International Journal of Sustainability in Higher Education

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IJSHE
10,3

250

Received 28 August 2008
Revised 27 October 2008
Accepted 8 December 2008

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Abstract

Purpose – The purpose of this paper is to discuss the recent history of climate action planning at the University of New Hampshire (UNH), a public university with a long history of sustainability action and commitment. Items discussed include a partnership with Clean Air-Cool Planet (CA-CP) to produce a greenhouse gas (GHG) inventory tool that adapted national and international inventory methodologies to the unique scale and character of a university community; involvement of administrators, faculty, staff and students in climate action planning, including to meet the requirements of the American College & University Presidents' Climate Commitment (ACUPCC); and the role of climate action planning within a broader institutional goal of integrating sustainability across curricula, operations, research and engagement efforts.

Design/methodology/approach – Background and historical information is shared in terms of best practices and lessons learned.

Findings – Successful climate action planning includes campus-wide stakeholder involvement, an institution-wide commitment to sustainability, and careful planning and partnerships that tie into a higher education institution's educational mission and identity and that take into account the culture and sense of place of each institution.

Practical implications – The paper contains lessons learned and best practices from which other institutions of higher education might learn.

Originality/value – UNH, a recognized national leader in sustainability and climate protection, and CA-CP developed one of the first emissions inventory tools for higher education in the USA. The tool has been adopted by more than 1,000 campuses and was adopted by the ACUPCC as the recommended tool for campuses not already participating in another GHG inventorying program. Instead of recreating the wheel, campuses may be able to learn from UNH and CA-CP's climate planning experience and history.

Keywords Global warming, Higher education, Energy management, United States of America

Paper type Case study

International Journal of Sustainability in Higher Education
Vol. 10 No. 3, 2009
pp. 250-265

1467-6370
DOI 10.1108/14676370910972567

Introduction

Before sustainability became the buzzword it is today, the University of New Hampshire (UNH) had been advancing sustainability in some way, shape or form for 35-plus years (Aber *et al.*, 2009; Blanchet, 2008; Wolff, 2008, www.sustainableunh.unh.edu). Since 1997, this work has been lead by UNH's University Office of Sustainability

(UOS), the oldest endowed sustainability program in American higher education. UOS brings together administrators, faculty, staff and students to integrate sustainability across the university's curriculum, operations, research, and engagement (referred to as the "CORE") through four initiatives designed around four key systems that underpin the ability of a community or society to define and pursue quality of life – biodiversity, climate, food, and culture. When we maintain integrity within and across these four systems and the CORE, we ensure and promote quality of life for generations under a model we call the "sustainable learning community" (Kelly, 2009, 2003; www.sustainableunh.unh.edu/coreframework.html).

The sustainable learning community model integrates sustainability into the fabric of an institution of higher learning in order to achieve the educational goal of cultivating a critical and creative global sustainability outlook in our students and ourselves. More than just "the environment" or even the intersection of environment, economy, and equity, sustainability is about seeing things whole and acting accordingly. And while this model was developed by UNH's Chief Sustainability Officer and Founding Director endowed sustainability program, in order to be successful, the entire university must work together continually to transform itself into a sustainable learning community (Kelly, 2009, 2008, 2003).

Climate Education Initiative

While energy conservation and efficiency work has been ongoing at UNH since the 1970s (Aber *et al.*, 2009; APPA, 2007; Goral, 2007; MacDonald, 2000; US Environmental Protection Agency and US Department of Transportation, 2008, *Best Workplace for Commuters*), this work took on expanded meaning when UNH's Climate Education Initiative (CEI) was developed in 1997-1998 under direction of UNH's then-newly endowed sustainability program (www.sustainableunh.unh.edu/climate_ed/index.html). CEI, built around one of the four foundational systems of sustainability, integrates with UNH's Biodiversity Education Initiative, Food & Society Initiative, and Culture & Sustainability Initiative.

Under CEI, UNH is committed to being a model climate protection campus that pursues a sustainable energy future through emissions reduction policies, practices, research, education, and engagement. The overarching goal of CEI is to help administrators, faculty, staff, students, and community partners increase their knowledge of and effectiveness in advancing greenhouse gas (GHG) emission reductions in their civic and professional lives, while integrating the ethics, science, technology, and policies of emissions reductions into the university's identity, policies, and practices. CEI unifies the entire campus community in working to:

- reduce carbon dioxide and other GHG emissions, as well as criteria pollutants as defined by the US Environmental Protection Agency;
- reduce potential climate change and improve (among other things) air quality;
- research, develop and demonstrate innovative solutions to energy challenges;
- research climate and air quality prediction and public health issues related to climate change;
- educate students in all fields about the relationship between human activities, climate, health and appropriate civic, and professional actions;

- educate public health students to address the risks associated with climate change and variability; and
- develop as a community model for the state and region.

A CEI Working Group of faculty, staff, and students from across campus was formed to plan and implement the vision, mission, goals, and initial projects of the CEI. One of the first projects instituted was the development of a novel GHG inventory tool designed to meet the unique needs of a higher education institution (Andrews *et al.*, 2008; Pasinella, 2009). The CEI Working Group determined that the university could not meet any of the stated goals of the CEI without knowing what the university's emissions were and then monitoring on a regular basis how the university was doing in reducing these emissions. This paper will describe the process for how the GHG inventory tool, now called the Campus Carbon Calculator – the planning backbone behind the CEI – was developed, how it has been refined and improved, and how it is now being used in the next phase of UNH's climate planning – the development of a climate action plan. In 2007, UNH signed the American College & University Presidents' Climate Commitment (ACUPCC), giving further impetus to climate planning, measuring and reducing emissions, and providing critical education around sustainability and climate change (Figure 1).

