



*An initiative of [www.CraneSustainability.org](http://www.CraneSustainability.org)*

---

# **Investing in Clean Energy: Campuses and Endowments**

W H I T E P A P E R

# Executive Summary

---

There are many options for colleges and universities to use their endowments, operations budget, capital budget, or a combination thereof to invest in clean energy. University endowments have over \$528 billion in assets, the ability to make illiquid investments, and long-term investment horizons, uniquely positioning them to finance clean energy investments. The financial and societal benefits of these investments are numerous. In 2015, renewable energy attracted \$329 billion<sup>1</sup> in global investments, the cost of solar photovoltaics has dropped 80% since 2008,<sup>2</sup> and wind is already the cheapest form of power in some parts of the United States.<sup>3</sup> To continue to meet human needs and support the global economy, demand-reduction, increased energy efficiency, and a shift to clean energy sources is needed. An additional \$1 trillion per year in clean energy investments is necessary to sufficiently curb rising global temperatures,<sup>4</sup> and institutional investors, including endowments, are well positioned to contribute to meeting this need.

Clean energy financing and investing options for colleges and universities include direct ownership, asset leasing, retail power purchase, renewable energy credit purchase, power purchase agreements, green revolving funds, and public or private market investments. These opportunities are growing rapidly, but several challenges, including concerns about financial performance and a lack of peer examples to follow, may be impeding endowments from making such investments.

Despite market volatility, new investment in clean energy across all asset classes has grown from \$62 billion in 2004 to a record \$349 billion in 2015.<sup>5</sup> Sub-sectors like smart grid, energy storage, power development, environmental services, agricultural solutions, and water-related companies have generated reasonable to strong rates of return in aggregate.<sup>6</sup> Additionally, established Green Revolving Funds (GRFs) report a median annual return on investment (ROI) of 28%<sup>7</sup>, and ROI in the direct ownership of clean energy projects can produce returns in the 10-15% range.<sup>8</sup> Power Purchase Agreements (PPAs), where a developer finances and owns a project and a campus purchases the electricity at an agreed upon price, have no upfront capital costs and the resulting electricity costs less than market prices. Demand for electricity is expected to double by 2060, requiring infrastructure investment in clean energy and energy efficiency. Solar and wind could supply up to 39% of power generation by 2060, and coal and oil are expected to fade from the energy supply. This expected economic

sector growth and development points to a long term market opportunity in the clean energy sector.<sup>9</sup>

Not only are universities and endowments uniquely positioned to invest in clean energy, a combination of future regulatory impact and the priorities of applicants and donors will likely demand it. This is exemplified by the views of the Millennial generation. By 2025, more than half of the world population will be under 30, and Millennials will make up 75% of the workforce. It is important to keep in mind what is important to this generation as the buying and investment power that they will have in the coming years is immense. When 85% of Millennials believe that social and environmental impact is important to investment decisions<sup>10</sup> and 87% believe that long-term success is more important than pursuing short-term profit maximization,<sup>11</sup> clean energy investing could be used as a competitive advantage for colleges and universities, and it is not something to be ignored.

Through meetings and forums, the Intentional Endowments Network has brought together hundreds of university leaders and investment experts to share information about ways to create sustainable investing strategies without sacrificing financial returns. This white paper includes brief snapshots of just a few institutions that are leaders in driving the clean energy economy forward through their investments on and off campus, including American University, George Washington University, Arizona State University, Green Mountain College, Luther College, Northeastern University, The University of California System, The University of North Carolina- Chapel Hill, and Yale University. By employing a variety of investing strategies, these schools provide examples that can help others when undertaking significant operational or endowment change to support the clean energy economy.

Clean energy investment includes everything from stable capital intensive commercially viable infrastructure options to early stage startup ventures, and each carries its own risk and reward profile. As each investment strategy requires differing resources and timeframes, consulting with investment advisors and industry experts is the best way to determine which strategy is most suitable for any individual campus' needs. There is no barrier to these clean energy investment strategies that cannot be addressed, and participating in peer-to-peer dialogue and forming strategic partnerships is a great way to start finding solutions.

# Background

## About IEN

Established in 2014, the Intentional Endowments Network is a broad-based, collaborative network advancing *intentionally designed endowments* – those that enhance financial performance; are aligned with institutional mission and values; and contribute to creating a sustainable society. 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 strategies (e.g., ESG integration, impact investing, shareholder engagement).

## About This Paper

The purpose of this white paper is to encourage conversation about the societal and financial benefits of clean energy investments and explore the barriers to such investments. Clean energy investments include renewable energy generation using wind, solar, hydropower, and biofuels, as well as fuel cells, energy efficiency, energy storage, combined heat & power (CHP), and electrified transport solutions. Although the Fossil Free divestment movement has directed attention to campuses in recent years, opportunities for colleges and universities to invest in clean energy through both campus operations as well as endowments, such as the Seize the Grid campaign<sup>12</sup>, haven't received as much focus to date.

Colleges and universities are platforms for testing new technologies and teaching future leaders, and through the creation of hundreds of courses, programs, and research projects, they have advanced knowledge and practice in the field. Nearly 700 institutions in the U.S. have committed to climate neutrality and made significant investments in on and off site renewable energy and energy efficiency. Yet, there's been a significant gap between these operational investments and endowment investing in clean energy, partly due to their differences in cost of capital, return value, and timeframe for investing. While investing in operational projects offers more steady returns than volatile stock investments, it's often at the cost of liquidity.

University endowments have over \$528 billion in assets, the ability to make illiquid investments, and long-term investment horizons.

### **Direct Ownership / Asset Acquisition**

Colleges and universities can purchase and install solar panels, wind turbines, geothermal systems, and other clean and renewable energy technologies to provide energy directly for campus operations.

### **Power Purchase Agreement (PPA)**

A PPA is an agreement to purchase power from a specific project for an agreed period of time, at an agreed price. The project developer finances and owns the project. The campus purchases the electricity from the project.

**Green Revolving Loan Fund (GRF):** GRFs provide capital for campus related green projects that generate operational savings over time. Those savings go toward repaying the GRF, and can generate returns to support additional projects in the future.

### **Public Market Investments**

Endowments can invest in clean energy focused public equities and fixed income markets, or directly purchase stock and bonds from public companies that support clean energy projects.

### **Private Market Investments**

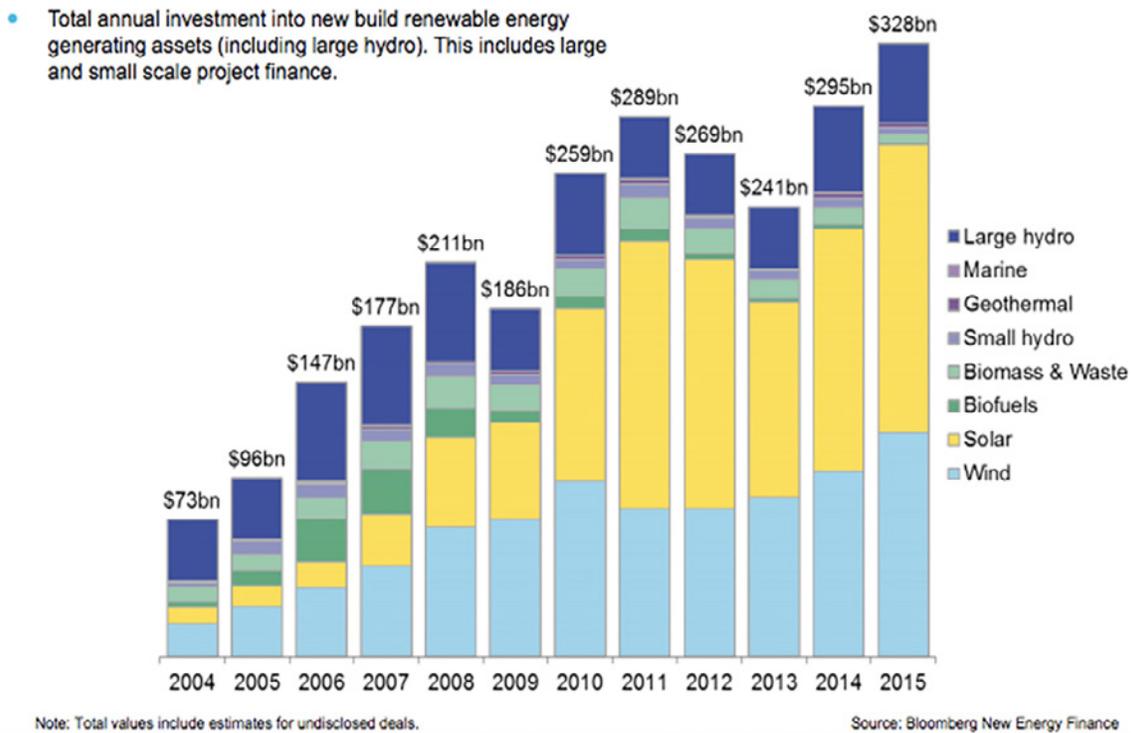
Endowments can also invest in private markets through venture capital, project finance and private equity funds focused on clean energy, individual projects in the local community or elsewhere.

