ULI Philadelphia

Strategies to Carbon Net Zero at St. Andrew's School, Middletown, DE.

Technical Assistance Panel Report | OCTOBER 26 & 27, 2023

About the Urban Land Institute

The Urban Land Institute (ULI) was established in 1936 as a nonprofit educational and research institute. It is supported by more than 45,000 members in 82 countries representing all aspects of land use and development disciplines. ULI's mission is to provide leadership in the responsible use of land to create and sustain thriving communities worldwide. ULI Philadelphia has nearly 900 members in the Philadelphia District Council, which includes the Philadelphia metropolitan area, Central Pennsylvania, the Lehigh Valley, Southern New Jersey, and Delaware.

ULI provides guidance to nonprofits and municipalities seeking solutions to land use challenges. Its Technical Assistance Panels objectively evaluate specific needs and make recommendations on implementation in an atmosphere free of politics and preconceptions. ULI member and non-member professionals provide their expertise in a voluntary capacity and each has signed an agreement to prevent current and potential conflicts of interest.

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In particular, the panel would like to thank Director of Special Projects Gregory M. Guldin, Head of School Joy McGrath, and Assistant to the Head of School Cara Alexander for their work preparing, coordinating, and supporting the panel's onsite work.

The panel would also like to thank the school community members for sharing their insights and perspectives during the stakeholder interview sessions.

ULI Advisory Services: National and Global Programs

Since 1947, the ULI Advisory Services program has assembled well over 700 ULI-member teams to help sponsors find creative, practical solutions for complex land use challenges. A wide variety of public, private, and nonprofit organizations have contracted for ULI's advisory services. National and international panelists are specifically recruited to form a panel of independent and objective volunteer ULI member experts with the skills needed to address the identified land use challenge. The program is designed to help break through obstacles, jump-start conversations, and solve tough challenges that need an outside, independent perspective. Three- and five-day engagements are offered to ensure thorough consideration of relevant topics. An additional national offering is the project analysis session (PAS) offered at ULI's Fall and Spring Meetings, through which specific land use challenges are evaluated by a panel of volunteer experts selected from ULI's membership. This is a conversational format that lends itself to an open exchange of ideas among diverse industry practitioners with distinct points of view. From the streamlined two-hour session to the "deeper dive" eight-hour session, this intimate conversational format encourages creative thinking and problem

solving. Learn more at americas.uli.org/programs/advisory-services/. Distinct from Advisory Services panels, TAPs leverage local expertise through a half-day to two-day process.

ULI Advisory Services: District Council Programs

The goal of the ULI Advisory Services program is to bring the finest expertise in the real estate field to bear on complex land use planning and development projects, programs, and policies. The ULI Philadelphia technical assistance panel (TAP) program has assembled over 187 ULI-member teams in service of ULI's mission to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. Drawing from its local membership base, ULI Philadelphia conducts TAPs offering objective and responsible advice to local decision-makers on a wide variety of land use and real estate issues ranging from site-specific projects to public policy questions. The TAP program is intentionally flexible to provide a customized approach to specific land use and real estate issues. In fulfillment of ULI's mission, this TAP report is intended to provide objective advice that will promote the responsible use of land to enhance the environment. An additional local offering is the project analysis forum, which offers a shorter format for district councils to employ local member expertise to address regional land use challenges. Panelists are land use professionals uniquely positioned to address the specific challenges at hand, and provide in-depth, project-specific, and pragmatic recommendations. The intimate, conversational format encourages creative thinking and problem solving between the panel and the sponsor. Learn more at www.philadelphia.uli.org

The Net Zero Imperative

Thanks to a generous gift from Owen Thomas, ULI has launched the Net Zero Imperative – a multi-year initiative to accelerate decarbonization in the built environment. Additional gifts from Lynn Thurber, Joe Azrack, Franz Colloredo-Mansfeld, and Dan Cashdan further support and bolster the NZI program's scale and impact. Work to advance the initiative includes technical assistance panels in five to eight global cities each year, designed to help developers, building owners, cities, and other relevant constituents reduce carbon emissions associated with buildings, communities, and cities. The fundamental goal of the effort is to provide concrete ideas and strategies to real estate owners, public sector leaders, and the general public to eliminate carbon emissions from the built environment to reach net zero. Through its work, the initiative will create global resources (research, toolkits, and other tools) to help all ULI members accelerate decarbonization in their real estate operations and in their cities.

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St. Andrew's School

With financial support through a generous gift from Jennifer and Owen Thomas.

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A. Felix du Pont, Jr. Memorial Chapel

CONTENTS

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Panelists touring the campus on Day One of the TAP.

INTRODUCTION

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Graduating seniors leave their name in the hallway of Founders Hall.

St. Andrew's School engaged with ULI Philadelphia for a Technical Assistance Panel (TAP) in Fall 2023. The goal was to provide guidance for the school's long-term sustainability and carbon reduction planning regarding infrastructure and capital improvements; land usage; procurement and vendors; and school policies and culture.

The TAP was held October 26-27 at St. Andrew's School, an Episcopal boarding school in Middletown, Delaware for grades 9 through 12. The panel was comprised of sustainability-focused professionals, including an accredited LEED architect; a strategic planning and sustainability planning consultant; a director of sustainability for a real estate developer; a construction engineer; an HVAC engineering specialist; and a renewable energy, energy management, and facilities management expert.

Onsite, available panelists attended a dinner on October 25th with students and an evening chapel session. This optional event provided a meaningful introduction to the school and its distinct culture.

On the morning of October 26th, the group toured the campus on foot, including its grounds, its historic buildings, and its more recently built LEED Gold certified facilities, gaining an understanding of the campus utility and energy systems. They then took a bus tour of the surrounding 1,500 acres of farmland and houses. These 1,500 acres are owned by St. Andrew's, and aside from a small solar array, the land is leased to local farmers who agree to practice ecologically appropriate techniques.

The afternoon was spent in groups dedicated to stakeholder listening sessions. All stakeholders came from the school community and represented a wide swath of perspectives, including students, faculty, staff, board members, administrators, school leaders, grounds and facilities personnel, and other key figures. At the conclusion of the interviews, the panel reconvened to share stakeholder feedback and initial observations. In the evening, Head of School Joy McGrath hosted the panel and other school community members at her home on campus for cocktails and dinner.

