Proposal to Sustainable CU small grant for Labs Conservation Manager contractor
October 2010

APPLICANT

The Energy Program in the CU Environmental Center in conjunction with the CU Office of Resource Conservation (in Facilities Management) is applying for a Sustainable CU small grant as part of a composite fund for contractor fees for a Laboratory Conservation Manager in the CU Laboratory Water and Energy Efficiency Program (LWEEP).

CONTACTS:
Susan Beckett
Energy Program Manager
Susan.Beckett@colorado.edu
303.492.3229

Moe Tabrizi
Resource Conservation Officer, Facilities Management
Moe.Tabrizi@colorado.edu
303.492.1425

DESCRIPTION OF PROJECT

The Need:

There are many challenges and opportunities to conserve energy and water in labs because they are not traditionally targeted for efficiency and conservation initiatives and education. Some of the challenges include educating a broad range of students, staff and faculty and working with the appropriate individuals on major equipment issues, such as equipment retirement, changes in way equipment is maintained and used, and replacing equipment with more efficient alternatives.. However, the extensive amount of resources (energy, water, steam) consumed by laboratories make them key targets for conservation. Buildings that house laboratories use five to seven times more energy than other buildings per square foot and have a lot of large energy-using equipment running 24/7.

There are many opportunities to reduce energy and water use in labs, but in order to do that, CU needs a dedicated coordinator, someone who is not only familiar with lab operations, equipment and the lab technician mindset (concerns, motives, decision-making processes, etc.), but also has a strong passion for making CU labs more sustainable. We are very fortunate to have found that unique combination of skills and passion in Kathy Ramirez.

Starting in summer 2006 the Energy Program and Office of Resource Conservation have managed Kathy Ramirez, a former CU lab manager and PhD. graduate. The LWEEP Manager was originally a 6-month temporary position that was initiated to investigate the feasibility, effectiveness and potential impact of a dedicated job title and set of responsibilities. In January 2010 Kathy signed on as a part time contract position.

During her 1.25-year tenure as Laboratory Conservation Manager, Kathy has laid much of the groundwork for continued success in making an impact on reducing energy and water usage in the labs where she has worked. With these funds the CU Environmental Center would extend her contract through the 2011 calendar year. Moe Tabrizi, CU Resource Conservation Officer in Facilities Management is in full support of this role and of this grant proposal.

Due to the great success in the past 1.25 years, we propose an additional outreach component to this program that would allow us learn best practices of other institutions and to share our successes with those schools that don't have a lab energy and water conservation program. The LWEEP program manager would supervise one part-time student employee that would contact other higher education institutions to learn what they have done and to share information about the CU LWEEP program and how it could fit in with their school.

The Benefits

Please see **Appendix A** for an accomplishment report and future plans for the Laboratory Conservation Manager role.

STUDENT INVOLVEMENT

The Laboratory Conservation Manager is recruiting and coordinating a team of Lab Eco Leaders who will be responsible for educating other lab users on energy and water efficiency actions and programs in each lab. The majority of the Eco Leaders are graduate students, some of who supervise undergraduate students. Their involvement is key to the success of the program as they are the ones that champion the efforts in the lab to conserve energy and other resources.

In the past year and a half, Kathy has found that many students are seeking support for their efforts to conserve resources in their lab. Originally Kathy needed to knock on doors of labs that weren't involved, but the word has started to spread about her efforts. She is now receives requests from labs that want to make their lab more sustainable.

DETAILED BUDGET and MATCHING FUNDS

The request is for $2,500, which will be matched with funds from Facilities Management and the Environmental Center Energy Program to complete the proposed contractor fee for 2011. The contractor will be paid $25.00/hour for 13 hours/week for a total of 640 hours in 2011, equaling $16,000 for calendar 2011.

Funding composite:

Colorado Carbon Fund Reinvestment fund	$2,500
Facilities Management match	$6,000
Fund balance request	$5,000
Sustainable CU grant	**$2,500**
Total	$16,000

FEASIBILITY

The roles and actions of the Labs Conservation Manager are already defined and underway, including fostering relationships with key individuals and "allies" with decision-makers. Please see Appendix A for more details on the demonstrated success and feasibility of this program to date.

STUDENT IMPACT

All students (more than several hundred) working in labs will be impacted by the conservation education and outreach that is part of the Laboratory Conservation Manager's responsibilities. Changes toward more sustainable behaviors are and will continue to be encouraged. For many of these students this outreach will be their first and/or only exposure to having their actions put into a sustainability context.

SUSTAINABILITY

The environmental impact of the role of Laboratory Conservation Manager will be reduced water and energy usage, with corresponding reductions in carbon emissions both on and off campus.

The economic impact will be long-term reductions in operating budgets from reduced and more efficient use of water and energy in lab spaces.

The social impact will be outreach to other higher education institutions to learn about their programs and inform them of our program.

INNOVATION

Although the potential for water and energy savings in academic research labs is great, few campuses (to our knowledge) have a job role dedicated to this target. Besides being innovative in this way, the Laboratory Conservation Manager will also be implementing innovative programs and practices in these labs. These are innovative, again, because they have not been implemented through such a focused effort and across such a broad audience.

Appendix A

Accomplishments and Future Projects for LWEEP Manager Position

Progress Report after 1.25 years as the LWEEP Manager

By Kathryn A. Ramirez-Aguilar, Ph.D.