They are therefore uniquely 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. The sidebar on the right lists five different approaches to higher education investment in clean energy.

With vast reductions in the cost of clean energy and gathering momentum after the Paris Climate Agreement in December 2015, endowments are now presented with unprecedented leadership and investment opportunities. As shown in *Figure 1*, there was

\$328 billion invested in renewable energy globally in 2015<sup>13</sup>, and renewable energy is predicted to attract \$7.8 trillion by 2040.<sup>14</sup> The cost of solar photovoltaics has dropped 80% since 2008, and by 2030 wind and solar will be the cheapest forms of electricity production in most of the world.<sup>14</sup> In fact, wind is already the cheapest form of power according to a November 2015 analysis by the investment bank Lazard.<sup>16</sup> As pressure for carbon pricing regulations continues to grow through regional, national, and international efforts like the Paris Agreement, fossil fuel competitiveness will diminish.

**Figure 1: Forecast of Total Investment in Lower Carbon Power Generation (\$BN)**



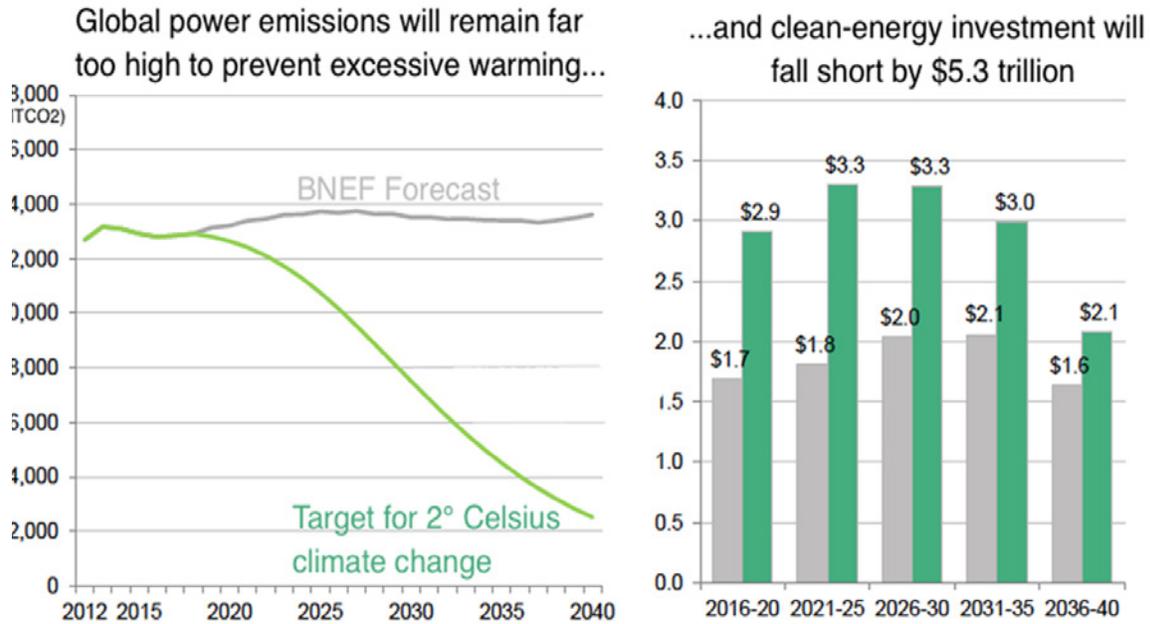
Source: Bloomberg, 2015

Society cannot burn the 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.<sup>17</sup> 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 shift to clean energy sources is needed.

Although clean energy prices will continue to decrease as technology advances, current rates of clean energy adoption and investment are not high enough to prevent average global temperatures from crossing the 2 degrees Celsius threshold, as *Figure 2* shows. In the chart, the grey line represents a ‘business-as-usual’ (BAU) forecast for emissions levels without additional policy action by governments; the green line represents emissions levels that can keep global average temperature increases below 2 degrees Celsius. In the chart, the grey bars represent the amount of investment in clean energy under a BAU scenario, while the green bars represent the level of investment in clean energy needed to keep temperature rise under 2 degrees Celsius.

Figure 2: Forecast of Total Investment in Lower Carbon Power Generation (\$BN)

# The Climate Is Still In Trouble



Source: Bloomberg, 2016<sup>18</sup>

Ceres calculates that on average, an additional \$1 trillion per year in clean energy investments is needed to sufficiently curb rising global temperatures (see Figure 3, below). The institutional investment sector (including endowments and foundations) is well positioned to contribute to meeting this need with its capital resources and innovative abilities.

Figure 3: The Clean Energy Investment Gap



Source: Ceres, 2014

# Higher Education Investing in Clean Energy

There are many options for colleges and universities to use their endowments, operations budget, capital budget, or a combination thereof to invest in clean energy. Instead of borrowing from banks to finance campus projects, colleges and universities can use their endowments to invest through private vehicles, public markets, or direct project finance. Each investment offers different risk profiles and return values depending on their place in the value chain, investment horizon and the size of the investment. Consulting with investment advisors and industry experts is the best way to determine which option is most suitable for your campus's specific needs. The following table provides a list of types of clean energy investments campuses and their endowments can make. It includes a brief description of each and an indication of the typical sources of capital for each.

Financing/ Investing Option <sup>21</sup>	Description	Operating Budget	Capital Budget	Endowment
Direct Ownership / Asset Acquisition – Campus Energy Procurement	Purchase of generating equipment. Colleges and universities can install solar panels, wind turbines, geothermal systems, and other clean and renewable energy technologies to provide energy directly for campus operations  <i>See Luther College, Arizona State University and University of California examples below.</i>	Common	Common	Possible, but little / no precedent
Asset Leasing	Paying rent on a piece of equipment, rather than paying for electricity.  <i>See Luther College example below.</i>	Common	N/A	N/A
Retail Purchase	Purchase of green power through a utility green pricing program or from a competitive supplier. Typically incurs a cost premium over brown power.	Common	N/A	N/A
Purchasing “Unbundled” Renewable Energy Certificates (RECs)	One REC represents the environmental attributes associated with one MWh of qualified green power. RECs are available in a number of states as commodities “unbundled” from the energy source from which they derive. REC ownership is required for making credible GHG reduction claims associated with electricity. Therefore, they can be attractive as a simple, short-term strategy for achieving GHG goals but incur an added cost on top of conventional electricity costs.  <i>See Luther College example below.</i>	Common	N/A	N/A

Financing/ Investing Option	Description	Operating Budget	Capital Budget	Endowment
Power Purchase Agreement (PPA)	A PPA is an agreement to purchase power from a specific project, either onsite or offsite, for an agreed period of time, at an agreed price. The project developer finances and owns the project. The campus purchases the electricity from the project. Thus, the campus pays for electricity only and has no capital cost. Prices can be lower than for conventional electricity. See Green Mountain College, Luther College, American University / George Washington University, and University of California examples below.	Common	N/A	N/A
Green Revolving Funds (GRFs)	GRFs provide capital for campus-related green projects (energy efficiency, renewable energy, water efficiency, etc.) that generate operational savings over time. Those savings go toward repaying the GRF, and can generate returns to support additional projects in the future. The Billion Dollar Green Challenge is an initiative with the goal of US campuses investing \$1 billion in GRFs to help them reduce operating expenses and greenhouse gas emissions while creating regenerating pools of funds for future projects. See Green Mountain College example below.	Common	Common	Limited precedent
Public Market Investments	Endowments can invest in funds that focus on clean energy investments in public equities and fixed income markets, or directly purchase stock and bonds from public companies that support clean energy projects across the value chain. See University of California and UNC Chapel Hill examples below.	N/A	N/A	Common
Private Market Investments	There are several ways endowments can invest in clean energy in private markets, including: venture capital, private equity funds focused on clean energy (limited partnership or pooled funds), private infrastructure funds, project finance in individual clean energy projects in the local community or elsewhere, and direct investment into campus projects. See Northeastern University and Yale University examples below.	N/A	N/A	Fairly common
Energy Service Companies (ESCOs)	ESCOs implement energy efficiency projects to reduce energy use on-campus while financially guaranteeing that the energy savings generated will cover the cost of service.	Common	N/A	N/A