On the morning of October 27th, panelists divided into two groups. One group was led on a second school tour in which school staff provided a more in-depth tour of campus mechanical and building systems, specifically the school's iconic Founders Hall, which houses the cafeteria, dining hall, classrooms, library, business office, chapel, performance theater, admissions offices, student life headquarters, head of school's office, in addition to the entire boy's dormitory and 10 faculty residences. A second group of panel members had a follow-up conversation with the campus farm manager and agricultural consultant and interviewed staff working in capital planning. Following the tour and phone interviews, the panel reassembled on campus to start compiling its findings and building out recommendations, which included developing a holistic sustainability plan; building a communications strategy to inform the school community and donors about its work; and proposing both short- and long-term infrastructure and capital improvements. They presented this report to the sponsor and stakeholders on the afternoon of October 27th.

BACKGROUND

St. Andrew's School was founded in Middletown, Delaware in 1929 by A. Felix du Pont. Grounded in Episcopalian identity, the boarding school has been co-ed since 1973. St. Andrew's welcomes students of all backgrounds and religious beliefs, providing financial aid to all who qualify for admission. St. Andrew's prides itself on "an exceptional academic program that promotes critical thinking and analytical problem solving; a school culture of kindness, authenticity and service to others; and a commitment to equity, inclusivity, and empathy." At the core of the school's mission are two pillars: student leadership and student service.

St. Andrew's bucolic setting amid 2200 acres bordering Noxontown Pond—1500 of which are working farmland—creates an atmosphere of idyllic retreat from the distractions of modern life in which students are encouraged to build community and deeply engage with their study. All students and more than 90 percent of faculty live on campus. St. Andrew's graduates are accepted at twice the national rate at top universities and liberal arts colleges.

From the Collegiate Gothic Revival-style architecture of its original Founders Hall to twice-weekly chapel gatherings and student servers at dinner, St. Andrew's cultivates a reverence for history and tradition. These rituals and customs—and an average class size of 10—bond the small community of 320 students. The school has also remained committed to a no-cell phone culture which promotes in-person communication and engagement on campus.

From its inception, St. Andrew's has prioritized land conservation. Sustainability is a core part of the organization's mission statement: "St. Andrew's is committed to the sustainability and stewardship of its land, water, and other natural resources. We honor this commitment by what we teach and by how we live in community and harmony with the natural world." More recently, St. Andrew's was designated a Green Ribbon School by the Department of Education in 2013 and added its two LEED Gold certified buildings to campus, including the first-ever LEED Gold certified building in the state of Delaware.

In 2014, the school issued a sustainability plan outlining its goals for carbon reduction. The school counts two hybrid vehicles in its fleet, employs green cleaning products, operates an organic garden, and recycles both common and less common waste materials. Student-led sustainability initiatives include the addition of a 50kW solar array, a system for composting dining hall waste, and a student-supported and faculty-led initiative called Project Zero, an end-of-school-year cleanup effort that ensures all unwanted items are recycled, upcycled, donated, and/or traded. Past student-led initiatives have included a Beekeeping Club. In the past several years, the school has hired a staff Sustainability Coordinator to oversee student and campus efforts. However, there is currently no one serving in this role and some of the above-mentioned efforts are less active since the onset of the COVID-19 pandemic.

In 2029, St. Andrew's will be celebrating its centennial year. With that key milestone in mind, the school approached ULI for assistance with revisiting its sustainability and carbon reduction goals and outlining a strategy for short and long-term measures to achieve those goals.

ST. ANDREW'S SCHOOL

Aerial view of St. Andrew's School over Noxontown Pond highlighting Founders Hall.

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Panelists touring the campus on Day One of the TAP.

SCOPE

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Panel members present their recommendations to the sponsor in Engelhard Hall.

With an assignment to assess St. Andrew's current site conditions, technologies, and daily practices and realign them with its sustainability and carbon neutrality goals, the panel was asked to consider the following questions in its scope:

- What set of actions or capital improvements are likely to yield the largest reductions in energy usage across all facilities and equipment?
- What opportunities might there be to convert to more economical or environmentally sensitive energy sources?
- Should St. Andrew's consider additional investments in its own renewable energy production capabilities and/or carbon capture?
- Are there other carbon footprint reduction areas beyond energy consumption that the school should consider, including but not limited to the school's vast acreage and its currently dedicated farming usage?
- What, if any, downstream vendor or supplier/partner commitment to environmentally sensitive practices should the school consider implementing?
- How can any future work directly or indirectly benefit the culture of sustainability already in place at St. Andrew's? What partnerships might the school consider?

On the morning of October 26th, panelists toured school grounds on foot, including the faculty housing quadrangle, the LEED Gold certified fieldhouse/athletic facility and 29,000 square foot math and science building, and the historic Founders Hall and its classrooms, dining, and student residence areas. The group boarded a bus for an extended tour of the school's surrounding acreage, including working farmland, its solar array, and faculty homes.

During stakeholder interviews on the afternoon of the 26th, panelists were divided into three groups and spoke with 42 stakeholders over the course of three-hours. In the meetings, the panel asked stakeholders for their input on the school's sustainability and carbon reduction practices, priorities, and challenges.

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Panelists stand in The Garth, outside of the library in Founders Hall.

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Panel members and ULI staff developing ideas for the presentation.

ASSESSMENT

St. Andrew's School Energy Cost and Consumption Report

Direct Energy Emissions	2004	2015	2023	DIFF 2004:2023	%
Scope 1: Fossil Fuels (MTCDe)	2,359	1,619	1,192	(1,167)	**-49%**
Scope 2: Electric (MTCDe)	1,795	1,467	1,643	(152)	**-8%**
Total Energy Emissions (MTCDe)	4,331	3,167	2,927	(1,404)	**-32%**

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Mechanical room in Founders Hall.

The panel synthesized its findings from the briefing materials, site tour, and stakeholder interviews into some general observations about St. Andrew's regarding its sustainability and carbon reduction activities.