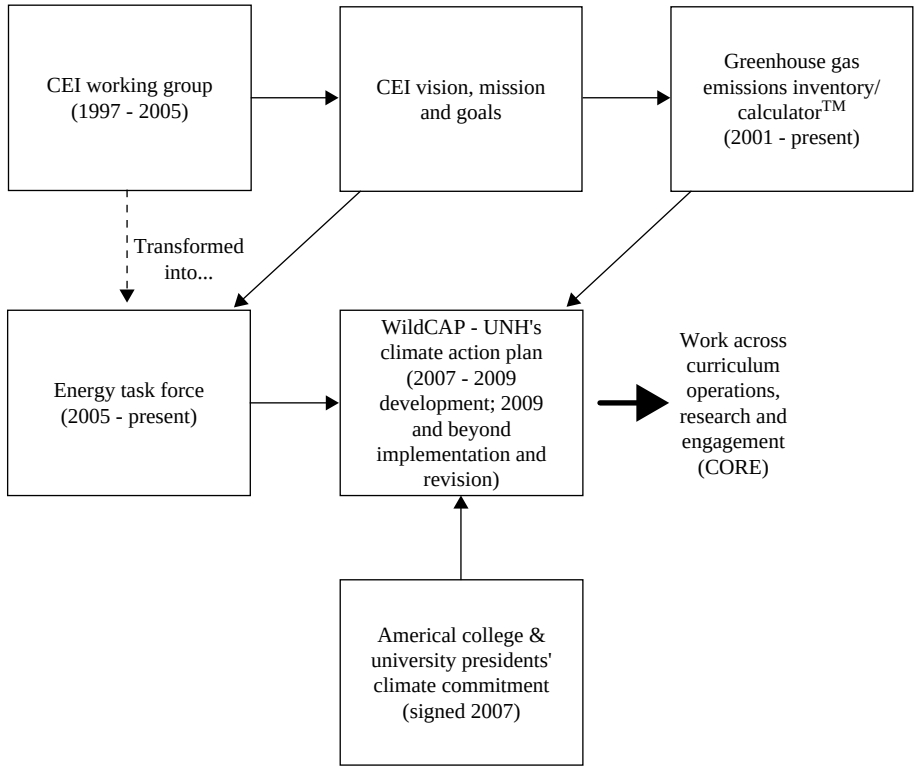

Figure 1.
Flow chart of planning 1997-2009 under the UNH's Climate Education Initiative

Partnership with Clean Air-Cool Planet

In the winter of 2000, UOS partnered with the New Hampshire-based non-profit Clean Air-Cool Planet – CA-CP (www.cleanair-coolplanet.org) to produce a GHG inventory tool that adapted national and international inventory methodologies to the unique scale and character of a university community. Combining financial and intellectual resources, the partners hired a UNH graduate student who developed the tool and gathered data with support from UNH faculty and staff. Using the inventory tool, UNH's GHG were documented back to 1990, and the first version of the GHG inventory was published in the spring of 2001 (www.sustainableunh.unh.edu/climate_ed/greenhouse_gas_inventory.html).

Following publication of the initial inventory, the partners continued to work together in order to package the inventory methodology into a generic tool that could be used by other campuses. By the fall of 2001, the "Clean Air-Cool Planet Campus Carbon Calculator" (www.cleanair-coolplanet.org/toolkit/) became available, and over the next 18 months was employed by nearly ten other Northeast campuses. UOS and CA-CP then hosted a series of technical meetings to continue to refine and simplify the calculator. As the calculator was adopted by more and more campuses over subsequent years, the revisions continued. Recently, the calculator is in its sixth version and has been utilized by more than 1,000 campuses.

UNH has continued to use the calculator to update its own GHG inventory, and since 2001 has published two more updates to its inventory in the summer of 2004 and fall of 2006 (UNH UOS, 2006, 2004). Both updates were conducted primarily by UNH graduate students working under the direction of UOS staff with support from faculty and staff. Each inventory update has been used as a baseline for assessing how the institution is doing in lowering its GHG campus-wide and then for planning revisions to existing initiatives or the development of new ones to continue to lower emissions as much as possible.

With the transformation of CEI's informal working group of faculty, staff and students into a formalized, vice president-chaired Energy Task Force (ETF) in 2005, and with UNH's subsequent signing of the ACUPCC in 2007 (www.unh.edu/news/cj_nr/2007/feb/bp15climate.cfm), it became increasingly important to maintain and update the inventory more frequently. Data are now reported to UOS at the end of each fiscal year, and the new inventory results published bi-annually. Longer, more detailed reports, similar to the first three versions of the UNH inventory, will continue to be published on a less frequent schedule. The first bi-annual report was completed, along with a comprehensive review of all historical data in the inventory, in the spring of 2008 (UNH UOS, 2008). Currently, the data for the 2007-2008 fiscal years are being collected.

