BRIEFING PAPER:

Options for Endowment Investment in Solar Energy

Intentional Endowments Network

An initiative of CraneSustainability.org
About Intentional Endowments Network

Established in 2014, the Intentional Endowments Network (IEN) is a broad-based, collaborative peer learning network advancing intentionally designed endowments – endowments that enhance financial performance and are aligned with institutional mission, values, and sustainability goals. Working closely with leading organizations, the network engages leaders and key stakeholders from higher education, foundations, business, and non-profits. It provides opportunities for learning and education, peer networking, convening, thought leadership and information exchange around a variety of considerations and strategies, including ESG integration, impact investing, and shareholder engagement.

About This Paper

This paper is intended to serve as a follow-up resource to the Clean Energy White Paper, which was developed in the Fall of 2016 to encourage conversation about the societal and financial benefits of clean energy investments and explore barriers to such investments. This briefing paper will focus on one clean energy investment opportunity: how to most effectively enable endowments to make investments in solar projects. It will provide guidance on three main approaches endowments can utilize to invest in solar: allocating capital across traditional asset classes in the investment portfolio, sponsoring a project by investing funds for its development, and allocating capital to a campus green revolving fund. Universities may use of their operating budget to procure solar power from a third-party owned solar project, however that is not covered in this paper, which is focused on endowment investment in solar.
Why Invest in Solar?

University endowments have over $550 billion in assets, the ability to make illiquid investments, and long-term investment horizons. They are therefore well positioned to finance certain types of clean energy investments. Colleges and universities have already been leaders in many ways when it comes to driving the clean energy economy.¹

Solar Market

Global clean energy investment totaled $333.5 billion in 2017, taking cumulative investment since 2010 to $2.5 trillion,² and the cost of solar photovoltaics has dropped 80% since 2008.³ According to the 2017 Bloomberg New Energy Outlook, renewable energy sources are set to represent almost 75% of the $10.2 trillion the world will invest in new power generating technology through 2040, and solar is already at least as cheap as coal in parts of Germany, Australia, the U.S., Spain and Italy. The cost of electricity from solar is set to drop another 66% by 2040, and by 2021, solar will be cheaper than coal in China, India, Mexico, the U.K. and Brazil.⁴

In the United States, solar has ranked first or second in new electric capacity additions in each of the last 5 years, representing at least 25% or more of the installed capacity additions each year since 2013.³ These estimates reflect major changes in energy economics around the world, supported by new policy commitments such as the global adoption of the Paris Agreement.⁶ Solar businesses represent a diversified value chain of opportunities that can be accessed through liquid and illiquid investment options.

Clean Trillion

Society cannot burn its existing fossil fuel reserves without exacerbating extreme weather patterns, levying trillions in economic damage from rising sea levels, and threatening the survival of modern society.⁷ To continue to meet human needs and support the global economy, a combination of demand-reduction (through conservation and smart design), increased energy efficiency, and a rapid shift to clean energy sources is needed. Although clean energy prices will continue to decrease as technology advances, current rates of clean energy deployment are not high enough to prevent average global temperatures from crossing the 2 degrees Celsius threshold commonly accepted as the maximum temperature increase society can tolerate without deeply disruptive impacts.

An additional $1 trillion per year in clean energy investments is necessary to sufficiently curb rising global temperatures,⁸ and institutional investors, including endowments, are well positioned to contribute to meeting this need.

How Can Endowments Invest in Solar?

Today’s endowments are invested most heavily in stocks and bonds, with additional holdings in commodities, natural resources, private equity, and other less liquid assets.⁹ The Solar Value Chain image below in Figure One is useful in understanding the various investment entry points that endowments could consider when looking to access the solar sector, and includes various strategies including software, technological innovation in components, sales driven development organizations, and project development.
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Figure One: Solar Value Chain

Image Reference: Green Rhino Energy\textsuperscript{10}
Solar Investment Opportunities by Asset Class

Endowments allocate capital across various asset classes based on factors including size, investment thesis, expertise, risk mitigation and tolerance, donor and investment committee guidelines, and in accordance with their investment policies. There are opportunities to invest in solar in virtually all asset classes. Within each asset class, investments should be considered based on their expected returns and implied business risk. Experts and professional asset managers can be very helpful in explaining the specifics of each.

