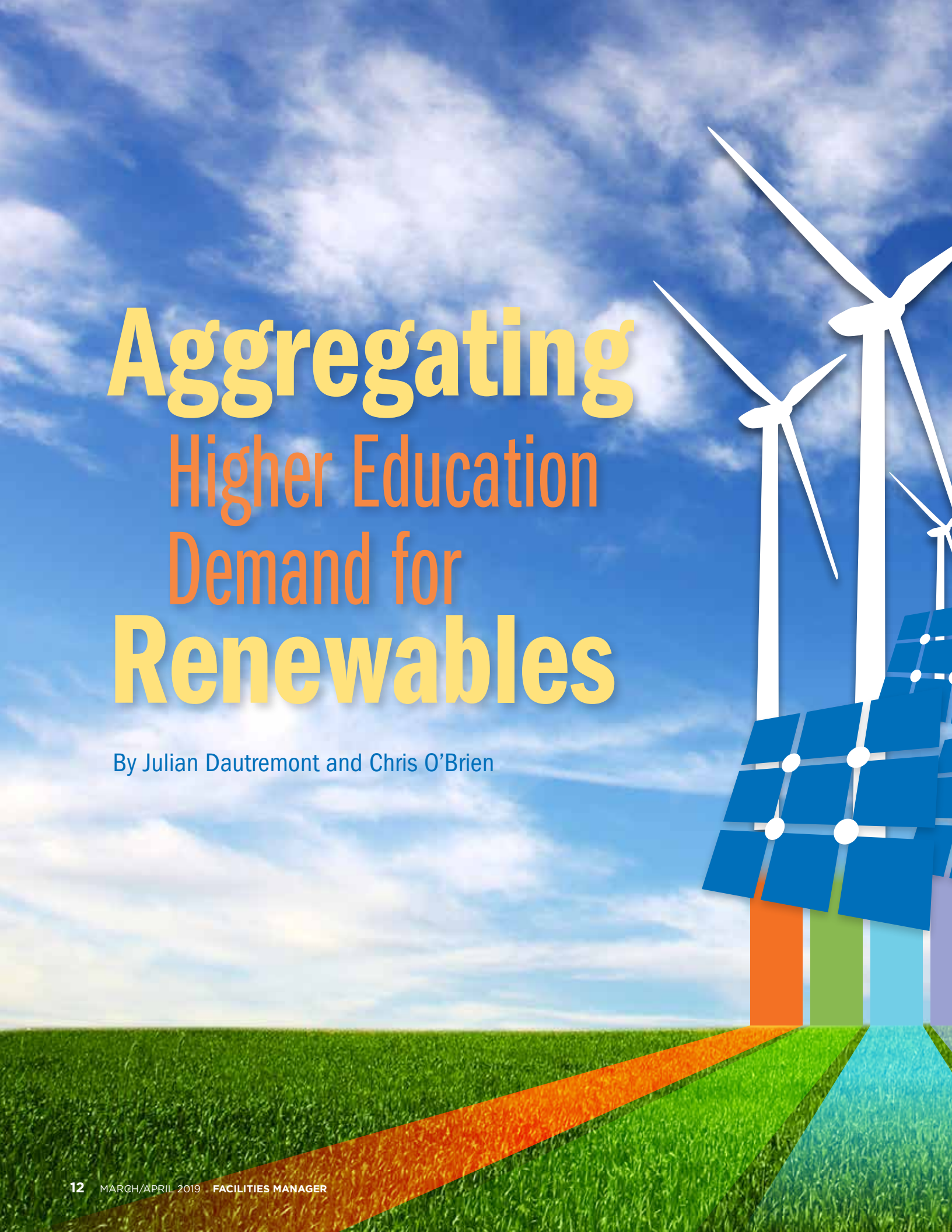


Aggregating Higher Education Demand for Renewables

By Julian Dautremont and Chris O'Brien

Cohorts of colleges and universities are aggregating energy loads to achieve economies of scale when sourcing renewable energy. This article highlights the benefits of this aggregated approach by examining several completed group purchases as well as some in progress, such as a 100,000-MWh effort in Pennsylvania. It also describes best practices for pursuing group renewable energy aggregations structured as power purchase agreements (PPAs).