The panel found that St. Andrew's has a supportive community with a shared commitment to excellence that includes forging a sustainable future. Head of School Joy McGrath's motto "Build nothing; use less; take care of what we have to do more" summarizes a guiding ethos that can be seen across the school.

Indeed, the school has already made impressive strides in minimizing its carbon footprint and promoting a culture of sustainability, having already reduced its carbon output by 32 percent since 2004, as documented by regular reporting and in an internal 2014 sustainability plan. This was achieved primarily through efficiency measures, building controls, and switching from oil to natural gas. In fact, total energy per square foot has been reduced even as overall building square footage has expanded. The farms on leased land already incorporate many best environmental practices, and the school's long-term engagement with a volunteer and school alumnus farm consultant has provided consistently valuable advice and guidance. With a wealth of resources, such as the surrounding land and capital to dedicate to infrastructure improvements, St. Andrew's is well positioned to pursue its goals.

What's more, with its emphasis on community and the collective good, St. Andrew's can make additional changes that might be difficult to implement in typical

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Noxontown Pond

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Active farmland on the campus property.

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The panel walks through the lawn between Noxontown Pond and Founders Hall.

school environments. The school's successful no-cell phone policy demonstrates a proven ability to modify habitual behavior for the benefit of all. Finally, the demonstrated institutional support from the highest levels down augurs well for future sustainability planning and implementation.

Yet St. Andrew's sustainability work also faces some challenges. On the infrastructure side, old buildings such as the sprawling all-purpose Founders Hall could be more efficient but are prohibitively difficult to upgrade.

On the culture and operational side, the current student body is less engaged around sustainability concerns than it may have been in the past. While just a few years ago, the student Environmental Stewards group had attracted a healthy number of participants, it has more recently waned in popularity. Many of the group's initiatives on campus were lost during the upheaval of the COVID-19 pandemic. Students cited a lack of curricular focus on sustainability and climate change as another reason the current cohort might not be as tuned in to these issues. In addition, in the past, the school's sustainability coordinator position has suffered from high turnover. While some stakeholders contended this was because the coordinator did not have the authority to make more than marginal environmental improvements on campus and left the job with frustration, the school administration reported that, in fact, coordinators have left for a variety of reasons and the school has not always been able to support the role due to housing constraints and pressing teaching and coaching needs.

Consistently effective communication to the entire school community is another barrier. Some stakeholders were not aware of the school's previous successes or even its current goals. At the same time, staff mentioned that a lack of coordination across such key departments as facilities, housekeeping, and residential life resulted in wasteful practices or undermined reparative ones. And as with any institution, cultivating a lasting culture and embedding long-term practices will be an ongoing test for St. Andrew's.

RECOMMENDATIONS

The panel divided up its recommendations into two buckets— infrastructure and capital improvements; and programming, culture, and organization.

Infrastructure and Capital Improvements

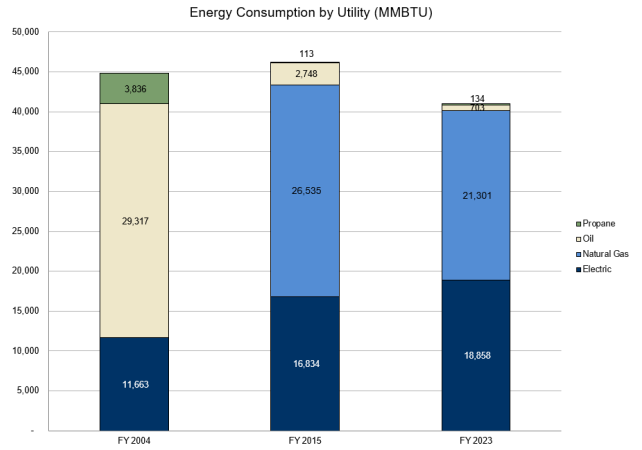
As previously stated, St. Andrew's School has already made significant progress in reducing its carbon footprint, largely through infrastructure and capital improvements. A high-level review and assessment by the panel recommended maximizing and optimizing building efficiency, electrifying equipment and fleets, phasing out systems (e.g. gas chillers/boilers at end of life), and building enough solar capacity to account for current energy usage—then leveraging land holdings to offset the remaining fossil fuel usage until those systems can be replaced with electric. Additionally, they recommended that the facilities team continue to keep pace with industry improvements, focusing on best practices for efficiency, preventative maintenance, and ongoing attention to building envelope integrity. This focus, along with continual monitoring of energy use, will reduce campus energy use and carbon emissions both in the short and longer-term, and set the stage for eventual achievement of a net zero carbon campus.

Near-Term Improvements

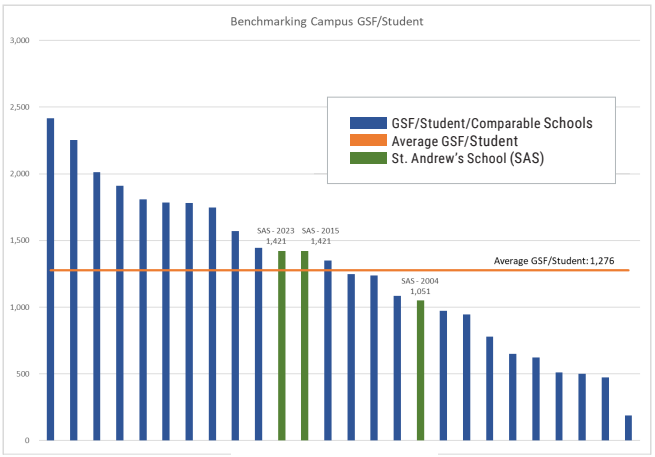
While existing systems are well kept and mostly up to date, the panel listed some tactics for improving efficiency that could be implemented immediately or in the near future. These include refining controls such as HVAC setpoints, automating systems, and establishing a single, more efficient control center. In addition, the school could finish its incremental upgrade to LED lighting and add lighting sensors and timers to eliminate energy waste in unoccupied spaces.

Adding submeters and installing additional sensors would help the school collect more data about its energy usage and carbon output, for continued improvement, maintenance purposes, and usage in the curriculum.