Figure Two below provides an overview of the types of investment generally available in both the broader renewable industry and specifically in the solar space.

Figure Two: Risk and Return Profiles for Solar Investments

PUBLIC STOCKS

Most solar companies are relatively small compared with the giants of the traditional energy sector, and their performance has historically have been affected by both normal competitive pressures and a variety of policy and market shifts.

The results of these competitive pressures and policy shifts can be seen in Figure Three, below. While the broader FTSE Environmental Opportunity All Share Index (which tracks clean energy, water, recycling/resource recovery and sustainable agriculture) has generally matched or exceeded broader MSCI market performance over the last decade, solar stocks as a group have underperformed. Individual investors have certainly found attractive investment opportunities within this rapidly growing and volatile sector, but significant investment skill (and the risk appetite to tolerate high volatility and longer-term return horizons) has historically been required for success.

Northeastern University made a commitment to direct $25 million of its endowment to investments with a focus on sustainability, including clean energy, renewables, green building, and sustainable water and agriculture. The university indicated in July 2016 that it would complete that goal in five years. To date, less than two years later, it already has invested $18 million into sustainable funds.

PEER EXAMPLE
Holding stocks in the broader clean energy and environmental markets sector portfolios have produced more reliable results over the last decade, as demonstrated by the performance of the FTSE Environmental Opportunity All Share Index below.

**Figure Three: Resource Optimization & Environmental Sectors Show Resilience**

**LIMITED PARTNER IN A PRIVATE INVESTMENT VEHICLE (VENTURE CAPITAL OR INFRASTRUCTURE FUND)**

Private investment vehicles such as those commonly used in Venture Capital, Private Equity and Infrastructure Funds allow institutions to participate in this market while relying on the confidence of a professional investment management team. These pooled vehicles are not publicly listed and offer different risk reward exposure to the solar industry.

**VENTURE CAPITAL**

Venture capital is financing that investors provide to early stage companies that are believed to have substantial long-term growth potential. Solar investments made by venture funds are typically grouped within a ‘clean tech’ strategy with other investments across a range of new technologies. The clean energy sector ranges from mature and established to young and fragmented. “Clean Energy” is a broad topic, and investing in a solar-focused start-up carries greater risks (with a higher potential for return) than committing funds to a public company with a proven track record, or bond or private infrastructure fund or project with a long-term contract.

**PEER EXAMPLE**

A venture fund started by the Massachusetts Institute of Technology (MIT) called The Engine financed its first seven companies, including a renewable energy company, in the fall of 2017 after raising $200 million from investors. MIT invested $25 million in the fund, joining several large family offices and endowments that also invested in the fund.
PRIVATE EQUITY

Technically, private equity refers broadly to all private investment vehicles that are not publicly listed; however, the term Private Equity is also used to refer to private investment strategies that include leveraged buyouts, distressed situations, growth, mezzanine debt, or second offerings. Generally speaking, private equity is taking a position in a company with the anticipation that the company will grow, improve or find new synergies, with the ultimate goal of reselling the company either to another private investor or to the public market (though an IPO). In the solar sector, there are many potential targets for these varying strategies which have mid- to long-term hold periods. During the hold period, (for most PE strategies listed above) there is no expectation of regular distributions or liquidity provided to investors; however the promise of future value from successful company sales (or exits) is expected to be large.

BONDS & GREEN BONDS

For investors seeking to access the bond market in a socially responsible way, the green bond market has emerged as an interesting alternative in recent years. According to The Climate Bond Initiative, the total issuance of green bonds in 2017 was $155.5 billion, an increase of 78% over 2016. Green bonds can finance solar projects and other renewable energy projects, energy efficiency, water management, and other more broadly described “green” projects. Figure Four below, taken from The Climate Bond Initiative’s 2017 Green Bonds Highlights Report, shows the breakdown of project types that were financed by green bonds in 2016 and 2017.

