



1111 Franklin Street  
Oakland, CA 94607-5200  
Phone: (510) 987-9074  
Fax: (510) 987-9086  
<http://www.ucop.edu>  
November 20, 2012

## **ACTION UNDER PRESIDENT'S AUTHORITY—APPROVAL OF THE BUDGET AND APPROVAL OF EXTERNAL AND INTERIM FINANCING, SMART LIGHTING INITIATIVE PHASE 2, DAVIS CAMPUS**

### **EXECUTIVE SUMMARY**

This item addresses the Smart Lighting Initiative Phase 2 (SLI Phase 2) project to implement campus-wide capital solutions designed to reduce energy consumption on the UC Davis campus. The Smart Lighting Initiative (SLI) is a multi-phase program that includes a combination of maintenance and capital projects designed to reduce lighting energy consumption on the Davis campus by 60 percent over a baseline of 2007 usage. SLI Phase 2 will modify the lighting in approximately 40 buildings on the Davis campus through the upgrade and/or replacement of the existing lighting with newer, more efficient lighting technologies, including dynamic occupancy/vacancy controls and energy efficient light sources such as LED fixtures and dimming systems.

The President is being asked to (1) approve the project budget of \$7,792,000, to be funded from external financing and interim financing (for projected utility incentive grants); and (2) approve external financing (\$6,464,000) and interim financing (\$1,328,000).

The SLI Phase 2 improvement project is scheduled to begin construction in September 2013, with improvements anticipated to be completed by August 2014.

### **RECOMMENDATION**

It is recommended that the President:

Pursuant to Standing Order 100.4(q)(1)

- (1) Amend the 2012-13 Budget for Capital Improvements and the Capital Improvement Program to include the following project:

Davis: Smart Lighting Initiative Phase 2—preliminary plans, working drawings, and construction—\$7,792,000 to be funded from external financing (\$6,464,000) and interim financing (\$1,328,000).

APPROVAL OF THE BUDGET AND APPROVAL OF EXTERNAL AND INTERIM FINANCING,  
SMART LIGHTING INITIATIVE PHASE 2, DAVIS CAMPUS

Pursuant to Standing Order 100.4(nn)(1)

- (2) Be authorized to obtain external financing, in an amount not to exceed \$6,464,000, to finance the project. The President shall require that:
  - a. Interest only, based on the amount drawn down, shall be paid on the outstanding balance during the construction period.
  - b. As long as the debt is outstanding, General Revenues of the Davis campus shall be maintained in amounts sufficient to pay the debt service and to meet the related requirements of the authorized financing.
  - c. The general credit of the Regents shall not be pledged.
  
- (3) Be authorized to obtain interim financing, in an amount not to exceed \$1,328,000. The President shall require that:
  - a. Interest only, based on the amount drawn down, shall be paid on the outstanding balance during the construction period.
  - b. Repayment of the interim financing shall be from energy efficiency incentive payments from investor-owned utilities under the terms of the Second Amendment to the UC/CSU/IOU Energy Efficiency Partnership Program Agreement; in the event that the incentive payment is insufficient, and as long as the debt is outstanding, the General Revenues of the Davis campus shall be maintained in amounts sufficient to pay the debt service and to meet the related requirements of the authorized financing.
  - c. The general credit of the Regents shall not be pledged.
  
- (4) Execute all documents necessary in connection with the above.

Approved:

  
\_\_\_\_\_  
Mark G. Yudof                      11/21/12  
President of the University                      Date

APPROVAL OF THE BUDGET AND APPROVAL OF EXTERNAL FINANCE,  
SMART LIGHTING INITIATIVE PHASE 2, DAVIS CAMPUS

**OFFICE OF THE PRESIDENT:**

Accordingly, under the authority delegated to me, I approve the Capital Improvement Budget dated November 11, 2012.

You may reflect \$6,464,000 in external financing and \$1,328,000 in interim financing to the plant expenditure ledger (Account 952170). The campus will need to submit an updated drawdown schedule for the external financing and interim financing to Capital Markets Finance at least 60 days in advance of when the funds are needed.



---

Vice President for Budget and Capital Resources  
As delegated by the President under DA 2224A

11/26/12  
date

## **BACKGROUND**

The Smart Lighting Initiative (SLI) aims to reduce energy consumption from lighting on the Davis campus by 60 percent over baseline 2007 usage. The program links campus needs to reduce energy consumption and greenhouse gas emissions with leading edge technology at the California Lighting Technology Center (CLTC) at UC Davis. Program improvements utilize new technology such as high efficiency light sources, occupancy controls, daylight harvesting, dimming systems, and other systems to realize light energy savings.

