America's Top Colleges for Renewable Energy 2020

Who Is Leading the Transition to 100% Renewable Energy on Campus?

ENVIRONMENT FLORIDA RESEARCH & POLICY CENTER

FRONTIER GROUP

America's Top Colleges for Renewable Energy 2020

Who Is Leading the Transition to 100% Renewable Energy on Campus?

FRONTIER GROUP

Written by:

Emma Searson and Bronte Payne, Environment America Research & Policy Center
Linus Lu
Tony Dutzik, Frontier Group

Summer 2020

Acknowledgments

Environment Florida Research & Policy Center thanks The Association for the Advancement of Sustainability in Higher Education (AASHE) for granting us access to the Sustainability Tracking, Assessment & Rating System (STARS) data displays. The authors also thank Jordan Schanda, the STARS Program Coordinator at AASHE, Julian Dautremont, AASHE's Director of Programs, and James Critchfield, EPA Green Power Partnership Director, for their help. The authors also thank Dennis Carlberg of Boston University and David Philips of the University of California for their review of this report. Thanks also to Susan Rakov, Gideon Weissman and Adrian Pforzheimer of Frontier Group and to Gail Tennen for editorial support. Abigail Bradford, formerly of Frontier Group, was lead author of the previous edition of this report, and we are grateful for her help and support with this year's edition.

Environment Florida Research & Policy Center thanks the Scherman Foundation, the John Merck Fund and the Arntz Family Foundation for making this report possible. The authors bear responsibility for any factual errors. The recommendations are those of Environment Florida Research & Policy Center. The views expressed in this report are those of the authors and do not necessarily reflect the views of our funders or those who provided review.

Environment Florida Research & Policy Center is a 501(c)(3) organization. We are dedicated to protecting Florida's air, water and open spaces. We investigate problems, craft solutions, educate the public and decision-makers, and help the public make their voices heard in local, state and national debates over the quality of our environment and our lives. For more information about Environment Florida Research & Policy Center or for additional copies of this report, please visit www.environmentfloridacenter.org.

Frontier Group provides information and ideas to help citizens build a cleaner, healthier, and more democratic America. We address issues that will define our nation's course in the 21st century – from fracking to solar energy, global warming to transportation, clean water to clean elections. Our experts and writers deliver timely research and analysis that are accessible to the public, applying insights gleaned from a variety of disciplines to arrive at new ideas for solving pressing problems. For more information about Frontier Group, please visit www.frontiergroup.org.

Layout: Alec Meltzer/meltzerdesign.net
Cover photo: Campus of the University of Central Florida, U.S. Department of Energy photo by Michael Rathburn

Table of contents

Executive summary

America's colleges and universities are leading the transition to a 100 percent renewable energy system. Small liberal arts colleges, large public universities and community colleges alike, from every corner of the U.S., are taking the lead in reducing energy consumption, deploying renewable energy technologies, and switching to electric vehicles (EVs).

The nation's leading campuses for clean energy – from Georgetown University to the University of Idaho – are setting a strong example for other colleges and the nation as a whole to follow. **More than 40 colleges and universities now obtain 100 percent or more of their electricity from renewable energy sources.**[1]

Campuses are also leading in cleaning up America's transportation system. **Each of the top 10 schools for electric vehicles in this ranking has switched over 60 percent of its campus-owned vehicles to EVs**. Of the schools that reported their campus fleet details to STARS, 82 percent have at least one EV.

Leading campuses are taking action on multiple fronts. Colby College in Maine is one of the leaders in the use of electricity from renewable sources, as well as the use of on-campus renewable energy to supply other building energy needs such as heating and hot water. Other leading colleges include Georgetown University, which generates 130 percent of its electricity needs with clean renewable sources, and Ringling College of Art and Design in Florida, which has a campus fleet made up of 85% EVs.

College campuses are ideal places to lead the renewable energy transition. Colleges are large energy users and are well suited to employ microgrids and district heating and cooling systems that expand the potential uses for renewable energy.[2] Organizations such as Second Nature, with more than 400 active participants in its Climate Leadership Network, have helped get hundreds of campuses to make commitments to act on climate by pursuing carbon neutrality and climate resilience.[3] Schools that seize these opportunities also draw the attention of potential students. A 2020 Princeton Review survey of more than 10,000 college applicants found that two-thirds of them would factor in schools' environmental commitments – including commitments related to energy use – when deciding where to attend.[4]

America's leading clean energy colleges and universities are setting a shining example for other schools to follow. When the COVID-19 pandemic wanes, schools should follow their lead by pledging to move toward 100 percent renewable energy.

Leading campuses are well on the way to 100 percent renewable energy.

Of 127 colleges that reported data to the U.S. Environmental Protection Agency's (EPA) Green Power Partnership, 42 are now meeting at least 100 percent of their electricity needs with renewable energy generated by the university or purchased through power purchase agreements (PPAs) or renewable energy certificates (RECs). Seventy-six colleges are getting at least 50% of their energy from renewables. Georgetown University in Washington, D.C., leads all schools, generating and purchasing more than 1.3 times as much electricity from renewable sources as it consumes.

TABLE ES-1: The top 10 U.S. EPA Green Power Partnership (GPP) colleges and universities obtaining 100 percent or more of their electricity from renewable sources*

School	State	Percent of electricity from renewable sources
Georgetown University	DC	130%
Hobart and William Smith Colleges	NY	125%
Emerson College	MA	123%
Whitman College	WA	119%
Unity College	ME	115%
Lewis & Clark College	OR	110%
Swarthmore College	PA	110%
Ithaca College	NY	109%
Bentley University	MA	107%
Saint Louis University	MO	105%

** Schools are able to attain more than 100 percent of their electricity needs from renewables for a number of reasons: there may be changes in electricity use relative to their contract amounts; some schools may buy renewable electricity to help cover emissions related to things like electric grid losses or from their supply chain; and schools might purchase renewables through long-term contracts at levels that anticipate campus growth.*

Leading campuses are not just switching to renewable electricity – they are also replacing all fossil fuel-powered systems, including for heating, cooling and hot water, with systems that run on electricity or renewable energy, such as solar thermal panels and geothermal heat pumps. Over half of universities' energy consumption – 53 percent on average – comes from water heating and space heating, which are primarily powered by gas and other fossil fuels.[5]

Colby College in Maine ranks first for using renewable energy for its non-electrical energy needs, thanks in part to energy from a geothermal system that draws from the earth's stable temperature to provide heating for its Alumni Center and the Davis Science Center. Chatham University in Pennsylvania, which is second in this year's ranking, features three solar thermal systems that are used to heat all of its hot water.[7]

TABLE ES-2: Top five schools for renewable heating, cooling, hot water and other non-electric energy produced per student[6]

Rank	School	State	Amount of non-electric renewable energy produced on campus per full-time equivalent student (MMBtu)
1	Colby College	ME	55.3
2	Chatham University	PA	40.2
3	University of Idaho	ID	36.2
4	Colgate University	NY	33.5
5	University of Iowa	IA	22.3

TABLE ES-3: Top five schools with the highest percentage of electric vehicles[9]

Rank	School	State	Percent of campus-owned vehicles that are EVs
1	Ringling College of Art and Design	FL	85%
2	University of the Pacific	CA	81%
3	Rice University	TX	76%
4	Harvey Mudd College	CA	73%
5	Loyola Marymount University	CA	72%

Leading schools are switching their campus fleets to electric vehicles.

Leading campuses are not just cleaning up their buildings, but also their transportation systems by transitioning away from fossil fuel-powered vehicles and toward EVs. Transportation accounts for the largest portion of greenhouse gas emissions in the United States at 29 percent, so shifting how we power our vehicles is essential to reaching a zero-carbon future.[8]

Ringling College of Art and Design in Florida leads the nation in percentage of campus-owned vehicles that are electric powered, with 35 of the college's 41 vehicles being EVs. All of the top five schools that reported to the AASHE STARS database had more than 70 percent of their vehicles be EVs.

Leading schools are reducing energy consumption by improving the energy efficiency of campus buildings and encouraging students and employees to conserve energy.

Colleges and universities are reducing energy consumption on campus to make it easier to power themselves with 100 percent renewable energy. Leading campuses are cutting their energy consumption by improving energy efficiency and by better managing their heating, cooling and ventilation needs in real time to prevent waste. Schools are also cutting consumption through energy conservation programs, such as Brown University's Departmental Sustainability Program (DSP), which encourages departments to adopt sustainable practices in their energy consumption, as well as to reduce waste production and to reduce emissions from transportation.[10]

Numerous schools have adopted ambitious renewable energy commitments for the future.

Vanderbilt University made a commitment in 2019 to power its entire campus with renewable energy and achieve carbon neutrality by 2050. To meet this goal, Vanderbilt plans to invest in on-site and off-site renewable energy, reduce its carbon footprint from transportation, expand green spaces and pedestrian walkways, and invest in sustainable infrastructure.[11] Some of the sustainability projects it has spearheaded include a dockless bikeshare program, the building of solar-powered phone charging stations and picnic tables, as well as a solar-powered water heating system installed in the Currey Tennis Center.[12] Vanderbilt also announced at the end of January 2020 a 20-year agreement with the Tennessee Valley Authority and Nashville Electric Service to build a new 35 MW solar farm that will help offset around 70 percent of Vanderbilt's annual indirect greenhouse gas emissions from purchased electricity.[13]

The University of Arizona is moving ahead with the state's largest ever renewable energy deal between a university and a utility company.[14] The agreement with Tucson Electric Power will dedicate portions of two new renewable energy projects to the university: a solar-plus-storage system southeast of Tucson and a wind farm in New Mexico. Both projects are set to go up in late 2020.[15]

The University of Hawai'i (UH) is committed to produce as much renewable energy as its campuses use by 2035.[16] In 2019, a 1-megawatt installation of PV panels at the University of Hawai'i at Mānoa's parking structure came online, and another megawatt of solar power is expected to be built in the summer of 2020.[17]

The University of California system (UC) is committed to 100 percent clean electricity and to becoming carbon neutral by 2025.[18] One of the most impressive parts of UC's commitment is its policy to avoid onsite combustion of fossil fuels for space heating and water heating in all new campus buildings and those undergoing major renovations.[19]

To follow in the footsteps of leading campuses, all colleges and universities should:

- Set a goal to obtain 100 percent of their energy from renewable sources – including for electricity, heating and other building energy needs, and campus-owned vehicles. To achieve this goal, schools should:
    - Reduce energy consumption through energy efficiency improvements and energy conservation initiatives.
    - Use renewable energy sources, such as wind and solar power, to supply 100 percent of their electricity.
    - Transition all other building energy systems – including heating, hot water and cooling – to be electric or powered by renewable energy sources, such as solar hot water or ground-source heat pumps.
    - Swap all fossil-fuel powered vehicles for EVs.
- Enable and encourage students and employees to commute to and from campus sustainably by walking, biking, taking transit or using EVs.
- Purchase goods and services – such as food and travel – that minimize the use of fossil fuels.

Introduction

Boston University is an institution of over 34,000 students, with world-renowned faculty and a location in one of America's most vibrant cities.[20] It is also one of the growing number of universities or university systems in the country that has made the commitment to shift to 100 percent renewable electricity.[21]

Each campus is unique and the approach to going 100 percent renewable used by one college may not be the ideal approach for another. As an urban campus, BU has less potential for large scale solar energy installations or other forms of on-campus renewable energy than some other schools. But that hasn't stemmed the university's ambitions.

In December 2017, BU laid out an ambitious climate action plan to achieve carbon neutrality by 2040.[22] A large part of the plan is to match 100 percent of the university's electricity demand with renewable energy through BU Wind, a 15-year power purchase agreement that supports a new wind farm to be built in South Dakota.[23] Once operational at the end of 2020, the 15-year agreement for 48.6 MW of wind power will allow BU to claim credit for the creation of 205,000 MWh of wind energy per year, enough to power 19,000 average American homes for a year.[24] These project RECs will be certified by Green-e, through an independent verification and certification program.[25]

BU is undertaking a comprehensive on-site solar feasibility study and building highly efficient buildings that go far beyond building codes.[26] The university's new 19-story Center for Computing and Data Sciences, which is slated to open in 2022, will be the city's largest carbon neutral and fossil fuel-free building, and will utilize 31 geothermal wells for ground-source heat pumps to heat and cool the building.[27]

BU is also taking steps to reduce its carbon footprint in the transportation sector by increasing bike-sharing, conducting a feasibility study for converting its vehicle fleet to electric power, and refining its parking system to reduce the number of people who drive to campus alone.[28]

The university is also a member of the University Climate Change Coalition, a coalition of North American universities that have "committed to mobilize their resources and expertise to accelerate local and regional climate action." The coalition works in close partnership with Second Nature's Climate Leadership Network, a 400 plus-member strong group of colleges and universities committed to taking action on climate.[29]

BU's efforts, and the efforts of other campuses around the country, serve as examples not only for how other educational institutions can address the problems of climate change, but also for how the rest of the country can move towards a zero-carbon society and a clean renewable future.

