

# PRITZKER BRIEFS

## Pritzker Environmental Law and Policy Briefs

### Overcoming Organizational Barriers to Carbon Neutrality: Lessons from the UC Experience

By *Julia Forgie & Ann Carlson*

#### Introduction

In 2013, University of California President Janet Napolitano announced one of the most ambitious environmental programs in the country, the Carbon Neutrality Initiative. The CNI sets a goal to reach net zero carbon emissions from the system's 10 campuses by 2025.

The UC system is not alone in committing to ambitious carbon reduction goals. Despite the Trump Administration's retreat from aggressive climate action, organizations of all types and sizes have set goals to reduce their emissions. Indeed, more than 1,200 cities, states and businesses committed to meeting the U.S. Paris Agreement target of a 28 percent reduction in their own emissions by 2025. Some have gone much further. Large technology companies like Microsoft and Apple have committed to carbon neutral global operations in relatively short time frames. A consortium of more than 100 campuses in all 50 states has committed to carbon reduction goals as well, some of them very ambitious.<sup>1</sup>

Our focus in this Pritzker brief is on lessons the UC system is learning as it implements its carbon neutrality goal. We believe that these lessons will be invaluable for other organiza-

tions as they work to reduce or eliminate their emissions. Our focus is somewhat unusual. Carbon neutrality initiatives often focus on many familiar questions about the technical feasibility of meeting such aggressive goals. How can organizations procure sufficient renewable energy? How much should an organization rely on energy efficiency to meet the goal, and what measures should be taken to improve efficiency? Is electrification of a vehicle fleet the right strategy? And for specialized operations like laboratories and hospitals, what is the right mix of technologies to ensure both maximum energy efficiency and the maintenance of safe and reliable environments for lab work and patient health?

Our focus is different. Although UC is addressing questions like those we've just raised, the experience of UC so far has also led to a number of less obvious issues involving organizational, communication, and financial challenges. Though we often think of the need for scientific and technological breakthroughs to achieve carbon neutrality, UC is finding that at least as important are insights into organizational behavior, communications strategy, and operations management. How, for example, can a large, disparate organiza-

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tion overcome institutional barriers to reaching carbon neutrality? How can complex decisions about issues like procurement, new construction, and energy efficiency expenditures be aligned to achieve carbon neutrality? How does an organization ensure that sophisticated energy efficiency systems continue to operate and be maintained to deliver maximum benefits? What staffing levels are necessary? How does an entity develop and ensure stakeholder awareness and buy-in? What should it do about existing large-scale investments in energy systems that will continue to emit greenhouse gases if operated? What does an organization with multiple locations do to respect local autonomy while ensuring compliance with the ambitious goal? And how can an organization fund the changes necessary for reaching carbon neutrality?

As UC begins to implement its Carbon Neutrality Initiative, its experience sheds light on some of these questions. After establishing the goal, it became clear that organizational, communication, and financial barriers are at least as important to achieving the 2025 carbon neutrality goal as technical ones. To

address these challenges, President Napolitano appointed a Carbon Neutrality Management and Financial Task Force to examine how to overcome them.\* Recognizing that no single solution would lead to carbon neutrality, our Task Force developed many recommendations and detailed them in its report. The full report and recommendations can be accessed at <http://ucop.edu/carbon-neutrality-initiative/files/overcoming-barriers-to-carbon-neutrality.pdf>. Building on that report, this Brief highlights key insights from the Task Force's research on organizational behavior and opportunities for overcoming institutional barriers. We believe these will be useful for other complex organizations as they seek to follow suit.