INTRODUCTION

Campuses are increasingly looking to renewable energy as the most financially attractive strategy for achieving dramatic reductions in greenhouse gas (GHG) emissions while reducing long-term energy costs and minimizing energy price risk.

A number of campuses have already taken steps to source renewable energy. In fact, as reported in *Assessing the Higher Education Sector's Use of Renewable Energy*, more than 240 are already using some amount of renewable energy. However, according to *The State of Sustainability in Higher Education 2016: The Life Cycle of Higher Education Facilities*, average annual campus GHG reductions have not been commensurate with many of the carbon-neutrality target dates compiled in the report. Unless campuses take more dramatic actions, they may be at risk of missing GHG reduction goals.

Since 2009, there has been steady growth in renewable energy adoption by institutions of higher education. Many schools purchase "unbundled" renewable energy certificates (RECs). As the costs of solar and wind energy have dropped, many campuses are now sourcing renewable energy via power purchase agreements (PPAs) from onsite solar arrays as well as from offsite, utility-scale solar and wind farms.

Onsite solar is an attractive strategy because it can be highly visible to campus stakeholders and because it is "behind-the-meter," which means it can displace more of the delivered cost of electricity. However, it is constrained by the size of the sites on a campus available to host arrays, therefore typically only providing a small portion of campus electricity usage. Given the approaching carbon neutrality target dates, onsite solar is unlikely to provide the scale needed by many campuses to reach their GHG targets on time.

Offsite wind and solar projects are much larger and are therefore capable of providing up to 100 percent of a campus's electricity usage—achieving dramatically larger GHG reductions and far more significant financial benefits.

Both options can be conducive to a consortium-style approach in which two or more entities aggregate their efforts in order to capture economies of scale. Higher education is particularly well suited to aggregation strategies, as evidenced by the growing number of cohorts emerging to achieve scale through renewable energy buyer groups.

BENEFITS OF AGGREGATION: CREATING AN ENERGY COHORT

There are several benefits to aggregating campus energy load for the renewable energy market, including:

Reducing soft costs through peer-learning cohorts

Most campuses have yet to adopt a comprehensive renewable energy strategy or, at least, have yet to execute a large onsite or offsite renewable energy PPA. One of the main benefits of participating in a renewable energy consortium is to climb the learning curve with a group of peers—or, perhaps, lead your peers on that journey. *Soft costs can account for as much as two-thirds of the cost of an institutional renewable energy deal.* Undertaking the learning process as a group can help cut those costs for developers by reducing the effort needed to acquire customers, which gets passed along to the institution in the form of lower PPA prices.

Gaining momentum

Renewable energy developers are attracted to colleges and universities because of their status as "forever" institutions. Stability and longevity tend to go hand-in-hand with strong credit ratings, which helps keep the cost of capital down for developers. But institutions that expect to be around forever (or close to it) also tend to take slow, methodical steps into unfamiliar territory. Thus, it can be challenging to gain traction on large-scale renewable energy efforts. The shared accountability that comes from working with peers can be a good way of keeping things moving forward.

Achieving scale

The average wind-project size in the United States is now over 200 MW. Utility-scale solar projects are smaller, on average, but many are still too large for one campus. Some projects will accommodate smaller PPA contract sizes, but many will not. This means that many (probably the vast majority) of campuses will be restricted in the number of projects willing to seek their business, simply because there is a mismatch between the amount of electricity used by the campus and the amount produced by the project. Going to the market as a group can attract more competition and therefore more attractive bids.