The SLI is a multi-phase program that includes a combination of maintenance and capital projects. The campus has chosen a phased approach to ensure that the assumptions related to energy savings can be validated prior to proceeding with subsequent phases. Phase 1 of the SLI included a series of maintenance projects funded by the Statewide Energy Partnership Program (SEPP). The Phase 1 improvements, which primarily include stairwell, restroom, and elevator lighting energy efficiency upgrades as well as the installation of lighting wallpacks, are currently under construction and will be completed under the auspices of the SEPP.

The proposed capital project, SLI Phase 2, will modify the lighting in approximately 40 buildings on the Davis campus—comprising approximately 2.5 million gross square feet—to reduce lighting energy consumption.

The SLI will continue to identify additional projects, both capital and maintenance in nature, that further the campus's progress toward reducing lighting energy consumption. These improvements will be completed in future SLI phases; a total of approximately five phases are anticipated. Lighting energy improvements that are capital in nature and beyond the scope and budget identified for SLI Phase 2 will be included in a subsequent phase of the SLI.

Davis has submitted an application through the Partnership program requesting an incentive grant of \$1,328,000. The incentive grant will be paid by PG&E to the Office of the President once the project is completed and the energy savings resulting from the lighting conversion measures have been verified by PG&E's agent. Thus, PG&E's third party review of the project prior to payment of the incentive grant provides quality control and assures project viability. The incentive grant will apply exclusively toward covering the Smart Lighting Initiative Phase 2 project cost including interim financing cost during construction. In the event the incentive grant is not awarded, the Davis campus will return for approval to convert interim financing of \$1,328,000 to external financing.

### **Project Drivers**

Sustainability and the mandate to return to 1990 emission levels by 2020, as required under Assembly Bill 32, the California Global Warming Systems Act of 2006, are primary drivers for the project.

The California Energy Commission estimates that 35 percent of the average California commercial electricity consumption is for lighting (interior and exterior). Based on this analysis

APPROVAL OF THE BUDGET AND APPROVAL OF EXTERNAL AND INTERIM FINANCING,  
SMART LIGHTING INITIATIVE PHASE 2, DAVIS CAMPUS

as well as the available data from current and future anticipated technologies, the California Public Utilities Commission (CPUC) adopted a Strategic Lighting Plan in September 2010 that set forth the following vision:

*By 2020, advanced products and best practices will transform the California lighting market to deliver improved quality, zero net energy (ZNE) buildings and a 60-80 percent reduction on statewide electrical lighting energy consumption.*

In September 2010, the Chancellor's Committee on Campus Planning and Design supported the CPUC lighting energy reduction goal, and UC Davis became the first large institution in California to respond to the CPUC's call to action.

The campus calculated its reduction target using 2007 lighting energy consumption under a business-as-usual model consistent with the California Energy Efficiency Standards (Title 24, part 6 of the California Building Code). Analysis conducted by the CLTC and UC Davis Design and Construction Management (DCM) in 2011,<sup>1</sup> indicated that the campus uses 57 million kWh per year for lighting purposes (51 million kWh for interior lighting and 6 million kWh for exterior lighting). Exterior sources include streets and pathways, wall packs, parking lots, three parking structures, and athletic fields; interior sources include 963 buildings, which total 11.4 million gross square feet.

In order to meet the SLI reduction goal, the Davis campus must reduce lighting electricity consumption by 34.2 million kWh per year, bringing total annual lighting energy consumption down from 57 million kWh per year to no more than 22.8 million kWh. The SLI Phase 1 improvements (described in Attachment 4) have implemented a savings of over 1.2 million kWh of lighting energy savings. Subsequent phases of the SLI will continue to advance the campus toward this target

**California Environmental Quality Act (CEQA)**

CEQA will be addressed at the time of design approval.

**PROJECT DESCRIPTION**

Smart Lighting Initiative Phase 2 project savings will be achieved through the implementation of a series of improvements that embrace newer, more efficient lighting technologies. The SLI Phase 2 improvements consist of upgrading and replacing existing lighting with newer, more efficient lighting technologies, including dynamic occupancy/vacancy controls and energy efficient light sources in approximately 2.5 million square feet of building space.