CA-CP planning module

In September 2008, CA-CP launched version six of the Campus Carbon Calculator, designed to aid institutions not only with inventorying GHG but also with developing climate action plans. This latest release of the calculator includes – among other updates – a unique new planning and decision-support module that allows for the comparison of reduction measures by their cost and magnitude of emissions reduction. In this way, institutions can plan and prioritize new initiatives based on their emissions reduction per dollar spent.

Continuing the tradition of user-inspired development, this new module was modeled initially on the innovative climate planning work being done at the Universities of California Santa Barbara and Berkeley, Duke University, and Middlebury College. It was developed by graduate and undergraduate students from a number of institutions who were involved in carbon reduction efforts on their own campuses, and vetted with copious input from key partners, including UNH.

The new planning and decision support module asks users to input school-specific project data for potential carbon reduction initiatives, including potential funding mechanisms, the discount rates for said funding mechanisms, project time frames, and changes in activity data (e.g. kilowatt hours or gallons used). Using this input, the new version of the Campus Carbon Calculator displays emissions reductions per dollar spent, clearly prioritizing certain reduction measures – those with a low cost and large reduction. While highlighting measures by cost-effectiveness, the new tool does not aim to present such measures as the final word in climate action planning, but rather as the beginning of a community discussion. Aside from cost, decision makers must consider the extent to which measures meet larger educational goals, are visible and engaging to the broad community, lessen negative impacts (if any) to the surrounding region, and make a contribution to the global shift toward clean technologies.

With the release of the new tool, CA-CP aims to enhance collaboration among all members of the campus community by enabling them to speak a "common language." The best climate action plans are created when:

- students and administrators are equipped to speak with staff, particularly in sustainability or facilities offices, about the feasibility of certain reduction measures they may wish to advocate or implement;
- when faculty and students can effectively identify important academic opportunities to collaborate on these questions; and
- when administrators and staff have user-friendly tools to meet their requirements for compliance with sustainability commitments the school has made, such as the ACUPCC.

The goal is to reduce the financial burden of outsourcing the creation of a climate action plan to consultants, by helping a school realize its commitments to sustainability in the most fiscally sound manner possible while also facilitating and supporting an open, inclusive learning process for the creation of institutional carbon management plans – such as the one UNH has embarked upon in its own climate action planning.

Energy Task Force

Chaired by the UNH Vice President for Research and coordinated by UOS and the UNH Energy Office, the UNH ETF is the formalized version of the former CEI Working Group. Initially developed in 2005 by then – UNH president to develop new ways to reduce energy consumption in response to fast-rising energy prices, the mission of the ETF soon broadened to serve in an advisory capacity to the UNH president and cabinet by making recommendations on the full range of issues that relate to climate and energy (Huddleston, 2007a; UNH Media Relations, 2005). These issues include everything from energy generation, demand management, efficiency, and conservation, to GHG mitigation policy and action, participation in energy and carbon markets, and curriculum, research, and

outreach opportunities related to climate and energy. The overarching goal of the ETF is to guide the university toward a systemic and integrated energy policy that emphasizes health and integrity, climate protection, efficiency, cost-effectiveness and stability, fairness for all university constituents, and consistency with priorities set by the UNH Academic Plan and UNH Campus Master Plan (www.unh.edu/etf).

The ETF's role in advising the campus administration on climate and energy issues took on even greater prominence when UNH became the first land grant university in New England to sign the ACUPCC in February 2007, and become a member of the leadership circle of ACUPCC signers. The ETF is charged with taking the actions necessary to implement the ACUPCC, including:

- Developing timelines, targets, and action items under a UNH Climate Action Plan (called "WildCAP") to help move UNH towards carbon neutrality.
- Developing immediate and future actions to reduce energy costs, lower GHG, and improve energy conservation through technological improvements, increases in efficiency, reductions in waste, and selection of fuels.
- Inventorying and promoting curricular, research, and engagement programs intended to increase awareness of and behaviors around energy use, efficiency, GHG, climate change, and sustainability.

To date, the ETF has been successful in meeting its charge for a number of interconnected reasons (Cleaves, 2009; Cleaves and Holt-Shannon, 2009):

- *Cross-campus membership.* Administrators, faculty, staff and undergraduate and graduate students sit on the ETF. Such a wide range of members allows the ETF to develop interdisciplinary, collaborative, and innovative projects that integrate curricula, operations, research and engagement around climate and energy. It also ensures that all stakeholder groups at UNH have a voice.
- *Leadership at the top.* The ETF is chaired by the Vice President for Research, and was officially chartered in 2007 by the UNH president. This gives the ETF formal credibility. Members know that their ideas and work are being heard and taken seriously by the campus administration, and good ideas are finding their way "up the ladder" to supportive administrators. What is more, this leadership at the top helps those policies and practices the ETF develops and the administration endorses have "teeth" and staying power.
- *Ownership at all levels.* Though chaired by a vice president, the day-to-day work and dynamics of the ETF are purposefully collaborative. Every member of the ETF, from the Vice President of Research to the undergraduate student representatives, has a voice.
- *Vision that unites.* Behind everything the ETF does, from educational campaigns at saving energy in offices and dorm rooms to recommending changes in UNH building standards or purchasing guidelines, lies a motivation to act now in addressing climate change. Members are united in the common goal of continuing to make UNH a sustainable learning community that not only reduces its emissions but also educates the next generation of citizen-professionals to advance climate protection in their lives when they leave campus. It is a mission that inspires and, no pun intended, fuels the enthusiastic work of the ETF.