Higher education is especially suited to aggregation, for several reasons:

1. Size matching

A rooftop solar array can sometimes produce all the power a single home needs in a year, and utilities can purchase all the output from a single large wind or solar farm. But most colleges occupy a midsize energy-usage segment in the market, falling somewhere between residential and utility-scale. This means that solar arrays located on campuses are unlikely to produce as much electricity as a campus uses—often just a small percentage of the total annual usage. But wind and solar projects that produce hundreds of thousands of megawatt hours of electricity per year are much too big for most campuses. Thus, combining electricity loads from two or more campuses helps achieve a scale that is more attractive to renewable energy project developers.

2. History of collaboration

While each college and university has its own independent financial responsibilities that require it to compete in the marketplace for students, faculty, and staff, higher education institutions also have a long history of collaborating with institutions that might otherwise be viewed as competitors.

3. Town–gown relations

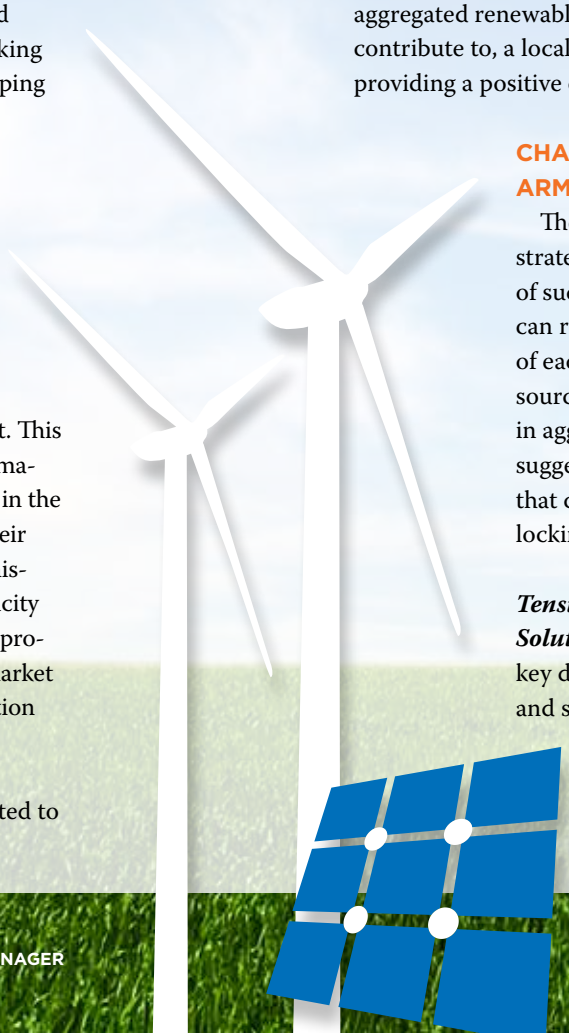
Some local governments are adopting climate plans or renewable energy targets. Colleges and universities often represent a large constituency to local governments, which can provide opportunities as well as responsibilities. It is possible that an aggregated renewable energy procurement can align with, and contribute to, a local or state government renewable energy goal, providing a positive opportunity for town–gown relationships.

CHALLENGES AND SOLUTIONS: LOCKING ARMS OR HOLDING HANDS?

The benefits of a renewable energy aggregation strategy must be weighed against the challenges of such an approach. Inherently, joining a group can raise questions regarding the independence of each member. This section highlights two sources of tension that institutions may face in aggregating their demand with others and suggests an approach to manage these tensions that can be summarized as "holding hands, not locking arms."

Tension: Coordinating Schedules

Solution: To the extent feasible, identify key decision-making points in the process and schedule them in advance. Individual participants may be better able to keep their internal processes moving forward if there is a clear group deadline. Consider who will need to



sign off on each important milestone and schedule time with them as far in advance as possible. It is easier to cancel a meeting than to get one scheduled with a senior decision-maker at the last minute.

Tension: Agreeing on Project Criteria

Solution: Discuss project criteria early in the process. Criteria can affect financial benefits, risks, and sustainability impacts. Think about criteria in terms of requirements versus "nice-to-haves." Establish clarity about the minimum requirements for success, as compared to what might be a shoot-for-the-stars scenario. Identify any "deal-breaker" criteria that are unlikely to change regardless of other mitigating factors. Otherwise, taking a "consider-all-options" approach until a more complete picture emerges may be helpful.