# Barriers & Solutions

---

While opportunities for investing in clean energy are growing rapidly, we have identified several challenges that may be impeding endowments from making such investments, including:

- Concerns about the financial performance of such investments
- Challenges in organizational communication among decision-makers within institutions
- Market regulations
- Lack of suitably structured investment opportunities for endowments
- Tax law
- Lack of familiarity with these strategies
- Lack of peer examples to follow

## 1. Financial Performance

Endowment decision-makers seek to maximize the risk-adjusted returns of the portfolio. Often, they are concerned that clean energy investments will generate low returns, or come with high transaction costs and management expenses. Some previous high profile failures in clean tech investments, including SunEdison and Solyndra, also contribute to their reluctance to invest.

The clean energy sector ranges from mature to young and fragmented. It is a broad sector, and investing in a start-up carries different risks than investing in a private infrastructure fund that deploys capital into commercially proven technologies backed by long term contracts. Investors should be cautious about drawing forward-looking conclusions from the current data. Clean energy markets are extremely susceptible to change due to policy shifts, other energy source pricing, etc., creating no clear trend in performance. In each sub-segment, the business operating risks and value creators will vary materially, and in many cases the price of oil (traditionally thought of as the energy indicator) will have no fundamental correlation to the investment's value. As with all dynamic markets, there are unpredictable complexities, and it is advised to consult a sector professional to capitalize on opportunities and avoid undue losses.

Despite the volatile challenges, new investment in clean energy across all asset classes has grown from \$62 billion in 2004 to a

record \$349 billion in 2015<sup>22</sup>, and the sector is expected to grow. In the 2016 World Energy Outlook Report, the International Energy Agency (IEA), the world's most prominent energy forecaster, has significantly raised its estimates for the deployment of renewables compared with previous years. These estimates reflect major changes in energy policies around the world, such as the adoption of the Paris Agreement.<sup>23</sup>

In the following Public and Private Market Performance sections, several indexes and benchmarks on market performance are offered. Given the variety of business models, operating risks, varied levels of maturity of the underlying technologies, and geographic locations of the companies, it is a bit of an oversimplification to distill all clean energy markets into a single index. The following information is in no way comprehensive and is intended to present a brief view into sector growth and performance.

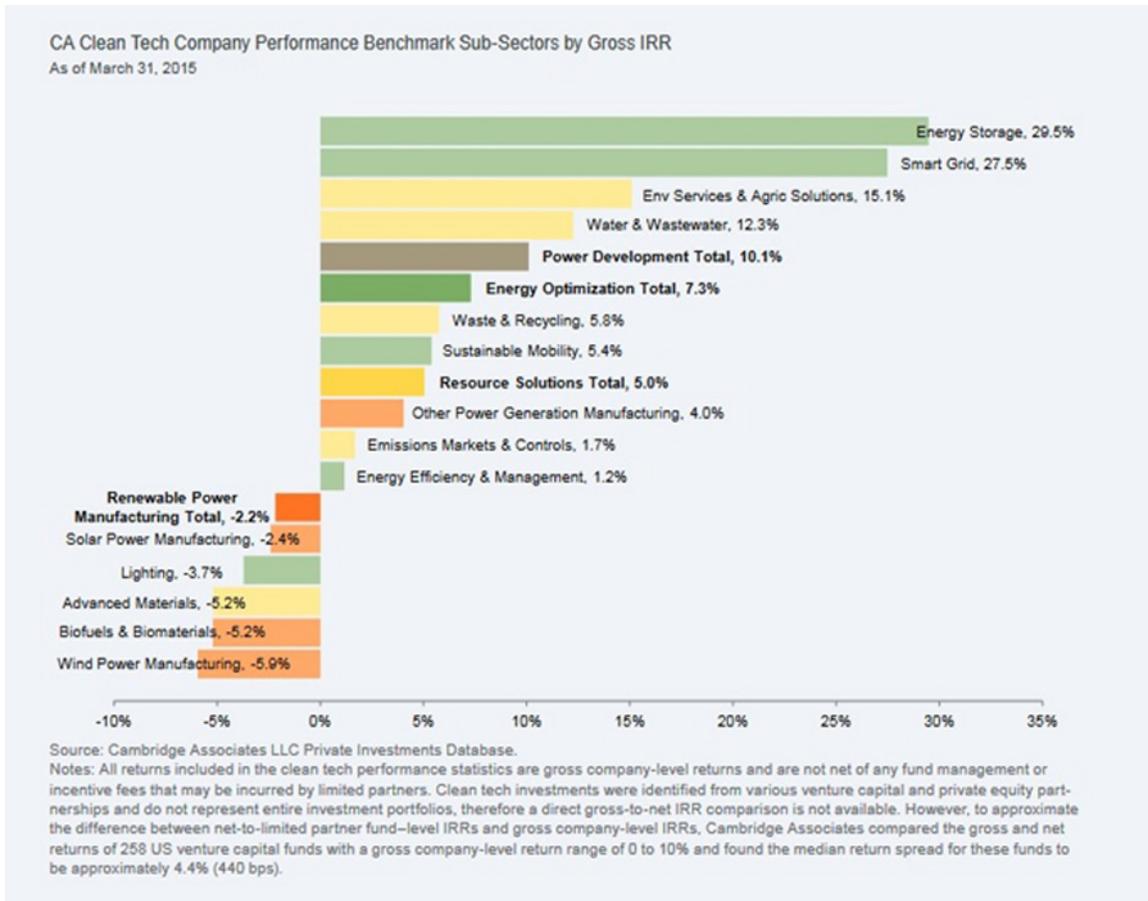
### *Public Market Performance*

According to the S&P/TSX Renewable Energy and Clean Technology Index, the return value over 3 and 5 years for 30 global clean tech companies is 9.39% and 6.51%, respectively.<sup>24</sup> The WilderHill New Energy Global Innovation Index (NEX), an index of publicly traded companies active in renewable and low-carbon energy, places 3, 5 and 10 year returns at 7.4%, 28.48%, and -36.05%, respectively.<sup>25</sup> Clearly, public market clean energy companies have been highly volatile. However, with experienced managers and proper due diligence, endowments can effectively mitigate risk in public market clean energy investments.

### *Private Equity Market Performance*

According to The Cambridge Associates Clean Tech Company Performance Benchmark as of March 31, 2015, the pooled return for all companies in the benchmark was a gross 5.1% internal rate of return (IRR) and 1.2x gross multiple on invested capital (MOIC). While these returns do lack luster, closer observation shows that sub-sectors within clean tech have performed quite differently, and reasonable returns have been generated in several clean energy pockets. Sub-sectors like smart grid, energy storage, power development, environmental services and agricultural solutions, and water-related companies have generated reasonable to strong rates of returns in aggregate, as shown in *Figure 4*.<sup>26</sup>

**Figure 4: Clean Tech Company Performance Benchmark Sub-Sectors by Gross IRR**



Source: Cambridge Associates, 2015<sup>27</sup>

### **Private Infrastructure Investment Performance**

Private investment vehicles such as those commonly used in private equity and venture capital allow institutions to participate in the clean energy infrastructure market while relying on the confidence of a professional investment management team. Returns of these funds can spread widely based on the timing of the project lifecycle in which the fund puts the dollars to work. Properly structured vehicles allow endowments to maximize the economic benefit and minimize risk. Development stage funds may seek to achieve +14% returns, while core real asset infrastructure funds that invest in operating projects could yield between 5% - 12%. The use of leverage at different levels of the capital stack has the ability to increase returns, and it also adds some risk to the investment. Generally speaking, these types of investments permit endowments to invest substantial amounts of capital and directly contribute to college and university clean energy goals.