Organizations seeking to become carbon neutral need to evaluate and overcome financial and management challenges, not just technical barriers. They will need to understand their organizations intimately, and institute multiple changes and new policies and practices to ensure that carbon neutrality becomes a reality. The following table lists our most important findings and lessons learned:

### Key Lessons in Overcoming Institutional Barriers to Carbon Neutrality

- One popular measure to try to incentivize organizational change is the imposition of a carbon charge or shadow price. Although a charge or price can help incentivize behavior, it will likely be insufficient on its own without addressing organizational changes, staff realignments, and other measures
- Organizations that are growing and investing should focus immediately on new buildings and other long-term investments to ensure that they do not increase carbon emissions and lock those emissions in for many years
- The imposition of an aggressive carbon goal requires efforts to increase buy-in at all decisionmaking levels and among all stakeholders; organizations must acknowledge and address real concerns about the fiscal consequences of carbon neutrality
- Organizations must hire sufficient staff to ensure that energy efficiency investments are maintained and properly operated to maximize emissions reductions
- For existing investments, organizations should avoid or minimize stranding assets that emit GHGs by using offsets and planning for longer-range phase-outs
- And using savings from lower utility costs to finance upfront costs of energy efficiency programs can help realize long-term savings

\*Ann Carlson chaired the Task Force and Julie Forgie provided staff support.

## UC's Leadership in Pursuing Carbon Neutrality

The University of California's Carbon Neutrality Initiative is a bold step to tackle climate change. If UC meets its 2025 goal, it will be the first major university system to do so. For that reason, UC's experience pursuing this aggressive goal can guide and support other universities.

The UC experience can apply to other complex organizations as well. The University of California is like a miniature nation-state. Each of its ten campuses is like a small city, with classrooms, auditoriums, hospitals, police forces, housing, restaurants, office space, laboratories, and even elementary schools on some sites. Seven campuses own and operate their own cogeneration plants. Two campuses are within the jurisdiction of municipally owned utilities, while the others get a significant amount of their power from investor-owned utilities. Our governance structure resembles the U.S. system of federalism—the centralized Office of the President and Board of Regents make University-wide decisions, but campuses retain high degrees of autonomy and maintain control over most of their funding. This system is made even more complex because the University is a public institution of the state of California, with some oversight and significant funding coming from the state. And we have a wide range of stakeholders, including students, staff, faculty, administrators, alumni, and the public.

The University of California also benefits from world-class academic researchers across all disciplines, many of whom are working to help solve the climate crisis. The system-wide effort to achieve carbon neutrality is incorporating many of these experts

in its planning, including in examining whether cost-effective alternatives exist for natural gas-fired co-generation plants, how to structure offsets to maximize stakeholder credibility, and how to engage its various stakeholders in achieving carbon neutrality.

Even with these tools, however, reaching carbon neutrality by 2025 will be difficult. If the University continues along its current emissions reduction trajectory, it will not reach carbon neutrality until 2040. Dramatic changes are necessary to achieve the 2025 goal. Some of those changes can and are being implemented without facing organizational barriers. For instance, UC is and can continue making large procurements of renewable energy that will help move toward the 2025 goal. But other possible solutions will only get us to the 2025 goal if we can overcome significant management and financial barriers.

The UC task force was initially created to consider implementation of a carbon charge to accelerate the pace of emissions reductions. It quickly expanded to tackle broader management and financing questions after concluding that a carbon charge by itself would not solve the problem. The Task Force developed recommendations about energy sourcing, energy efficiency and conservation, new buildings, financing and funding, change management and University medical centers. It did so after conducting extensive surveys and interviews of key stakeholders, circulating its final report in draft form prior to its publication, and holding workshops across the system to explain its findings and solicit feedback.

Building on that report, this Brief highlights key institutional barriers to achieving carbon neutrality and lessons we learned in evaluating them. These lessons and considerations should prove useful as other organizations—universities, businesses, cities, and other local governments—follow our path.

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## Key Institutional Barriers to Achieving Carbon Neutrality

Our assessment uncovered six key institutional barriers that have impeded progress toward carbon neutrality.

### ■ Lack of Buy-in

Administrators and decision-makers at all levels across campuses have limited time and resources to tackle multiple competing priorities. Research and the education of students are obviously the top priority, but the University has many initiatives that enhance the quality of life of students, staff, and faculty, improve their safety, and contribute to environmental goals. Many of these goals cost money. Some, such as seismic retrofits, are mandated by state law. Others are directly related to the education of students, including system-wide goals to absorb thousands of additional students on certain campuses and to improve four-year graduation rates. Still others focus on the environment, including a 2020 zero waste goal.

