

## Relight Redwood Bowl Project

**Project Description** The Alliance to Save Energy's Green Campus Program (GC) at Humboldt State University is proposing an energy efficiency retrofit of the existing stadium lighting system in the Redwood Bowl. The proposed project, entitled Relight Redwood Bowl (RRB), will produce significant and measurable energy and cost savings for the University, while simultaneously reducing the light pollution. **Project Goals**

- Reduce HSU's energy consumption
- Reduce greenhouse gas emissions
- Reduce ecological impacts
- Improve light quality

The proposed lighting retrofit is projected to reduce energy usage by 1,525,000 kilowatt-hours over a 25-year period, yielding an estimated energy cost-savings of \$186,221 for the University. Moreover, the RRB project will help the University achieve its greenhouse gas reduction targets, pursuant to Executive Order (EO) 987 by eliminating 796,525 pounds (361 metric tons) of carbon dioxide gas emissions over 25 years. A view east from the Arcata Bottom reveals HSU and the Redwood Bowl perched on the hillside and shrouded in a halo of radiating luminescence. On foggy nights this effect is amplified, and while quantitative data to assess light pollution was cost prohibitive to obtain, it is safe to qualitatively state the light pollution is significant. Redwood Bowl's light pollution is attributed to light spillage as a result of misdirected lighting fixtures. The Musco Lighting® Sportscluster Green&trade; system addresses the light pollution issue by guaranteeing 50 percent less light spillage. These lighting structures are factory-aimed and assembled and will be precisely aimed to re-direct spilled light back onto the field and track. Furthermore, Musco's 1500-watt metal halide lamps are designed with "smart lamp" technology, guaranteeing a life of 5,000 hours versus standard 1500-watt metal halide lamps that have a life span of approximately 3,000 hours. Additionally, the new lighting system also guarantees a constant light level of 60 footcandles[1] (FC) for the football field and 25 FC for the track over the life of each lamp. To ensure that the FC levels for the new system are compatible with the existing system, GC student interns measured FC levels of the Redwood Bowl.

[1] A footcandle is a unit of illuminance, equal to one lumen falling on one square foot of surface area (Morgan King).

**Sustainability** GC student interns will work with PO to ensure that the project is maintained over the next 25 years. GC will oversee preparation of annual reports on the system's performance and condition, and, based on these reports, PO will consider whether maintenance is in order to maximize the lighting and energy efficiency of the stadium. After 5,000 hours of system use or by year 10, the first re-lamping of the entire facility will be conducted by Musco at no cost under the Musco Constant 10&trade; warranty. Additional visits by Musco technicians will only occur if significant damages to the system take place. However, PO will be in charge of the removal and disposal of expired and/or damaged lamps and all other basic maintenance and repairs of the system, as this is PO's jurisdiction and thus responsibility is bestowed upon its staff. Maintenance and repairs of the existing system are handled by PO staff. **Assessment** Once the new lighting system is installed, students will track and monitor its energy consumption with the ElitePro&trade; Recording Poly-phase energy meter[1] (written into proposal budget). The collected data will be analyzed and compiled by GC student interns and reported to PO. Evaluation of the project's overall effectiveness will be based on energy savings. A survey distributed around the community will be used to evaluate the qualitative benefits from the reduction in light pollution.

[1] ELITEpro&trade; Recording Poly-Phase Power Meter measures, logs and analyzes electrical loads on all types of devices (<http://www.dentstruments.com/detailsElitePro.htm>).