When equipment or building systems (such as roofs and windows) reach the end of their useful life, replacement should be carefully considered using a net-present-value

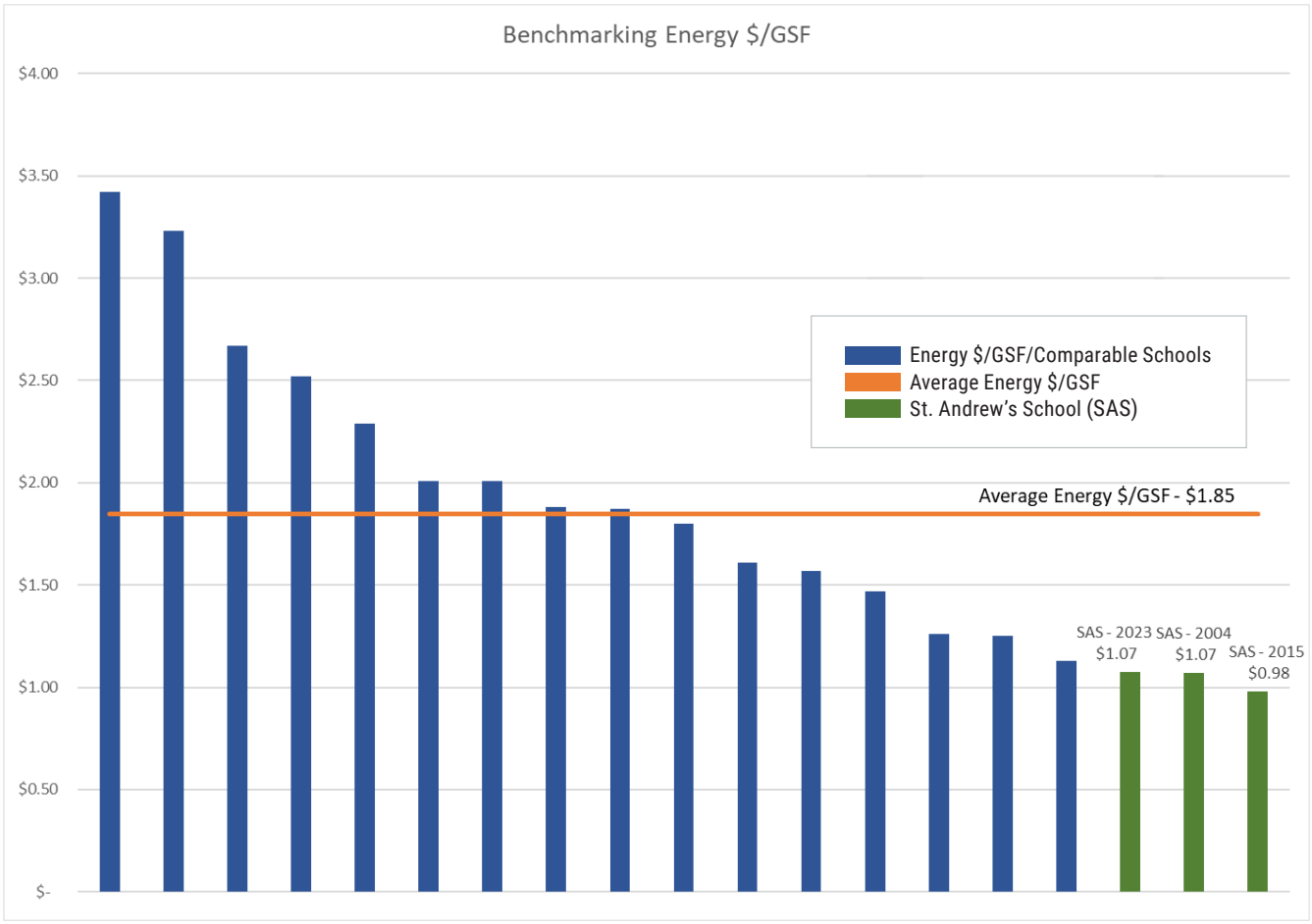


The shift from fuel oil for heating to natural gas has changed St. Andrew's School's energy consumption profile. Gains in efficiency can be seen from FY 2015 to FY 2023.



St. Andrew's School has average GSF per student when compared to similar boarding schools. The amount of space on campus influences both energy consumption and emissions.

The benchmarking charts presented in this report compare St. Andrew's School to similar boarding schools across the northeast that are similar in building square footage and/or total population of students, faculty, and staff on campus. Energy benchmarking data was collected within the last three years and analyzed by The Stone House Group and utilized by ULI.



THE STONE HOUSE GROUP

St. Andrew's School's energy cost per GSF has consistently been below average for other boarding schools. The location of the school and utilities that serve the school influence energy cost per GSF.

assessment to ensure both long-term cost effectiveness and environmental improvement. One example of such an approach was noted for the on-campus faculty homes, some of which are still using oil-burning furnaces for heat. Rather than replace still-performing systems, the furnaces should be maintained in good repair, but when it is time for a replacement, the TAP panelists recommended exploring high-efficiency electric heat pumps as a potential upgrade. This makes particularly good sense in light of currently available tax incentives from the federal and state governments.

St. Andrew' School can take the following steps to prepare for the long-term investment of installing additional solar panels. First, engage consulting & design engineers to develop a solar array interconnection application that will engage Delmarva Power to understand utility infrastructure upgrades required to support a large solar array. Then issue an RFQ/P to solar engineering, procurement, and construction contractors to identify a preferred solar construction partner.