Some administrators perceive carbon neutrality as being in tension with these initiatives. Building renovations, seismic retrofits, and new facilities top the list of priorities on some campuses. The University's medical centers will require new buildings to meet building codes by 2030. Campuses targeted for student-body growth will likely need new buildings for housing, classrooms, and laboratories. Some administrators also worry that carbon neutrality could compromise educational and research goals by jeopardizing state-of-the-art facilities and laboratories. At the medical centers, patient care is, understandably, the top priority. Anything perceived to undercut quality of care

is not tolerated and indeed can conflict with state health and safety requirements. Finally, tight finances at many of the campuses and medical centers put these multiple priorities in competition for limited funding.

One of the Task Force's most significant findings is that campus leaders and constituencies have not embraced the carbon neutrality goal—particularly the 2025 compliance date. Perceived competition among various initiatives and low awareness of the goal each contribute to this lukewarm response. Various leaders at each campus who are in a position to implement measures to reach the goal have limited knowledge about the Initiative, its importance, and practical steps for achieving it. Without a solid understanding of why the Initiative matters and how it can be implemented cost-effectively, leaders on campus are unlikely to buy into the funding required to achieve carbon neutrality. In addition, top-level decision-makers do not always seek guidance from knowledgeable staff who have embraced the carbon neutrality goal. For example, while sustainability staff are well-versed in the carbon neutrality goal and steps necessary to achieve it, they often do not participate in decision-making processes about new building designs or energy efficiency retrofits. And other staff have not been educated about the centrality of carbon neutrality to the University's goals. Finally, campus leaders are uncertain about the role individual campuses should play in an Initiative that they see as coming from the centralized University leadership.

### ■ Complex Governance Structure

The University's complex governance structure also creates additional challenges. With a central Office of the President that reports to the University Board of Regents, ten campuses spread throughout the state, and five medical centers, the University is an enormous institution with diversified leadership

*Campus leaders and constituencies have not embraced the carbon neutrality goal.*





Solar Water Heating at UCLA Residence Halls (Photo credit: Nurit Katz)

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and hundreds of thousands of stakeholders.

This divided authority can make decision-making at the University challenging in three ways. Decisions made by the Office of the President can feel like top-down mandates to the individual campuses that must implement those decisions. This tension is magnified by the University's funding structure—money comes from the individual campuses, which fund any initiatives developed by the Office of the President. Therefore, many of these initiatives are seen as “unfunded mandates” when pushed onto the campuses from the central office. If the central office were to provide funding for the initiative, it would simply be “taxing” the campuses to fund its implementation. Further, each campus has distinct finances, geographical and topographical characteristics, cultures, energy infrastructure, and sets of priorities that make decisions by one campus difficult to apply to the others. University-wide actions may work better for

some campuses than for others. Even within a single campus, diversified channels for approving new facilities and capital projects and the uncertainty of whether sustainability staff will be included in design and approval processes make decisions to incorporate carbon reduction measures dependent on the particular priorities of the individuals present at the time.

#### ■ Ineffective Building Operations by Untrained Staff

Even the best policy is useless without mechanisms to ensure its proper implementation. Policies that require energy efficiency projects have the potential to substantially reduce energy consumption. But without people who know how to correctly plan, implement, and operate them, these projects may not have much effect. Understaffing and lack of training and expertise among existing staff make it difficult for these projects to achieve promised energy savings.



### ■ Long Building Planning Timeline and Lifetimes

Buildings have lifetimes that span many decades. And the planning process for new buildings may take a decade. A proposed building that entered the pipeline a few years ago may be built in the coming years without energy efficiency measures and without being net carbon neutral. That means the building will increase the University's carbon emissions, making any carbon reduction goal even less attainable. And those emissions will continue for decades, unless and until that building undergoes a significant retrofit.