WildCAP – UNH's climate action plan

Process

Through the ETF, UNH is developing a climate action plan called "WildCAP" – named after the university's wildcat mascot – to reduce UNH's GHG. The plan will be developed and in place by November 2009 (www.sustainableunh.unh.edu/climate_ed/projects.html#wildcap). The goals are to:

- maximize emissions reductions as soon as possible to reduce climate impacts;
- maximize cost savings through reduced energy consumption;
- develop a plan with broad-based support across the UNH community to ensure smooth implementation, willingness to invest in energy saving projects, and participation in energy-saving behavioral changes;
- maintain UNH's leadership position in campus climate action;
- develop opportunities to highlight UNH climate action to internal and external stakeholders and funders; and
- integrate operational and behavior savings efforts with existing or new curricula and research where possible.

The proposed process UNH is following to develop WildCAP has two broad phases.

Analysis phase. During the analysis phase of WildCAP's development, which began in winter 2008, the ETF discussed and agreed upon recommended long-term emissions reduction targets, an associated timeline for meeting these targets, and a database of emissions reduction projects (listing initial capital costs, emission reduction potential, energy savings, and cost savings) for the UNH president and cabinet to consider. Working groups led by ETF members were formed to focus on estimating emissions reductions and costs associated with projects in several key areas that were chosen based on the results of previous versions of the GHG inventory. For example, after UNH's landfill gas pipeline (called EcoLine™) comes online in early 2009 to fuel the on-campus cogeneration heat and power plant, heating/cooling/electricity production will no longer be the largest contributor of emissions on campus. Working groups instead focused their attention on estimating the emissions reduction potentials and costs associated with projects in other larger areas of emissions – namely buildings, transportation, and behavior.

The working groups included:

- *Building working group*. This group is focusing primarily on capital improvements to structures and equipment in campus buildings that would improve efficiency or minimize the use of carbon-intense energy sources.
- *Transportation working group*. This group is focusing on equipment and policies designed to minimize emissions due to operation of the university fleet, commuter vehicles, and university sponsored air travel.
- *Behaviors working group*. This group is focusing on policies and educational efforts to encourage efficiency and conservation behaviors by members of the university community.

While the areas of focus of the working groups overlapped, they were useful in ensuring that as many possible emission reduction strategies were considered as

was feasible. New groups, such as communications and fundraising working groups, will be added during the second phase of WildCAP's development and during its implementation as the emissions profile of the university changes over time.

The ETF member leading each working group worked with other staff on campus to gather data related to energy use and costs of as many potential projects related to the focus of their group as possible. Data were entered into the new planning module of the CA-CP Campus Carbon Calculator so that projects could be evaluated on the basis of the amount of carbon reduced, the cost of implementation, and the cost benefits. While final project decisions will be driven in large measure by emissions avoided or reduced, costs of each project, and ease of implementation, the educational mission of the university will always be taken into account.

While the working groups were gathering initial data, the full ETF developed recommended campus-wide targets and a timeline for emissions reductions that are consistent with national and international calls for reductions in GHG (Hansen *et al.*, 2008). The requirements of the ACUPCC state that UNH's climate action plan must include a date by which UNH will become carbon neutral, as well as interim targets in the process of meeting that date.

To build internal ownership, institutional commitment, and stakeholder input into WildCAP, in the fall of 2008 the ETF hosted a summit for key administrators to review the initial findings of the working groups in the context of the ETF's recommended targets and timeline. A list of projects necessary to meet the proposed targets, prioritized by cost, was discussed with the administrators. The particular goals of the summit were to work with key decision makers to identify strategies for further study and to develop consensus on proposed emissions targets and timelines.

Collaboration phase. In the second phase of WildCAP's development, which extends from November 2008 through September 2009, ETF members will be presenting and discussing the targets, timelines, and potential emissions reduction projects with the broader UNH community in order to refine estimates, familiarize all levels of faculty, staff, and students with what would be required of them to ensure successful implementation of the plan, and gather from them their ideas and suggestions for emissions reduction strategies – either elaborations of strategies already listed in the plan or new strategies. Along with hosting a number of open meetings, feedback will be solicited through groups such as the faculty senate, student senate, three staff councils, graduate student organization, and other individual operating units, departments, or organizations. The goals of these outreach efforts are to solicit new ideas for projects, identify areas where the initial estimates for projects need to refined, build support necessary for successful implementation of the final plan, and ensure that all campus stakeholders have a voice in WildCAP's development.

Simultaneously with these outreach efforts, key decision makers in each of the working groups will be further analyzing the initial data presented by them to the ETF and working with staff members in their operating units to verify and refine the estimates in each of the projects of interest identified during the administrator's summit. During this process, assumptions related to costs or energy reductions of proposed projects will be reviewed by the staff members who will be responsible for their eventual implementation in order to provide expert review in each area.

Making use of feedback garnered from the outreach sessions and detailed analyses by the working groups, the ETF will assemble a complete WildCAP and offer it to UNH's

president and his cabinet for their review and approval in advance of the ACUPCC's deadline of September 15, 2009. WildCAP will then be reported to the ACUPCC following any guidelines they require, made available to the public on the web site of the Association for the Advancement of Sustainability in Higher Education (AASHE), and published in a form useful for dissemination to UNH stakeholders (Figure 2).