The SLI Phase 2 retrofit work is targeting a savings of 5.5 million kWh of lighting energy. Program improvements utilize new technology such as high efficiency light sources, occupancy controls, daylight harvesting, dimming systems, and other systems. The core technologies to achieve lighting energy savings include the following:

---

<sup>1</sup> CLTC/DCM analysis based on a sample set of data using site surveys and lighting plans as well as data from completed retrofit projects.

*APPROVAL OF THE BUDGET AND APPROVAL OF EXTERNAL AND INTERIM FINANCING,  
SMART LIGHTING INITIATIVE PHASE 2, DAVIS CAMPUS*

- High efficacy light sources such as LEDs;
- Dynamic occupancy/vacancy controls;
- Integrated daylight harvesting systems;
- Reduced lighting levels where appropriate;
- Dimming systems;
- Wireless technologies to avoid the expense of rewiring and asbestos abatement;
- User education; and
- Continuing work with CLTC to select additional lighting energy savings sources ready for implementation.

The retrofit work is designed to generate lighting energy savings in approximately twenty percent of campus buildings. The buildings identified for inclusion in the SLI Phase 2 account for twenty percent of the square footage of buildings on campus and represent a cross section of the different types of buildings and uses found on campus. Analysis indicates that these buildings are well suited for lighting energy improvements. The outcome of these improvements will allow the campus to maximize lighting energy savings, but also to gain insights about improvements that achieve the highest lighting energy savings, optimal visual acuity, important information for planned, subsequent phases of the SLI.

A list of buildings has been identified for potential inclusion in SLI Phase 2 project (see Attachment 5). The list is not intended to serve as a comprehensive listing of buildings that will be improved through the SLI Phase 2 and also does not reflect a prioritization of the order of implementation. These buildings have been identified to provide a nucleus for evaluating the potential effectiveness of specific improvements to capture lighting energy savings. The campus anticipates that there may be additions or deletions to the list as additional study is completed by the design-build team. Improvements within each building will be prioritized based on the ability to generate the most cost efficient lighting energy savings.

**ATTACHMENTS:**

Attachment 1: Project Budget

Attachment 2: Summary of Financial Feasibility

Attachment 3: Policy Compliance

Attachment 4: UC Davis Lighting Energy Savings Implemented

Attachment 5: SLI Phase 2 Targeted Buildings List

**PROJECT BUDGET  
SMART LIGHTING INITIATIVE PHASE 2, A/C 952170  
DAVIS CAMPUS  
CCCI 6149**

<u>Cost Category</u>	<b>Total Amount</b>	<b>% of Total</b>
	-	-
Site Clearance	-	-
Building	\$5,744,000	73.7%
Exterior Utilities	-	-
Site Development	-	-
A/E Fees <sup>2</sup>	\$510,000	6.5%
Campus Administrations <sup>3</sup>	\$364,000	4.7%
Surveys & Tests	\$90,000	1.2%
Special Items <sup>4</sup>	\$505,000	6.5%
Finance Cost	\$292,000	3.7%
Contingency	\$287,000	3.7%
<b>Total</b>	<b>\$7,792,000</b>	<b>100.0%</b>
Group 2 & 3 Equipment	-	-
<b>Total Project Cost</b>	<b>\$7,792,000</b>	<b>100.0%</b>

**Project Statistics**

GSF NA

ASF NA

Building Cost/GSF NA

*The Smart Lighting Initiative Phase 2 project will modify lighting in approximately 20 percent of the Davis campus, affecting approximately 2.5 million gross square feet. The unique nature of the project does not allow for costs analysis based on project cost per square feet.*

<sup>2</sup> Fees include consultant and professional design contract costs.

<sup>3</sup> Campus administration includes project management and inspection.

<sup>4</sup> Special Items include: Environmental Impact Report (\$5,000), detailed project program (\$200,000), value engineering (\$10,000), agency review (\$40,000), as built survey/documentation (\$10,000), and independent reviews (\$40,000).