### ■ Creation Of Stranded Assets from Natural Gas Investments

Seven of the ten UC campuses have invested heavily in natural gas combined heat and power (CHP), or "co-generation," plants. These plants have significantly reduced emissions from those seven campuses, including emissions of conventional air pollutants. Indeed many of these investments were made in part because of the environmental benefits of co-generation at a time when

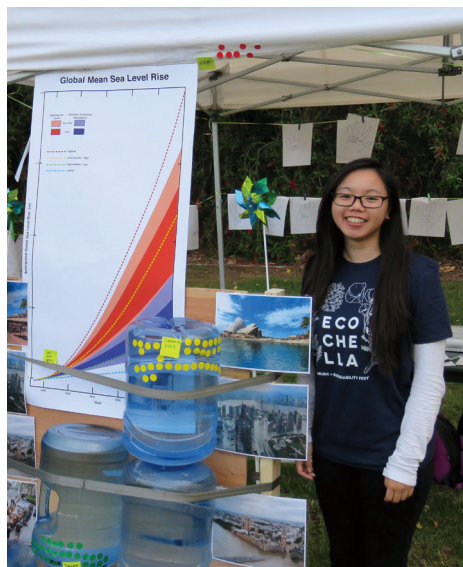
concern about greenhouse gas emissions was much lower. But these facilities make it nearly impossible to reach carbon neutrality without large offsets elsewhere or without abandoning investments that have significant operating lives remaining. Replacing them—through fully electrifying the campuses, for example—would be prohibitively expensive.

### ■ No Mechanism to Finance Upfront Costs of Energy Efficiency Measures

Most energy efficiency measures will pay for themselves eventually through the savings in energy consumption. But some have high upfront costs that are difficult to justify or impossible to cover in the budget. The University's budget system further impedes these investments by limiting debt capacity. Campuses can only go into so much debt, limiting the flexibility they have for upfront funding and financing measures. So even when long-term cost-savings are factored into the equation, the high upfront costs make many deep energy efficiency actions cost prohibitive.

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UCLA carbon neutrality fellow with sea level rise educational display.



Bike-powered music festival organized by students at UCLA. (Photo by Nurit Katz.)

## Key Lessons Learned and Important Considerations for Other Organizations

These barriers have seriously impeded the University's progress toward its 2025 carbon neutrality goal. As we considered options to overcome them, we came to the following conclusions:

### ■ Look Beyond a Carbon Charge or Shadow Price to Incentivize Dramatic Behavioral Change

We considered both a shadow carbon price and a carbon charge as ways to increase awareness of carbon uses and prioritization of carbon neutrality efforts, and to create a funding source for additional energy efficiency and conservation efforts. We ultimately recommended that campuses adopt one or the other, or a shadow price first and a carbon price once stakeholders have adapted to a pricing mechanism. Both shadow prices and carbon charges can in some circumstances effectively incentivize changes in behavior to reduce emissions. But neither is sufficient without examining organizational and other impediments to change.

A shadow price can be attached to building and other project designs before approval. Decision-makers then see how different options affect carbon usage in dollar amounts. Similarly, a shadow price can be included in utility bills so that energy users see their carbon consumption. A carbon charge takes the shadow price concept a step further by actually charging different operating units for their carbon consumption. In addition to

raising awareness, the carbon charge incentivizes carbon reduction actions with real monetary rewards. It also creates a new funding source that can be reserved for energy efficiency and other carbon abatement efforts.

In theory, shadow prices and carbon charges raise awareness about carbon use and incentivize carbon reduction behavior. But we found at least two problems with a carbon charge: The people who see and pay the utility bills are not always those consuming the energy (conversely those who are consuming energy often aren't paying directly for it); and many individual departments, laboratories, and schools aren't metered and thus lack the ability to track their energy use. So even assuming that awareness of a charge would change behavior, the information link between charge and consumer is in many instances not available, and consumers may lack the tools to change their consumption. On top of these disconnects, a carbon charge raises prices and can become controversial when resources are tight.

