Charting the Future of Applied Energy Efficiency Instruction: Community – University Sustainability Partnerships

Stephen Miller, Cyane Dandridge and Candis Mary-Dauphin, Strategic Energy Innovations
Matthew St. Clair, University of California Office of the President

ABSTRACT

As budgets continue to shrink, institutions of higher education face the pressing challenge of creatively partnering to leverage complementary resources. Moreover, the emergence of the green economy is forcing campuses to turn a critical eye toward how they are addressing interdisciplinary education and applied learning. One approach that a number of campuses are pursuing is to enter into a formalized partnership with a nearby municipality. In so doing, the local community serves as an active partner, more than just a living laboratory, bringing forth critical interests and resources that support faculty and students working on real-world energy efficiency policies, projects and programs.

This paper will include a review of noteworthy models for connecting colleges and universities with their local communities through the climate and energy lens, focusing on a particular approach, namely: Community-University Sustainability Partnerships (CUSP). Through CUSP, faculty and students from a variety of disciplines converge to work alongside municipal staff as they address a community's climate and energy issues and projects. Students' participation on community projects tie their coursework and learning objectives to place-based application of classroom theory. The session facilitator will draw on these case studies to review unique aspects of these models, noteworthy challenges faced, lessons learned and suggestions for replicating this approach in new localities.

Doing More with Less – The Municipal Government Conundrum

Given the environmental challenges that society is currently facing, energy and environmental policy and supporting programs have become critically important, yet local governments are pressured to devote their limited staff and budgets to addressing essential services. Within California, state mandates require municipal governments not only maintain but accelerate progress to identify and pursue climate mitigation and adaptation targets, even in the face of staffing and budget shortfalls.

A California Sustainable Alliance local government survey reports: "Local governments tend to have unique local priorities and resource challenges, such that one size does not necessarily fit all" (California Sustainability Alliance 2009 p.iv). At the same time, local governments cannot tackle energy problems on their own. A International City Managers Association (ICMA) Report concluded that although "government is a role model for the broader community...The reality is that sustainability is a goal and is something you work toward. It is such a huge topic that it's easy to become overwhelmed. Willingness to build partnerships, both likely and unlikely, is crucial. Sustainability is too complex a challenge for local government to tackle alone" (ICMA 2010 p.iv). Communities on a path to energy sustainability need access to the latest information, resources, and talent, and also the flexibility to innovate their way towards solutions that fit their needs and capacities.

Local governments are increasingly facing competing interest, compelled by law and accompanying regulations, motivated by community interest and desire to take action on climate change, but challenged to respond due to limited resources, staff capacity and technical knowledge. Recently, federal stimulus funds, and utility funds have directed more resources towards climate mitigation efforts such as energy efficiency retrofits for homes, businesses, and government facilities. However, while funding in some regions for energy efficiency projects is likely to continue in some form, Federal stimulus funds are expiring and future Federal funding for these purposes is highly uncertain. Competition for future funding will be intense. Ironically, it is often the communities who have made the least progress on climate change (e.g. smaller and/or economically disadvantaged communities) because they lack dedicated and technically qualified staff, that continue to struggle to access and utilize what funding is available.

Talent Gap

A vast pool of local governments needs cost-effective technical support to implement energy programs. For example, 69% of 2,176 local governments responding to a 2010 International City Manager's Associate local government sustainability survey indicated that energy is a priority or high priority, but only 29% have dedicated staff to energy programs (ICMA 2010 p.1). Within such an operating environment, municipal access to high-quality customized information and research, technical know-how and capacity diminishes. Addressing this need is going to require development of a long-term career infrastructure to cultivate a generation of leaders. At the same time, a rapidly growing cadre of highly qualified, passionate people eager to tackle energy issues are finding limited opportunity to gain professional experience in the energy field. The Association for Environmental Studies and Sciences reports that over 10,000 students graduated from Environmental Studies/Science programs in 2003-08, and new programs are launching at a rapid pace (Vincent 2009 p.3). Although energy and related "green jobs" are projected to account as much as 10% of new job growth over the next 30 years, it is critical to align career opportunities with local need.