But while BU is at the forefront of the movement of campuses around the country moving towards clean, renewable energy, it is far from alone. From Colby College in Maine to St. Olaf College in Minnesota to Southwestern University in Texas, colleges all across the country are showing that a commitment to sustainability and clean energy is within reach.

Institutions of higher learning are places of bold new ideas that change the world. Academics have been

researching and improving renewable technologies for decades in laboratories, and debating for years about how to move society in a direction away from fossil fuels.

As colleges and universities emerge from COVID-19, these institutions will once again be called on to be pioneers and set an example for the nation as a whole. As leading schools across the nation have shown, colleges and universities have the opportunity to put into practice the knowledge that has been fostered under their roofs – and to commit to powering their campuses with 100 percent clean, renewable energy.

Colleges and universities can lead the transition to 100 percent renewable energy

America needs to move away from fossil fuels and create a 100 percent renewable energy system to tackle global warming and the other problems caused by fossil fuels, including public health threats and environmental destruction.

America has enough renewable energy potential from the sun and wind to power the nation several times over. Many studies suggest that high penetrations of renewable energy are possible using technologies available today at costs that society can afford, indicating that we can move toward an energy system powered by 100 percent renewable energy.[30]

College and university campuses are great places to accelerate the transition to 100 percent renewable energy. Colleges are major energy users, so their commitments to renewable energy can have big impacts. Educational buildings, including colleges and K-12 schools, were responsible for 10 percent of all energy consumption in the commercial sector in 2012.[31] Colleges are often geographically constrained collections of buildings, enabling them to take advantage of solutions such as microgrids and renewable district heating and cooling that expand the range of potential uses for renewable energy.[32] College campuses are also hotbeds of technical training and innovation, making them perfect places to develop, test and deploy new clean energy technologies, and providing an opportunity to use every stage of that process to educate students. Lastly, college students tend to be climate-conscious and tech-savvy, so campuses that deploy clean energy technologies can attract prospective students. A 2020 Princeton Review survey of more than 10,000 college applicants found that two-thirds of them would factor in schools' environmental commitments – including commitments related to energy use – when deciding where to attend.[33]

Organizations like Second Nature and the Association for the Advancement of Sustainability in Higher Education (AASHE) have helped lead the way in organizing colleges and universities across the country in making ambitious commitments to fight climate change and invest in sustainable solutions. The Presidents' Climate Leadership Commitments, organized by Second Nature, have brought together hundreds of campuses, with more than 400 currently active participating institutions.[34]

To power their campuses with 100 percent renewable energy, colleges and universities are reducing their energy consumption; obtaining their electricity from renewable energy sources; meeting their heating, cooling and other building energy needs with renewable electricity or other renewable energy sources; and transitioning their campus-owned vehicles away from fossil fuels. Small private colleges, large public universities and community colleges from Maine to Texas are already taking these steps – laying the path for all campuses to follow their lead.

Reducing energy consumption

Leading colleges and universities are reducing their energy consumption, making it easier to power their campuses with 100 percent renewable energy. Colleges are reducing energy consumption through energy efficiency improvements in their buildings and appliances, and through programs that encourage students and employees to conserve energy. Many campuses have older buildings that can be made more energy efficient by adding insulation, replacing windows, or adding storm windows, as well as by upgrading appliances, lighting, and heating and cooling equipment. When campuses construct new buildings, they have the opportunity to use the most advanced energy efficient building practices, appliances, and heating and cooling systems.

Certain campus facilities, such as research laboratories, are highly energy-intensive, so reducing energy use in these facilities can lead to big savings. Campuses across the country are taking measures to reduce operational costs in labs by installing motion sensor lighting and reorganizing lab layouts to optimize efficiency.[35] Labs often contain fume hoods that provide ventilation to protect lab workers. Shutting the front of these fume hoods can save a lot of energy, so many campuses have adopted programs to encourage this behavior.[36] Harvard University, for instance, has competitions amongst its labs to "shut the sash" and turn off the lights.[37]

Many campuses also reduce energy consumption through programs that encourage students and staff to conserve energy. Simple shifts in how students and employees use energy on campus could save as much as 20 percent of energy consumption and help colleges achieve their clean energy goals.[38] Social interaction programs like competitions are relatively cheap and easy to implement and can result in big energy savings, but ongoing programs that continually encourage conservation are best. Colleges also use smart sensors and displays to show employees and students their energy use in real time to encourage conservation.[39]

Shifting to renewable electricity

Leading colleges and universities are generating and purchasing 100 percent of their electricity from on- and off-campus renewable energy sources like solar energy and wind power. Based on EPA Green Power Partnership data, which tracks schools' voluntary purchases and production of renewable power (excluding any renewable energy that is part of the university's ordinary purchases of power from the grid), over 40 colleges and universities in the U.S. are obtaining 100 percent or more of their electricity from renewable sources.[40] (For complete list, see Appendix B.)

On-campus solar photovoltaic (PV) energy is a great choice for schools because it can be installed on existing rooftops and is becoming increasingly affordable. Arizona State University (ASU), for example, has deployed solar panels and solar heating systems at 90 locations on its four campuses and its research park.[41] Solar PV is becoming available to more and more schools thanks to plummeting prices – between 2010 and 2018, solar installations dropped in price by 70 percent, making solar energy often cheaper than energy from fossil fuels.[42]

Universities can also be good locations for wind energy. For example, the University of Delaware has the only commercial-sized wind turbine in Delaware, which produces enough electricity to power the buildings at its Lewes campus, as well as 108 homes in the city of Lewes.[43]

Wind and solar energy systems on campus are not only powering universities, but are also being used to train future renewable energy industry workers and provide engineering students with the opportunity to do cutting-edge research. To create a renewable energy system throughout the U.S., we will need many more students trained in these fields.

While some campuses have ample opportunities to install solar and wind power on site, colleges with limited space or cash reserves can purchase renewable energy generated off-campus or help to finance its production. Purchasing options such as power purchase agreements (PPAs) and renewable energy credits (RECs)

enable colleges to purchase clean energy and drive the deployment of new renewable energy installations without incurring the upfront costs of installing renewable energy themselves.[44]

Colleges can even team up with one another to collectively fund renewable energy projects. In 2018, five New England colleges – Bowdoin, Smith, Amherst, Hampshire and Williams – partnered with NextEra Energy Resources to construct a solar PV installation in Farmington, Maine. All of the colleges will share the clean, renewable electricity generated by the new project.[45]

Repowering buildings with clean energy

Heating, hot water, cooling, cooking, laundry and other activities on college campuses are often powered directly by fossil fuels. Over half of universities' energy consumption – 53 percent on average – is for water heating and space heating, which are primarily powered by gas and other fossil fuels.[46] Increasingly, colleges are transitioning these systems to be powered by electricity or renewable energy sources such as solar thermal or geothermal energy, helping these campuses move toward 100 percent renewable energy.

Stanford University in California, for example, swapped its natural gas heating and cooling system for one primarily powered by electricity in 2015 to cut emissions and costs.[47] The school's electric heat recovery chiller is twice as efficient as natural gas heating systems, which leads to significant cost savings – $420 million over 35 years for Stanford's system. This system also features storage tanks that allow the university to heat and cool the water in the tanks at night when electricity costs are low and circulate it through the buildings during the day when demand is high.[48]

Solar heating and hot water systems are another option campuses are using to clean up their buildings' energy use. While solar photovoltaic panels convert sunlight into electricity, solar thermal systems capture heat from freely available sunshine to heat water for cooking, bathing or laundry. These systems can cut hot water costs by more than half.[49] Solar thermal systems can also heat or cool air in buildings using efficient and cost-effective solar air heat collectors.[50] Campuses can also meet heating and cooling needs without mechanical systems through smart building design, layout and materials choices – harnessing the sun's heat or limiting sun exposure depending on the weather and the season.[51]

In addition to renewable electricity and solar thermal energy, campuses are reducing energy demand for hot water, heating and cooling needs by using ground-source heat pumps that take advantage of the stable temperature of the earth. These systems transfer heat to or from the ground using pipes that weave through buildings in order to provide heating during the winter and cooling during the summer.[52] Ground-source heat pumps have lower operating and maintenance costs than some conventional heating systems and can be scaled to work in individual buildings or whole campuses.[53] According to a report by the National Wildlife Federation, 160 campuses in 42 states were already using geothermal energy for heating and cooling by 2011.[54]

Adopting sustainable transportation

To create 100 percent renewable energy systems, colleges are also transitioning their campus-owned vehicles away from fossil fuels. Electric vehicles (EVs) can serve this purpose and provide additional benefits, such as reducing vehicle exhaust, heat and noise.[55] Currently,

A new electric bus in the University of Montana's campus fleet. Credit: Vickie Rectenwald, used with permission from the University of Montana.

in the U.S., it costs roughly half as much per mile to fuel an EV as a gasoline-powered car.[56] This means that while EVs might have a higher purchase cost, their lifetime costs are often much lower. Adopting EVs can also make it easier to integrate more wind and solar power on college campuses because any excess power produced from those sources can be used to charge the vehicles.[57] Electric campus shuttles may charge at night in a campus garage or even along their route.

While cleaning up campus vehicles is critical, transportation emissions associated with other types of travel – especially commuting with private cars – are also important to address. Campuses are providing infrastructure and programs to enable and encourage their students and employees to commute using sustainable means. Campuses are encouraging biking by providing bike lanes, covered bike storage and showers to commuters. Schools are also encouraging commuters to use transit by providing free, electric shuttles around campus and the local community, and by providing free local transit passes to students and employees. Lastly, some schools are encouraging EVs by providing charging infrastructure on campus.[58]

America's leading college campuses are moving rapidly toward 100 percent renewable energy

Small liberal arts colleges, large research universities and community colleges, from every corner of the U.S., are deploying renewable energy. The following lists rank the top colleges and universities currently leading the way in producing or purchasing renewable energy for electricity, heating, hot water and other building energy needs, and in adopting clean vehicles.

These rankings are based on the EPA's Green Power Partnership data and data from the Association for the Advancement of Sustainability in Higher Education's (AASHE) Sustainability Tracking, Assessment & Rating System (STARS). Only schools that have reported since 2016 are included in the analysis. See the Methodology section for full details on how these rankings are generated.

Some schools featured in these rankings use forms of energy that are often considered "renewable" but that are not necessarily pollution-free. These forms of energy include biomass and renewable fuel oil such as biodiesel. Because schools do not report the share of their renewable energy that comes from particular sources, there is no consistent way to exclude sources of energy that are not clean.

Renewable electricity

Forty-two schools reporting to the U.S. Environmental Protection Agency (EPA) Green Power Partnership (GPP) produce or purchase 100 percent or more of their electricity from renewable sources.

This long list of schools obtaining 100 percent or more of their electricity from renewable energy sources includes small, private liberal arts colleges in New England, large public research universities in the Midwest, community colleges and more. This diverse list of schools is laying the groundwork for all schools to shift to 100 percent renewable energy.

Schools of different sizes face different obstacles when it comes to making the transition to renewable energy. While large schools tend to have more resources at their disposal to make the necessary investments, small schools have the benefit of smaller campuses and less overall consumption to shift. Table 2 and Table 3 (page 16) break down the list of top schools by large and small schools, with the cutoff point being a student population of 10,000. For large schools, Georgetown University in Washington, D.C., and Saint Louis University in Missouri are the top two, while Hobart and William Smith Colleges and Emerson College are the leaders in the small schools category.