To make the widespread use of carbon charges effective, campus infrastructure would need to be significantly restructured to allow for perfect information transfer and flexibility to act. There would need to be a direct link between those who get charged and those who can save energy consumption. Carbon charges may still have efficacy for some decision makers and we ultimately recommended that campuses consider them. Nevertheless, absent those ideal conditions, additional actions are critical to create the larger cultural and organizational shifts necessary to achieve carbon neutrality.

### ■ Increase Buy-In at All Decision-Making Levels and Among All Stakeholders

In light of the University's complex governance structure, the many competing priorities facing campus leadership, and a general lack of awareness about the importance of carbon neutrality, we found a need to increase prioritization of the Carbon Neutral-

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ity Initiative across the entire University, not just among a select few sustainability experts.

Initiatives like this cannot be viewed as “unfunded mandates” from a centralized authority or campuses will resist their implementation. To minimize that perception, our task force made recommendations that maximize campuses autonomy in implementation. Certain actions require a system-level approach to take advantage of economies of scale or to coordinate with statewide programs like cap and trade. But others can be implemented differently by each campus, depending on their needs and priorities. Of course, this diffuse decision-making creates risk of inaction or weaker steps toward the goal. And it puts authority in the hands of people who may not have prioritized the Initiative.

Therefore, additional approaches are needed to increase buy-in to the Initiative across all campuses and at all leadership levels. The process of developing and refining recommendations for overcoming organizational barriers itself has helped create awareness and buy-in. Engaging project managers, administrators, faculty, staff, and students from each campus and medical center via surveys and interviews has piqued their interest in carbon neutrality and led them to think critically about the importance of the Initiative and how it fits within the University’s mission. Outreach throughout the report-writing process has signaled to the University community that their input and priorities are valued. And workshoping the draft report and discussing its findings with varied groups of stakeholders has helped build a broad sense of ownership over this Initiative. Rather than a set of recommendations sent down from central authority, the final report grew and changed as more stakeholders weighed in.

Substantive outreach about carbon neutrality is also critical. Project managers and campus leadership need to be aware of the Initiative and understand how it fits within their work and decisionmaking. For instance, new building project managers and campus

leadership need to understand that energy efficiency measures are critical to building performance before making final design decisions. And stakeholders using the buildings—students, staff, faculty—need to be aware of how to minimize their energy use.

Outreach that builds broader awareness among stakeholders has the secondary benefit of creating accountability necessary to ensure that leadership at each campus continues to pursue aggressive carbon abatement measures. If students, staff, and faculty across the University believe in and prioritize the Initiative, they will help ensure that leadership makes decisions that are consistent with it. We have seen this sort of student activism cause sweeping changes across the country. At a University with hundreds of thousands of students, the student voice can be a powerful accountability tool.

Stakeholders at all campuses and leadership levels also need to understand the centrality of carbon neutrality to the organization’s mission. No matter how well versed someone is in the Carbon Neutrality Initiative, they may prioritize other efforts unless they believe that there is a strong connection between achieving the carbon neutrality goal and the University’s mission.

For the University of California, this connection is direct and deep. The University’s mission is to discover and advance knowledge via education, research, and public service.<sup>2</sup> The Carbon Neutrality Initiative engages the University’s academic researchers in developing solutions to a challenging global problem, educates students and the greater community in the process, and offers a critical public service by helping tackle climate change and guiding others to do the same. Arguably, the University will not be able to pursue its research, education, and public service goals to their potential without pursuing and achieving carbon neutrality. Stakeholders and decision-makers who adopt this perspective about the centrality of the Initiative are far more likely to prioritize it in their



University work. And recognition of this connection also makes decisions that prioritize carbon neutrality more politically palatable.

Similarly, linking this Initiative with other efforts will help minimize the concern that the Carbon Neutrality Initiative must compete with other initiatives for priority and funding. Rather, the campuses can pursue both this Initiative and other complementary efforts simultaneously.