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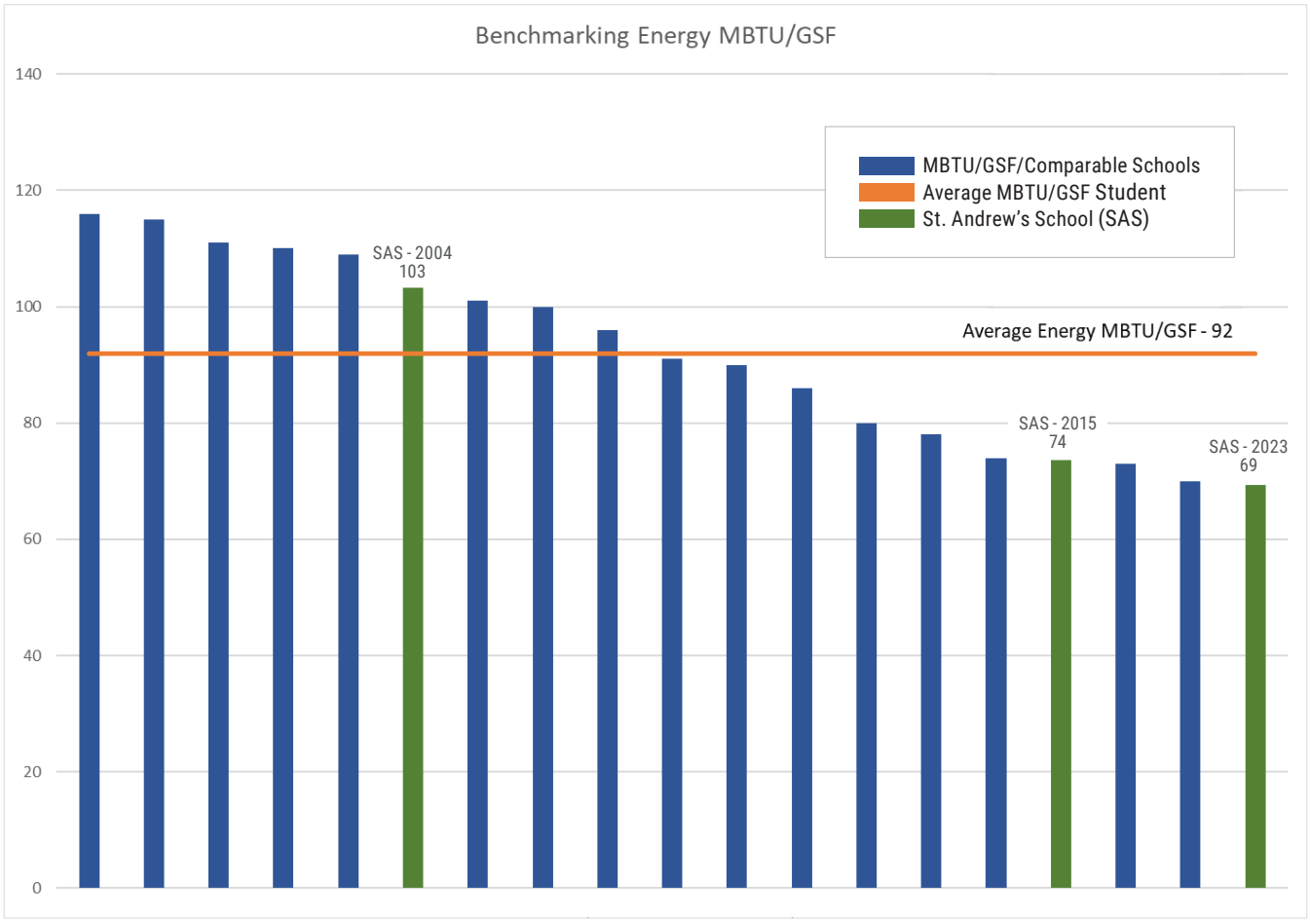
Existing solar panels on the campus



St. Andrew's School's Energy Use Intensity (EUI), energy consumed per GSF of campus space (MBTU/GSF), was average in 2005. The conversion to highly efficient natural gas heating systems can be seen in 2015 data, and 2023 data indicates that further investments in energy efficiency have been made. St. Andrew's School currently has the lowest EUI of benchmarked boarding schools.

Long-Term Improvements

In the long-term, St. Andrew's has an opportunity to upgrade its full campus fleet to hybrid or electric vehicles. With the increased availability of electric vehicles, the school could continue to make its transportation more efficient, beginning with maintenance vehicles and other vehicles used for short distances. A similar approach could be adopted for groundskeeping, with a phase-in for all-electric equipment that is owned, leased, or contracted by the school. Infrastructure would require an upgrade to support this shift with the addition of charging stations. Many federal incentives are available for funding electric vehicle charging infrastructure, primarily through the Inflation Reduction Act.

Finally, the school can continue making efficiency gains in its equipment, replacing older models with more efficient or battery-operated ones as they give out.

Achieving Net Zero

A crucial path to achieving net zero carbon will be expanding St. Andrew's current on-campus solar power production. Up to 5 MW of solar production would be allowable on-site from a utility perspective, and the panel recommended building a 4 MW solar array to cover all current electricity needs (which would require approximately 8 acres of land). This capital investment would be recouped in 10 to 15 years, depending on the future costs of grid electricity.

A second option, which has less long-term environmental benefits but still achieves a net zero outcome for St.

PHILLIPS EXETER ACADEMY

New Hampshire boarding school Phillips Exeter Academy has for many years engaged with climate and sustainability issues. The school employs both a manager of sustainability and natural resources and a sustainability education coordinator who are part of a multidisciplinary Environmental Stewardship committee that meets twice a month. In 2023, the school released its sustainability and climate action plan with the goals of reducing emissions, educating all students about the principles of sustainability and dangers of climate change, and integrating sustainable practices into all programs and operations on campus. The school already offers 12 courses, multiple extracurricular opportunities, and a global study program related to sustainability. Phillips Exeter boasts six LEED certified buildings and a 575,000 kw solar array. Having reduced emissions by 60 percent since 2005, the plan sets a goal of achieving net zero by 2050.

Source: Building From Strength to a Zero Carbon Future: Phillips Exeter Academy's Sustainability and Climate Action Plan

DICKINSON COLLEGE

Dickinson College, a small liberal arts school in Pennsylvania, has established itself as a sustainability leader in higher education with a holistic and long-term commitment to environmental stewardship. That includes a net zero emissions status as of 2020, achieved by reducing emissions by 25 percent and offsetting the school's remaining greenhouse gas emissions. The school offers an academic Center for Sustainability Education with a mission to, "engage Dickinsonians in learning about, innovating for and practicing sustainability in the classroom, on the campus and in communities near and far." Dickinson also maintains an organic farm that supports dining services and provides produce to the community through a CSA and farmstand; houses the nationally recognized Alliance for Aquatic Resource Monitoring; and tracks solar energy output and other energy metrics on a website dashboard. The school's Climate Action Plan encompasses environmental resilience, climate action, and ongoing environmental education.