CRITERIA FOR CONSIDERATION:

- *Financial benefits*—will the project economics mitigate risk associated with energy-price volatility, improve budget certainty, and reduce costs?
- *Location*—are you looking for a solution that is on campus (i.e., "behind the meter"), or will you consider solutions that are nearby, in-state, within your regional market, or beyond your regional market?
- *Environmental attributes*—will you require RECs from the project, or are national RECs sufficient?
- *Academic integration*—does the solution need to include any teaching or research components?
- *Contract term*—how long do you want to contract for renewables?

Different participants may have different requirements. For example, some projects may allow one buyer, or "offtaker" as they are called, to retain RECs from the project, while another offtaker allows the project owner to retain the project RECs. The number of years in the contract term may also be flexible, with one participant contracting for 12 years and another for 15 years, for example.

Keep in mind that one of the benefits of aggregation is minimizing soft costs by working as a group. Thus, the more the

group agrees on similar requirements, the more efficient the process is likely to be. But, in the end, if participants are holding hands rather than locking arms, then each will have the flexibility to make independent decisions about many of the criteria.

AGGREGATE EXAMPLES

Capital Partners Solar Project, 2016

American University (AU) and George Washington University (GWU) in the District of Columbia, banded together to seek renewable sources for at least 50 percent of the electricity used by each campus. The GWU Hospital (a separate buying entity from the university itself) also joined the effort. The group worked with CustomerFirst Renewables (CFR) to pioneer a demand-side aggregation procurement process to competitively solicit and sign PPAs from a utility-scale renewable energy project. In the end, the three members (AU, GWU, and the GWU Hospital) sourced 53 MW of solar from one developer under similar terms. The project has been operational since early 2016 and has provided an opportunity to optimize GW's energy procurement strategy, leading to strong cost savings.

Massachusetts Institute of Technology, 2017

The Massachusetts Institute of Technology (MIT), Boston Medical Center (BMC), and Post Office Square procured and contracted electricity from a 60-MW solar project. By aggregating the three organizations' demand, each could benefit from the economies of scale inherent in contracting for a larger renewable project, while working as a group ensured that any issues arising during the engagement were problem-solved together, providing an additional reassurance mechanism for a new and unfamiliar business decision and sustaining momentum throughout the engagement. The result was the largest demand-side aggregation across multiple industries in the United States at that time. The project is currently producing energy in line with initial estimates and providing strong environmental and risk mitigation benefits to MIT, BMC, and Post Office Square.

Emerging Aggregation, 2019

A leading university has organized a group of three (possibly four at the time of publication) colleges and universities in Pennsylvania to seek at least 100,000 MWh of electricity from renewable sources. The cohort is working to align their stakeholders around common goals and project criteria, and expects to have gone to the market seeking renewable energy solutions by the time this article is in print. This group has already helped inspire additional emerging aggregations in Pennsylvania.

CONCLUSIONS

According to data reported in *Assessing the Higher Education Sector's Use of Renewable Energy*, the higher education sector is adopting renewable energy at a steady growth rate. Indeed, hundreds of campuses are now buying renewable energy, but most are either buying "unbundled RECs," which incur an added cost, or they are sourcing onsite solar, which is a step in the right direction but lacks the scale needed to make significant financial and environmental impacts.

In short, the renewable energy adoption rate in higher education may be too slow to meet the sector's voluntary GHG reduction goals. Ramping up renewable energy sourcing through large-scale, offsite PPAs may be among the most financially viable ways to meet the goals on time. But large, offsite deals are complex and can be time-consuming.

In this light, renewable energy buying consortia that aggregate campus load and create "learning and doing" cohorts may be the pivotal strategy that enables hundreds of colleges and universities to meet their climate goals under financially attractive conditions.

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