For a community to take action holistically to reduce its emissions, a large investment of upfront effort is required to successfully conduct greenhouse gas inventories, develop a comprehensive climate action plan, and set the plan into motion by implementing specific programs. Many communities are unable to take these steps without additional technical support. While some programs exist to provide discrete energy and climate protection support to municipalities, to date no one has coordinated these products into a robust, platform that connects communities struggling to respond to the climate challenge with able community members eager to gain experience in this field. Although volunteer support can be effective at addressing many community problems, with climate change, most local governments can only utilize such individuals in an ancillary or advisory capacity because local government staff themselves lack the technical capacity and time to define, manage and implement solutions. In such an environment, there is no guarantee that volunteers can effectively address critical climate change issues.

Rethinking the Curriculum – The Challenge for Higher Education

On the education and training side, institutions of higher learning are expanding their environmental and energy program offerings, but they still lag behind the growing demand to

prepare and produce experts to address our pressing climate and energy issues. Moreover, students graduating from energy and environmentally focused programs often lack real-world experience and application of the theory learned in the classroom. Students are increasingly aware of this skill gap, and try to backfill by integrating climate and energy policy internships and volunteer positions, but they find limited access to opportunities compared to those available for more traditional paths of study. Faculty have recognized this problem as well, but are oftentimes bound by the constraints of their department's curriculum requirements, or limited by their lack of on- and off-campus connections in this relatively new and highly interdisciplinary branch of study. Academic faculty often shy away from integrating sustainability into their courses because of their discomfort with interdisciplinary education, and their lack of the necessary knowledge and skills (Jones et al 2010 p.10-11). In order to meet the challenges of climate change and to develop and foster the next generation of climate thinkers and policy, colleges and universities must find a way to fill the applied knowledge gap that currently exists in energy and environmental policy education.

Synergy between Municipal Need and Campus Resources

Many local governments are open to and are actively seeking creative ways take action to address our current climate and energy crises that include accessing low-cost, high quality research, planning and implementation services. At the same time, university and college programs are looking to keep pace with the rapidly burgeoning field of climate adaptation and mitigation and related principles and policies. Course instructors are increasingly pursuing coveted green applied-learning opportunities for their students. In an environment where both municipal and university finances are shrinking, taking advantage of synergies (see Table 1) that each partner offers can result in mutual benefit.

Table 1. Campus and University Points of Synergy

	Municipal Profile	**University Profile**
Needs and Challenges	o Budget and staff cuts o Prioritization of services and resources	o Budget and staff cuts o Departmental boundaries
Goals and Objectives	o Targeted research and analysis o State and regional climate goals and mandates	o Student development and meaningful contribution o Inroads to interdisciplinary sustainability curriculum
Resources and Assets	o Long-term perspective on regional climate policy o Breadth of community partners and interested stakeholders	o Local, credible and cost effective o Strength of faculty and academic research and resources o Student availability, creativity and enthusiasm

Limitations to Campus and Municipal Climate and Energy Partnerships

California cities and counties have a long tradition of partnering with local colleges and universities to support discrete projects and initiatives. Oftentimes, the campus relationship is between a particular professor and municipal staff member, thus limiting the nature of the project

and student/class support. Furthermore, at the end of the semester, municipal staff can find themselves without continued support yet tasked to take student recommendations forward through to a proposed program, stakeholder review and adoption, planning and launch milestones. Staff members working within small to medium-sized municipalities report that this lack of continuity jeopardizes their ability to advance needed efforts in an efficient manner. Beyond this gap of academic cycles, there are additional, significant limitations to campus-municipal partnerships that need to be considered.

Breaking through Academic Silos. University professors are typically the resident experts in highly specialized fields. Academic departments consist of groups of specialized experts. In many institutions – especially those with a research focus – a professor's specialization is also their proprietary purview that is closely defended (Jones et al 2010). Teaching climate policy and mitigation requires reaching across these academic boundaries to educate students to the many diverse elements of the disciplines of sustainability.

Scoping Appropriate Student Roles in Light of their Profiles and the Academic Calendar. University students are capable of materially contributing to the evaluation and scoping of their community's climate and energy policy and supporting programs, but the extent to which this can be done successfully will vary given the profile of the student and the institution. While new energy policies and projects generally require highly professional technical assistance, they oftentimes comprise a substantial portion of data collection, synthesis and basic analysis, which can be ideal work for students with the requisite faculty/community partner oversight. These considerations must be reflected when developing the scope of the partnership.