Accomplishments and Ongoing Projects

- Ongoing energy savings on the order of an estimated 130,000 kWh/yr
- Indentified approximately 7 million gallons of water per year being used for single use cooling of scientific equip
- Fume hoods
    - Ongoing VAV fume hood "Just Shut It" campaign for 84 hoods focusing on sash closing for energy savings
    - 4 CAV hoods on single fans being turned off when not in use and one more to come
    - 2 CAV hoods removed permanently
    - 2-3 hoods to be taken off ventilation in Ekeley until needed
- Refrigeration
    - Over 100 units set-up for LWEEP refrigerator/freezer maintenance program
    - Facilitated replacement of 10 old refrigerator/freezer units new Energy Star units by GEO (Governor's Energy Office)
    - 5 units at -70C instead of -80C
    - One refrigerator/freezer retired for energy savings after consolidation of contents into other units
    - New launch of LWEEP fridge and freezer retire/replace program which provides incentives to retire units not needed and replace inefficient units
- Eco-Leader Network
    - Over 70 labs on campus have Eco-Leaders established. ~300 left to go.
    - 6 Eco-Leader meetings held
    - Working heavily with three departments (Chem, MCDB, and Ebio) and have initiated work with numerous others
- Educational Campaigns
    - Posters individually addressing fume hoods, refrigeration, timers, centrifuges, autoclaves in use in lab buildings
    - Stickers for timers and turning equipment off
    - Presentations given at Eco-leader meetings
- Website creation and need for upgrade with additional materials
- Contests
    - Just Shut It Contest for hood sashes of 55 VAV hoods
    - Large Plug Load Off Contest for large equipment previously being left on unnecessarily
    - LWEEP Refrigerator/freezer maintenance program contest – ongoing for twice/ year
- Timer Campaign
    - Nearly 100 basic timers (low load and high load) on scientific equipment
    - 5 timers on Cristol autoclaves being monitored by volunteer
    - Smart timers being added to 4 or more Bierbaum diffusion pumps for significant water and electricity savings
- Autoclave Campaign
    - Distributed trays for more efficient use of autoclave to 15 labs
    - Promoting the use of full loads only
    - Initiated shutdown behavior for very large autoclave infrequently used (unit is put in standby mode)
- 14 Lab Assessment conducted, 4 more coming up, and many more to go
- 39 large plug load pieces of equipment turned off when not in use (many as result of Lab Assessments)
- Surveying of 6 Scientific Buildings for hazards for Office of Resource Conservation
- Ongoing management of an undergraduate student staff member
- Collaborations
    - Established working relationship with EH&S and CU Recycling/Waste Management
    - Pass identified projects to FM Engineers (steam, diffusion pumps, single use water, IT projects, fume hoods) and Electrical Engineer (lighting in lab buildings)

    - Established connections with collaborator at numerous other Universities for swapping established programs and thus eliminating the need to do the initial groundwork.

Future Work Identified in Addition to Ongoing Projects Above

- Recycling of Laboratory Materials Projects (greatly desired by lab members; inclusion in LWEEP will only further encourage lab members to participate in the energy and water conservation aspects of LWEEP)
    - MCDB Styrofoam Pilot nearly established
    - Pipette tip box recycling
    - Select chemical bottle recycling
    - Work on manufacturer responsibility
    - Reduction of single use materials in labs (more efficient use and return to glassware)
- Reduction of water usage for single use cooling
    - Processed chilled water for electron microscopes
    - Visual aid and flow controller for reflux reactions with condensers in hoods in Organic Chem Labs
    - Low flow faucets in labs
- Check into the elimination of house stills using old, energy consuming technology for water purification
- Outreach to share LWEEP materials and programs with other Universities
- Addition of another student to LWEEP staff to work on Outreach and other items
- Autoclaves
    - Use of sensor to turn off autoclave ventilation when not in use (for VAV buildings)
    - Shelving for more efficient use
    - Conservation through programming
    - Standby mode for infrequently used units
    - Retirement without replacement for two old units on campus
- Vacuum pump upgrade project
- Mass spec chiller/heat exchanger project
- Ductless hoods for benign applications such as sifting soils and work with feces
- Biosafety Cabinets
    - Additional blowers off
    - Low resistance HEPA filters
    - Possible upgrade to more efficient Biosafety Cabinets
    - Conversion of MCDB outside venting cabinets to typical cabinets
- Fume hoods on single fans-candidates for off/on switches
- Equipment upgrades (gel drying vacuum pump/cold trap to vacuum aspirator and more efficient drying ovens)
- New Poster development- general poster to be placed in each lab on campus and specific for those who have completed lab assessments
- Refrigeration
    - Organizational dry erase boards for labeling where things can be found in units (results in efficient use and hopefully lack of need to buy a new unit.
    - Develop a Refrigeration Guide for lab members
    - -80C to -70C contest for data collection on items at -70C and to encourage labs to change to -70C from -80C
    - Biomatrica for DNA and RNA storage at room temp instead of refrigeration conditions
    - Look into renting mobile freezer for labs
- Green Lab Certification Development
- Lighting projects
- Work with IT administrators in Lab Buildings to address server rooms and computer not in sleep mode
- Lab Clean-up Day checklist and food incentive