Involving students

UNH students have played an active role in UNH's emissions reduction efforts. Graduate students were often hired to track UNH's emissions and to work with CA-CP to develop and refine the GHG inventory tool, and student representatives participate in the ETF. In addition, the general education course Earth Sciences 405 "Global environmental change" has engaged undergraduate students in developing and quantifying strategies to reduce the university's GHG (Wake, 2009). This form of the class has been taught since 1997, with an average enrollment of 80 undergraduate students.

The main goals of the "Global environmental change" class are to help students understand key components, interactions, and concepts that characterize the earth system; describe and evaluate the relative importance of various natural processes and anthropogenic activities that shape the modern Earth and lead to global environmental change; and develop their scientific analysis, peer-to-peer collaboration, and communication skills. Students also spend the final third of the course taking what they have learned about global environmental change and applying their knowledge to reducing GHG at UNH.

Students are split into groups and assigned to learn from and then role play an important campus decision-maker, specifically, UNH president, provost, VP finance, VP research/chair ETF, energy manager, campus planner, campus transportation planner, and housing representative. Students must interview their role models, develop facts each would bring to Table I when negotiating strategies for the university to reduce emissions, and write a briefing paper that articulates the basic background facts and negotiating position for their role model. The briefing paper then becomes the grounding reference for the mock negotiation. In addition to the students that represent UNH role models, a group of six to eight students are selected to serve as facilitators and are tutored by staff from the UOS.

Six to eight negotiations occur simultaneously; each negotiating table consists of one member from each of the role model student groups and is lead by one facilitator. Each negotiating table must develop an agreement to reduce overall university GHG by an assigned amount (e.g. 3 per cent per year reductions below current emission levels).

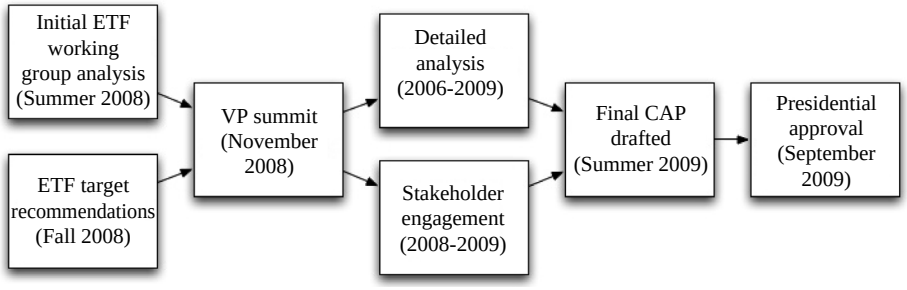

Figure 2.
Flow chart of planning 2008-2009 development of the UNH's climate action plan-WildCAP

Planning tool	Description	Dates used
Campus Carbon Calculator	Adapts national and international GHG emissions inventory methodologies to the unique scale and character of a university community Now used by over 1,000 campuses, including UNH, and maintained and supported by CA-CP, to monitor GHG in order to track how well enacted strategies reduce emissions and then to plan new strategies to reduce remaining emissions Latest release of the Calculator (version 6, released in September 2008) includes a unique planning and decision-support module that allows for the comparison of emissions reduction measures by their cost and magnitude of reduction UNH is using this new planning module to list in its under-development climate action plan prioritized strategies for how the university will work towards carbon neutrality (i.e. reduce net emissions to zero) after its novel landfill gas methane pipeline comes online in early 2009 to fuel its on-campus cogeneration heat and power plant	2001-today
American College & University Presidents' Climate Commitment (ACUPCC)	UNH signed the ACUPCC in February 2007, and it has become the plan that guides the recommendations the ETF makes to the university administration on how UNH can move towards carbon neutrality In November 2007, UNH agreed to include the following actions in its climate action plan (which begins November 2009): ensuring that all new construction and major renovation on campus is LEED-Silver or equivalent; participating in EPA's RecycleMania waste minimization competition; instituting a campus-wide energy efficient purchasing policy; advancing public transportation and other transportation demand management strategies; and meeting a majority of on-campus electricity needs with renewable energy	2007-today
Energy Task Force (ETF)	Under UNH's Climate Education Initiative, this campus-wide task force of faculty, staff and students plans, helps implement, and monitors how UNH is meeting its ACUPCC obligations On a regular basis, the ETF recommends to the UNH president and cabinet how the university can continue to reduce GHG and energy use and to improve and expand curriculum, research, and engagement with the broader community on climate and energy The ETF plans action steps on issues like energy generation, demand management, efficiency and conservation, GHG mitigation policy and action, participation in energy and carbon markets, and curriculum, research, and outreach opportunities related to climate and energy	2005-today

(*continued*)

Table I.
Planning done under the University of New Hampshire's climate education initiative

Planning tool	Description	Dates used
WildCAP – UNH's Climate Action Plan	The ETF is working from November 2007 – September 2009 to engage the campus community in developing a climate action plan for UNH (called "WildCAP") WildCAP will include timelines, targets, and action items to move the university towards carbon neutrality. Its targets and timelines will be met through immediate and future actions the ETF will outline in the plan to reduce energy costs, lower GHG, and improve energy conservation through technological improvements, increases in efficiency, reductions in waste, and selection of fuels WildCAP will also include an inventory of curricular, research, and engagement programs (current and proposed) that increase awareness of and behaviors around energy use, efficiency, GHG, and climate change	In development to be finalized in September 2009

Table I.