TABLE 1: The 42 U.S. EPA Green Power Partnership (GPP) colleges and universities obtaining 100 percent or more of their electricity from renewable sources[59]

School	State	Percent of electricity from renewable sources
Georgetown University	DC	130%
Hobart and William Smith Colleges	NY	125%
Emerson College	MA	123%
Whitman College	WA	119%
Unity College	ME	115%
Lewis & Clark College	OR	110%
Swarthmore College	PA	110%
Ithaca College	NY	109%
Bentley University	MA	107%
Saint Louis University	MO	105%
Carnegie Mellon University	PA	105%
Lewis and Clark Community College	IL	105%
Regis University	CO	105%
Goshen College	IN	104%
University of Vermont	VT	101%
Knox College	IL	101%
The Evergreen State College	WA	100%
Colby-Sawyer College	NH	100%
Bates College	ME	100%
Bryn Mawr College	PA	100%
Austin College	TX	100%
Raritan Valley Community College	NJ	100%

School	State	Percent of electricity from renewable sources
City Colleges of Chicago	IL	100%
Columbia University	NY	100%
Southern Illinois University Edwardsville	IL	100%
University at Buffalo, the State University of New York	NY	100%
University of New Hampshire	NH	100%
Abilene Christian University	TX	100%
Boston Architectural College	MA	100%
Colby College	ME	100%
Colgate University	NY	100%
College of the Atlantic	ME	100%
Goucher College	MD	100%
Lebanon Valley College	PA	100%
Northampton Community College	PA	100%
Principia College	IL	100%
Southwestern University	TX	100%
St. Olaf College	MN	100%
The Catholic University of America	DC	100%
University of Wisconsin - Stevens Point	WI	100%
Wells College	NY	100%
Allegheny College	PA	100%

TABLE 2: Top 10 large schools for percent of electricity from renewable sources

School	State	Percent of electricity from renewable sources
Georgetown University	DC	130%
Saint Louis University	MO	105%
Carnegie Mellon University	PA	105%
University of Vermont	VT	101%
City Colleges of Chicago	IL	100%
Columbia University	NY	100%
Southern Illinois University Edwardsville	IL	100%
University at Buffalo, the State University of New York	NY	100%
University of New Hampshire	NH	100%
American University	DC	97%

TABLE 3: Top 10 small schools for percent of electricity from renewable sources

School	State	Percent of electricity from renewable sources
Hobart and William Smith Colleges	NY	125%
Emerson College	MA	123%
Whitman College	WA	119%
Unity College	ME	115%
Lewis & Clark College	OR	110%
Swarthmore College	PA	110%
Ithaca College	NY	109%
Bentley University	MA	107%
Lewis and Clark Community College	IL	105%
Regis University	CO	105%

The most direct and powerful way that campuses can encourage renewable energy is by installing wind turbines, solar panels or other forms of clean energy right on their own campuses. Butte College, which leads the nation for renewable energy installed on campus, was the first college campus in the country to become "grid positive" back in 2011, generating more electricity than it used, in large part thanks to the 25,000 solar panels that it operates.[60] Table 4 (right) lists the top schools for the percentage of electricity they consume that comes from renewable projects that they own and operate.

TABLE 4: Top five schools for percent of electricity that is generated by energy projects that are owned and operated by the school

School	State	% Self supply
Butte College	CA	79%
University of Minnesota, Morris	MN	58%
Carleton College	MN	22%
University of Missouri	MO	20%
Luther College	IA	20%

Renewable heating, cooling and other building energy needs

Schools are not just transitioning their electricity to renewable energy sources, but they are also increasingly meeting their heating, cooling, hot water and other building energy needs without the use of fossil fuels. Top schools are leading this charge by making use of various technologies, including solar hot water panels and geothermal heating and cooling systems.

Colby College is ranked first for obtaining the most non-electrical energy from renewables per student, thanks in part to a geothermal system that draws from the earth's stable temperature to provide heating for its Alumni Center and the Davis Science Center.[61] Colgate University, ranked fourth, includes a closed-loop geothermal heating and cooling system for the Chapel House, the campus' spiritual retreat center. This system draws from the stable temperature of the earth to cool the building in the summer and heat it in the winter, without the use of polluting fossil fuels.[62] The university also recently installed a 600 square-foot solar thermal system on one of its dormitories to provide hot water for the building.[63]

TABLE 5: Top 10 schools for renewable heating, cooling, hot water and other non-electric energy produced per student

Rank	School	State	Amount of non-electric renewable energy produced on campus per FTE student (MMBtu)
1	Colby College	ME	55.3
2	Chatham University	PA	40.2
3	University of Idaho	ID	36.2
4	Colgate University	NY	33.5
5	University of Iowa	IA	22.3
6	Cornell University	NY	22.1
7	University of New Hampshire	NH	20.9
8	University of Missouri	MO	20.2
9	Bates College	ME	19.5
10	Binghamton University	NY	14.2

Campus-owned electric vehicles

College and university campuses across the country are moving their vehicles away from fossil fuels and are switching to electric vehicles (EVs). Of the schools that reported to STARS between 2017 and 2019, 82 percent have at least one EV. And over 60 percent of the campus-owned vehicles at each of the top 10 schools in this ranking are EVs. Schools in California are overwhelmingly leading this charge – claiming six of the top 10 spots in this ranking.

Many schools have invested in other types of green transportation, including improving campus accessibility in a way that reduces vehicle use and greenhouse gas emissions. Whether it's making campuses more pedestrian friendly, building bike lanes, or encouraging students and faculty to commute via public transit, colleges and universities have the opportunity to reduce carbon emissions in the transportation sector in ways that go beyond adopting EVs.

The technologies needed to create a 100 percent renewable energy system have been developed in colleges and universities around the country. As the leaders in these rankings demonstrate, those same institutions are now leading the transition to 100 percent renewable energy by transforming their own campuses to reduce energy consumption, adopt renewable energy for electricity, heating and other energy needs, and by switching to electric vehicles.

TABLE 6: Top 10 schools with the highest percentage of campus-owned vehicles that are EVs[64]

Rank	School	State	Percent of campus-owned vehicles that are 100 percent clean powered
1	Ringling College of Art and Design	FL	85%
2	University of the Pacific	CA	81%
3	Rice University	TX	76%
4	Harvey Mudd College	CA	73%
5	Loyola Marymount University	CA	72%
6	California State University, Northridge	CA	70%
7	California State University, Dominguez Hills	CA	67%
8	California State University, Long Beach	CA	63%
9	Florida Gulf Coast University	FL	63%
10	Southwestern University	TX	61%

The next leaders: Colleges and universities with impressive renewable energy goals

There are colleges and universities all over the U.S. that are transitioning to renewable energy systems. Most of the following schools do not appear in the top 10 for any category in this report, either because they do not have up-to-date reports in the database used, or because their renewable energy projects have not yet been completed. However, these schools have some of the most impressive commitments to renewable energy in the country and are taking action on multiple fronts – showing other schools the way to transition to 100 percent renewable energy.

Vanderbilt University

In 2019, Vanderbilt University made a commitment to power its entire campus with renewable energy and achieve carbon neutrality by 2050. Not only that, but leaders of the university have also stated that they plan to produce more renewable energy than needed and have a surplus of clean energy.[65] To meet this goal, Vanderbilt plans to invest in on-site and off-site renewable energy, reduce its carbon footprint from transportation, expand green spaces and pedestrian walkways, and invest in sustainable infrastructure.[66]

Vanderbilt has already taken steps to promote sustainability and reduce its environmental impacts, such as stopping the use of coal in its on-campus power plant in 2014.[67] Earlier this year, Vanderbilt announced a 20-year agreement with the Tennessee Valley Authority and Nashville Electric Service to build a new 35 MW solar farm that will help offset around 70 percent of Vanderbilt's annual indirect greenhouse gas emissions.[68] It has also spearheaded numerous sustainability projects, including a dockless bikeshare program, the building of solar-powered charging stations, as well as a solar-powered water heating system installed in the Currey Tennis Center.[69]

University of Arizona

On December 10, 2019, the University of Arizona voted to approve a renewable energy agreement with Tucson Electric Power (TEP), the largest deal ever between a university and a utility company in the state.[70] The plan means that TEP will dedicate portions of two new renewable energy projects to the university: a solar-plus-storage system southeast of Tucson and a wind farm in New Mexico. Both projects are set to start generating electricity in late 2020.[71] The planned solar array and storage system will include more than 300,000 solar panels, while the Oso Grande Wind Project will include 61 high-efficiency turbines installed across 24,000 acres.[72]

With these new projects, TEP expects to generate more than 28 percent of its power from renewable sources by 2021. The utility is also working with climate scientists at UA in order to develop carbon-reduction targets, as well as to provide educational opportunities through the Solar Zone at Tech Parks Arizona, one of the largest solar demonstration sites in the country.[73]

Harvard University

Harvard University aims to be carbon neutral by 2026 by dramatically reducing its energy consumption, investing in renewable energy projects, and purchasing offsets for its remaining emissions.[74] The university has also committed to stop using fossil fuels entirely by 2050.[75] To achieve this goal, the university will purchase 100 percent of its electricity from renewable energy sources; transition to emission-free vehicles; obtain heating, cooling and other building energy needs from fossil fuel-free energy sources; and purchase goods and services, such as food and travel, that minimize the use of fossil fuels.[76]

Harvard is taking steps toward these goals by rapidly cutting energy consumption through efficiency upgrades and conservation efforts. For example, Harvard used a competition to encourage students, faculty and staff to conserve energy in research laboratories by turning off the lights and closing fume hoods, which provide ventilation and can leak large amounts of energy if left open. This is an impactful program because research laboratories account for 44 percent of Harvard's energy use.[77] Thanks to efforts such as this, Harvard cut its total energy consumption by 10 percent between 2006 and 2016, in spite of a growing campus.[78]

University of Hawai'i

In 2015, the University of Hawai'i (UH) committed to produce as much renewable energy as its campuses use by 2035.[79] To achieve this goal, UH is creating an energy management system that can monitor energy use, increasing energy efficiency in its buildings, encouraging energy conservation, and deploying solar energy.[80]

In 2019, a 1-megawatt installation of PV panels at the University of Hawai'i at Mānoa's parking structure came online, and another megawatt of solar power is expected to be built in the summer of 2020.[81] Five community colleges in the UH system are also deploying solar PV plus battery storage systems; combined with energy efficiency measures, these PV systems will reduce those campuses' fossil fuel use for electricity by 70 to 98 percent.[82]

University of California

In the fall of 2018, the University of California (UC) system committed to obtain 100 percent of its electricity from renewable sources and hydropower, and to power all heating, hot water and other energy needs in new buildings with electricity.[83] This commitment will help UC achieve its goal to be carbon neutral by 2025.[84] UC's campuses are among over 600 across the country that have committed to tackle climate change as part of Second Nature's Climate Leadership Network, in which schools can publicly track their climate commitments and progress.[85] To achieve its goals, UC is increasing energy efficiency, deploying renewable energy sources, transitioning away from gas for building energy needs such as heating, and switching to electric campus-owned vehicles.[86]

One of the most impressive parts of UC's commitment is its policy to avoid onsite combustion of fossil fuels for space heating and water heating in all new campus buildings and those undergoing major renovations.[87] In a scoping study, UC found that increasing energy efficiency over time will be more feasible in all-electric buildings than in buildings combining electricity and gas. The study also determined that all-electric buildings will be comparable in cost with or slightly cheaper than combined electric and gas buildings over time.[88]

Brown University

In February 2019, Brown University committed to reduce its greenhouse gas emissions by 75 percent by 2025 and to eliminate the use of fossil fuels for heating and cooling by 2040. To achieve these ambitious goals, Brown is reducing its energy use, transitioning to 100 percent renewable electricity, and switching to renewable energy sources for campus heating and cooling.[89]

To meet 100 percent of its electricity needs with renewable energy sources, Brown is pursuing two projects. The university is partnering with two private companies to construct a solar array at a former gravel pit in nearby North Kingstown, Rhode Island. This installation will produce electricity equivalent to about 70 percent of Brown's electricity consumption. The remaining 30 percent will be covered by RECs from a wind farm in Texas.[90]

University of Richmond

In 2007, the University of Richmond in Virginia signed the Presidents' Climate Commitment to reduce greenhouse gas emissions and achieve carbon neutrality as quickly as possible. To uphold that commitment, the school adopted a climate action plan that aims to cut the campus' greenhouse gas emissions 30 percent by 2020 and 100 percent by 2050.[91]

The campus is moving toward those goals through energy efficiency upgrades and renewable energy adoption. On the energy efficiency front, the campus has adopted energy efficient lighting and appliances, thermal windows and an energy management system that optimizes heating, cooling and ventilation to save energy.[92] For renewable energy, the University of Richmond constructed a rooftop solar array on its recreation center in 2016, which classes use as a laboratory for research. This project was the first to be completed in Virginia under a new PPA pilot program.[93] The university has also contracted with the renewable energy company sPower to build an off-campus solar project that is expected to be completed in 2020 and produce as much electricity as the entire campus uses.[94]

The University of Richmond has also done a lot to help its students and employees commute to and from campus sustainably – by foot, bike, bus or EV. The campus has 50 bikes that anyone can use, and the school provides access to showers, covered bike parking and bike racks across campus. The university also pays for local bus passes for full-time students and employees and runs free, regular campus shuttles throughout the city of Richmond. The campus has five Zipcars for carsharing and partners with RideFinders to facilitate carpooling. Lastly, the campus has charging stations in two parking lots for EV drivers.[95] This suite of infrastructure and programs demonstrates that colleges can do a great deal to encourage and enable their students and employees to get to campus without the use of fossil fuels.