Additionally, the academic calendar, the election cycle, and the jurisdiction's fiscal year do not perfectly align. This incongruity also needs to be considered when scoping student work on community greening efforts. Generally long-term projects with flexible stopping and re-engagement points are good candidates for such collaborations.

Failure to Institutionalize the Connections Across Faculty/ Staff and the Policy/Program Vetting Process. Making changes to the existing academic landscape is always administratively burdensome, but trying to do so when there are budgetary issues, as there currently are in the state of California's public high education system, is an even greater challenge. Various departments working collaboratively on a project, however, do not require the same degree of authorization as the creation of a new academic program. At the same time, such projects can be used to justify the need for the development of a more formalized academic program further down the line.

Harvesting the Opportunity for Campus, Community Partnerships

Through various pathways (internships, project-based learning, service learning, etc.) institutions of higher education are starting to embrace the student learning potential that their community presents in the sustainability (environment, climate and energy) realm. Campus departments and offices devoted to community engagement are being asked by students and community partners alike to add a focus on sustainability to their pairing efforts. The following vignettes offer some distinct models that evidence this trend. See Figure 1 for a visual representation of these models in terms of campus and municipal benefit.

Campuses with Local Government Climate Partnerships: University of California, Berkeley; University of Oregon; Consortium of Pittsburgh, PA Universities

The Cal in Local Government (CLG) program at UC Berkeley engages students in project-based internships with local government agencies in Berkeley and the East Bay region. Student internship projects encompass a variety of policy issues that are starting to include those dealing with climate and energy. The University of Oregon sponsors the Sustainable Cities Initiative (SCI), with its City Year Program where students and faculty from multiple academic departments assist a chosen partner city with its sustainability-related goals. The Pittsburgh Climate Initiative supports a consortium of area colleges and universities as students, faculty and staff work on addressing citywide energy and greenhouse gas emission reduction goals.

Joint Campus and Community Teams: The University of Minnesota's Regional Sustainable Development Partnerships

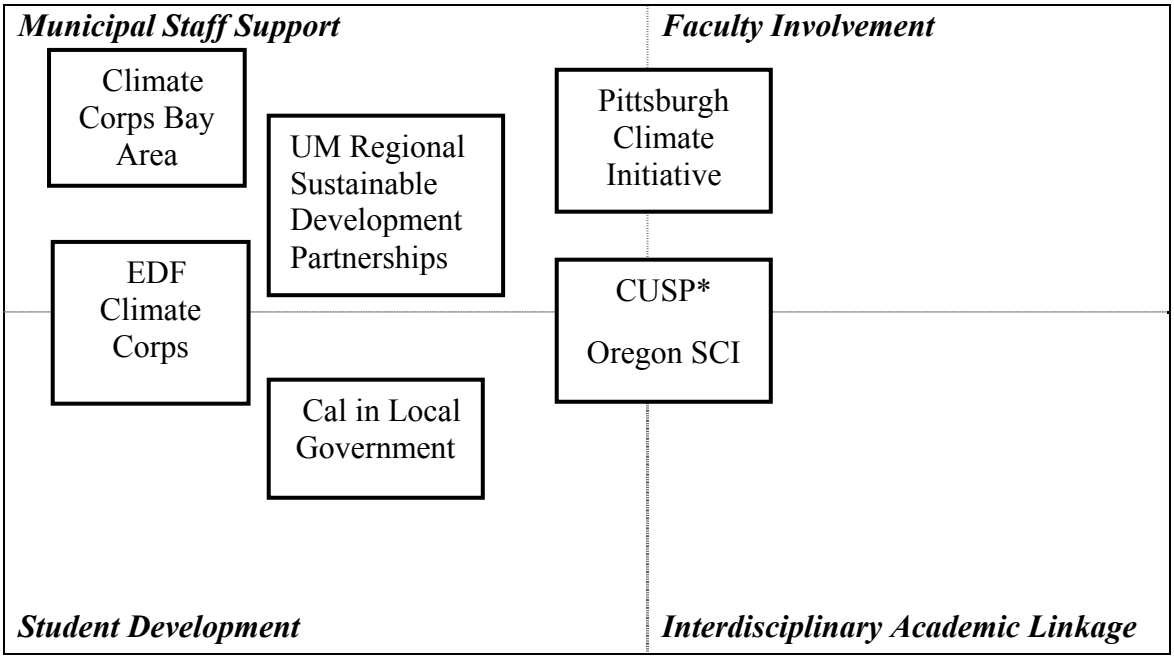
The University of Minnesota regional partnerships consist of seven regional boards made up of campus, governmental, and community stakeholders who identify local issues and solutions addressing items related to climate, energy and the environment. Agreed upon strategies are translated into projects to support targeted (primarily low-income) communities and which are guided by the regional boards. Citizens and university members work jointly on the implementation of selected projects in the areas of local foods and agriculture, natural resources, community vitality, tourism, and energy. One component of the UM Regional Sustainable Development Partnerships is the Clean Energy Resource Teams, or CERT. CERT projects have focused on the adoption of renewable and energy efficient technologies for residential, commercial and municipal applications.