Source: Dickinson College Climate Action Plan

Andrews, would be constructing a 2 MW solar array and supplementing that investment with ongoing purchase of Renewable Energy Credits. These energy credits would be purchased in the open market from an existing producer of renewable energy but would offset the carbon associated with St. Andrew's continued (but reduced) reliance on electricity from the grid.

Critically, St. Andrew's would rely on improved practices on the leased farmland to sequester carbon in the fields annually. This process can be documented and reported to achieve verifiable carbon offsets from the farmland to balance out any remaining carbon emissions from campus fossil fuels. The panel estimated that implementing carbon capture/sequestration at a rate of 0.9 metric tons of carbon per acre of farmland on 1100 acres of farmland would be an ample offset.

Programming, Culture and Organization

Sustainability Coordinator

To ensure better coordination across departments and operations, the panel suggested that the school hire a sustainability staff member to oversee and manage all related efforts on campus. The panel also recommended structuring this position to a higher-level that reports directly to the Head of School. The coordinator (or similarly titled staff person) would dedicate at least 25-50 percent of their time to sustainability work. Responsibilities would include co-chairing (along with the Associate Head of School or another administrator) a multidisciplinary sustainability committee that meets regularly and leads data collection and reporting to regularly update the school community. In order to successfully recruit and hire for this position the school would have to develop a thorough job description that would reflect its current needs and the changed function of this role.

Sustainability Committee

The sustainability committee would be tasked with writing a sustainability plan for the school and overseeing its implementation. In addition to the sustainability coordinator and Associate Head of School, committee members should be diverse and include the chief financial officer, two or more board members, the athletic director,

WOODBERRY FOREST SCHOOL

An all boys, all boarding secondary school in Orange Virginia set on a 1,200-acre campus, Woodberry Forest School instills in its students a commitment to caring for and protecting their environment. In 2021, Woodberry called on ULI Virginia to help improve energy efficiency, minimize its carbon footprint, and develop a path to net zero. The panel toured the campus and met with stakeholders to assess current conditions such as energy usage and attitudes toward sustainability. Based on these findings, the TAP developed guidance in the following areas: culture and mission; fiscal responsibility; land use and environmental stewardship; and educational mission with specific suggestions for addressing each. In particular, the school was advised to align stakeholders around sustainability goals, improve infrastructure and operations, identify land use opportunities for renewable energy, and integrate sustainability topics into both the course curriculum and student community service engagements. The goal was to offer the school concrete recommendations to incorporate into its strategic planning as it built toward a more sustainable future. Since then, the school has hired a sustainability focused staff member, electrified several dormitories, and has initiated the early stages of planning a pilot solar photovoltaic array installation.

Source: ULI Virginia: Woodberry Forest School: Envisioning the Future Toward a Net Zero Campus

selected faculty, students, and additional stakeholders interested in participating.

The committee might also hire a consultant to facilitate the planning process and help write the plan, including stated benchmarks and goals. The consultant could also advise on such matters as institutional partnerships and future programming.

Sustainability Planning

Before engaging in the process of developing a new plan, the committee should review the 2014 plan to determine what goals were achieved, and extrapolate any additional successes, challenges, and/or lessons learned. Using both quantitative and qualitative data, the committee would identify goals and their supporting rationale. Finally, the plan should outline the specific roles relevant community members would play in achieving these goals.

A holistic sustainability plan would encompass the following:

- Curriculum
- Partnerships
- Programming and Activities
- Natural Resources

Curriculum

The committee would conduct a full audit or review of the current curriculum to determine how sustainability is presently being taught and where there are gaps or opportunities to integrate potential learning opportunities. Beginning in students' first year, courses might explore concepts such as carbon footprinting, farming, biodiversity, and energy analysis, among others. This work would build on or expand the environmental science course currently being taught to students in their junior and senior years. Additionally, the school could add a data analysis course or track to support needed data analysis for sustainability awareness and improvement.

Partnerships

In order to maximize resources and increase the reach of sustainability programming, St. Andrew's would ideate and pursue partnerships with other like-minded nonprofit organizations and institutions that could offer more possibilities for student engagement. Additional educational or extracurricular partnerships could be created, for example, with the University of Delaware, the Department of Education, or Future Farmers of America.

Programming and Activities

There are a myriad of opportunities for St. Andrew's to incorporate more sustainability programming. With a largely student-run campus (and a track record of past successes around student-run sustainability initiatives), it would follow that students should be encouraged to organize and run their own clubs, events, and activities. These could include expanding current move-in and move-out events, offering community yard sales, creating student groups dedicated to improving consumer habits on campus, inviting speakers to campus, starting school-wide behavioral challenges, raising money for related causes, and more.

Natural Resources

Given its well preserved forest, watershed, and surrounding farmland, St. Andrew's should dedicate a section of its sustainability plan to supporting, protecting, and where possible, building learning opportunities around natural resources. Here the plan could cover standard operating procedures (SOPs) for regularly monitoring and protecting soil health and water quality, and supporting data collection. The school would likely have to create a framework for data collection and analysis to inform its sustainability activities. The plan could prescribe a process for working closely with the volunteer farm consultant to ensure that farm leases stipulate sustainable farming practices. It could also map out opportunities for leveraging the land for overlapping functions such as farmland with solar arrays.