Finally — and this is a conclusion the task force reached only after high-level administrators questioned the ambition of the goal (the 2025 date in particular) — concerns about the fiscal consequences of the goal need to be taken seriously and addressed. Our task force found, for example, that making clear that campuses would not need to abandon and replace costly capital investments like the co-generation facilities before the end of their useful lives is important. Communicating about the ways in which smart, up-front decision-making about ensuring that new buildings do not add new carbon emissions helped make sense of the goal. Communication about the goal includes not just why it is integral to the UC mission but also about why it can be achieved in a fiscally responsible way.

#### ■ Hire Sufficient Staff to Ensure that Energy Efficiency Investments are Maintained and Properly Operated

Building awareness about carbon neutrality among faculty, staff, students, and administrators will help campuses prioritize the Initiative. Beyond that cultural shift, adequate numbers of qualified, informed staff are necessary to ensure that buildings are built and operated to maximize energy efficiency. Often, campuses lack enough qualified staff that understand how energy efficiency measures work to see a building project through from inception to long-term operation. Without these dedicated staff ensuring that a planned energy efficiency measure is included and operated

effectively, a new building that might have achieved significant energy savings could instead impede our efforts to achieve carbon neutrality. Committing to carbon neutral operations requires hiring enough staff to make that possible.

#### ■ Focus Immediately On New Buildings And Other Long-Term Investments

Reusing space more effectively to avoid constructing new buildings helps constrain a campus's carbon footprint. But with growth in student bodies, new buildings are inevitable on many campuses.

The long planning period and multi-decade lifetimes of new buildings put them at the top of the priority list for implementing low and no carbon emissions measures. While retrofits are essential for existing buildings, buildings are more cost-effective if constructed with energy efficient and low carbon designs from their inception. Measures implemented now will provide important energy savings for decades.

Among the ways to ensure new buildings will not increase a campus's carbon emissions, we considered requiring all new buildings to have zero carbon emissions designs. But some buildings like laboratories and hospitals require substantially more energy than others, making a zero carbon requirement more burdensome for certain building types. A net zero carbon emissions policy that allows for intra- and cross-campus "offsets" gives campuses flexibility to build those energy intensive buildings while reducing energy consumption elsewhere.

Another solution is to require all-electric building design, with the assumption that electricity sourcing can and will move toward renewable energy. This type of design is more feasible for certain building types than others, and may be especially cost-effective for housing units and non-laboratory classrooms.

*Building awareness about carbon neutrality among faculty, staff, students and administrators will help campuses prioritize the Initiative.*

### ■ **Incorporate Life-Cycle Cost Assessments into New Building Project Analyses to Account for Long-Term Energy Savings from Upfront Investments**

Because energy efficiency measures sometimes have high up-front costs, they are often eliminated from buildings in the planning and design phases. To avoid this short-term fix with long-term consequences, metrics like life-cycle cost assessments should be incorporated into building analyses to account for the long-term savings from energy efficiency and other low carbon measures. Those metrics will demonstrate the monetary and carbon benefits of energy efficiency measures throughout the building's lifetime. And they will help decision-makers justify promoting and selecting designs that have higher upfront costs but long-term savings. When combined with a shadow or action carbon price, low or zero carbon buildings may even be more affordable than buildings with higher emissions.

### ■ **Avoid or Minimize Stranded Assets through Temporary Offsets and Planning for Longer-Range Change**

For any entities using natural gas as a "bridge" fuel, stranded assets will become a significant barrier to reaching carbon neutrality. Avoiding those "bridge" fuel investments altogether is the safest way to prevent this problem. But once those investments have been made, as in the case of seven of UC's campuses, careful planning to eventually phase them out, while using offsets in the meantime, is likely to be necessary.

Forward thinking and long-term planning could also help avoid further locking us into carbon intensive activities. For instance, the University has established a task force to examine the time frame for moving away from existing natural gas facilities, their rela-

tionship to short-term offsets, and other opportunities to reduce campus emissions associated with the co-generation plants. Their report is accessible here: <https://osf.io/ku94n/>. The sort of focused, long-term planning recognized in the report will help ensure smart investments in carbon neutral technologies and minimize the negative impacts of past investments that impede further progress toward carbon neutrality.