**Figure Four: 2016 and 2017 Green Bond Issuance By Project Type**
INFRASTRUCTURE FUNDS

Private solar or other renewable infrastructure funds seek to produce returns through direct exposure to renewable infrastructure projects. These strategies often seek to create value from the sale of contracted electricity generation, which is generally not correlated with other markets (like stocks), and can sometimes be thought of as part of a fixed income allocation. Often, these funds seek to create relatively regular distributions and liquidity to investors during the hold period, and may realize an equity-like upside upon exit.

Infrastructure strategies generally focus on real assets and integrated projects, as opposed to ‘Clean Tech Venture’ which invests at various points along the entire solar value chain. Each Solar Infrastructure Fund will have nuances and specific risks attributable to the timing that investments are made in the project lifecycle (e.g. early stage development versus a fully operational project), the size and types of projects included, the geographic focus, the contract counterparty credit requirements, the underlying technology employed, and the financial structure of the investment (e.g. debt or equity). Each variable should be considered when deciding on an appropriate fund for an endowment. A Private Solar Infrastructure Fund, with the base premise of a 30+ year physical asset that sells its production under a long-term contract, can align very nicely with long-term investor goals.

PEER EXAMPLE

The University of California invested in a mezzanine loan to a large-scale private wind, solar, and biomass company that operates globally (hyperlink: https://www.bloomberg.com/news/articles/2017-05-31/u-s-colleges-have-500-billion-to-invest-now-where-are-all-the-green-deals). Mezzanine financing is a hybrid of debt and equity financing, and gives the lender the rights to convert to an ownership or equity interest in the company in case of default.15
2) **Endowment as Project Sponsor**

The basic premise of sponsoring (or financing) a project is that the endowment invests its capital (equity or debt) directly in the development of a specific project. Under this structure, the endowment commits its capital in order to receive future project-specific cash flows, and sponsors in early stage projects are frequently able to recover development costs at the closing of the project.  

A solar project, with its base premise of a 35+ year physical asset that sells its production to a third party under a long-term contract, can be an interesting value proposition to a long-term investor like a university endowment. It has the potential to provide higher fixed income returns than those typically available in the bond market, with very reasonable risk parameters.

The development of solar or other renewable energy projects is somewhat similar to real estate development, where many projects are conceived and risk dollars can be invested in ideas that may never come to fruition. Typically, an investment in a development stage project will yield an equity-like return when the project is sold or goes into construction. Investments can be made throughout the life of a project, and the risk continuum relative to return is dynamic, rising as the project matures until all development risk is eliminated, when returns typically drop sharply, as illustrated in Figure Five.

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**Figure Five: Investment Risk Profile of a US Based Contracted Renewable Project Utilizing Commercially Viable Technology**

Each project is unique and there are hundreds of specific attributes to each project that should be reviewed and considered when contemplating investing. Endowments should be aware that a proposed project in development has a long road until it becomes a cash yielding investment, although with proper planning, funding a project from the start can produce higher returns.
A Green Revolving Fund (GRF) is an internal fund that provides financing to parties within an organization to implement energy efficiency, renewable energy, and other sustainability projects that generate on-campus cost savings. These savings are tracked and used to replenish the fund for the next round of green investments, thus establishing a sustainable funding cycle while cutting operating costs and reducing environmental impact. Green revolving funds provide benefits beyond simple investment returns, including improving the institutions’ physical plant, reducing operating costs, enhancing institutional reputation and offering students and facility enhanced value by promoting hands-on learning. Successful GRF investments also fundamentally help build the business case for sustainability.

Sources of GRF seed capital are diverse and include administrative budgets, endowment assets, student fees, and targeted alumni donations. At its core, investing endowment funds in a GRF is an agreement between the institution’s finance and investment functions. In a fixed income model, the endowment lends a certain amount of capital to the GRF. The GRF then pays a stipulated interest rate (fixed or variable) to the endowment each year. Each transaction is designed so the principal is returned in full to the endowment by the end of the specified period (e.g., 10 or 15 years).