Communication

Improved communication around carbon reduction efforts would help to support St. Andrew's investments and ensure that students, faculty, staff, and other stakeholders continue to contribute to an ongoing effort. The plan should also encompass a communications strategy that emphasizes transparency and where possible, supporting data. Regular updates should cover developments such as:

- Announcement of the completed plan when available
- Progress reports, such as community dashboards linked to the school home webpage
- Introduction of new technology and products to ensure community buy-in and related costs to end users
- Available resources for students, faculty, and staff to better understand sustainability practices and implement them on campus

Framework for Action

1) **Create a game plan for infrastructure and capital improvements that includes**
    a. Phasing out old equipment
    b. Maximizing building efficiency
    c. Electrifying fleets and equipment
    d. Building more solar capacity to meet energy needs
        i. leverage land holdings for solar capacity to offset remaining fossil fuel systems until they can be replaced
    e. Begin the processes necessary to certify farming practicies as regenerative, creating carbon offsets that can be utilized by the school
    f. Achieving net zero through data collection and reporting, building more solar capacity, and carbon capture/sequestration
2) **Implement and stay current with industry best practices for**
    a. Efficiency
    b. Preventative maintenance
    c. Building envelope integrity
3) **Near-Term Improvements**
    a. Refine HVAC setpoints
    b. Automate systems
    c. Establish a single, efficient control center
    d. Complete upgrade to LED lighting
    e. Add lighting sensors and timers
    f. Add submeters and additional sensors for data collection
    g. Explore high-efficiency electric heat pumps as an alternative to fossil fuel heating systems in campus housing
    h. Begin application process for solar panels

i. Engage consulting & design engineers to develop a solar array interconnection application that will engage Delmarva Power to understand infrastructure upgrades required to support a large solar array

j. Issue an RFQ/P to solar engineering, procurement, and construction contractors to identify a preferred solar construction partner

4) Lay groundwork for cultural and programming changes

a. Develop communications capacity for sustainability communications

b. Develop a data collection and data sharing framework, such as a campus wide dashboard

5) Hire a Sustainability Coordinator

a. Create a job description

i. Reports to Head of School

ii. Spends 25 to 50 percent of hours on sustainability work

iii. Co-chairs Sustainability Committee

b. Recruit for position

6) Create a Sustainability Committee

a. Co-chaired by Sustainability Coordinator and Associate Head of School or similar.

b. Recruit other members from diverse divisions of school

c. Hire a consultant to assist with planning, partnerships and programming

7) Develop a Sustainability Plan

a. Review 2014 plan to assess what was achieved and what wasn't; successes; lessons learned

b. Use data to identify specific goals and supporting rationale

c. Outline specific roles for community members to play

d. Include the following:

i. Curriculum

1. Conduct full audit of current curriculum
   a. Build on current environmental science course
2. Look for gaps and opportunities
3. Consider adding coursework in
   a. carbon footprinting
   b. farming
   c. biodiversity
   d. energy analysis

ii. Partnerships

1. Ideate and pursue partnerships with like-minded nonprofits and institutions
2. Seek partnerships for student engagement, education and extracurricular activities

iii. Programming and Activities

1. Conduct an audit of current programming and activities to determine sustainability opportunities
2. Consider expanding current activities and adding new ones, such as
   a. Community yard sales
   b. Student initiatives/behavioral challenges to improve consumer habits
   c. A green speaker series
   d. Fundraisers for related causes

iv. Natural Resources

1. Dedicate a section of plan to conserving, supporting and integrating learning opportunities around natural resources
   a. Include SOPs for
   i. Soil health and water quality monitoring
   ii. Data collection
   iii. Working with farm consultant to ensure leases stipulate sustainable farming practices

iv. Map out opportunities for leveraging resources for overlapping functions such as farmland with solar arrays

8) Long-Term Improvements

1. Continue to upgrade vehicles and equipment to electric
2. Expand solar power
   a. Build a 4 MW solar array
   b. Or build a 2 MW solar array and offset remaining carbon with Renewable Energy Credits, using sequestered farmland
3. Implement carbon capture/sequestration at a rate of 0.9 metric tons of carbon per acre of farmland on 1100 acres of farmland

9) Communication

1. Incorporate a communications strategy to ensure ongoing transparency about sustainability
   a. Updates should include
      i. Announcement of the completed plan when available
      ii. Progress reports, such as community dashboards linked to the school home webpage
      iii. Introduction of new technology and products to ensure community buy-in and related costs to end users
      iv. Available resources for students, faculty, and staff to better understand sustainability practices and implement them on campus

SUMMARY

St. Andrew's School presented the panel with the challenge of evaluating its current conditions, infrastructure, and culture to help it reach its carbon neutrality goals. While on campus for two days, the panel discovered that the school had already made many changes over the past decade to improve its systems and sustainability practices. At the same time, the panel noted that the school community was inherently amenable to making and supporting meaningful change.

Nevertheless, the panel also identified gaps and areas of opportunity for the school to make future investments. Creating a new campus-wide sustainability plan would be essential to laying the foundation for a more holistic approach. This effort should be led by a sustainability coordinator and a multidisciplinary committee of stakeholders and should encompass school culture, operations, land use, curriculum, and more. To bolster this effort, the school should also build a communications strategy to ensure that the entire school community stays abreast of its initiatives, goals, and progress.

On the infrastructure side, panelists outlined some key changes St. Andrew's can make to buildings and operations in the immediate and long-term with the goal of ultimately reducing carbon emissions to net zero with more solar power and carbon capture offsets.

ULI PHILADELPHIA

Boaters on Noxontown Pond

PANELISTS

Chair: Daniel Garofalo,

Director of Sustainable Operations, Edelman Fossil Park and Museum

An accredited LEED architect, Dan Garofalo is currently the Director of Sustainable Operations for the Edelman Fossil Park and Museum, which will be New Jersey's largest net-zero carbon institution when it opens in 2024. Dan has overseen and planned sustainability projects for the private and public sector, in higher education, and for non-profit organizations to improve lives and promote equity. His experience includes 10 years as the University of Pennsylvania's first Sustainability Director and as a consultant assisting Drexel University's Real Estate and Facilities Department in creating their first sustainability plan. Prior to his work in higher education, Garofalo was a consulting architect at the Hillier Group, BBLM Architects, Jacobs/Wyper Architects, and Becker Winston Architects, where his work involved leading design projects for a variety of commercial, health care, pharmaceutical, and institutional clients. He has a long history of volunteerism and community service, having served as a Peace Corps volunteer in both Sri Lanka and Malawi, and currently serves as Vice-Chair of the City of Philadelphia Civic Design Review Committee, and on the Design Advisory Committee of the Philadelphia Navy Yard.