### ■ **Use Savings from Lower Utility Costs to Finance Upfront Costs of Energy Efficiency Programs and Realize Long-Term Savings**

As noted for new buildings, long-term savings from energy efficiency and other low carbon designs need to be accounted for in cost assessments. Otherwise, these types of measures, which often have high upfront costs, will be cut from new building and renovation projects. But even when these long-term savings are accounted for, campuses need mechanisms and budgets to finance the high upfront costs in order to realize the long-term financial and energy savings.

Organizations should create separate budgets for carbon abatement efforts to ensure that they do not get cut from projects. Funds from the carbon charge discussed above could be dedicated for this type of effort. Additional funds may be necessary to cover projects with especially high upfront costs. Financing options that allow for higher debt capacity and longer-term views about returns on investment will facilitate approval of these projects. Campus financial officers need assurance that by taking on more debt they will not be penalized by a system that only values annual budgets without an eye toward the long term savings that those debt incurring decisions will create.



One of two fully electric buses at UCLA. UCLA was the first public university in California to adopt electric buses. (Photo credit: Brent Pantell)

## Conclusion

The University of California is uniquely positioned to tackle carbon neutrality on an accelerated 2025 timeline and to provide guidance to other academic institutions, corporations, and cities looking to follow suit. But achieving carbon neutrality within a complex organization requires more than just technological advancements. Organizational and financial barriers impede progress toward the goal. To overcome these barriers, the University—and other organizations—must ensure that the goal and its urgency are widely embraced, hire enough qualified staff to effectively implement energy efficiency measures, prioritize projects like new buildings that entail long planning timelines and lifetimes, incorporate life-cycle cost assess-

ments to account for long-term energy savings in upfront building project analyses, avoid or minimize stranded assets, and facilitate aggressive carbon abatement actions through smart funding and financing mechanisms.

This Brief has detailed the insights we gained as the University of California Carbon Neutrality Management and Financial Task Force developed its full report with substantive recommendations for overcoming barriers to achieving carbon neutrality. We believe that organizational impediments and financing barriers often receive too little attention in determining whether to adopt a carbon neutrality goal and how to achieve it. We are hopeful that recommendations in the Task Force report and insights in this Brief will prove useful as other organizations commit their operations to carbon neutrality.

## Endnotes

- 1 Second Nature, Reporting Platform, <http://reporting.secondnature.org/institution/data/> (last visited June 26, 2017).
- 2 UC's Mission, University of California Office of the President, <http://ucop.edu/uc-mission/index.html> (last visited June 6, 2017).





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*This policy paper is the ninth of the Pritzker Environmental Law and Policy Briefs. The Pritzker Briefs are published by UCLA School of Law and the Emmett Institute on Climate Change and the Environment in conjunction with researchers from a wide range of academic disciplines and the broader environmental law community. They are intended to provide expert analysis to further public dialogue on important issues impacting the environment.*

## About the Emmett Institute on Climate Change and the Environment

<http://www.law.ucla.edu/emmett>

*The Emmett Institute on Climate Change and the Environment is the leading law school center focused on climate change and other critical environmental issues. Founded in 2008 with a generous gift from Dan A. Emmett and his family, the Institute works across disciplines to develop and promote research and policy tools useful to decision makers locally, statewide, nationally and beyond. Our Institute serves as a premier source of environmental legal scholarship, nonpartisan expertise, policy analysis and training.*

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**Ann E. Carlson** is the Shirley Shapiro Professor of Environmental Law, and the inaugural Faculty Director of the Emmett Institute on Climate Change and the Environment at the UCLA School of Law. Professor Carlson is one of the country's leading scholars of climate change law and policy. She chaired the UC Carbon Neutrality Management and Financial Task Force and serves on the President's Global Climate Leadership Council.

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