### **Direct Ownership Performance**

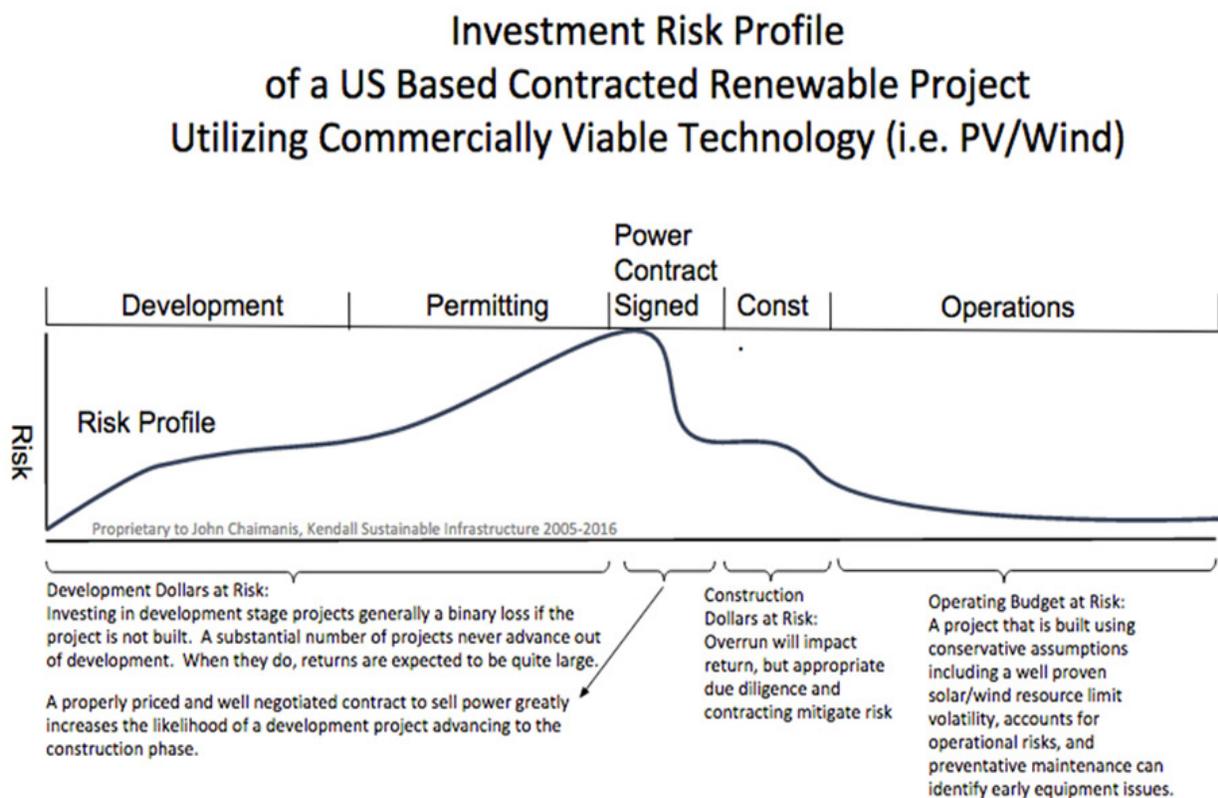
The direct ownership and building of clean energy projects requires considerably intensive development and large amounts of capital. Much like real estate development, many projects are conceived that never come to fruition, even after risk dollars have been invested.

A university may consider direct ownership in order to offset procuring power from their utility or retail electric provider. Such a strategy could average 5% - 15% or higher savings off of electric bills. The ownership structure of such an asset is important when considering

owning, as there are tax benefits of ownership, which may be complicated for a non-profit institution. The amount of dollars that can be invested through this strategy may be constrained by the energy needs or the physical space available for such an installation.

Typically, an investment in a development stage project will yield an equity like gain 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. Once a project goes into operation, a vast majority of the variables affecting risk should be locked down, and the regular cash flow profile can be expected to commence, as illustrated in Figure 5.

**Figure 5: Investment Risk Profile of a U.S. Based Contracted Renewable Energy Project Utilizing Commercially Viable Technology (i.e. PV / Wind)**



Note: Graphic is illustrative. Project development is not linear and the attributes of a specific project will impact the risk profile.

Source: John Chaimanis, Kendall Sustainable Infrastructure

Return on investments (ROI) in the direct ownership of clean energy projects can produce returns in the 10-15% range. According to Nat Kremer, Chief Executive Officer of Clean Power Finance in San Francisco, a solar farm is “a nice cash-flow instrument.”<sup>28</sup> Directly owning a wind farm or solar farm not only provides a good ROI based on what the campus would otherwise have been paying for conventional power, but can also provide very precise budgetary cost certainty, eliminating the risks associated with fluctuating fossil fuel power prices. Today’s utility prices are a poor reflection of what you might have to pay five or ten years from now. Historically, grid electricity prices have risen 3% to 4% every year, depending on the location.<sup>29</sup> With hundreds of specific attributes, each clean energy project produces varying returns. Each project should be reviewed and considered when contemplating investing.

## Green Revolving Fund Performance

Established Green Revolving Funds (GRFs) report a median annual return on investment (ROI) of 28%. Specific examples include Boston University, with a reported annual ROI of 57%<sup>30</sup>, and the University of Vermont (UVM), whose Board of Trustees approved the establishment of a \$13 million Green Revolving Fund (GRF) in 2012, using capital from the institution's endowment.<sup>31</sup> The year before the GRF was established, UVM's cash reserve, generally invested for short periods in low risk financial instruments, earned 2.5% interest. The GRF will pay 5% interest on all investments while financing on-campus energy efficiency improvements.<sup>32</sup> Weber State University (WSU) began its \$9 million revolving fund in 2010 after securing seed money through a loan from the institution's endowment. To allow the fund to expand beyond its original size, 25 percent of cost savings from efficiency projects accrue to the general utilities budget; while 75 percent replenish and grow the revolving fund even after the initial project cost has been repaid. WSU is anticipating they will fully repay the endowment loan (with interest) by 2019.<sup>33</sup> In 2014, North Central College committed \$1.8 million of unrestricted endowment funds to their GRF. North Central's first GRF project was a 539 kW solar array with a 250 kW energy storage system.<sup>34</sup> Caltech's GRF was established in 2009 and manages \$8 million within the endowment, allowing an average ROI of 33%.<sup>35</sup> These examples suggest that GRFs can significantly outperform average endowment investment returns while maintaining strong returns over longer periods of time.

## 2. Organizational Communication

Clean energy investment decisions involve communication among the board of trustees, presidents, the university's investment office, CFOs, investment committees, portfolio managers, facilities and energy directors, energy advisors, procurement officers, accounting managers, legal counsel, sustainability officers, faculty leaders, students, alumni, donors, community leaders, and other stakeholders. It can be a challenge to change investment strategies when these parties are neither in direct conversation with each other nor working in a coordinated way towards clearly understood common goals.

With so many different stakeholders involved, the expertise across the group regarding clean energy investments and portfolio strategies might not be equal. Initiating collaborative internal dialogue to determine clean energy goals as they relate to

campus operations, endowment investing, education, research, and engagement would help the campus community establish a baseline understanding of the current reality. Collaborative dialogue would also help in setting a vision for where a college or university would like to be with regard to supporting the clean energy economy. To ameliorate communication barriers, stakeholder engagement processes such as town hall style meetings, surveys, or requests for information to improve organizational learning can ensure more informed input from all members. Strong and persistent leadership from the president and Board that underscores the urgency of the climate crisis and the magnitude of the opportunity to create solutions is also critical in ensuring alignment in pursuing clean energy investments.