This negotiation relies heavily on the UNH GHG inventory. All of the negotiations are constrained by two factors: carbon emissions and cost. Every strategy proposed and negotiated by the students requires analysis to estimate the carbon reductions as well as the cost (or savings) to implement.

Once the negotiations are completed and each negotiation table has reached an agreement, the main strategies from each agreement are presented to the entire class on the last day of classes. However, the agreements do not languish. After the class is completed, the facilitators are then asked to synthesize the results from all of the agreements and present the findings to the ETF. In this way, the student work is not theoretical. It informs actions on a variety of levels at the university and provides a strong student perspective in a discussion that could easily exclude them.

A facilitator from the fall 2007 "Global environmental change" course not only presented the entire course's emissions reduction strategies to the ETF but also took on the challenge of working with UOS and the ETF to further verify the costs and emissions reduction potential of strategies recommended by several year's worth of "Global environmental change" students. After winning a UNH Undergraduate Research Conference Award for the poster on her research, this student is continuing her work during the 2008-2009 academic year to help with WildCAP's development (www.unh.edu/urc/2008/presentations/poster_lehr.pdf).

Challenges

Like many institutions, UNH has faced – and continues to face – a number of challenges in its work to be a climate protection campus. While some of the challenges below are ongoing, the good news is that sustainability is embraced by the UNH administration and a growing number of faculty, staff and students on campus, ensuring that the motivation to turn challenges into opportunities continues to expand:

- *Limited time and resources.* UNH continues to struggle with a lack of resources for new faculty, staff and projects. Current faculty and staff do their best to prioritize climate planning within their already filled workloads. However, as sustainability is a top priority of the university administration – and as

communication to the campus community around this commitment has improved – more faculty and staff are encouraged on their own or by their administrators, deans and supervisors to participate in groups like the ETF, become involved in climate planning analysis and related research, and assist with the development and implementation of WildCAP.

- *Competing priorities.* While UNH has prioritized energy conservation and efficiency very strongly over the last 35-plus years, when budgets and staff time are tight these efforts can be lowered on the priority list or pushed aside completely. However, a wide body of climate research indicates that we must act over the next decade to stabilize and then lower our GHG if we are to avert the worse consequences of climate change. What is more, sustainability in higher education more broadly has become a highly competitive issue, and institutions not only are competing for related fundraising, faculty and staff recruitment, and media attention, but also under more scrutiny to demonstrate climate and energy leadership. Both the scientific research at UNH and the larger sustainability trends of which UNH is a part have helped to buffer climate planning somewhat from being "bumped" by other priorities.
- *Silos and boundaries.* While sustainability at UNH is campus-wide and not the purview of only the UOS, the Department of Energy and Campus Development, or academic and research programs on campus like the Institute for the Study of Earth, Oceans and Space, some faculty and staff still face hurdles when trying to become more involved in climate and energy. For example, the operations of facilities on campus is separate from campus planning, including in energy; the staffs working in these areas have different middle managers, job descriptions and budgetary structures. As a result, some staff may have supportive managers while others may not. In addition, faculty with supportive deans or directors can more easily engage in interdisciplinary teaching, research and on-campus committee participation and service than those whose leadership tends to stay focused solely on the disciplines located within the confines of their particular college, institute and department. There is still a mindset on campus that climate and energy are the purview of the sciences, engineering, and political science, or are to be handled only by staff with the words "energy" or "sustainability" in their department's name. As a result, ensuring full campus-wide membership on the ETF has proven to be challenging. This mindset is changing, however, through the leadership and active involvement of a key group of faculty and staff on the ETF, and through the relationship building being done by the UOS. In addition, over the course of the 2008-2009 academic year UNH has been undergoing a strategic planning process to envision where the university should go in the next five to ten years. The inclusive nature of this strategic planning process, along with the very visible support of top UNH administrators for this process, ensures that more of the campus community will hear about and become actively involved in sustainability on campus, including climate planning.
- *Lack of in-house expertise.* While UNH has grown its in-house faculty and staff expertise in emissions policies and reporting, energy technology, and the like, early on the university faced a lack of such expertise to track its GHG and to start climate planning analysis. CA-CP, which works with hundreds of higher

education institutions who use the Campus Carbon Calculator, reports that institutions often feel that they do not have the in-house capacity to undertake a GHG inventory or climate plan, and a common initial response is to assume they will need to rely on consultants to complete these analyses. However, as a public university committed to educating students to advance sustainability in their civic and professional lives, UNH involves undergraduate and graduate students in this work to not only assist faculty and staff but also to provide the students with invaluable hands-on learning opportunities. Making this curriculum-operations link is crucial both in helping students understand our climate system and what we can do to protect it and in getting climate planning work done on campus. In addition, as a land-grant, sea-grant and space-grant institution, UNH collaborates often with external partners like CA-CP and AASHE on a wide variety of sustainability initiatives and projects. Such collaboration ensures that projects have the expertise, resources, and stakeholder involvement they need to succeed.