Cornell University

Cornell University is currently ranked sixth for deriving its heating, cooling and other non-electric building energy needs from renewable sources, but the school is aiming to go much further. Cornell is working to use 100 percent renewable energy and to be carbon neutral by 2035.[96] The school has adopted a climate action plan to achieve these goals that includes reducing energy consumption, supplying electricity with renewable energy sources, transitioning to clean campus-owned vehicles, encouraging students and employees to commute sustainably, and testing and deploying a renewable energy system to heat the campus.[97]

Cornell is pursuing a diverse array of renewable energy technologies to power its campus, including solar PV, solar hot water, lake-source cooling and deep geothermal energy for heating.[98] Cornell has installed enough renewables to meet 20 percent of the Ithaca campus's net annual needs.[99] Cornell also uses solar thermal panels to meet some of its hot water and heating needs.[100]

One of Cornell's most innovative projects is its lake source cooling system, which uses the deep, cold waters of nearby Cayuga Lake to cool campus buildings. Through heat exchangers, heat from campus water is transferred to the cold lake water, which is able to cool using no energy except to move the water through pipes. The chilled water is then circulated through campus buildings to provide cooling needs. This project has reduced the campus' energy use for cooling by 80 percent and uses no refrigerants, some of which can contribute to ozone depletion.[101]

Cornell University's Lake Cooling System. Credit: Jon Reis Photography, used with permission of Cornell University.

Recommendations

To prevent the worst impacts of global warming, the U.S. needs to take bold action to reduce emissions as quickly as possible – including transitioning to a 100 percent renewable energy system by electrifying the energy grid, buildings and transportation systems. As centers for research and innovation, and the institutions training the leaders of tomorrow, colleges and universities are well positioned to lead this transformation. As the nation's colleges and universities emerge from the disruption caused by COVID-19, they have an opportunity to make bold strides toward a future that is cleaner and healthier both for their students and the broader world.

All colleges and universities should set a goal to obtain 100 percent of their energy from renewable sources. To achieve that goal, each school should adopt a plan with defined steps and clear timelines.

As the schools featured in this report demonstrate, there are many ways to make progress toward 100 percent renewable energy, but to achieve the goal, campuses must:

- *Reduce energy consumption.* Reducing energy consumption will make it easier for colleges and universities to power their campuses with 100 percent renewable energy. Campuses can reduce consumption through:
    - **Energy efficiency** improvements and high efficiency standards for new buildings.
    - **Energy conservation**, which can be encouraged in the campus community through initiatives such as competitions and real-time feedback displays.
- *Generate or buy 100 percent of their electricity from renewable energy sources.*
    - **On-Campus**: Most campuses have many rooftops suitable for solar PV installations and some have space for wind power. Campuses that install on-campus renewable energy systems can pair them with energy storage technologies, such as batteries, and connect their campuses through microgrids. To ensure that their clean energy purchases are actually resulting in the net addition of renewable energy to the grid, responsible campuses should make sure that they retain ownership of the renewable attributes of the clean energy they produce and/or procure verified, high-quality renewable energy certificates (RECs).
    - **Off-Campus**: Schools without enough space for wind or solar energy, or that are unable to finance the upfront cost of renewable energy systems, can purchase renewable energy and help finance the construction of new off-campus renewable energy projects through power purchase agreements and renewable energy certificates.
- *Transition all other building energy systems – including heating, hot water and cooling – to be electric or powered by renewable energy sources, such as solar hot water or ground-source heat pumps.*
- *Transition all campus vehicles from fossil fuels to electricity.*

See the Environment America Research & Policy Center reports *Renewable Energy 101: Tools for Moving Your Campus to 100% Clean Energy* and *Renewable Energy 100: The Course to a Carbon-Free Campus* for more information, case studies and resources to transition to renewable energy.[102] Also see Environment America Research & Policy Center and U.S. PIRG report *Electric Buildings: How to Repower Where We Live, Work and Learn with Clean Energy* for information and recommendations on how to transition energy systems like heating, hot water, cooling, and other appliances to clean renewable sources.

While not necessary to achieve 100 percent renewable energy for their own operations, campuses should also:

- *Encourage and enable students and employees to commute to and from campus sustainably.* At most schools, thousands of employees and students commute to and from campus every day, generating significant amounts of carbon pollution. Luckily, there are numerous actions schools can take to reduce emissions from commuting.
    - **Biking**: Schools can provide bike lanes, covered bike storage and showers. Schools should also advocate for bike lanes and other safe infrastructure in their communities. Colleges and universities are often among the largest institutions in their communities and can therefore influence local transportation decisions.
    - **Transit**: Colleges should provide frequent electric bus service around campus and through the local community and/or provide free passes for the local transit system to students and employees.
    - **Electric vehicles**: Campuses should offer access to shared EVs and install EV charging stations on campus.
- *Purchase goods and services that minimize the use of fossil fuels.* Campuses should purchase goods, such as food for dining halls, and services, such as travel for students and employees, that utilize the smallest amount of fossil fuels possible.

Methodology

The rankings in this report are based on colleges' and universities' most recent reports to the Association for the Advancement of Sustainability in Higher Education's (AASHE) Sustainability Tracking, Assessment & Rating System (STARS) database versions 2.0, 2.1, and 2.2, and from the Environmental Protection Agency's (EPA) Green Power Partnership (GPP). STARS data were acquired in January 2020 and data in this report reflect conditions as of that date. Only STARS reports submitted between 2017 and 2019 are included. Green Mountain College was excluded from the top schools for non-electric renewables, as it closed in 2019. Austin Peay State University in Tennessee and California State University, San Marcos, reported errors in the data for electric vehicles for those schools in the STARS database. These schools were removed from all rankings in this report using STARS data.

AASHE provided access to the STARS data displays, which include all schools' entries in spreadsheet form. The on-campus non-electric renewable energy ranking (for heating, cooling, hot water, etc.), is based on: "Non-electric renewable energy generated on-site, performance year." For that ranking, the amount of energy schools produced or purchased was divided by "full-time equivalent student enrollment (undergraduate and graduate)" to account for the differences in size between schools.

Some schools featured in these rankings use forms of energy that are often considered "renewable" but that are not necessarily clean. These forms of energy include biomass and renewable fuel oil, such as biodiesel. The sustainability of these forms of energy depends critically on how they are obtained. Because schools do not report the share of their renewable energy that comes from particular sources, there is no consistent way to exclude sources of energy that are not clean from the data used for the rankings. Therefore, energy production from sources such as biomass remain in the final dataset and are reflected in the rankings.

The campus-owned vehicles ranking is based on schools' entries for "Total number of vehicles (e.g., cars, carts, trucks, tractors, buses, electric assist cycles) in the institution's fleet," "Number of 100 percent electric vehicles in the institution's fleet (including electric assist utility bicycles and tricycles)," and "Number of hydrogen-fueled vehicles in the institution's fleet." Using these entries, we calculated the percent of campuses' vehicles that were 100 percent electric or hydrogen-fueled. None of the top 10 schools had any hydrogen-fueled vehicles. For the breakdown between large and small schools for percent of electricity generated by clean renewables, a cut-off point of 10,000 student population was used based on data from the Carnegie Classification of Institutions of Higher Education, provided by the EPA Green Power Partnership.

Appendix A: AASHE STARS data

The following table includes data from all schools' self-reported data to AASHE STARS versions 2.0, 2.1, and 2.2 for at least one of the metrics used in this report's rankings, organized alphabetically by state and institution name. (Note: Enrollment figures are from STARS and do not necessarily match the student population figures in Appendix B.)

School	State	Full-time equivalent student enrollment (undergraduate and graduate) (FTE)	On-campus non-electric energy (heating etc.)		% of campus-owned vehicles that are EVs or hydrogen-fueled	
			Rank	MMBtu per FTE	Rank	% of vehicles that are EVs or hydrogen-fueled
Auburn University	AL	24,849	NA	-	165	4.6%
University of Alabama in Huntsville	AL	7,150	NA	-	156	5.2%
University of Montevallo	AL	2,291	NA	-	205	2.1%
University of Arkansas	AR	NA	NA	-	242	0.4%
Arizona State University	AZ	76,018	36	0.11	21	47.9%
Northern Arizona University	AZ	28,657	NA	-	233	0.7%
University of Arizona	AZ	41,631	35	0.15	90	13.1%
California College of the Arts	CA	1,877	28	0.27	37	33.3%
California Polytechnic State University	CA	20,272	NA	-	35	35.2%
California State Polytechnic University, Pomona	CA	19,741	NA	-	28	41.0%
California State University, Bakersfield	CA	7,764	NA	-	36	34.8%
California State University, Chico	CA	16,335	NA	-	44	29.3%
California State University, Dominguez Hills	CA	11,325	NA	-	9	67.2%
California State University, East Bay	CA	13,735	NA	-	47	26.9%
California State University, Fullerton	CA	32,494	NA	-	16	51.6%
California State University, Long Beach	CA	31,175	NA	-	10	63.4%
California State University, Los Angeles	CA	23,599	NA	-	19	49.5%
California State University, Monterey Bay	CA	7,567	NA	-	78	16.0%
California State University, Northridge	CA	32,111	21	0.74	8	70.1%
Harvey Mudd College	CA	885	NA	-	6	73.1%
Humboldt State University	CA	8,228	NA	-	88	13.7%

School	State	Full-time equivalent student enrollment (undergraduate and graduate) (FTE)	On-campus non-electric energy (heating etc.)		% of campus-owned vehicles that are EVs or hydrogen-fueled	
			Rank	MMBtu per FTE	Rank	% of vehicles that are EVs or hydrogen-fueled
Loyola Marymount University	CA	7,641	NA	-	7	71.6%
San Diego State University	CA	31,402	NA	-	82	14.8%
San Francisco State University	CA	24,499	NA	-	23	44.0%
Santa Clara University	CA	8,702	23	0.48	22	47.0%
Santa Rosa Junior College	CA	18,038	NA	-	177	3.8%
Stanford University	CA	16,517	NA	-	26	42.4%
University of California, Berkeley	CA	42,103	48	0.02	166	4.6%
University of California, Irvine	CA	33,093	NA	-	30	38.6%
University of California, Merced	CA	8,038	NA	-	27	42.0%
University of California, San Diego	CA	31,921	26	0.30	25	42.5%
University of California, Santa Barbara	CA	21,799	NA	-	100	11.6%
University of California, Santa Cruz	CA	19,142	NA	-	102	10.5%
University of San Diego	CA	7,671	NA	-	81	15.2%
University of the Pacific	CA	NA	NA	-	3	81.3%
Colorado College	CO	2,278	25	0.31	122	8.5%
Colorado State University	CO	25,373	33	0.17	173	4.2%
University of Colorado Boulder	CO	26,124	NA	-	141	6.5%
University of Colorado Colorado Springs	CO	10,475	29	0.21	129	7.5%
Antioch College	CT	133	NA	-	65	21.4%
University of Connecticut	CT	21,776	NA	-	167	4.6%
Yale University	CT	12,402	66	0.00	244	0.2%
American University	DC	12,504	56	0.01	93	12.7%
George Washington University	DC	22,866	46	0.02	79	15.7%
University of Delaware	DE	20,512	NA	-	179	3.7%
Florida Gulf Coast University	FL	12,551	NA	-	11	63.2%
Florida Institute of Technology	FL	4,509	NA	-	40	30.7%
Florida International University	FL	30,620	NA	-	53	25.1%
Florida State University	FL	35,340	NA	-	188	3.2%
Miami University	FL	17,700	15	1.93	NA	0.0%
Nova Southeastern University	FL	18,000	NA	-	158	5.0%
Ringling College of Art and Design	FL	1,321	NA	-	2	85.4%
University of Central Florida	FL	40,071	59	0.00	74	17.5%
University of Florida	FL	NA	NA	-	186	3.2%
University of Miami	FL	16,397	61	0.00	56	23.7%