## 3. Market Regulations

Despite the push for clean energy investments, state level market regulations such as regulated electricity monopolies, net metering (or the lack thereof) and renewable portfolio standards (RPS) (or the lack thereof) impede comprehensive, nationwide progress. They complicate local progress when these regulations and policies are unfavorable to renewables. Net metering is a billing mechanism that allows consumers to receive up to the full retail value of self-generated solar or wind energy, regardless of when it is produced.<sup>36</sup> However, net metering laws are complex, vary at the state level, and have been changed in some cases without adequate customer protection. These complexities can vary the potential benefits for consumers. Similarly regulated at the state level, RPSs require a certain percentage of energy production to come from renewable sources. Although intended to increase renewable energy usage, the differences in program structure, enforcement mechanisms, size, and application make this strategy difficult to be universally applied.<sup>37</sup> Institutions can help support productive regulations by partnering with peers to advocate for climate smart policy.

## 4. Investment Structures

Another investment barrier campuses face is the availability of appropriately structured clean energy opportunities. Some current clean energy investment opportunities are risky, early-stage venture capital endeavors or infrastructure upgrades that take years to provide returns. Additionally, campus-based operating investments, besides being illiquid, are often small in size (potentially under \$100,000), which can be time consuming

for an investment team to track.<sup>38</sup> One solution to the lack of appropriately structured investments is for campuses to participate in peer groups like the Aligned Intermediary<sup>39</sup> and create investment opportunities based on models developed by other partners. Many colleges and universities are also empowering and incentivizing their own students to come up with startup ideas that address clean energy problems. Lastly, many investment consultants already have lists of structured opportunities with proven track records available for interested clients.

## 5. Tax Law

The barrier with using endowments to finance PPAs is that the endowment cannot use state and national tax incentives like for-profit investors can. Third party for-profit investors can take financial advantage of renewable energy investment tax credits at both the state and national level. Nonprofits need tax equity partners in order to realize the benefit of these federal and state tax incentives.

## 6. Lack of Familiarity

Often college and university decision makers are unfamiliar with clean energy investment opportunities and may assume that they are not relevant or possible in their context. From an energy procurement perspective, they may be in a regulated utility market and assume it is not possible to invest in clean energy beyond what the utility offers. From an endowment investment perspective, they may not be familiar with managers or funds that specialize in this space. Without clear examples of peer institutions making these types of investments, some may feel uncomfortable being a 'first mover.'

Many do not directly invest in clean energy projects because they are commonly seen as expenses for the operational budget instead of investments for the endowment, when in fact they can be both. These projects are often illiquid, have initial capital expenditures, accrue savings in the operational budget instead of the investment portfolio, and are difficult to compare in performance terms with other investments.<sup>40</sup> However, similar to traditional investments, they can generate competitive returns (in the form of cost savings) and have multi-year timeframes. As an added benefit, unlike stocks and bonds, operating project cost-saving returns aren't subjected to federal and state taxes.

## 7. Peer Examples

It is difficult to undertake significant operational and endowment change without examples to follow. IEN has been working towards addressing many of these challenges, especially in regards to encouraging peer-to-peer dialogue and forming strategic partnerships. Through meetings and forums, IEN has brought together hundreds of university leaders and investment experts to share information about ways to create sustainable investing strategies without sacrificing financial returns.

# Campus Snapshots

We compiled below conversations with seven institutions surrounding their investments in clean energy and their progress to become more sustainable, to provide some initial examples for IEN members and other institutions exploring clean energy investments.

## American University & George Washington University<sup>41</sup>

**ENDOWMENT:** American University: \$600.3 million, George Washington University: \$1.616 billion

**CONTACT:** Chris O'Brien, Director of Higher Education Programs, Altenex; Lecturer and former Director of Sustainability, American University (chris.obrien@altenex.com)

**HIGHLIGHTS:** American University: Climate Neutral by 2020, George Washington University: Climate Neutral by 2040, Green Revolving Fund, Billion Dollar Green Challenge

- **Power Purchase Agreement (PPA):** The Capital Partners Solar Project (CPSP) is a 20-year PPA to build a 53-megawatt solar photovoltaic array. The 117 million kWh of electricity generated will eliminate 60,000 metric tons of Co2 while supplying half the electricity needs of George Washington University and American University, and 30% of the needs of George Washington University Hospital. As an added incentive, the state of North Carolina offered a 35% corporate tax credit for renewable energy investments through 2015, and 30% through 2016. With no upfront capital costs and the resulting electricity expected to cost less than the market prices, the CPSP is expected to save millions in electricity price increases, especially if carbon becomes priced.
- **Purchasing "Unbundled" Renewable Energy Credits (RECs):** American University buys RECs for the remainder of its electricity needs, ensuring that all of its electricity is renewable or has clean energy offsets.
- **Direct Ownership / Asset Acquisition:** American University also has about 1MW of solar on campus (split between PV and thermal).

## Arizona State University<sup>42 43 44</sup>

**ENDOWMENT:** \$643.2 million

**CONTACT:** Gerry DaRosa, Director of Energy Innovation, Arizona State University (Gerald.Darosa@asu.edu)

**HIGHLIGHTS:** IEN Member, Climate Neutral by 2035, Green Revolving Fund

- **Direct Ownership / Asset Acquisition & Power Purchase Agreement (PPA):** Arizona State University's on-site solar portfolio is one of the largest of any university in the United States consisting of both ASU owned and third-party owned systems. ASU's portfolio includes more than 24 MW dc equivalent of photovoltaic (PV), concentrated photovoltaic (CPV) and solar thermal capacity from 88 systems located throughout four major campuses and the ASU Research Park. ASU's portfolio of renewable energy accounts for approximately 13% of ASU's total electric use, avoiding approximately 21,000 metric tons of carbon dioxide equivalent emissions per year, roughly the same as the annual emissions of 4,500 passenger vehicles.
- **Green Revolving Fund (GRF):** ASU's revolving fund is called the Sustainability Initiatives Revolving Fund, or SIRF. The SIRF was established in fiscal year 2010 to invest in projects that foster and enable sustainability efforts and provide an economic return on investment. SIRF funds are available to ASU community members. With the exception of small SIRF grant projects (less than \$5,000), SIRF projects have certain investment criteria (e.g., IRR, NPV and payback goals). Projects include lighting retrofits, HVAC improvements, and central utility infrastructure improvements.
- **Other Noteworthy Activities:** AASHE STARS Gold, Billion Dollar Green Challenge

## Green Mountain College<sup>45 46</sup>

ENDOWMENT: \$3.8 million

CONTACT: Ryan Ihrke, Director of Sustainability, Green Mountain College (ihrker@greenmtn.edu)

HIGHLIGHTS: IEN Member, Climate Neutral as of 2011, Green Revolving Fund

- **Green Revolving Funds (GRFs):** Green Mountain College has a \$30,000 Green Revolving Loan Fund (GRLF). To date, the GRLF has funded four energy projects: the replacement of all 80 outdoor lighting fixtures with LED light bulbs; the installation of a solar PV array that generates electricity for the grid and provides an electric car charging station for the community; the transformation of the Two Editor's Inn to be a model for energy efficient, older residential buildings in the North East; and the replacement of lighting fixtures in a residence hall with LED lightbulbs. Additional details of each specific project, including payback is published on their website.<sup>47</sup>
- **Power Purchase Agreement (PPA):** In 2014, the College finalized a partnership with Aaron Kelly, an investor and solar installer who built a 150 kW system on his land in Benson, VT. The College agreed to purchase all of the electricity produced by the panels, while Aaron agreed to donate and transfer the renewable energy credits (RECs) to the College. This project offsets nearly 10% of the College's electricity every year.<sup>48</sup>
- **Other Noteworthy Activities:** Completed fossil fuel divestment, AASHE STARS Gold, Socially Responsible/Sustainable Investment Fund, Socially Responsible Investment Policy, Billion Dollar Green Challenge, Committee on Investor Responsibility.<sup>49</sup>

## Luther College<sup>50</sup>

ENDOWMENT: \$131 million

CONTACT: James Martin-Schramm, Professor of Religion, Luther College (marschja@luther.edu)