Conclusion and next steps

After the completion of the analysis and collaboration phases of WildCAP in September 2009, on-going efforts will be made through the ETF to facilitate implementation and budgeting for projects associated with the plan. GHG emissions will be tracked in relation to established targets, and refinements to the plan and proposed projects made as needed, to ensure successful achievement of targets. In addition, new curriculum, research, and engagement efforts will be developed to ensure that as UNH is lowering its emissions to carbon neutrality it is also teaching, researching, and sharing climate and energy knowledge with the campus community and beyond.

The success of UNH's CEI in engaging the campus community in climate and energy should be replicated in the other initiatives in biodiversity, food, and culture with task forces similar to the ETF and an overall Sustainability Executive Committee that will collate the monitoring, reporting and recommendations of all the task forces into overall strategic sustainability planning and recommendations for the UNH administration. The goal is not only to ensure that in each initiative UNH is integrating sustainability in curriculum, operations, research and engagement, but also that each initiative integrates with the others (i.e. synergistic food and climate projects, for example) and that the university is linking across this CORE as much as possible (i.e. faculty and student research tied to campus operations). The ongoing planning, inventorying of emissions, and collaboration under CEI will stand as a model for and be integrated with planning, inventorying, and collaboration in biodiversity, food and culture, ensuring a comprehensive and holistic approach to sustainability that weaves through the entire fabric of the university.

Institutions of higher education – especially public institutions with land-grant, sea-grant, and space-grant missions like UNH – can have no greater mission than helping their graduates, employees, and surrounding communities advance sustainability at home, at work, and abroad. UNH's commitment to being a climate protection campus, and in particular its climate action planning, are crucial to this broader commitment to sustainability and its educational mission. As UNH's President, Huddleston (2007b), said at CA-CP's "Global Warming and Energy Solutions 2007" Conference:

Our mission as a university goes beyond greening the campus. Today's students are the inheritors of the world's climate change crisis, and it is incumbent upon us to help them find solutions. It is imperative that what they learn here and now empowers them to advance a clean, secure energy future. As an educational institution, UNH provides a forum in which students are free to shape their perspectives on everything, and that certainly includes learning how to live sustainably as individuals and community members (Huddleston, 2007a).

References

Aber, J., Kelly, T. and Mallory, B. (Eds) (2009), *The Sustainable Learning Community: One University's Journey to the Future*, University Press of New England, Hanover, NH (in press).

Andrews, J., Hough, I., Kowalski, J. and Pasinella, B. (2008), "Developing a climate action plan with the campus carbon calculator", paper presented at the AASHE 2008: Working Together for Sustainability – On Campus and Beyond: Association for the Advancement of Sustainability in Higher Education, Raleigh, NC, November.

APPA (2007) *Energy Benchmarking Study and Evaluation University and College Campus Energy Consumption Profiles Phase* 1 *Summary Report*, prepared for the University of New Hampshire, March.

Blanchet, K.D. (2008), "Sustainability program profile: the University of New Hampshire's University Office of Sustainability", *Sustainability: The Journal of Record*, Vol. 1 No. 2, pp. 114-8.

Cleaves, S. (2009), "The energy task force: a cross-campus collaboration to address climate change", in Aber, J., Kelly, T. and Mallory, B. (Eds), *The Sustainable Learning Community: One University's Journey to the Future*, University Press of New England, Hanover, NH (in press).

Cleaves, S. and Holt-Shannon, M. (2009), "The energy waste watch challenge and student energy captains", in Aber, J., Kelly, T. and Mallory, B. (Eds), *The Sustainable Learning Community: One University's Journey to the Future*, University Press of New England, Hanover, NH (in press).

Goral, T. (2007), "Transportation trends: institutions of higher education (IHEs) take the lead in reducing auto pollution and vehicle overpopulation", *University Business*, available at: www.universitybusiness.com/viewarticle.aspx?articleid=703&p=1#0 (accessed March).

Hansen, J., Sato, M., Kharacha, P., Beerling, D., Berner, R., Masson-Delmotte, V., Pagani, M., Raymo, M., Ryoyer, D.L. and Zachos, J.C. (2008), "Target atmospheric CO2: where should humanity aim?", *Open Atmospheric Science Journal*, Vol. 2, pp. 217-31.

Huddleston, M. (2007a), "Letter of endorsement of the mission and charter of the UNH Energy Task Force", *UNH Energy Task Force*, September, available at: www.unh.edu/etf/HuddlestonEndorsementETF2007.pdf (accessed December 2008).

Huddleston, M. (2007b), "Success through emissions reductions: past, present, and future", paper presented at the Clean Air-Cool Planet Conference on Global Warming and Energy Solutions 2007, October, from UNH Office of the President, Durham, NH, available at: http://unh.edu/president/markhuddleston/speeches/cleanair1007.htm (accessed November 18, 2008).

Kelly, T. (2003), "Building a sustainable learning community at the University of New Hampshire", *Association of University Leaders for a Sustainable Future*, Vol. 6 No. 2, available at: www.ulsf.org/pub_declaration_othvol62.htm

Kelly, T. (2008), "Higher education & sustainability: universities can have no greater mission than this", UNH UOS, Durham, NH, April, available at: www.sustainableunh.unh.edu/highereducation.html (accessed November 18, 2008).

Kelly, T. (2009), "Sustainability as an organizing principle for higher education", in Aber, J., Kelly, T. and Mallory, B. (Eds), *The Sustainable Learning Community: One University's Journey to the Future*, University Press of New England, Hanover, NH (in press).