School	State	Full-time equivalent student enrollment (undergraduate and graduate) (FTE)	On-campus non-electric energy (heating etc.)		% of campus-owned vehicles that are EVs or hydrogen-fueled	
			Rank	MMBtu per FTE	Rank	% of vehicles that are EVs or hydrogen-fueled
University of South Florida	FL	33,413	NA	-	109	9.7%
University of South Florida St. Petersburg	FL	4,080	NA	-	15	55.6%
Agnes Scott College	GA	917	19	0.87	67	21.1%
Emory University	GA	14,521	NA	-	46	27.3%
Georgia College & State University	GA	NA	NA	-	24	42.6%
University of Georgia	GA	35,165	64	0.00	196	2.9%
University of West Georgia	GA	11,877	NA	-	70	19.9%
Drake University	IA	4,130	NA	-	106	10.0%
Iowa State University	IA	33,634	NA	-	240	0.4%
Luther College	IA	1,988	NA	-	153	5.4%
University of Iowa	IA	29,288	5	22.35	208	1.9%
University of Idaho	ID	8,287	3	36.16	227	1.0%
College of Lake County	IL	8,365	51	0.01	204	2.2%
Eureka College	IL	502	NA	-	123	8.3%
Illinois Institute of Technology	IL	5,456	NA	-	39	32.3%
Knox College	IL	1,378	NA	-	120	8.6%
Loyola University Chicago	IL	14,802	44	0.05	55	24.5%
Northwestern University	IL	NA	NA	-	144	6.3%
University of Illinois at Chicago	IL	24,509	31	0.18	NA	0.0%
University of Illinois, Urbana-Champaign	IL	45,533	NA	-	246	0.2%
Butler University	IN	4,644	NA	-	185	3.3%
Earlham College	IN	1,085	NA	-	83	14.8%
Indiana State University	IN	9,793	NA	-	152	5.5%
Indiana University Bloomington	IN	38,219	63	0.00	110	9.7%
University of Notre Dame	IN	12,255	NA	-	226	1.0%
Johnson County Community College	KS	22,372	NA	-	207	2.0%
Berea College	KY	1,635	62	0.00	111	9.5%
Eastern Kentucky University	KY	13,789	NA	-	120	8.6%
University of Kentucky	KY	28,550	65	0.00	112	9.3%
University of Louisville	KY	21,449	17	1.48	229	0.9%
Western Kentucky University	KY	16,143	NA	-	211	1.6%
Louisiana State University	LA	27,656	NA	-	43	29.4%
Amherst College	MA	1,836	NA	-	214	1.4%
Babson College	MA	3,471	45	0.03	118	8.7%

School	State	Full-time equivalent student enrollment (undergraduate and graduate) (FTE)	On-campus non-electric energy (heating etc.)		% of campus-owned vehicles that are EVs or hydrogen-fueled	
			Rank	MMBtu per FTE	Rank	% of vehicles that are EVs or hydrogen-fueled
Bentley University	MA	NA	NA	-	54	24.6%
Boston College	MA	12,972	NA	-	160	5.0%
Clark University	MA	3,000	NA	-	33	36.4%
Hampshire College	MA	1,244	NA	-	200	2.5%
Massachusetts Institute of Technology	MA	11,053	NA	-	139	6.6%
Mount Holyoke College	MA	2,177	24	0.45	NA	0.0%
Smith College	MA	2,804	NA	-	225	1.1%
Tufts University	MA	10,598	NA	-	235	0.6%
University of Massachusetts Amherst	MA	28,412	60	0.00	146	6.1%
University of Massachusetts Lowell	MA	14,357	NA	-	105	10.4%
Wellesley College	MA	2,419	NA	-	151	5.6%
Wentworth Institute of Technology	MA	3,973	NA	-	34	35.3%
Williams College	MA	2,073	NA	-	194	3.0%
Worcester Polytechnic Institute	MA	5,718	42	0.06	168	4.5%
University of Maryland, College Park	MD	37,384	NA	-	218	1.3%
Bates College	ME	1,772	9	19.47	95	12.2%
Bowdoin College	ME	1,814	30	0.19	NA	0.0%
Colby College	ME	1,917	1	55.34	150	5.8%
College of the Atlantic	ME	332	13	3.62	123	8.3%
Saint Joseph's College - ME	ME	1,995	NA	-	174	4.0%
Unity College	ME	705	16	1.88	206	2.0%
Calvin University	MI	3,915	NA	-	133	7.1%
Delta College	MI	6,043	NA	-	92	12.8%
Grand Valley State University	MI	24,707	NA	-	17	50.6%
Hope College	MI	NA	NA	-	222	1.2%
Michigan State University	MI	45,677	NA	-	161	4.9%
Siena Heights University	MI	1,320	NA	-	127	7.7%
University of Michigan	MI	43,147	NA	-	237	0.5%
Washtenaw Community College	MI	7,904	NA	-	103	10.4%
Western Michigan University	MI	18,413	NA	-	213	1.5%
Concordia College - Moorhead	MN	2,092	NA	-	181	3.6%
Macalester College	MN	2,121	NA	-	31	38.5%
University of Minnesota, Duluth	MN	10,505	NA	-	134	6.9%
University of Minnesota, Morris	MN	1,688	11	12.48	158	5.0%

School	State	Full-time equivalent student enrollment (undergraduate and graduate) (FTE)	On-campus non-electric energy (heating etc.)		% of campus-owned vehicles that are EVs or hydrogen-fueled	
			Rank	MMBtu per FTE	Rank	% of vehicles that are EVs or hydrogen-fueled
University of St. Thomas	MN	8,546	NA	-	147	6.1%
Missouri State University	MO	18,720	NA	-	155	5.3%
Missouri University of Science and Technology	MO	7,941	12	7.84	203	2.3%
Saint Louis University	MO	12,281	NA	-	216	1.4%
University of Missouri	MO	31,194	8	20.16	NA	0.0%
Washington University in St. Louis	MO	15,252	68	0.00	116	8.8%
Montana State University	MT	15,124	52	0.01	NA	0.0%
University of Montana	MT	10,223	NA	-	144	6.3%
Appalachian State University	NC	18,099	53	0.01	217	1.3%
East Carolina University	NC	25,065	NA	-	130	7.5%
Elon University	NC	6,610	NA	-	115	9.0%
University of North Carolina at Chapel Hill	NC	27,518	NA	-	187	3.2%
University of North Carolina, Greensboro	NC	18,303	NA	-	97	12.1%
Wake Forest University	NC	6,829	41	0.07	91	12.9%
Creighton University	NE	8,228	NA	-	149	5.8%
Metropolitan Community College	NE	9,771	NA	-	132	7.1%
University of Nebraska – Lincoln	NE	23,340	NA	-	231	0.9%
University of Nebraska at Omaha	NE	12,733	NA	-	214	1.4%
Keene State College	NH	4,400	NA	-	76	16.7%
Southern New Hampshire University	NH	68,000	NA	-	75	17.4%
University of New Hampshire	NH	14,292	7	20.87	NA	0.0%
Princeton University	NJ	8,032	NA	-	68	20.3%
Raritan Valley Community College	NJ	5,463	NA	-	168	4.5%
Stockton University	NJ	9,191	NA	-	116	8.8%
Central New Mexico Community College	NM	14,813	NA	-	85	14.3%
New Mexico State University	NM	18,255	NA	-	247	0.1%
Bard College	NY	2,111	NA	-	183	3.5%
Binghamton University	NY	16,930	10	14.19	20	48.0%
Clarkson University	NY	4,367	NA	-	202	2.3%
Colgate University	NY	2,865	4	33.53	201	2.3%
Columbia University	NY	23,716	NA	-	85	14.3%
Cornell University	NY	23,162	6	22.15	239	0.4%
Hobart and William Smith Colleges	NY	2,186	39	0.10	172	4.3%
Orange County Community College	NY	3,714	NA	-	73	19.2%

School	State	Full-time equivalent student enrollment (undergraduate and graduate) (FTE)	On-campus non-electric energy (heating etc.)		% of campus-owned vehicles that are EVs or hydrogen-fueled	
			Rank	MMBtu per FTE	Rank	% of vehicles that are EVs or hydrogen-fueled
Pratt Institute	NY	4,829	NA	-	58	23.1%
Rochester Institute of Technology	NY	13,699	NA	-	162	4.9%
Skidmore College	NY	2,555	38	0.10	NA	0.0%
St. Lawrence University	NY	2,415	NA	-	52	25.4%
State University of New York at Brockport	NY	7,679	NA	-	77	16.1%
State University of New York at Cortland	NY	6,565	50	0.01	72	19.4%
State University of New York at Fredonia	NY	4,556	NA	-	148	5.9%
State University of New York at New Paltz	NY	7,027	NA	-	114	9.0%
State University of New York at Oneonta	NY	6,098	NA	-	113	9.2%
State University of New York College of Environmental Science and Forestry	NY	1,826	14	2.98	87	13.8%
Syracuse University	NY	19,331	NA	-	171	4.4%
University at Albany	NY	16,259	NA	-	101	11.4%
University at Buffalo	NY	28,125	NA	-	212	1.6%
University of Rochester	NY	10,707	NA	-	163	4.8%
Vassar College	NY	2,409	22	0.62	197	2.9%
Case Western Reserve University	OH	10,820	NA	-	180	3.6%
Cleveland State University	OH	13,947	NA	-	178	3.8%
Oberlin College	OH	NA	NA	-	176	3.9%
Ohio University	OH	24,654	67	0.00	224	1.1%
The Ohio State University	OH	54,759	NA	-	198	2.9%
The Ohio State University at Newark	OH	2,224	NA	-	181	3.6%
University of Cincinnati	OH	28,922	NA	-	228	1.0%
University of Dayton	OH	10,208	NA	-	89	13.7%
University of Mount Union	OH	2,254	NA	-	50	25.7%
Oklahoma State University	OK	21,240	NA	-	220	1.2%
Lewis & Clark College	OR	3,250	NA	-	49	26.7%
Oregon State University	OR	23,879	49	0.02	119	8.7%
Pacific University	OR	3,703	NA	-	13	57.1%
Portland Community College	OR	28,019	NA	-	232	0.8%
Southern Oregon University	OR	4,218	40	0.08	98	12.1%
University of Oregon	OR	NA	NA	-	136	6.8%
Bucknell University	PA	3,781	NA	-	236	0.5%
Carnegie Mellon University	PA	11,264	NA	-	42	29.6%