HIGHLIGHTS: Climate Neutral by 2030

- **Power Purchase Agreement (PPA):** The Preus Library and Regents Center PV arrays were financed via a third party PPA at a fixed price for ten years. Luther College is buying both the solar power produced and the RECs, and the project is predicted to save \$1 million in electricity purchases over 25 years.<sup>51</sup>
- **Purchasing "Unbundled" Renewable Energy Credits (RECs):** Luther College purchases all of the Renewable Energy Certificates (RECs) from a single turbine community wind project owned by WindVision, LLC.
- **Direct Ownership / Asset Acquisition:** The Luther College wind turbine was installed on September 19, 2011 and, on average, generates 3.6 million kilowatt hours (kWh) of electricity per year, which is about 27 percent of all power consumed on campus. In order to complete this \$3.2 million project Luther College established a for-profit corporate entity, Luther College Wind Energy Project, LLC. Formed in 2005, LCWEP receives Iowa's 476C tax credit for renewable energy, which adds about \$50,000 per year to the project's bottom line.<sup>52</sup>
- **Green Revolving Fund (GRF):** In 2015, the College established the roughly \$1 million Climate Action Fund to provide necessary financial resources for Luther to achieve the goals in its Climate Action Plan, especially Luther's emission reduction targets.<sup>53</sup>
- **Asset Leasing:** The Baker Village 280 kilowatt (kW) solar photovoltaic (PV) array was constructed in the summer of 2012. Leased for seven years from Decorah Solar Field, LLC, Luther's lease payments are funded by avoided electricity purchases, donations to Luther earmarked for renewable energy, and the sale of solar renewable energy certificates (SRECs). After the lease period ends and Luther acquires ownership of the facility, Luther will pay less for electricity over the 25-year-rated life of the panels than it would to purchase electricity from the grid to power Baker Village.<sup>54</sup>

## Yale University<sup>55 56 57 58</sup>

**ENDOWMENT:** \$25.57 billion

- **Private Market Investments:** In 2011, The Yale University Endowment invested funds in the Record Hill Wind Power Project in Maine, a 22 turbine, 50 MW wind power plant that will avoid over 70,000 tons of carbon dioxide annually.<sup>59</sup> According to a 2009 Endowment Report, the Yale Endowment has \$100 million invested in clean energy, which represents 6.4% of the entire venture capital portfolio. The Office of Facilities has also committed \$21 million in capital investment for energy conservation and greenhouse gas reduction. These capital investments include an “Energy Solutions Fund” of \$100,000 per year that is reserved for student-inspired and proposed projects focusing on energy conservation.<sup>60</sup>
- **Power Purchase Agreement (PPA) & Purchasing “Unbundled” Renewable Energy Credits (RECs):** Yale University has signed a 1.34 MW solar PPA contracted for 20 years with SolarCity. Yale is buying all the electricity and retaining all of the RECs. Collectively, there’s a savings of about 10% in operational cost per year. This PPA supplies 5% of the electricity West Campus uses, or around .5% of the electricity the entire university uses. Yale is currently pursuing 4 more PPAs.
- **Other Noteworthy Activities:** Swensen’s letter to managers regarding investment implications of climate change, Yale Entrepreneurial Institute Green Innovation Fellowship, Presidential Carbon Charge Task Force, GHG disclosure, third-party verification and comparability of data.

## Northeastern University

**ENDOWMENT:** \$729.4 million

**HIGHLIGHTS:** Climate Neutral by 2060

- **Public and Private Market Investments:** Northeastern University will direct \$25 million of its endowment to investments with a focus on sustainability, including clean energy, renewables, green building, and sustainable water and agriculture. Implementation will take place over five years, allowing the university to maintain strong endowment performance while transitioning to make these strategic investments in a sustainable planet.<sup>61</sup>

## University of North Carolina – Chapel Hill<sup>62</sup>

**ENDOWMENT:** \$2.989 billion

**CONTACT:** Cindy Pollock Shea: Sustainability Director, University of North Carolina Chapel Hill (cpshea@fac.unc.edu)

**HIGHLIGHTS:** Climate Neutral by 2050, Green Revolving Fund

- **Public and Private Market Investments:** The UNC Management Company has investments in green energy companies like SolarCity, Sunrun and Energy Investors Funds Renewable Energy Holdings, which converts landfill methane to power.<sup>63</sup> There is nearly \$18 million worth of existing exposure to alternative energy investments within the Fund.<sup>64</sup>
- **Other Noteworthy Activities:** AASHE STARS Gold (2014), Sustainability Seed Fund (2014), Invested in clean energy and sustainable forestry (2014).

## University of California System<sup>65</sup>

**ENDOWMENT:** \$14.27 billion

**CONTACT:** Amy Jaffe: Senior Advisor to Chief Investment Officer, University of California (Amy.Jaffe@ucop.edu)

**HIGHLIGHTS:** IEN Member, Climate Action Plans for all 10 campuses, Green Revolving Fund at the Los Angeles Campus

- **Power Purchase Agreement (PPA) & Direct Ownership/ Asset Acquisition:** The University of California (UC) System has the largest solar power project of any college or university in the U.S. In 2014, The UC signed two PPAs with Frontier Renewables, securing 80 MW of solar energy for UC for 25 years.<sup>66</sup> In 2016, UC signed an additional 25-year PPA with project developer Centaurus Renewable Energy, with the supplied power representing roughly 14% of the total UC System’s electricity usage. 60 MW have already been installed in the newly opened Five Points Solar Park, with an additional 20 MW installation set to come online by mid-2017. Across the University’s campuses and medical centers, a total of 36.5 MW of solar technology has been installed, with an additional 18.3 MW planned for 2017.<sup>67</sup>
- **Public and Private Market Investments:** The Office of the Chief Investment Officer of the Regents has committed to allocating \$1 billion over five years to climate change solutions.<sup>68</sup> The UC Ventures Program has also committed to investing \$25 million in aggregate in local, profit-seeking, investment funds being raised across the UC system, targeting seed and early stage innovation.<sup>69</sup>
- **Other Noteworthy Activities:** Sold \$200 million of coal mining public equity holdings as well as holdings in oil sands focused companies in 2015, member of CDP, PRI, INCR, Montreal Pledge, Proxy Voting, Shareholder engagement, and ESG integration.

# Conclusion

---

Colleges and universities are uniquely positioned to reap the financial, operational and reputational advantages of clean energy investments. Barriers to organizational communication, unfavorable market regulations, incompatible investment structures, concerns about financial performance, the lack of peer examples and unfamiliarity with endowment driven operational investments can prevent campuses from investing in clean energy at the most optimal levels. In response to these challenges, 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.

By becoming a pioneer in clean energy investing now, colleges and universities can get in front of future regulatory impact and the standpoint of applicants and donors and become leaders in the field, presenting it as a competitive edge to the institution. Between the variety of options now available, reduced price of clean energy, ability to make illiquid investments and long-term investments, and changing societal and environmental needs, colleges and universities are better positioned to make investments into clean technology than ever before. There is no barrier to these clean energy investment strategies that cannot be addressed, and participating in peer-to-peer dialogue is a great way to start finding solutions.

# Acknowledgements

---

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:

## Contributing Authors

- Georges Dyer, Principal, Intentional Endowments Network
- Nicole Harman, Program Associate, Intentional Endowments Network
- Jacquelyn Smith, Senior Fellow, Intentional Endowments Network
- Yingjie Wang, Intern, Intentional Endowments Network and Student, Yale University

## Interview Subjects for Campus Snapshots

- Gerry DaRosa: Director of Energy Innovation, Arizona State University
- Ryan Ihrke, Director of Sustainability, Green Mountain College
- Amy Jaffe, Senior Advisor at UC Regents and Executive Director, Energy and Sustainability at UC Davis
- Jim Martin-Schramm, Professor of Religion, Luther College
- Julie Paquette, Director of Energy Management at Yale University, Office of Facilities
- Cindy Pollock Shea, Sustainability Director, University of North Carolina Chapel Hill

## IEN Clean Energy Working Group

- Chris O'Brien (Chair), Director of Higher Education Programs, Altenex; Lecturer and former Director of Sustainability, American University
- John Chaimanis, Managing Director, Kendall Sustainable Infrastructure
- Daniel Dixon, Director, Office of Sustainability, University of Maine
- Kevin Brennan, Principal, Equilibrium Capital
- Alex Bernhardt, Head of Responsible Investment, US Mercer
- Jenny Heeter, Senior Energy Analyst, NREL
- Bracken Hendricks, CEO, Urban Ingenuity
- Nick Hylla, Executive Director, Midwest Renewable Energy Association
- Ken Locklin, Director, Impax Asset Management
- Michele Madia, Director of Education and Partnerships, Second Nature
- Erik Melang, Senior Managing Director, Clean Energy Advisors
- Mark Orłowski, Executive Director, Sustainable Endowments Institute
- Liesel Schwarz, Sustainability Director, Villanova University
- Dave Wallace, Managing Director, Investments, Pomona College

# Appendix

---

There are a variety of networks and initiatives that colleges and universities can join to support effective investments in clean energy and climate solutions, such as:

## **Intentional Endowments Network (IEN)**

[www.intentionalendowments.org](http://www.intentionalendowments.org)

The Intentional Endowments Network is a broad-based, collaborative network advancing intentionally designed endowments through a variety of strategies (e.g., ESG integration, impact investing, shareholder engagement). Working closely with leading organizations and initiatives, the network engages key leaders and stakeholders in the higher education, business, and non-profit sectors. It provides opportunities for learning and education, peer networking, convening, thought leadership and information exchange.

