power Purchase Agreement With Option To Purchase ("PPA") signed between the parties on November 30, 2020; and,

WHEREAS, the parties wish to acknowledge and memorialize ownership by Boxerwood of any COREworks Credits, as defined below, and ownership by the Array Owners of any Renewable Energy Credits, as defined below, and to acknowledge and memorialize certain representations, warranties, and covenants regarding Renewable Energy Credits by entering into this Addendum to the PPA (the "Addendum"); and,

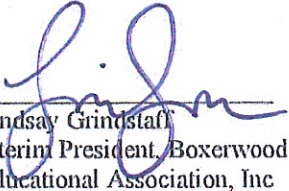
WHEREFORE, the Array Owners and Boxerwood, in exchange for the promises and covenants set forth herein and in the PPA, acknowledge and agree to the following:

1. **Definitions.** The following definitions apply to this Addendum:
 - a. **COREworks Credit:** any removal, limitation, reduction, avoidance, sequestration, or mitigation of any greenhouse gas associated with the Array and arising during the period beginning on April 1, 2021 and ending on March 31, 2041.
 - b. **Renewable Energy Credit:** any right, interest, credit, marketable certificate, or other benefit, except for COREworks Credits, created as a result of the production of electricity from the Array, which the parties agree is a renewable energy source, during the beginning on April 1, 2021 and ending on March 31, 2041.
2. **Acknowledgement of Title in and Ownership of COREworks Credits.** The Array Owners expressly acknowledge and accept that Boxerwood is the sole owner of and has sole title to all COREworks Credits generated by the Array.
3. **Acknowledgement of Intent to Sell, Market, and Retire.** The Array Owners expressly acknowledge and accept that Boxerwood intends to and may market, sell, and/or retire any or all COREworks Credits generated by the Array.

4. **Acknowledgement of Title in and Ownership of Renewable Energy Credits.** Boxerwood acknowledges and accepts that the Array Owners are the sole owners of and have sole title to all Renewable Energy Credits.
5. **Covenant Not To Sell, Convey, Donate, or Transfer.** The Array Owners represent, warrant, and covenant that they will not sell, convey, donate, transfer, or in any way attempt to sell, convey, donate, or transfer any Renewable Energy Credits.
6. **Default.** The Array Owners will be in default under this Addendum if the Array Owners sell, convey, donate, transfer, or in any way attempt to sell, convey, donate or transfer any Renewable Energy Credits or if the Array Owners fail to honor any of the representations, warranties, or covenants within this Addendum. In the event of a default by the Array Owners, Boxerwood shall be entitled to seek any legal or equitable relief, including injunctive relief, that may be available under Virginia law.
7. **Termination.** In the event that Boxerwood fails to market, sell, or retire any COREworks Credits within one year of the signing of this Addendum, the Array Owners may terminate this Addendum upon written notice to Boxerwood in accordance with paragraph 10 of the PPA. Upon the Array Owners' notice to Boxerwood in accordance with this paragraph and paragraph 10 of the PPA, this Addendum will terminate, all right, title and ownership of all COREworks credits will revert to the Array Owners, and the Array Owners shall from that day forward have sole title to and be sole owners of all COREworks Credits and all Renewable Energy Credits generated by the Array.
8. **Incorporation.** This Addendum is made in accordance with paragraph 13 of the PPA and as of the date of its execution shall be fully incorporated into and form a part of the PPA. Any written notice required under this Addendum or any dispute arising under this Addendum shall follow the terms and procedures set out in paragraph 10 of the PPA.

IN WITNESS WHEREOF, the undersigned Array Owners and Boxerwood have executed this Addendum to the Power Purchase Agreement with Option To Purchase signed between the parties on November 30, 2020, as of the date first written.




Lindsay Grindstaff
Interim President, Boxerwood
Educational Association, Inc