MacDonald, M. (2000), "Higher education energy performance indicators 1997-98", APPA/Rebuild America Strategic Partnership, US Department of Energy Oak Ridge National Laboratory, and the Association of Higher Education Facilities Officers, Portland, OR, available at: http://eber.ed.ornl.gov/commercialproducts/CCAS9798.htm (accessed August).

Pasinella, B. (2009), "UNH greenhouse gas inventory", in Aber, J., Kelly, T. and Mallory, B. (Eds), *The Sustainable Learning Community: One University's Journey to the Future*, University Press of New England, Hanover, NH (in press).

UNH Media Relations (2005), *In the Wake of a National Energy Crisis, UNH Task Force will Explore Measures to Reduce Energy Consumption and Costs*, UNH Media Relations, Durham, NH, available at: http://unhinfo.unh.edu/news/news_releases/2005/november/kb_051102energy.html (accessed November).

UNH UOS (2004), *1990-2003 Greenhouse Gas Emissions Inventory*, available at: www.sustainableunh.unh.edu/climate_ed/greenhouse-gas-invnt/1990-2003_UNH_GHG_Report.pdf

UNH UOS (2006), *2004-2005 Greenhouse Gas Emissions Inventory Update*, available at: www.sustainableunh.unh.edu/climate_ed/greenhouse-gas-invnt/UNH2004200GHGEInventoryUpdateFinal.pdf

UNH UOS (2008), *2006-2007 Greenhouse Gas Emissions Inventory Update*, available at: www.sustainableunh.unh.edu/climate_ed/greenhouse-gas-invnt/unhghgreportFY0607.pdf

US Environmental Protection Agency and US Department of Transportation (2008), *List of Best Workplaces for Commuter's by State*, available at: www.bestworkplaces.org/pdf/BWC-Employer-A-to-Z.pdf (accessed December 2008).

Wake, C. (2009), "Case study 1: ESCI 405 – global environmental change", in Aber, J., Kelly, T. and Mallory, B. (Eds), *The Sustainable Learning Community: One University's Journey to the Future*, University Press of New England, Hanover, NH (in press).

Wolff, C.W. (2008), "A matter of common sense", *UNH Magazine*, Spring.

Further reading

CA-CP Climate Action Toolkit (n.d.), available at: www.cleanair-coolplanet.org/toolkit/

Griffo, P. (2008), *10 Transit Agencies Recognized by FTA for Creatively Boosting Ridership*, US Department of Transportation Federal Transit Administration, Washington, DC, available at: www.fta.dot.gov/news/news_events_7939.html (accessed March 11).

Mindrum, B. (2008), "Beyond the Buzz: higher education leader offers insight into sustainability", *ACUI Bulletin*, Interview with Tom Kelly, UNH's Chief Sustainability Officer, Association of College Unions International, July, available at: www.acui.org/publications/bulletin/article.aspx?issue=702&id=7456

UNH CEI (n.d.), available at: www.sustainableunh.unh.edu/climate_ed/index.html

UNH ETF (n.d.), available at: www.unh.edu/etf

UNH Greenhouse Gas Inventory (n.d.), available at: www.sustainableunh.unh.edu/climate_ed/greenhouse_ gas_inventory.html

UNH UOS (n.d.), available at: www.sustainableunh.unh.edu

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1. K. Ceulemans, I. Molderez, L. Van Liedekerke. 2015. Sustainability reporting in higher education: a comprehensive review of the recent literature and paths for further research. *Journal of Cleaner Production* **106**, 127-143. [CrossRef]
2. Tom Murphy Graduate School of Management, Clark University, Worchester, Massachusetts, USA Will O'Brien Graduate School of Management, Clark University, Worchester, Massachusetts, USA . 2014. A strategic decision model for evaluating college and university sustainability investments. *Management Research Review* **37**:1, 2-18. [Abstract] [Full Text] [PDF]
3. Cynthia Klein-Banai, Thomas L. Theis. 2013. Quantitative analysis of factors affecting greenhouse gas emissions at institutions of higher education. *Journal of Cleaner Production* **48**, 29-38. [CrossRef]
4. Matthew ThurstonRecreational Equipment Inc., Kent, Washington, USA Matthew J. EckelmanDepartment of Chemical and Environmental Engineering, Center for Industrial Ecology, Yale University, New Haven, Connecticut, USA. 2011. Assessing greenhouse gas emissions from university purchases. *International Journal of Sustainability in Higher Education* **12**:3, 225-235. [Abstract] [Full Text] [PDF]
5. Alison AthertonInstitute for Sustainable Futures, University of Technology, Sydney, Australia Damien GiurcoInstitute for Sustainable Futures, University of Technology, Sydney, Australia. 2011. Campus sustainability: climate change, transport and paper reduction. *International Journal of Sustainability in Higher Education* **12**:3, 269-279. [Abstract] [Full Text] [PDF]
6. Alan H. McGowan. 2011. Energy and sustainability: an undergraduate course. *Journal of Environmental Studies and Sciences* **1**:1, 88-92. [CrossRef]
7. Richard EmanuelDepartment of Communication, Alabama State University, Montgomery, Alabama, USA J.N. AdamsDepartment of English, Tuskegee University, Tuskegee, Alabama, USA. 2011. College students' perceptions of campus sustainability. *International Journal of Sustainability in Higher Education* **12**:1, 79-92. [Abstract] [Full Text] [PDF]