## **Sustainable Endowments Institute (SEI)**

<http://www.endowmentinstitute.org/>

<http://greenbillion.org/resources/>

In 2011, SEI launched the Billion Dollar Green Challenge (BDGC) to encourage \$1 billion in GRFs from universities. The BDGC has over 59 participating institutions in its network with over \$125 million dollars committed. SEI publishes implementation guides, white papers, primers, and case studies among other resources to help institutions start their own GRF.

## **Second Nature**

<http://secondnature.org>

In 2006, Second Nature founded the American College & University Presidents' Climate Commitment (now the Carbon Commitment) to create a network of colleges and universities pursuing climate neutrality. It currently has over 665 signatories and provides a framework to support other institutions in promoting a sustainable society.

## **Ceres**

<http://www.ceres.org/>

Ceres started the Clean Trillion investment campaign to encourage an additional \$1 trillion per year in clean energy investment to keep global temperatures from rising above 2 degrees Celsius. Ceres offers reports about clean energy investments and immediate action recommendations on its website.

## **AASHE**

<https://www.aashe.org/>

AASHE is the founding partner of the Green Gigawatt Partnership, an effort to catalyze one gigawatt (GW) of green power development by 2020 by recognizing colleges and universities who have signed long term contracts to purchase green power and providing support to help more campuses enter into large scale power purchase agreements.

AASHE also manages STARS, a self-reporting framework for colleges and universities to gauge relative progress toward sustainability. Over 772 universities have registered to use the STARS Reporting Tool to gain international recognition for their efforts, obtain a baseline for continuous improvement, and generate new ideas for sustainability.

# Footnotes

---

- <sup>1</sup> [www.bloomberg.com/company/clean-energy-investment/](http://www.bloomberg.com/company/clean-energy-investment/)
- <sup>2</sup> [www.bloomberg.com/news/articles/2016-06-13/we-ve-almost-reached-peak-fossil-fuels-for-electricity](http://www.bloomberg.com/news/articles/2016-06-13/we-ve-almost-reached-peak-fossil-fuels-for-electricity)
- <sup>3</sup> [www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf](http://www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf)
- <sup>4</sup> [www.ceres.org/issues/clean-trillion](http://www.ceres.org/issues/clean-trillion)
- <sup>5</sup> [data.bloomberglp.com/bnef/sites/4/2016/07/20160714\\_BNEF\\_Clean-energy-investment-Q2-2016-factpack.pdf](http://data.bloomberglp.com/bnef/sites/4/2016/07/20160714_BNEF_Clean-energy-investment-Q2-2016-factpack.pdf) (p.9)
- <sup>6</sup> [www.cambridgeassociates.com/our-insights/research/risks-and-opportunities-from-the-changing-climate-playbook-for-the-truly-long-term-investor/](http://www.cambridgeassociates.com/our-insights/research/risks-and-opportunities-from-the-changing-climate-playbook-for-the-truly-long-term-investor/)
- <sup>7</sup> [greenbillion.org/wp-content/uploads/2014/01/Billion-Dollar-Green-Challenge-Info-Packet-2016.pdf](http://greenbillion.org/wp-content/uploads/2014/01/Billion-Dollar-Green-Challenge-Info-Packet-2016.pdf)
- <sup>8</sup> [www.bloomberg.com/news/articles/2012-03-20/solar-15-returns-lure-investments-from-google-to-buffett](http://www.bloomberg.com/news/articles/2012-03-20/solar-15-returns-lure-investments-from-google-to-buffett)
- <sup>9</sup> <https://www.theguardian.com/business/2016/oct/10/global-demand-for-energy-will-peak-in-2030-says-world-energy-council>
- <sup>10</sup> [www.ustrust.com/publish/content/application/pdf/GWMOL/USTp\\_ARXDJKR8\\_2017-05.pdf](http://www.ustrust.com/publish/content/application/pdf/GWMOL/USTp_ARXDJKR8_2017-05.pdf)
- <sup>11</sup> [www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/gx-millennial-survey-2016-exec-summary.pdf](http://www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/gx-millennial-survey-2016-exec-summary.pdf)
- <sup>12</sup> <http://www.sierraclub.org/youth/seize-the-grid>
- <sup>13</sup> [data.bloomberglp.com/bnef/sites/4/2016/07/20160714\\_BNEF\\_Clean-energy-investment-Q2-2016-factpack.pdf](http://data.bloomberglp.com/bnef/sites/4/2016/07/20160714_BNEF_Clean-energy-investment-Q2-2016-factpack.pdf)
- <sup>14</sup> [www.bloomberg.com/news/articles/2016-06-13/we-ve-almost-reached-peak-fossil-fuels-for-electricity](http://www.bloomberg.com/news/articles/2016-06-13/we-ve-almost-reached-peak-fossil-fuels-for-electricity)
- <sup>15</sup> [www.bloomberg.com/news/articles/2016-06-13/we-ve-almost-reached-peak-fossil-fuels-for-electricity](http://www.bloomberg.com/news/articles/2016-06-13/we-ve-almost-reached-peak-fossil-fuels-for-electricity)
- <sup>16</sup> [www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf](http://www.lazard.com/media/2390/lazards-levelized-cost-of-energy-analysis-90.pdf)
- <sup>17</sup> [time.com/4082328/climate-change-economic-impact/](http://time.com/4082328/climate-change-economic-impact/)
- <sup>18</sup> [www.bloomberg.com/news/articles/2016-06-13/we-ve-almost-reached-peak-fossil-fuels-for-electricity](http://www.bloomberg.com/news/articles/2016-06-13/we-ve-almost-reached-peak-fossil-fuels-for-electricity)
- <sup>19</sup> [www.ceres.org/issues/clean-trillion](http://www.ceres.org/issues/clean-trillion)
- <sup>20</sup> [www.ceres.org/resources/reports/investing-in-the-clean-trillion-closing-the-clean-energy-investment-gap/view](http://www.ceres.org/resources/reports/investing-in-the-clean-trillion-closing-the-clean-energy-investment-gap/view)
- <sup>21</sup> Adopted from “Guidance for Leadership in Sustainable Purchasing, v2.0,” published by the Sustainable Purchasing Leadership Council, 2016. Website: [www.sustainablepurchasing.org](http://www.sustainablepurchasing.org)
- <sup>22</sup> [data.bloomberglp.com/bnef/sites/4/2016/07/20160714\\_BNEF\\_Clean-energy-investment-Q2-2016-factpack.pdf](http://data.bloomberglp.com/bnef/sites/4/2016/07/20160714_BNEF_Clean-energy-investment-Q2-2016-factpack.pdf)
- <sup>23</sup> <http://www.bloomberg.com/news/articles/2016-10-15/iea-to-lift-solar-wind-outlook-after-decade-of-underestimates>
- <sup>24</sup> [us.spindices.com/indices/equity/sp-tsx-renewable-energy-and-clean-technology-index](http://us.spindices.com/indices/equity/sp-tsx-renewable-energy-and-clean-technology-index)
- <sup>25</sup> [finance.yahoo.com/quote/%SENEX?ltr=1](http://finance.yahoo.com/quote/%SENEX?ltr=1)
- <sup>26</sup> [www.cambridgeassociates.com/our-insights/research/risks-and-opportunities-from-the-changing-climate-playbook-for-the-truly-long-term-investor/](http://www.cambridgeassociates.com/our-insights/research/risks-and-opportunities-from-the-changing-climate-playbook-for-the-truly-long-term-investor/)
- <sup>27</sup> [40926u2govf9kuqen1ndit018su.wpengine.netdna-cdn.com/wp-content/uploads/2015/12/Risks-and-Opportunities-From-the-Changing-Climate.pdf](http://40926u2govf9kuqen1ndit018su.wpengine.netdna-cdn.com/wp-content/uploads/2015/12/Risks-and-Opportunities-From-the-Changing-Climate.pdf)
- <sup>28</sup> [www.bloomberg.com/news/articles/2012-03-20/solar-15-returns-lure-investments-from-google-to-buffett](http://www.bloomberg.com/news/articles/2012-03-20/solar-15-returns-lure-investments-from-google-to-buffett)
- <sup>29</sup> [us.sunpower.com/sites/sunpower/files/media-library/white-papers/wp-valuing-return-solar-projects-businesses-government-agencies.pdf](http://us.sunpower.com/sites/sunpower/files/media-library/white-papers/wp-valuing-return-solar-projects-businesses-government-agencies.pdf)
- <sup>30</sup> [greenbillion.org/wp-content/uploads/2014/01/Billion-Dollar-Green-Challenge-Info-Packet-2016.pdf](http://greenbillion.org/wp-content/uploads/2014/01/Billion-Dollar-Green-Challenge-Info-Packet-2016.pdf)
- <sup>31</sup> [www.uvm.edu/sustain/sustainability-uvm/initiatives/energy-revolving-fund](http://www.uvm.edu/sustain/sustainability-uvm/initiatives/energy-revolving-fund)
- <sup>32</sup> [www.aashe.org/files/documents/resources/greening-the-bottom-line-2012.pdf](http://www.aashe.org/files/documents/resources/greening-the-bottom-line-2012.pdf)
- <sup>33</sup> <http://greenbillion.org/wp-content/uploads/2011/10/WeberState.pdf>
- <sup>34</sup> <http://www.chicagotribune.com/suburbs/naperville-sun/ct-nvs-north-central-green-challenge-st-0902-20160901-story.html>
- <sup>35</sup> <https://www.caltech.edu/news/greening-caltechs-bottom-line-1889>
- <sup>36</sup> [www.seia.org/policy/distributed-solar/net-metering](http://www.seia.org/policy/distributed-solar/net-metering)
- <sup>37</sup> [www.eia.gov/todayinenergy/detail.cfm?id=4850](http://www.eia.gov/todayinenergy/detail.cfm?id=4850)
- <sup>38</sup> Energy Efficiency as an Investment: Bridging the Analysis Gap Between University Finance and Sustainability Staff
- <sup>39</sup> <http://www.alignedintermediary.org/>
- <sup>40</sup> Energy Efficiency as an Investment: Bridging the Analysis Gap Between University Finance and Sustainability Staff
- <sup>41</sup> [solar.gwu.edu/file/1052/download](http://solar.gwu.edu/file/1052/download)
- <sup>42</sup> <https://cfo.asu.edu/solar>
- <sup>43</sup> <https://cfo.asu.edu/zerowaste-publications>