In an equity model, the financial and investment functions form a partnership. This might be a legal entity such as a limited liability company. Endowment funds are invested in the GRF for a specified period. The ROI is shared based on fund performance rather than a formula. Given the potential return of a GRF (20-30 percent annually according to the Sustainable Endowments Institute), this may be an appealing option for the institution’s investment function; the upside could provide larger returns than agreeing to a fixed rate. The returns can be shared on any basis agreed to by the partnership. In this model, the risks of underperformance are shared by the financial and investment functions.

Despite the large cost-saving potential of energy efficiency and sustainability investments, many institutions perceive them only as an expense. Rather than simply allowing the savings from these projects to be absorbed into the operating budget, a GRF tracks the savings distinctly and directs them into future projects—thus creating a measurable return on investment (ROI). Established GRFs report a median annual ROI of 28%, reliably outperforming average endowment investment returns while hedging against rising energy costs.

In addition to other investment opportunities listed in this paper, endowments can also fund purchasing scenarios including self-generation, on-site power purchase agreement (PPA), direct and/or virtual PPAs, community/shared solar, utility and competitive supplier solar product, and unbundled solar renewable energy certificates. For more information on these opportunities, see the Clean Energy White Paper and the resources listed in the footnote.

PEER EXAMPLE

The California Institute of Technology and Weber State University have invested endowment funds in their GRF. Caltech used a portion of its endowment designated for capital projects to begin the Caltech Energy Conservation Investment Program (CECIP). Weber State University considered a variety of funding alternatives including bond, municipal lease, and endowment investment.
Conclusion

There are many options for colleges and universities to use their endowments to invest in solar and clean energy more broadly, and the institutional, financial and societal benefits of these investments are numerous. While global clean energy investment totaled $333.5 billion in 2017, an additional $1 trillion per year in clean energy investments is necessary to adequately curb rising global temperatures. Endowments are uniquely positioned to finance certain key types of long term clean energy investments, including solar, which can help address both societal needs and the institution’s own financial and operational requirements.

The three main approaches outlined in this paper for endowments to invest in solar are: 1) allocating capital across traditional asset classes in the investment portfolio, 2) sponsoring a project by investing equity or loaning money for its development and ownership, and 3) allocating capital to a campus green revolving fund. Each approach offers differing advantages and challenges, and the variety of options present a range of approaches for interested endowments to explore.

Investing in solar is not a new concept, and today there are discreet strategies that match each risk appetite. By joining other pioneering endowments that are sharing their clean energy investing approaches, colleges and universities can get in front of future regulatory impact and become leaders in the field. This approach provides institutions additional benefits beyond investment returns, including enhancing institutional reputation and promoting hands-on learning, in turn attracting additional applicants and donors and creating a competitive edge for the institution.

In response to this opportunity, The Intentional Endowments Network is working to drive peer-to-peer dialogue between higher education institutions, investment managers, and organizations with clean energy solutions in order to build partnerships to create a more sustainable society. Interested readers should feel free to contact IEN for further information or peer perspectives.\

Acknowledgments

Development of this white paper was a collective effort of members of the Intentional Endowments Network and others in the field. The following people played critical roles in the research, writing, and review of this document:

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Footnotes

1 http://www.intentionalendowments.org/case_studies_best_practices
5 https://www.seia.org/solar-industry-research-data. Accessed April 23, 2018
6 Despite the de facto withdrawal by the Federal government from the Paris Agreement, the combination of public support for its goals (demonstrated by the widespread popularity of the US “We Are Still In” movement), and the improving energy economics of solar worldwide (as discussed in this paper), global support for the agreements appears largely undiminished.
7 time.com/4082328/climate-change-economic-impact/
8 https://www.ceres.org/campaigns/clean-trillion
9 For primers on how endowments are structured and to understand the basics of endowment investing, see the following two resources: “Understanding College and University Endowments,” American Council on Education, December 10, 2014: http://www.acenet.edu/news-room/Pages/Understanding-College-and-University-Endowments.aspx
12 https://www.investopedia.com/terms/v/venturecapital.asp
15 https://www.investopedia.com/terms/m/mezzaninefinancing.asp
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