School	State	Full-time equivalent student enrollment (undergraduate and graduate) (FTE)	On-campus non-electric energy (heating etc.)		% of campus-owned vehicles that are EVs or hydrogen-fueled	
			Rank	MMBtu per FTE	Rank	% of vehicles that are EVs or hydrogen-fueled
Chatham University	PA	1,525	2	40.23	51	25.5%
Dickinson College	PA	2,357	58	0.01	NA	0.0%
Haverford College	PA	1,268	43	0.05	84	14.5%
Lehigh University	PA	6,659	NA	-	234	0.7%
Muhlenberg College	PA	2,504	32	0.18	45	27.7%
Pennsylvania State University	PA	45,661	NA	-	238	0.4%
Slippery Rock University	PA	9,062	57	0.01	143	6.4%
Susquehanna University	PA	2,150	NA	-	18	50.0%
Swarthmore College	PA	1,619	NA	-	58	23.1%
Temple University	PA	35,750	NA	-	219	1.2%
University of Pennsylvania	PA	21,358	NA	-	191	3.0%
Villanova University	PA	9,942	NA	-	137	6.8%
Bryant University	RI	3,380	NA	-	131	7.4%
Clemson University	SC	22,307	NA	-	189	3.2%
Furman University	SC	2,981	NA	-	14	56.6%
Black Hills State University	SD	3,034	NA	-	108	9.8%
Belmont University	TN	7,987	NA	-	99	11.8%
Sewanee - The University of the South	TN	1,725	NA	-	104	10.4%
Tennessee Technological University	TN	9,125	NA	-	96	12.2%
University of Tennessee at Knoxville	TN	24,535	NA	-	199	2.6%
Vanderbilt University	TN	12,344	55	0.01	38	32.3%
Austin College	TX	1,232	NA	-	71	19.5%
Baylor University	TX	16,001	NA	-	175	4.0%
Rice University	TX	6,554	NA	-	5	75.8%
Southwestern University	TX	1,508	NA	-	12	60.9%
Tarleton State University	TX	NA	NA	-	125	8.0%
Texas A&M University	TX	58,691	NA	-	140	6.6%
Texas Tech University	TX	34,090	NA	-	170	4.4%
The University of Texas at Dallas	TX	24,175	NA	-	29	39.9%
University of Houston	TX	43,774	NA	-	66	21.1%
University of Texas at Austin	TX	46,453	54	0.01	60	23.0%
University of Texas Rio Grande Valley	TX	21,724	NA	-	61	22.5%
Weber State University	UT	17,436	NA	-	135	6.9%
Westminster College - Utah	UT	2,533	NA	-	63	22.2%

School	State	Full-time equivalent student enrollment (undergraduate and graduate) (FTE)	On-campus non-electric energy (heating etc.)		% of campus-owned vehicles that are EVs or hydrogen-fueled	
			Rank	MMBtu per FTE	Rank	% of vehicles that are EVs or hydrogen-fueled
Eastern Mennonite University	VA	1,465	NA	-	57	23.7%
George Mason University	VA	28,019	NA	-	41	30.0%
James Madison University	VA	20,837	NA	-	223	1.2%
Radford University	VA	9,165	NA	-	157	5.1%
Randolph College	VA	671	NA	-	94	12.5%
University of Richmond	VA	3,633	NA	-	62	22.3%
Virginia Commonwealth University	VA	28,377	37	0.10	241	0.4%
Washington and Lee University	VA	2,170	34	0.15	126	7.8%
Champlain College	VT	3,891	20	0.79	NA	0.0%
Middlebury College	VT	NA	NA	-	210	1.7%
Saint Michael's College	VT	2,167	NA	-	184	3.5%
University of Vermont	VT	12,251	NA	-	128	7.6%
Central Washington University	WA	18,441	NA	-	154	5.3%
Evergreen State College, The	WA	3,924	NA	-	164	4.8%
Gonzaga University	WA	NA	NA	-	221	1.2%
North Seattle College	WA	3,828	NA	-	80	15.4%
Portland State University	WA	20,507	NA	-	64	21.8%
Seattle University	WA	6,681	NA	-	32	37.3%
South Seattle College	WA	4,562	NA	-	47	26.9%
University of Washington, Seattle	WA	52,466	NA	-	142	6.4%
Western Washington University	WA	14,619	NA	-	195	3.0%
Whatcom Community College	WA	3,771	NA	-	69	20.0%
Northland College	WI	579	27	0.30	138	6.7%
University of Wisconsin-Green Bay	WI	4,720	NA	-	209	1.8%
University of Wisconsin-Madison	WI	39,624	NA	-	243	0.3%
University of Wisconsin-Oshkosh	WI	10,654	18	1.15	230	0.9%
University of Wisconsin-Platteville	WI	7,878	NA	-	192	3.0%
University of Wisconsin-River Falls	WI	6,927	47	0.02	107	9.9%
University of Wisconsin-Stevens Point	WI	7,814	NA	-	190	3.2%
University of Wisconsin-Whitewater	WI	10,888	NA	-	192	3.0%
University of Wyoming	WY	9,803	NA	-	245	0.2%

Appendix B: EPA Green Power Partnership data

The following table includes data from the Environmental Protection Agency's (EPA) Green Power Partnership (GPP). The table, which is sorted by state and then institution name, contains records from between 2016 and 2020. The data contains self-reported voluntarily obtained renewable electricity for which the school owns the energy attributes, which includes purchased power from RECs, PPAs and renewable power that the school owns and operates. (Note: Student population figures are from EPA and do not necessarily match the enrollment figures in Appendix A.)

School	State	Student Population	Percent of electricity from renewable sources		Percent of electricity from projects owned and operated by the school	
			Rank	% of electricity	Rank	% of electricity
Arizona State University	AZ	50,320	51	86.9%	N/A	-
Chandler-Gilbert Community College	AZ	14,906	95	24.8%	N/A	-
Northern Arizona University	AZ	31,051	105	15.8%	15	1.3%
Butte College	CA	12,161	53	79.3%	1	79.3%
California Polytechnic State University, San Luis Obispo	CA	22,370	98	22.3%	59	0.0%
California State University, Bakersfield	CA	10,131	114	10.8%	N/A	-
California State University, Fullerton	CA	40,905	109	14.2%	11	3.0%
Loyola Marymount University	CA	9,618	97	22.4%	8	5.0%
Saint Mary's College of California	CA	4,112	43	97.2%	N/A	-
Santa Clara University	CA	9,015	70	54.3%	28	0.3%
Stanford University	CA	17,534	60	67.0%	N/A	-
University of California	CA	285,216	88	30.4%	36	0.2%
Colorado State University	CO	33,083	82	37.4%	32	0.3%
Fort Lewis College	CO	3,332	67	57.7%	17	0.9%
Regis University	CO	8,341	13	104.6%	N/A	-
University of Colorado Colorado Springs	CO	11,761	55	76.6%	18	0.8%
Southern Connecticut State University	CT	10,202	83	34.1%	51	0.1%
American University	DC	13,858	44	96.7%	55	0.1%
George Washington University	DC	25,613	73	50.2%	64	0.0%

School	State	Student Population	Percent of electricity from renewable sources		Percent of electricity from projects owned and operated by the school	
			Rank	% of electricity	Rank	% of electricity
Georgetown University	DC	17,858	1	130.1%	N/A	-
The Catholic University of America	DC	6,023	23	100.0%	N/A	-
Iowa State University	IA	36,158	119	10.3%	N/A	-
Luther College	IA	2,385	79	42.2%	5	19.9%
City Colleges of Chicago	IL	77,000	23	100.0%	N/A	-
DePaul University	IL	22,769	92	28.4%	42	0.1%
Knox College	IL	1,399	16	100.9%	46	0.1%
Lewis and Clark Community College	IL	7,000	12	104.8%	22	0.6%
Northwestern University	IL	22,008	81	38.5%	49	0.1%
Principia College	IL	455	23	100.0%	N/A	-
Roosevelt University	IL	4,457	94	25.8%	N/A	-
Southern Illinois University Edwardsville	IL	13,796	23	100.0%	N/A	-
University of Illinois at Urbana-Champaign	IL	45,140	126	7.3%	58	0.0%
Goshen College	IN	843	14	103.5%	N/A	-
Indiana University-Purdue University Indianapolis	IN	29,791	121	10.0%	N/A	-
Babson College	MA	3,329	121	10.0%	N/A	-
Bentley University	MA	5,543	9	106.5%	N/A	-
Boston Architectural College	MA	695	23	100.0%	N/A	-
Emerson College	MA	4,545	3	123.1%	N/A	-
Gordon College	MA	1,963	46	95.1%	N/A	-
Wellesley College	MA	2,508	127	5.0%	56	0.0%
Wentworth Institute of Technology	MA	4,457	118	10.3%	N/A	-
Goucher College	MD	2,236	23	100.0%	N/A	-
Loyola University Maryland	MD	5,783	107	15.5%	N/A	-
Salisbury University	MD	8,714	71	52.7%	N/A	-
St. Mary's College of Maryland	MD	1,721	68	57.5%	47	0.1%
University of Maryland	MD	40,521	57	70.2%	63	0.0%
Bates College	ME	1,787	19	100.1%	53	0.1%
Colby College	ME	1,917	23	100.0%	30	0.3%
College of the Atlantic	ME	354	23	100.0%	48	0.1%
Unity College	ME	733	5	114.7%	38	0.1%
Grand Rapids Community College	MI	14,269	111	12.2%	N/A	-
Michigan Technological University	MI	7,292	76	50.0%	N/A	-
Carleton College	MN	2,078	86	32.4%	3	21.8%
St. Olaf College	MN	3,034	23	100.0%	6	16.6%
University of Minnesota	MN	51,147	108	15.4%	N/A	-

School	State	Student Population	Percent of electricity from renewable sources		Percent of electricity from projects owned and operated by the school	
			Rank	% of electricity	Rank	% of electricity
University of Minnesota, Morris	MN	1,627	66	58.2%	2	58.2%
Saint Louis University	MO	14,581	10	105.1%	N/A	-
University of Missouri	MO	35,425	85	33.3%	4	20.0%
Colby-Sawyer College	NH	995	18	100.1%	39	0.1%
Dartmouth College	NH	6,509	106	15.5%	13	1.7%
University of New Hampshire	NH	15,363	23	100.0%	N/A	-
Monmouth University	NJ	6,340	99	20.8%	25	0.3%
Raritan Valley Community College	NJ	8,079	21	100.0%	N/A	-
Rider University	NJ	5,073	61	64.7%	N/A	-
Bard College	NY	2,293	116	10.4%	N/A	-
Colgate University	NY	2,894	23	100.0%	N/A	-
Columbia University	NY	30,454	23	100.0%	N/A	-
Cornell University	NY	23,016	115	10.5%	10	3.7%
Fordham University	NY	16,037	125	7.7%	N/A	-
Hamilton College	NY	1,901	112	12.1%	40	0.1%
Hobart and William Smith Colleges	NY	2,244	2	125.5%	60	0.0%
Hofstra University	NY	11,131	87	31.5%	N/A	-
Houghton College	NY	1,043	80	41.6%	N/A	-
Ithaca College	NY	6,516	8	109.1%	N/A	-
Rochester Institute of Technology	NY	16,584	48	92.5%	44	0.1%
Skidmore College	NY	2,684	89	30.0%	N/A	-
St. Lawrence University	NY	2,493	110	13.1%	N/A	-
State University of New York at Cortland	NY	6,913	54	78.1%	33	0.2%
Syracuse University	NY	22,484	84	34.1%	N/A	-
Union College	NY	2,267	45	96.3%	35	0.2%
University at Buffalo, the State University of New York	NY	30,648	23	100.0%	27	0.3%
Wells College	NY	488	23	100.0%	N/A	-
Cleveland State University	OH	16,371	78	48.9%	N/A	-
Denison University	OH	2,341	90	29.0%	34	0.2%
Oberlin College	OH	2,978	69	56.5%	23	0.6%
Ohio University	OH	29,369	74	50.1%	41	0.1%
The Ohio State University	OH	59,837	104	16.9%	N/A	-
Oklahoma State University	OK	25,295	63	60.1%	N/A	-
University of Oklahoma	OK	28,527	58	70.0%	N/A	-
Lewis & Clark College	OR	7,000	6	110.4%	37	0.2%
Portland Community College	OR	28,005	102	18.4%	12	2.5%