## SUMMARY OF FINANCIAL FEASIBILITY

<b>Davis Campus</b>	
Project Name	<b>Smart Lighting Initiative Phase 2</b>
Project ID	<b>952170</b>
Total Estimated Project Costs	<b>\$7,792,000</b>
Estimated Interest During Construction	<b>\$292,000</b>

<b>Proposed Sources of Funding</b>	
External Financing	<b>\$6,464,000</b>
Interim Financing	<b>\$1,328,000</b>
Total	<b>\$7,792,000</b>

*Below are results of the financial feasibility analysis for the proposed project using the campus' debt affordability model. The financial projections take into consideration market conditions, new sources of revenue and all previously approved projects.*

<b>External Financing Assumptions</b>	
Anticipated Repayment Source	<b>General Revenues of the Davis Campus</b>
Anticipated Fund Source	<b>Auxiliary Funds and Unrestricted STIP (6950) Funds</b>
Financial Feasibility Rate	<b>5.0%</b>
Term	<b>15 years</b>
First Year of Payment	<b>FY 2014</b>
Final Maturity	<b>FY 2029</b>
Estimated Average Annual Debt Service	<b>\$617,000</b>
<b>Interim Financing Assumptions</b>	
Anticipated Repayment Source	<b>General Revenues of the Davis Campus</b>
Anticipated Fund Source	<b>Investor Owned Utility Incentives and Auxiliary Funds</b>
Financial Feasibility Rate	<b>4.0%</b>
Term	<b>3 years</b>
First Year of Payment	<b>FY 2014</b>
Final Maturity	<b>FY 2017</b>
Estimated Average Annual Debt Service	<b>\$474,000</b>

<b>Campus Financing Benchmarks</b>		
Measure	10 Year Projections (as of 11/07/12)	Approval Threshold
Debt Service to Operations	3.1% (max) 2017 (yr)	6.0%
Debt Service Coverage	3.67x (min) 2016 (yr)	1.75x
Expendable Resources to Debt	n/a	1.0x
<b>Auxiliary Financing Benchmarks</b>		
Measure	10 Year Projections (as of 11/07/12)	Approval Threshold
Debt Service Coverage	1.64x (min) in FY 2016	1.25x



<b>Measure</b>	<b>Definition</b>
<i>Debt Service to Operations (%)</i>	$\frac{\text{Annual Debt Service}}{\text{Total Operating Expenses}}$
<i>Debt Service Coverage (x)</i>	$\frac{\text{Operating Income} + \text{Depreciation} + \text{Interest}}{\text{Annual Debt Service}}$
<i>Expendable Resources to Debt (x)</i>	$\frac{\text{Expendable Financial Resources (unrestricted net assets} + \text{temporarily restricted net assets} - \text{net investment in plant)}}{\text{Total Debt Outstanding}}$

*Financing approval requires the campus to meet the debt service to operations benchmark and one of the two other benchmarks for approval.*

*Fund sources for external financing shall adhere to University policy on repayment for capital projects.*

## POLICY COMPLIANCE

### **Long Range Development Plan (LRDP).**

The *LRDP* is a comprehensive policy and land use plan that guides growth on the Davis campus. SLI projects will be initiated throughout the Davis campus. SLI improvements include upgrade and replacement of on-site utility services, which are consistent with the allowed uses within each campus land use designation. The project will not modify existing land uses on campus.

The directive to “create sustainable places” that use resources wisely is one of the main principles of the LRDP. The LRDP envisions a quest for sustainability and stewardship that challenges the campus to look for ways to satisfy current needs without limiting future generations or transferring negative impacts to others.

### **Capital Financial Plan.**

The UC Davis *Ten Year Capital Financial Plan* provides the context and framework for guiding campus capital investment and outlines a series of objectives for capital planning. The Smart Lighting Initiative Phase 2 project is not included in the accepted 2011-2021 Consolidated State and Non-State Capital Financial Plan; the project is included in the proposed 2012-2022 Consolidated State and Non-State Capital Financial Plan (CFP) anticipated to be adopted by the Regents in November 2012. With this action, the campus is seeking Presidential Approval of budget and external finance to proceed with this project. The project schedule calls for advancing the project with the bid and contract award phase to begin in October 2012 prior to adoption of the proposed 2012-2022 CFP.

### **Physical Design Framework.**

The UC Davis *Physical Design Framework* envisions the development of a campus physical environment that supports the academic mission, enhances personal and environmental health, and brings meaning and enjoyment to participants in the campus community. The *Framework* includes criteria that the campus uses to evaluate proposed projects with regard to planning and design.

Planning and Design Principle 1.6 (Create Sustainable Places) of the PDF emphasizes wise resource use. This principle acknowledges that renovation and new construction should be designed to minimize operating costs (utilities and maintenance), reducing financial and resource use burdens. The improvements to be implemented through the SLI Phase 2 directly support this goal. The installation of more energy efficient technologies will result in financial savings and maintenance cost reductions will be realized as well.

