

Application for a Small Grant from the Sustainable CU: Environmental Improvement Initiative

Title: Energy Saving Timers for Scientific Laboratory Equipment

Applicant:

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Description of Project:

Problem: In many labs, laboratory equipment is left “ON” unnecessarily simply for convenience’s sake. Of course, the best solution in terms of energy savings is to require laboratory members to keep equipment “OFF” unless they are going to use it. However, some equipment is shared among many lab members making it difficult to know whether equipment should be turned “OFF” after one lab member is finished because another member may be needing it shortly. Another part of the problem is that some equipment takes 30-60 minutes to warm up or cool down before it can be used, thus delaying research when a lab member forgets to turn the equipment “ON” ahead of time. Lastly, some lab members claim that they simply have too many things to remember in the course of their experiments (which vary in length from a hour to a week) to also have to remember to turn “ON” equipment ahead of time.

Proposed Solution: Providing lab members with FREE timers for automatic shutdown and startup of equipment is an easy solution for equipment which can be turned “OFF” and “ON” with a simple flip of a switch. While some lab equipment cannot be turned off in this manner, much equipment can be, such as heating blocks, temperature controlled water baths, drying ovens, and other equipment specific to individual labs. Even devices of only 25 Watts will typically take less than a year to recoup the cost of the timer in energy savings. These timers will also be applied to many pieces of equipment using more than 25 Watts so the payback will be even shorter.

Implementation of Solution: We have determined that there are opportunities for at least 130 timers on lab equipment throughout campus. Lab members will be made aware of the opportunity for FREE timers through email announcements sent out by building proctors, posters hung in laboratory buildings, and through direct communication with laboratories via the Lab Eco-Leaders Program. To obtain timers, lab member simply need to contact the Efficiency Manager for LWEEP who will visit their lab to assess the situation, teach them how to set-up their timer(s), and help them get the timer(s) set-up.

Student Involvement and Impact: Students will be directly involved in this project since the majority of lab members are graduate students and it is the lab members (some of whom are designated “Lab Eco Leaders”) who will be 1) identifying what equipment can and cannot be used with timers, 2) determining the timer schedules, 3) setting up timers and 4) periodically checking on the timers. Labs also can typically contain one or two undergraduate students.

Labs, by nature, are large consumers of energy and resources. They typically consume 5-7 times more energy than campus classroom or office space. Just recently, the Laboratory Water and Energy Efficiency Program (LWEEP) was formed to work with lab members to minimize their impact on climate

change and resource consumption. Timers not only reduce energy consumption, but are an excellent visual, promoting an atmosphere of conservation in the laboratory environment. Because of the large consumptive nature of laboratories, it is particularly important that we raise awareness and teach the need for efficient use resources before our students leave CU and continued their learned laboratory behaviors elsewhere in the world.

Budget:

\$1000 to purchase 90-130 timers (depending on price at time of purchase):

Intermatic TN311C Heavy-Duty Grounded Timer: Over the past month, the cost of this timer has varied in price from \$7.60/timer to \$11.05/timer on Amazon. Shipping is free for orders \$25 or more.

Link to timer on Amazon: http://www.amazon.com/Intermatic-TN311C-Heavy-Duty-Grounded-Timer/dp/B00002N5FO/ref=sr_1_2?ie=UTF8&s=home-garden&qid=1257796439&sr=8-2

Other sources of funding outside this proposal: Funding for the printing of posters to advertise the project and for the hourly salary of the LWEPP Efficiency Manager to develop and promote the project will come from the LWEPP budget.

Timeline: The Efficiency Manager for LWEPP will maintain a stock of these timers and distribute them as they are requested by lab members or as the Efficiency Manager visits lab for various conservation efforts. As described above, lab members will be made aware of the opportunity for FREE timers through email announcements, posters, and direct communication via the Lab Eco-Leaders Program. With this focused promotion of the availability of the timers, we expect to distribute the stock of FREE timers to lab members across campus within one year if not sooner.

Feasibility: The Harvard Green Campus Initiative has implemented a similar project which can be found at this site: <http://www.greencampus.harvard.edu/node/421>. Also, before work on this project by LWEPP had begun, one lab in Biochemistry at CU-Boulder had already requested timers to be used for energy savings on multiple pieces of equipment in their lab.

Overall, there are approximately 400 laboratories on campus. We have determined that there are opportunities for at least 130 timers on lab equipment throughout campus. As the project progresses and timers are distributed, it may be found that the number of opportunities for timers is actually higher than 130.

Sustainability: The energy and carbon reduction potential for timers is very large and economical, especially when viewed collectively. Individually, the reduction potential will depend on the piece of equipment using the timer. On the low end, for example, a timer on a heating block at 37 degrees Celsius with a nightly shutdown of 10 hours, will result in a 30 kWh savings per year, a reduction of 56 lbs of carbon dioxide emissions per year, and a carbon dioxide reduction cost of \$71/ton of carbon dioxide (based solely on timer cost, assuming a timer lifetime of 5 years and price of \$10/timer). However, on the high end, a timer on a cooling trap with a nightly shutdown of 10 hours will result in a 730kWh savings per year, a reduction of 1365 lbs of carbon dioxide emissions per year, and a carbon dioxide reduction cost of only \$2.90/ton of carbon dioxide.

Innovation: Although timers are a sound and practical solution, to the best of my knowledge, timers have only rarely been used in laboratories on the CU-Boulder campus for energy savings. In most cases, they simply have not been suggested to lab members or made readily available.