School	State	Student Population	Percent of electricity from renewable sources		Percent of electricity from projects owned and operated by the school	
			Rank	% of electricity	Rank	% of electricity
Allegheny College	PA	1,802	42	99.7%	50	0.1%
Bryn Mawr College	PA	1,640	20	100.0%	57	0.0%
Bucknell University	PA	3,678	113	11.6%	54	0.1%
Carnegie Mellon University	PA	13,869	11	104.9%	62	0.0%
Chatham University	PA	2,269	50	88.0%	21	0.6%
Drexel University	PA	24,190	72	51.7%	N/A	-
Duquesne University	PA	9,190	65	58.5%	N/A	-
Gettysburg College	PA	2,411	47	93.8%	N/A	-
Haverford College	PA	1,296	49	90.5%	N/A	-
Lebanon Valley College	PA	1,901	23	100.0%	N/A	-
Northampton Community College	PA	9,921	23	100.0%	9	4.5%
Slippery Rock University	PA	8,495	120	10.0%	61	0.0%
Swarthmore College	PA	1,577	7	109.8%	N/A	-
Temple University	PA	39,967	96	24.6%	N/A	-
University of Pittsburgh	PA	28,642	101	19.3%	65	0.0%
West Chester University	PA	17,306	62	62.9%	N/A	-
Coastal Carolina University / The College of Science	SC	10,663	93	27.5%	31	0.3%
University of Tennessee, Knoxville	TN	28,321	59	67.3%	52	0.1%
Abilene Christian University	TX	5,145	23	100.0%	N/A	-
Austin College	TX	1,228	21	100.0%	N/A	-
Southwestern University	TX	1,396	23	100.0%	N/A	-
University of Utah	UT	32,800	77	49.5%	45	0.1%
Weber State University	UT	27,949	91	28.6%	19	0.7%
Westminster College	UT	2,570	123	9.1%	20	0.7%
Emory & Henry College	VA	1,038	52	81.9%	26	0.3%
University of Richmond	VA	4,182	116	10.4%	N/A	-
University of Virginia	VA	24,360	103	17.5%	43	0.1%
Goddard College	VT	496	56	73.1%	N/A	-
Middlebury College	VT	2,533	100	20.0%	7	12.7%
University of Vermont	VT	13,340	15	101.1%	24	0.5%
Vermont Law School	VT	632	64	58.8%	14	1.5%
Gonzaga University	WA	7,506	75	50.0%	N/A	-
The Evergreen State College	WA	4,219	17	100.3%	29	0.3%
Whitman College	WA	1,498	4	119.4%	16	1.0%
University of Wisconsin	WI	42,977	124	9.0%	N/A	-
University of Wisconsin - Stevens Point	WI	8,222	23	100.0%	N/A	-

Notes

1 Received data from EPA Green Power Partnership on 4 August 2020.

2 U.S. Environmental Protection Agency (EPA), *Energy Use in Commercial Buildings,* accessed 19 December 2018, archived at http://web.archive.org/web/20181129150514/https://www.eia.gov/energyexplained/index.php?page=us_energy_commercial; Leia Guccione and Laurie Stone, "Higher education's energy lessons**:** Why universities and colleges are big believers in campus microgrids" (blog post), *Rocky Mountain Institute*, 31 October 2013, archived at http://web.archive.org/web/20190130182200/https://rmi.org/blog_2013_10_31_higher_educations_energy_lessons/; Association for the Advancement of Sustainability in Higher Education, *How Do Campus Sustainability Initiatives Affect College Admissions?,* 2 March 2009, archived at http://web.archive.org/web/20171007171202/http://www.aashe.org/campus-sustainability-initiatives-affect-college-admissions/.

3 Second Nature, *Reporting Platform* (online database), accessed at https://reporting.secondnature.org/home/, 24 July 2020.

4 Princeton Review, *2020 College Hopes & Worries Survey Report*, downloaded 24 July 2020, available at https://www.princetonreview.com/college-rankings/college-hopes-worries.

5 National Grid, *Managing Energy Costs in Colleges and Universities*, 2003, available at https://www9.nationalgridus.com/non_html/shared_energyeff_college.pdf.

6 This ranking and the clean vehicle ranking are based on schools' reports to AASHE STARS from 2017 through 2019. See Methodology for full details.

7 Association for the Advancement of Sustainability in Higher Education's, Sustainability Tracking, Assessment & Rating System, *Chatham University OP-6: Clean and Renewable Energy*, 26 November 2018, archived at https://web.archive.org/web/20200724174906/https://reports.aashe.org/institutions/chatham-university-pa/report/2018-11-26/OP/energy/OP-6/.

8 Environmental Protection Agency, *Fast Facts on Transportation Greenhouse Gas Emissions,* accessed 10 February 2020, archived at http://web.archive.org/web/20200207163346/https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions.

9 EVs in this ranking include battery-electric and hydrogen fuel cell-powered vehicles.

10 Brown University, *Departmental Sustainability Program Overview*, accessed on 19 February 2020, archived at http://web.archive.org/web/20190125045726/https://www.brown.edu/sustainability/initiatives/brown-departmental-sustainability-program.

11 Alexandra Valnoski, "Vanderbilt outlines major plans to reduce environmental footprint," *Vanderbilt News*, 22 April 2019, archived at http://web.archive.org/web/20190511180731/https://news.vanderbilt.edu/2019/04/22/vanderbilt-outlines-major-plans-to-reduce-environmental-footprint/.

12 Vanderbilt University, *On-Site Energy*, accessed on 5 February 2020, archived at http://web.archive.org/web/20191207094427/https://www.vanderbilt.edu//sustainability/on-site-energy/.

13 Katherine Keith, "Vanderbilt commits to first-of-its-kind renewable energy partnership with TVA, NES," *Vanderbilt News*, 22 January 2020, archived at http://web.archive.org/web/20200128185640/https://news.vanderbilt.edu/2020/01/22/vanderbilt-commits-to-first-of-its-kind-renewable-energy-partnership-with-tva-nes/.

14 UA News, *UArizona and TEP Given Green Light for 100% Clean Energy Agreement*, 10 December 2019, archived at http://web.archive.org/web/20191214092638/https://uanews.arizona.edu/story/uarizona-and-tep-given-green-light-100-clean-energy-agreement.

15 Ibid.

16 University of Hawai'i, *New Law Sets Net-zero Energy Goal for UH*, 8 June 2015, archived at http://web.archive.org/web/20180930015755/https://www.hawaii.edu/news/2015/06/08/new-law-sets-net-zero-energy-goal-for-uh/.

17 University of Hawai'i News, *1 MW of Renewable Energy Goes Online at UH Mānoa*, 4 October 2019, archived at https://web.archive.org/web/20200214153449/https://www.hawaii.edu/news/2019/10/04/1mw-pv-online/.

18 One hundred percent clean electricity: Robyn Schelenz, "UC makes bold commitment to 100 percent clean electricity," *University of California*, 29 October 2018, archived at http://web.archive.org/web/20190323233601/https://www.universityofcalifornia.edu/news/100-percent-clean-electricity; carbon neutrality: University of California, *Carbon Neutrality Initiative*, accessed 13 February 2019, archived at http://web.archive.org/web/20181210062758/https://www.ucop.edu/carbon-neutrality-initiative/global-climate-council/index.html.

19 University of California, *Policy on Sustainable Practices*, 24 July 2019, 9, available at https://policy.ucop.edu/doc/3100155/SustainablePractices.

20 Boston University Office of the President, *BU Facts & Stats*, accessed 10 February 2020, archived at http://web.archive.org/web/20190801004550/http://www.bu.edu:80/president/boston-university-facts-stats/.

21 Environment America, *100% Renewable: Campaigns & Commitments*, accessed 10 February 2020, archived at https://web.archive.org/web/20200210180013/https://go100renewablecampus.org/campaigns-and-commitments/.

22 Boston University, *Recommendations of the Climate Action Task Force for Boston University's Climate Action Plan*, December 2017, archived at http://web.archive.org/web/20191224141145/https://www.bu.edu/climateactionplan/files/2017/12/ClimateActionPlan_Report_FINAL.pdf.

23 Boston University Sustainability, *BU Wind*, accessed 10 February 2020, archived at http://web.archive.org/web/20190719232229/http://www.bu.edu:80/sustainability/what-were-doing/bu-wind/.

24 Calculated by dividing 205,000 MWh by 10.76 MWh, the average amount of energy consumed by an American home. Source: Andrew Sendy, "What is a Megawatt (MW) and what is a Megawatt-hour (MWh)?," *Solar Estimate*, 6 February 2020, archived at http://web.archive.org/web/20200310230009/https://www.solar-estimate.org/solar-panels-101/what-is-a-megawatt-and-what-is-a-megawatt-hour.

25 See note 23.

26 Boston University, *New Buildings*, 25 November 2017, archived at https://web.archive.org/web/20200210205800/https://www.bu.edu/climateactionplan/files/2017/12/17-11-25-New-Buildings-Final.pdf.

27 Kristin Toussaint, "Boston University is building the city's largest carbon-neutral, fossil fuel-free building," *Fast Company*, 6 February 2020, archived at http://web.archive.org/web/20200207194948/https://www.fastcompany.com/90460086/boston-university-is-building-the-citys-largest-carbon-neutral-fossil-free-building.

28 Boston University, *Transportation*, 22 September 2017, pp. 15-16, archived at http://web.archive.org/web/20171025051025/http://www.bu.edu:80/climateactionplan/files/2017/09/Transportation-Draft-2017-09-22.pdf.

29 Second Nature, *The University Climate Change Coalition*, accessed on 28 February 2020, archived at http://web.archive.org/web/20191105131525/https://secondnature.org/initiative/uc3-coalition/.

30 Studies detailing high or 100 percent renewable energy scenarios include:

- Christian Breyer et al., "On the role of solar photovoltaics in global energy transition scenarios," *Progress in Photovoltaics Research and Applications*, DOI: 10.1002/pip.2885, May 2017.
- Cory Budischak, "Cost-minimized combinations of wind power, solar power and electrochemical storage, powering the grid up to 99.9% of the time," *Journal of Power Sources*, 225: 60-74, 1 March 2013.
- M.M. Hand et al., National Renewable Energy Laboratory, *Renewable Electricity Futures Study*, December 2012.
- Mark Jacobson et al., "100% clean and renewable wind, water, and sunlight (WWS) All-sector energy roadmaps for the 50 United States," *Energy & Environmental Science*, DOI: 10.1039/C5EE01283J, 27 May 2015.
- Alexander MacDonald et al., "Future cost-competitive electricity systems and their impact on U.S. CO_2 emissions," *Nature Climate Change*, DOI: 10.1038/nclimate2921, 25 January 2016.
- James H. Williams et al., Energy and Environmental Economics, *Pathways to Deep Decarbonization in the United States*, 16 November 2015.

31 U.S. Environmental Protection Agency (EPA), *Energy Use in Commercial Buildings*, accessed 19 December 2018, archived at http://web.archive.org/web/20181129150514/https://www.eia.gov/energyexplained/index.php?page=us_energy_commercial.

32 Leia Guccione and Laurie Stone, "Higher education's energy lessons**:** Why universities and colleges are big believers in campus microgrids" (blog post), *Rocky Mountain Institute*, 31 October 2013, archived at http://web.archive.org/web/20190130182200/https://rmi.org/blog_2013_10_31_higher_educations_energy_lessons/.

33 See note 4.

34 See note 3.

35 Zach Durham et al., *Promoting Sustainability in Campus Laboratories*, University of Michigan, Winter 2011, archived at https://web.archive.org/web/20200317191403/http://graham.umich.edu/media/files/campus-course-reports/Sustainable%20labs%20-%20final%20report.pdf.

36 Harvard University, *Shut the Sash Program*, accessed 19 December 2018, archived at http://web.archive.org/web/20171120124632/https://green.harvard.edu/programs/green-labs/shut-sash-program.

37 Harvard University, Sustainability, *We're Reducing Energy Even as Demand Is Growing*, accessed 30 January 2019, archived at http://web.archive.org/web/20180207134258/https://green.harvard.edu/topics/climate-change-energy/energy-efficiency.

38 McKinsey & Company, *Unlocking Energy Efficiency in the U.S. Economy*, 2009.

39 For example, Mike Debraggio, "Building dashboard shows college's energy use in real time," *Hamilton College*, 28 August 2008, archived at http://web.archive.org/web/20190108121716/https://hamilton.edu/news/story/building-dashboard-shows-colleges-energy-use-in-real-time.

40 U.S. Environmental Protection Agency (EPA), *Green Power Partner List*, accessed 13 January 2020, available at https://www.epa.gov/greenpower/green-power-partner-list.

41 Arizona State University, *ASU Solar*, accessed 26 September 2018, available at https://cfo.asu.edu/solar.

42 Kyle Pennell, "Why did solar get so cheap in the last 20 years?," *Unplugged*, 18 January 2018, available at https://www.ohmconnect.com/blog-post/why-did-solar-get-so-cheap-in-the-last-20-years.