### **Sustainable Practices.**

Sustainability and the mandate to return to 1990 emission levels by 2020, as required under Assembly Bill 32, the California Global Warming Systems Act of 2006, are primary motivators for the project. The SLI Phase 2 project will comply with the *Policy on Sustainable Practices* as approved by The Regents on August 22, 2011. As required by the Policy, the project will adopt principles of energy efficiency and sustainability to the fullest extent possible, consistent with budgetary constraints and regulatory and programmatic requirements.

**UC Davis Lighting Energy Savings Implemented**

UC Davis implemented the campus’ Smart Lighting Initiative (SLI) in response to the California Public Utilities Commission’s (CPUC) September 2010 Strategic Lighting Plan calling for the market to deliver improved quality zero net energy buildings and a 60-80 percent reduction in statewide electrical energy consumption. The campus calculated its reduction target using 2007 lighting energy consumption under a business-as-usual model consistent with the California Energy Efficiency Standards (Title 24, part 6 of the California Building Code).

In order to meet the SLI reduction goal, the campus must reduce lighting electricity consumption by 34.2 million kWh per year, bringing total annual lighting energy consumption down from 57 million kWh per year on the Davis campus to no more than 22.8 million kWh. The campus has captured lighting energy improvements from 2007 forward in measuring progress toward SLI reduction targets.

Setting the base year at 2007 allowed the campus to capture savings from a number of energy-reduction programs already completed or in construction, including:

1. Lighting retrofits in the tree parking structures and almost all campus parking lots;
2. Statewide Energy Partnership Program (SEPP) lighting projects;
3. Select projects by Housing and Facilities Management;
4. LEED building programs for recently completed facilities; and
5. Adoption of new Davis campus interior and exterior lighting design standards, which were designed with assistance from the CLTC.

Improvements such as these have translated to a reduction on lighting energy consumption of at least ten percent, with savings increasing annually. A number of the improvements noted above were components of the SLI Phase I project. The estimate savings outlined below is a result of the SLI Phase I maintenance improvements, which are currently underway.

Phase I Work (restrooms, stairs, elevators, lamps)	1,187,600
<u>Pier Wall Pack Demonstration</u>	<u>38,200</u>
Total	1,225,200 kWh

Subsequent phases of SLI improvements will continue to move the campus toward the reduction goal.

**Smart Lighting Initiative Phase 2 Targeted Buildings List**

SLI Phase 2 work consists of upgrading and replacing existing lighting with controls and energy efficient light sources throughout the Davis campus. The retrofit work is designed to generate lighting energy savings in approximately twenty percent of campus buildings with a targeted savings of 5.6 million kWh of lighting energy.

**Campus Buildings Under Consideration for SLI Phase 2 Improvements**

Memorial Union (3-6th floors only)  
Activities and Recreation Center  
Aggie Stadium East  
Aggie Stadium West  
Aggie Stadium North  
Schaal Aquatic Center  
Segundo Dining Commons  
Tercero Services Center  
Transportation and Parking Services  
Genome & Biomedical Sciences Facility  
Hart Hall  
North Hall  
South Hall  
Dutton Hall  
Parsons Seed Certification Center  
Social Sciences & Humanities  
Plant & Environmental Sciences  
Buehler Alumni & Visitors Center  
Life Sciences  
Sciences Lab Building  
Sciences Lab Building Lecture Hall  
Jungerman Hall (Crocker Nuclear Lab)  
Heitman Staff Learning Center  
Meyer Hall  
Kemper Hall  
Academic Surge Building  
Ghausi Hall  
Mathematical Sciences Building  
Watershed Science Facility  
Giedt Hall  
Advanced Materials Research Laboratory  
Human Resources Administration Building  
Plant Reproductive Biology Facility (Genome Launch)

Maddy Lab  
Gourley Clinical Teaching Center  
Center for Companion Animal Health  
Vet Med Equine Athletic Performance Lab  
Vet Med 3A  
Vet Med MPT  
Valley Hall  
University Extension Building  
University Services Building

This is not a comprehensive listing of buildings that will be improved through the SLI Phase 2 and does not reflect a prioritization of the order in which work will be completed. These buildings will provide a nucleus for evaluating the potential effectiveness of specific improvements to capture lighting energy savings. The campus anticipates that there may be additions or deletions to the list as additional study is completed by the design-build team. Improvements within each building will be prioritized based on their ability to generate the most cost efficient lighting energy savings.