Scott Frenck,

Managing Director, DEDC, LLC

Scott has over 20 years of experience in Project Management as well as in engineering and designing mechanical systems for educational, commercial, and industrial projects. As a Managing Director, Scott is responsible for managing and coordinating all engineering aspects of the project, from design conception to construction completion. He is responsible for understanding the requirements of the project and translating them into mechanical and electrical drawings and specifications for bidding and construction. As the Engineering Project Leader, Scott manages the entire mechanical and electrical engineering team and leads all interactions with the larger project team. As the Lead Mechanical Engineer, Scott leads the mechanical engineering and design effort for the project. As a LEED professional, Scott always considers sustainability in his work. Scott's technical skills combined with his unique ability to understand, simplify, resolve and effectively communicate complex engineering problems makes him an asset in the project process.

James Hayes,

Associate Principal, The Stone House Group

James has been a renewable energy, energy management, and facilities management consultant with The Stone House Group since 2009. His background is in the facilities management and construction field working in non-profit, educational environments with an emphasis on project coordination, energy optimization, negotiating/ managing energy contracts, and sustainable master plan development. He is often called on to conceive and implement energy project financing plans that leverage federal, state, and utility incentives. Additionally, he does climate action planning and greenhouse gas mitigation as well as purchasing carbon offsets and renewable energy credits for The Stone House Group. His ability to identify opportunities for both energy efficiency and renewable energy incentives produces solutions that

clients can seamlessly implement while achieving economic, environmental, and social triple bottom line results. James has helped secure over $10 million in grants and incentives for clients.

Ron Pluto,

Sr. Director of Engineering, Brandywine Realty Trust

Since 2005, Ron has been responsible for many of Brandywine's major construction projects and activities relative to building system design and construction. Ron was responsible for the opening of the Cira I and the renovation of the historic 30th Street Post Office and was also a key member of the project team for the FMC Tower development. Ron worked with the Spark Therapeutics design team on the conversion of 150,000 square feet at 3025 Market to a life science lab space. Ron has worked with Spark, UPHS, and other tenants on many other projects converting BRT office space to life science lab use. Ron also worked with various design teams on the design of multi-tenant ground up life science buildings in Brandywine's pipeline. Over the last five years, Ron has had responsibility for all of Brandywine's major development projects for building system design, installation, and commissioning. Ron is a member of ASHRAE. Ron has achieved certifications from BOMA as an RPA, AEE, CEM and CBCP and holds a PA real estate salesperson license. Ron has completed ASHRAE courses on the design of DOAS, design of high performance buildings, advanced laboratory design, and many others.

Angi Rivera,

Director of Sustainability, Sellen Construction

With experience leading government and commercial teams globally through strategic sustainability planning and sustainable design and construction processes, Angi joined Sellen, one of the largest locally owned general contractors in the Pacific Northwest, in 2021. As Sellen's Sustainability Director, Angi oversees the company's strategic sustainability direction and enables Sellen to deliver spaces that meet or exceed client sustainability goals; from strategy, to certifications, to embodied carbon analysis. With twenty years' experience in sustainability, Angi's holistic approach brings diverse stakeholders to the table to collaboratively explore, identify and realize sustainable solutions, no matter how complex the issue.

Frank Robinson,

Vice President, Econsult Solutions, Inc

Frank Robinson is a vice president at Econsult Solutions, Inc (ESI). Mr. Robinson has been a leader in the economic development and sustainable development industries for over 20 years, working with corporate, government, and nonprofit clients, banks, and credit unions, as well as community development financial institutions (CDFIs) and small businesses. With a knack for creatively engaging clients and re-envisioning possibilities, he enjoys hammering out logistics and bringing forth new realities. Mr. Robinson has extensive experience articulating primary objectives for strategic plans, pursuing federal grant opportunities, construction management, business expansion and sustainability planning, and launching new programs. He has also written and managed over $40 million in federal grants/programs; assessing, planning, improving, reporting, and presenting to high level boards and governing bodies along the way.

STAKEHOLDER PARTICIPANTS

Michael Amos, Director of Information Technology

Celina Bao, Student (co-Head of Environmental Stewards)

Aaron Barnes, Board

Peter Bird, Student

Phil Braselton, Grounds Supervisor

Jen Brown, Assistant Food Service Director

Neil Cunningham, Director of Athletics

Kate Cusick, Faculty (English)

Phil Davis, Director of Security

Stacey Duprey, Co-Dean of Residential Life

Ari Ellis, Board

Hannah Gilheany, Student
(co-Head of Environmental Stewards)

Gregory Guldin, Director of Special Projects

Mark Hammond, Faculty (Science)

Joe Hickman, Farm Manager and Consultant

Jason Honsel, Director of College Counseling

Kristin Honsel, Director of Student Life

Zoey Honsel, Student

Alex Horgan, Faculty (Science)

Julia Huffman, Facilities Care Supervisor

Ashley Hyde, Faculty (Science; Dept Chair)

Maria Kimsey, Interim CFO

Jay Knight, Equipment & Transportation Management

Christopher Lewis, Technology

Ron Lindsey, Facilities Tech Trades

Charlie Lunsford, Student (School co-President)

Kelly Massett, Director of Dining Services

Joy McGrath, Head of School

Dave McKelvey, Director of Facilities Services

Freddy Nagle, Director of Capital and Planned Giving

Chuck Papenhausen, Facilities Tech Trades

Ana Ramirez, Associate Head of School

Will Rehrig, Co-Dean of Residential Life

Will Robinson, Dean of Admission and Financial Aid

Allie Sethman, Controller

Scott Sipprelle, Board

Riya Soni, Student (School co-President)

Courtney Temler, Facilities Administrator

Jennifer Thomas, Board

Richard Vaughan Sr., Board

Karin Wright, Transportation Coordinator

Tony Zdrojewski, Tech Trades Supervisor

ADDITIONAL RESOURCES

- Building From Strength to a Zero Carbon Future: Phillips Exeter Academy's Sustainability and Climate Action Plan
- Dickinson College Climate Action Plan
- ULI Virginia: Woodberry Forest School: Envisioning the Future Toward a Net Zero Campus
- Renewable Energy Strategies for Real Estate
- The ULI Blueprint for Green Real Estate
- Electrify: The Movement to All-Alectric Real Estate

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