43 Karen B. Roberts, "Wind Turbine Turns 5," *UDaily*, 31 August 2015, archived at http://web.archive.org/web/20180926191418/http://www1.udel.edu/udaily/2016/aug/wind-turbine-083115.html.

44 Environmental Protection Agency, *Physical Power Purchase Agreements (Physical PPAs): What is a Power Purchase Agreement?*, accessed on 17 March 2020, archived at http://web.archive.org/web/20181018055243/https://www.epa.gov/green-power/physical-power-purchase-agreements-physical-ppas; Environmental Protection Agency, *Renewable Energy Certificates (RECs)*, accessed on 17 March 2020, archived at http://web.archive.org/web/20200313232129/https://www.epa.gov/greenpower/renewable-energy-certificates-recs.

45 Amherst College, *Five Leading Liberal Arts College Partner to Create New Solar Energy Facility in Maine,* accessed 2 March 2019, archived at http://web.archive.org/web/20190204100333/https://www.amherst.edu/news/news_releases/2018/4-2018/five-leading-liberal-arts-college-partner-to-create-new-solar-energy-facility-in-maine.

46 National Grid, *Managing Energy Costs in Colleges and Universities*, 2003, available at https://www9.nationalgridus.com/non_html/shared_energyeff_college.pdf.

47 "Stanford electrifies its campus, cuts greenhouse gas emissions by 65%," *EPRI Journal,* 17 May 2018, available at http://eprijournal.com/electric-university/.

48 Stanford University, *Stanford Energy System Innovations*, accessed 28 September 2018, available at http://sustainable.stanford.edu/sites/default/files/documents/Stanford_SESI_General_Information_Brochure.pdf.

49 ENERGY STAR, *Save Money and More with ENERGY STAR Solar Water Heaters*, archived 21 September 2017 at web.archive.org/web/20170921194623/https://www.energystar.gov/products/water_heaters/water_heater_solar/benefits_savings.

50 U.S. Energy Information Administration, *Solar Explained: Solar Thermal Power Plants*, accessed on 17 March 2020, archived at http://web.archive.org/web/20200312095307/https://www.eia.gov/energyexplained/solar/solar-thermal-power-plants.php.

51 U.S. Department of Energy, *Passive Solar Home Design*, archived 21 September 2017 at web.archive.org/web/20170921194628/https://energy.gov/energysaver/passive-solar-home-design.

52 Office of Energy Efficiency & Renewable Energy, *5 Things You Should Know About Geothermal Heat Pumps*, 1 August 2017, archived at http://web.archive.org/web/20190913192512/https://www.energy.gov/eere/articles/5-things-you-should-know-about-geothermal-heat-pumps.

53 National Wildlife Federation, *Going Underground on Campus: Tapping the Earth for Clean, Efficient Heating and Cooling*, 2011, available at https://www.nwf.org/EcoLeaders/Campus-Ecology-Resource-Center/Reports/Going-Underground-on-Campus.

54 Ibid.

55 Michael Casey, "A surprising benefit of electric cars: Cooler cities," *CBS News,* 19 March 2015, archived at web.archive.org/web/20170921201406/https://www.cbsnews.com/news/a-surprising-benefit-of-electric-cars-cooler-cities/; U.S. Department of Energy, *Reducing Pollution with Electric Vehicles,* archived at web.archive.org/web/20170921201510/https://energy.gov/eere/electricvehicles/reducing-pollution-electric-vehicles; U.S. Department of Energy, *Fuel Prices*, accessed 8 September 2017 at www.afdc.energy.gov/fuels/prices.html.

56 U.S. Department of Energy, *The eGallon: How Much Cheaper Is It to Drive On Electricity?,* accessed 24 July 2020 at https://www.energy.gov/eere/electricvehicles/saving-fuel-and-vehicle-costs. Estimated cost as of 18 July 2020 of $2.19 for regular gasoline versus $1.21 for an equivalent "eGallon."

57 Mia Yamauchi, "Driving on electricity is cheaper than gas in all 50 states," *Plugless*, 2016, archived at web.archive.org/web/20170727162954/https://www.pluglesspower.com/learn/driving-electricity-cheaper-gas-50-states/; Climate Solutions, *Why Electric Vehicles Are a Climate Solution,* March 2016, available at www.climatesolutions.org/sites/default/files/uploads/why_evs_are_a_climate_solution_final.pdf.

58 For example, University of Richmond, *Transportation*, accessed 5 February 2018, available at http://web.archive.org/web/20190206232421/https://sustainability.richmond.edu/campus/transportation/index.html.

59 See Appendix B for the full EPA Green Power Partnership list. Allegheny College, which receives 99.7% of its electricity from renewables, is rounded up to 100% and is considered one of the 42 schools receiving 100% of its electricity from renewable energy.

60 Butte College, "California's Butte College becomes first in the nation to generate more than 100% of its electricity from renewables," *PR Newswire*, 29 June 2011, archived at http://web.archive.org/web/20110904073014/http://www.prnewswire.com:80/news-releases/californias-butte-college-becomes-first-in-the-nation-to-generate-more-than-100-of-its-electricity-from-renewables-124729083.html.

61 Association for the Advancement of Sustainability in Higher Education's, Sustainability Tracking, Assessment & Rating System, *Colby College OP-6: Clean and Renewable Energy*, 5 November 2018, archived at https://web.archive.org/web/20200724162342/https://reports.aashe.org/institutions/colby-college-me/report/2018-11-05/OP/energy/OP-6/..

62 Chaveli Miles, Colgate University Sustainability Office, *Just Scratching the Surface: A Beginner's Guide to Geothermal Energy,* 19 July 2017, archived at http://web.archive.org/web/20181201152209/http://blogs.colgate.edu/sustainability/2017/07/19/just-scratching-the-surface-a-beginners-guide-to-geothermal-energy/.

63 Colgate University, *Energy & Green Buildings*, accessed on 16 March 2020, archived at http://web.archive.org/web/20191201043148/https://www.colgate.edu/about/sustainability/energy-green-buildings.

64 EVs in this ranking include battery-electric and hydrogen-powered vehicles, although no schools in the top ten have any hydrogen-powered vehicles in their fleets.

65 See note 11.

66 Ibid.

67 See note 12.

68 Katherine Keith, "Vanderbilt commits to first-of-its-kind renewable energy partnership with TVA, NES," *Vanderbilt News*, 22 January 2020, archived at http://web.archive.org/web/20200128185640/https://news.vanderbilt.edu/2020/01/22/vanderbilt-commits-to-first-of-its-kind-renewable-energy-partnership-with-tva-nes/.

69 See note 12.

70 See note 14.

71 Ibid.

72 Pam Scott, "UA initiates 100% clean energy project with TEP," *UA News*, 22 August 2019, archived at http://web.archive.org/web/20191213230609/https://uanews.arizona.edu/story/ua-initiates-100-clean-energy-project-tep.

73 Ibid.

74 Harvard University, *Harvard's Climate Action Plan*, accessed 6 February 2019, archived at http://web.archive.org/web/20190131150528/https://green.harvard.edu/campaign/harvards-climate-action-plan.

75 Harvard University, *2017 Sustainability Report*, accessed 6 February 2019, archived at http://web.archive.org/web/20180605092455/http://report.green.harvard.edu:80/.

76 See note 74.

77 Harvard University Sustainability, *Green Labs*, available at https://green.harvard.edu/programs/green-labs.

78 Harvard University, Sustainability, *We're Reducing Energy Even as Demand is Growing*, accessed 30 January 2019, archived at http://web.archive.org/web/20180207134258/https://green.harvard.edu/topics/climate-change-energy/energy-efficiency.

79 See note 16.

80 Jan Gouveia et al., University of Hawai'i, *University of Hawai'i Office of Sustainability 2016 Annual Report*, 26 January 2017, available at https://vdocuments.mx/document/university-of-hawaii-office-of-of-hawaii-office-of-sustainability-2016-annual.html.

81 University of Hawai'i News, *1 MW of Renewable Energy Goes Online at UH Mānoa*, 4 October 2019, archived at https://web.archive.org/web/20200214153449/https://www.hawaii.edu/news/2019/10/04/1mw-pv-online/.

82 Kelli Trifonovitch, "UH Maui College Aims to be First Net-Zero UH Campus," *University of Hawai'i News*, 19 March 2018, archived at http://web.archive.org/web/20190130145916/https://www.hawaii.edu/news/2018/03/19/maui-college-aims-to-be-first-100-percent-renewable-energy/.

83 Robyn Schelenz, "UC makes bold commitment to 100 percent clean electricity," *University of California*, 29 October 2018, archived at http://web.archive.org/web/20190323233601/https://www.universityofcalifornia.edu/news/100-percent-clean-electricity.

84 UC Office of the President, *President Proposes Tuition Freeze, New Systemwide Initiatives* (press release), 13 November 2013, archived at http://web.archive.org/web/20180909075217/https://www.universityofcalifornia.edu/press-room/president-napolitano-proposes-tuition-freeze-new-systemwide-initiatives.

85 Second Nature, *The Network*, accessed 2 March 2019, archived at http://web.archive.org/web/20190302205726/https://secondnature.org/climate-action-guidance/network/.

86 Point Energy Innovations, *Final Report: UC Carbon Neutral Buildings Cost Study*, 23 June 2017, available at https://www.ucop.edu/sustainability/_files/Carbon%20Neutral%20New%20Building%20Cost%20Study%20FinalReport.pdf.

87 University of California, *Policy on Sustainable Practices*, 24 July 2019, 9, available at https://policy.ucop.edu/doc/3100155/SustainablePractices.

88 Point Energy Innovations, *Final Report: UC Carbon Neutral Buildings Cost Study*, 23 June 2017, available at https://www.ucop.edu/sustainability/_files/Carbon%20Neutral%20New%20Building%20Cost%20Study%20FinalReport.pdf.

89 Kevin Stacey, "Brown pledges to reduce campus greenhouse gas emissions to net-zero by 2040," *Brown University*, 11 February 2019, available at https://www.brown.edu/news/2019-02-11/emissions.

90 Jill Kimball, "Solar and wind energy projects expected to offset 100 percent of Brown's on-campus electricity use," *News from Brown*, 17 January 2019, archived at http://web.archive.org/web/20190123161200/https://news.brown.edu/articles/2019/01/renewable.

91 University of Richmond, *Climate Action Plan*, available at https://sustainability.richmond.edu/common/pdf/climate-action-plan.pdf.

92 University of Richmond Sustainability, *Energy*, accessed 3 March 2019, archived at http://web.archive.org/web/20190303224433/https://sustainability.richmond.edu/campus/energy/index.html.

93 University of Richmond, *UR Announces Transformative Solar Agreement*, accessed 3 March 2019, archived at http://web.archive.org/web/20190206233148/https://sustainability.richmond.edu/campus/renewables/index.html.

94 Ibid.

95 University of Richmond, *Transportation*, accessed 5 February 2018, available at http://web.archive.org/web/20190206232421/https://sustainability.richmond.edu/campus/transportation/index.html.

96 Cornell University, *Our Sustainability and Climate Leadership*, accessed 3 March 2019, archived at http://web.archive.org/web/20190303225043/https://sustainablecampus.cornell.edu/our-leadership.

97 Cornell University, *Planning for Carbon Neutrality by 2035*, accessed 3 March 2019, archived at http://web.archive.org/web/20190303225326/https://sustainablecampus.cornell.edu/our-leadership/cap.

98 Cornell University, *Campus Energy Systems*, accessed 17 March 2020, archived at http://web.archive.org/web/20190930080939/https://sustainablecampus.cornell.edu/campus-initiatives/buildings-energy/campus-energy.

99 See note 97.

100 Cornell University, *Solar Thermal*, accessed 9 February 2019, archived at http://web.archive.org/web/20180612230333/https://energyandsustainability.fs.cornell.edu/util/heating/production/solarthermal.cfm.

101 Cornell University, *Lake Source Cooling Home*, accessed 30 January 2019, archived at http://web.archive.org/web/20181016041701/https://energyandsustainability.fs.cornell.edu/util/cooling/production/lsc/default.cfm.

102 The "Renewable Energy 101" factsheets are available for download at https://environmentamerica.org/energy-101; and the "Renewable Energy 100" report is available at https://frontiergroup.org/reports/fg/renewable-energy-100.