- <sup>44</sup> <https://cfo.asu.edu/sirf>
- <sup>45</sup> [www.greenmtn.edu/wordpress/wp-content/uploads/S2020whitepaper10.3.20131.pdf](http://www.greenmtn.edu/wordpress/wp-content/uploads/S2020whitepaper10.3.20131.pdf)
- <sup>46</sup> [www.greenmtn.edu/sustainability/sustainability-on-campus/purchasing-and-investing/](http://www.greenmtn.edu/sustainability/sustainability-on-campus/purchasing-and-investing/)
- <sup>47</sup> [www.greenmtn.edu/wordpress/wp-content/uploads/Green-Revolving-Loan-Fund-Projects-To-Date.pdf](http://www.greenmtn.edu/wordpress/wp-content/uploads/Green-Revolving-Loan-Fund-Projects-To-Date.pdf)
- <sup>48</sup> [www.greenmtn.edu/sustainability/sustainability-on-campus/energy-buildings/renewable-electricity/](http://www.greenmtn.edu/sustainability/sustainability-on-campus/energy-buildings/renewable-electricity/)
- <sup>49</sup> [http://www.intentionalendowments.org/green\\_mountain\\_college](http://www.intentionalendowments.org/green_mountain_college)
- <sup>50</sup> Interview with Jim Martin-Schramm, Director, Luther College Study Centre
- <sup>51</sup> [www.luther.edu/sustainability/energy-climate/renewable/solar-pv-systems/preus-regents/](http://www.luther.edu/sustainability/energy-climate/renewable/solar-pv-systems/preus-regents/)
- <sup>52</sup> <http://www.luther.edu/sustainability/energy-climate/renewable/wind-energy/>
- <sup>53</sup> [http://www.luther.edu/policies/assets/Climate\\_Action\\_Fund\\_Spending\\_Policy.pdf](http://www.luther.edu/policies/assets/Climate_Action_Fund_Spending_Policy.pdf)
- <sup>54</sup> [www.luther.edu/sustainability/energy-climate/renewable/solar-pv-systems/bakersolar/](http://www.luther.edu/sustainability/energy-climate/renewable/solar-pv-systems/bakersolar/)
- <sup>55</sup> [static1.squarespace.com/static/55db7b87e4b0dca22fba2438/t/578e41ffe58c629352d7560a/1468940803516/Yale\\_Endowment\\_15.pdf](https://static1.squarespace.com/static/55db7b87e4b0dca22fba2438/t/578e41ffe58c629352d7560a/1468940803516/Yale_Endowment_15.pdf)
- <sup>56</sup> [investments.yale.edu/images/documents/Endowment\\_Climate\\_Change\\_Update.pdf](http://investments.yale.edu/images/documents/Endowment_Climate_Change_Update.pdf)
- <sup>57</sup> [sustainability.yale.edu/sites/default/files/20151103\\_final\\_-\\_with\\_live\\_links.pdf](http://sustainability.yale.edu/sites/default/files/20151103_final_-_with_live_links.pdf)
- <sup>58</sup> Interview with Julie Paquette, Director of Energy Management at Yale University, Office of Facilities.
- <sup>59</sup> [news.yale.edu/2011/03/03/endowment-invests-maine-wind-power-project](http://news.yale.edu/2011/03/03/endowment-invests-maine-wind-power-project)
- <sup>60</sup> [news.yale.edu/2016/04/21/just-time-earth-day-update-yale-sustainability-initiatives](http://news.yale.edu/2016/04/21/just-time-earth-day-update-yale-sustainability-initiatives)
- <sup>61</sup> [www.northeastern.edu/news/2016/07/northeastern-to-invest-25-million-of-endowment-funds-in-environmental-sustainability/](http://www.northeastern.edu/news/2016/07/northeastern-to-invest-25-million-of-endowment-funds-in-environmental-sustainability/)
- <sup>62</sup> [http://sustainability.unc.edu/files/2015/08/SustainabilityPlan\\_Final.pdf](http://sustainability.unc.edu/files/2015/08/SustainabilityPlan_Final.pdf)
- <sup>63</sup> <http://www.citizen-times.com/story/news/local/2015/02/13/unc-keep-fossil-fuel-holdings-researches-renewables/23352061/>
- <sup>64</sup> <https://uncmc.unc.edu/Editor/files/UNCIF%20FY%202015%20Annual%20Report.pdf>
- <sup>65</sup> Interview with Amy Jaffe, Senior Advisor at UC Regents and Executive Director at UC Davis
- <sup>66</sup> [universityofcalifornia.edu/press-room/uc-make-large-purchase-solar-energy-partner-frontier-renewables](http://universityofcalifornia.edu/press-room/uc-make-large-purchase-solar-energy-partner-frontier-renewables)
- <sup>67</sup> [universityofcalifornia.edu/news/uc-surges-toward-carbon-neutrality-largest-solar-power-purchase](http://universityofcalifornia.edu/news/uc-surges-toward-carbon-neutrality-largest-solar-power-purchase)
- <sup>68</sup> [www.ucop.edu/investment-office/\\_files/sustainable-investment-framework.pdf](http://www.ucop.edu/investment-office/_files/sustainable-investment-framework.pdf)
- <sup>69</sup> <http://ucop.edu/innovation-entrepreneurship-initiative/uc-ventures-program.html>