Graduate Community Internships: Environmental Defense Fund Climate Corps; Climate Corps Bay Area

The EDF Climate Corps program is a highly competitive fellowship for MBA and MPA students. During a period of 10-12 weeks in the summer, graduate students are matched with public and private institutions, to develop recommendations on reducing energy use, and identifying the financial justification for doing so. Although this type of a program does not have an intentional connection to the student's curriculum, it is flexible, low-cost model that results in a valuable developmental experience for the student and high-quality deliverables for the community partner. Through Climate Corps Bay Area (CCBA), recent graduates take on a year of AmeriCorps service to advance climate protection while fostering their development as emerging sustainability professionals. CCBA places full-time AmeriCorps Members with local governments and community organizations to implement greenhouse gas emissions reduction projects and programs.

The following matrix attempts to compare on a relative basis these case studies across four key components of a successful pairing of municipal and academic partners: staff support, faculty involvement, student development, and interdisciplinary academic tie-in.

Figure 1. Comparison of Campus and Municipal Partnerships



** The CUSP model is profiled in the subsequent section*

CUSP as an Alternative Approach

Ongoing university support to municipalities for climate and energy policy and programs (through research and analysis, design and planning, etc.) more often than not requires an intentional process with a dedicated facilitator. Unlike the University of Oregon model, smaller to medium-sized campus and government partners do not typically have the staff capacity and experience to effectively forge the web of connections and engagement channels required to scope and shepherd collaborative projects over time. As previously mentioned, the sunset of federal Recovery Act funding places both the will and resources for municipal-level energy efficiency in peril. Within this general context, the pressure for municipal governments to effectively partner with credible local entities in order to pursue mandatory and voluntary energy programs is strong and becoming more compelling over time. Nearby institutions of higher education are ripe for filling this cost-effective technical and human resource need, but for their own staffing and cultural limitations. Moreover, students' work on critical energy programs often requires additional analysis and synthesis in order to make the deliverables meaningful and actionable by municipal staff and their stakeholders.

Community-University Sustainability Partnerships (CUSP) provides for an externally funded and intentional model designed to connect campuses with their nearby communities to advance green policies and programs. The CUSP process focuses on enabling the appropriate engagement pathways for students – with faculty oversight - to work on community-based green projects that link back to the curriculum. At the same time, the CUSP approach builds connections among academic faculty that cross divergent disciplines (e.g.: engineering; environmental science; public policy; business and finance, etc.) Through their participation in demanding, real-world consulting projects, students will be better prepared and trained to fill the ranks of the green, environmental workforce needed to address complex climate and energy

problems in the future. On the local government side, CUSP partnerships help move along energy efficiency and other energy and climate efforts at the jurisdictional level. In short, CUSP offers the intentional structure and support to forge enduring alliances between college and university staff seeking project-based learning opportunities for students, and their municipal counterparts in need of trusted, local, cost effective technical assistance.

An Externally Funded, Structured Process

Inherent in the CUSP approach, the following elements ensure for the successful development and launch of new campus and municipal sustainability collaborations:

- ***Identify An Able Coordinator:*** The designated community partner (e.g.: a nonprofit well versed in education and climate consulting,) secures the grant/ sponsorship to engage in the CUSP process and to serve as coordinating agent between campus and municipal entities, shepherding both through project scoping and implementation. This process includes project identification and planning; arranging for project launch meetings between municipal staff, faculty and students; ongoing project consulting; and supporting the students as they prepare for municipal stakeholder presentations.
- ***Develop an Inventory of Projects and Appropriate Student Scope:*** Critical to the up-front planning is the scoping of a broad range of municipal projects for the campus to address over time. Experience shows that, although the selected projects may require some degree of highly technical support, they oftentimes comprise a significant portion of data collection, synthesis and basic analysis, which can be ideal work for students, and which can be phased over time in terms of the profile of student profile and discipline area.
- ***Recruit and Engage Faculty:*** By making available educational stipends and curriculum 'innovation' workshops, faculty are more inclined to enroll their course into green community projects.
- ***Provide Students with Meaningful Work, Periodic Review and Milestones:*** Providing the structure to students is an essential piece to optimize their contribution. The Coordinator works in conjunction with faculty oversight to provide students with municipal project contextualization, periodic review and consulting to students' work, planning and preparation for student presentations back to their municipal stakeholders.
- ***Publicize Partners and Outcomes:*** Campus and municipal partners alike benefit from and appreciate recognition for their efforts. Publication of partnership projects and results through press releases, case studies, informational webinars and presentations at regional conferences are channels that the Coordinator might pursue. These channels offer a chance to spotlight the outcomes from partnership efforts, while ensuring wider access to the tools and resources for effectively engaging in similar projects in other geographies.
- ***Evaluate and Adjust:*** As with most programs, mid course and final evaluations are imperative for making mid-course adjustments and process improvements, while informing the planning for future joint projects.

Table 2 below depicts essential elements of the CUSP process overseen by the Coordinator:

Table 2. Overview of the CUSP Process

Form Partnerships	o Pair municipal need with academic partner capacity o Draft and finalize scope of services
Implement Projects	o Orient faculty/ students with municipal partner/ project goals and context o Conduct periodic check-ins, and student project consulting
Document and Present Outcomes	o Support students to synthesize collective outcomes and findings o Prepare students to present on their work and recommendations

Conclusion

Local governments and our communities at large are at a critical juncture in our collective response to climate and energy challenges. At the same time, colleges and universities grapple with how to best train and prepare students to address these issues and leverage the attendant career development opportunities. Students within 'green' disciplines are seeking out opportunities to apply their classroom learning to real world, local problems and issues Increasingly, it is becoming evident that cost-effective public-private partnerships are essential for driving meaningful progress towards energy and climate goals in the face of deepening economic realities. How our communities move forward to forge effective climate and energy public-private partnerships in the coming few years will help set our course for decades to come. The benefits from smart campus and community collaborations are plentiful and well established, yet largely untested in the sustainability arena, where interdisciplinary academic approaches to address community challenges and related policy are required. Such municipal and campus joint efforts in this realm dictate a web of connections and an intentional structure and process to organize and move all parties forward. While a handful of relatively well-resourced universities and their municipal partners have taken it on themselves to forge successful climate and energy connections, limited budgets, staff capacity and capabilities hinder most institutions from engaging likewise. For the majority of smaller to medium-sized communities and campuses, establishing effective partnerships around climate and energy issues, policies and projects requires an able, outside coordinator, supported by external funding, backed by an intentional and structured process.

References

California Sustainability Alliance. 2009. *Sustainability Programs, Strategies and Tools Used by California Local Governments*. Public Technology Institute.

[EPA] Environmental Protection Agency. 2011. *Energy Efficiency in Local Government Operations*. Washington D.C.: U.S. Environmental Protection Agency.

[ICMA] International City/County Management Association. 2010. *Local Government Sustainability Policies and Programs*. Washington D.C.: International City/County Management Association.

Okubo, Derek. 2010. "Local Governments and the Economics of Sustainability." *National Civic Review: Special Issue: The Civics of Sustainability*, Volume 99, (3): 45-53.

P. Hopkinson, P. Hughes, and G. Layer. 2008. "Sustainable Graduates: linking formal, informal and campus curricula to embed education for sustainable development in the student learning experience." *Environmental Education Research*, Volume 14, (4):435-454,

P. Jones, D. Shelby, and S. Sterling. 2010 "Sustainability education: perspectives and practice across higher education." *Earthscan*.

Joshua M. Pearce and Chris Russell. 2005. *Interdisciplinary Environmental Education: communication and applying energy efficiency for sustainability*, Applied Environmental Education & Communication 4: 65-72..

Vincent, Shirley. 2009. "Growth in Environmental Studies and Science Programs." *Association for Environmental Studies and Sciences* Volume 2, (2): 1-4.