

# Utilities Deficit Reduction Plan

## August 2007 Update

### Executive Summary

The campus' utilities budget funds the purchase of electricity, natural gas, water, and sewage disposal for State-maintained space. In 2007-08, the allocated utilities budget will be approximately \$15.8 million for State-maintained space. The actual cost of utilities for State-maintained space (without utility deficit reduction plan measures) would be \$19.7 million, resulting in a deficit of \$3.9 million. This deficit is driven by two major factors:

- Utilities allocations have not recognized staggering energy price increases over the last seven years, exacerbated by...
- The opening of numerous energy-intensive research buildings with greater-than-budgeted utilities consumption.

Other UC campuses are experiencing comparable or larger utilities deficits, for the same reasons noted above. No other UC campus has a plan to eliminate their utilities deficit; rather, other UC campuses are funding their utility deficits year-to-year (at a rate of typically \$7-9 million per year) or distributing unfunded costs across campus.

UC Irvine experienced a persistent utilities deficit problem seventeen years ago. Efficiency retrofits in older buildings, combined with sharply improved efficiency standards for new construction, successfully reduced energy use. The surplus generated by these projects was used to fund other energy conservation projects and brought utility expenses below funded levels for several years, creating a surplus that was tapped to offset increasing energy costs beginning in 2000-01. In fiscal year 02-03, the remaining surplus was used to cover the difference between utility allocation and expense (Chart 1). The deficits that accumulated in fiscal years 03-04 and 04-05 were covered by one-time funding from Office of the President and central campus.

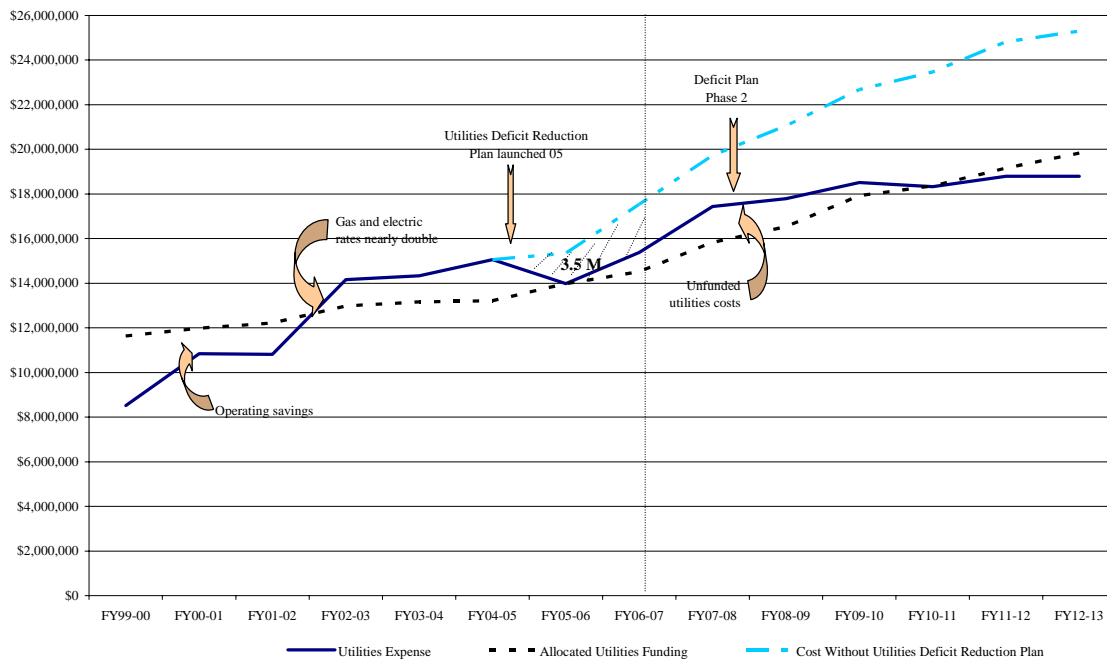
In anticipation of the growing deficit, UC Irvine implemented a Utilities Deficit Reduction plan in June 2005 that addressed the following energy-saving measures:

- Utility purchasing contract change;
- Numerous curtailment actions and an associated radical change in occupant comfort standards, effected campuswide;
- Efficiency measures, of which many required a capital investment in order to realize ongoing utility savings;

- Complete cost recovery from non-State functions that consume rechargeable utilities;
- Price increase funds.

This plan has been successful, achieving savings of \$3.5 million to date (see Chart 1). In fiscal year 05-06, the deficit reduction plan measures covered utilities costs without incurring a deficit. However, fiscal year 2006-07 energy efficiency savings were not sufficient to cover the gap, leaving a deficit of \$858,000.

**Utilities Allocation Vs. Expense  
Chart 1**



Phase II of the Utilities Deficit Reduction Plan is organized into five sections:

1. Causes, scale, and intractability of the utilities deficit
2. Summary of actions taken to date
3. Proposed measures for eliminating the operating utilities deficit
4. Risk factors that could improve or reduce deficit relief
5. Summary comparing all planned and proposed actions against projected deficits

UC Irvine is the only UC campus with a Utilities Deficit Reduction Plan that will not only eliminate the deficit, but also generate excess savings once all energy retrofit projects are completed, which can then be applied against deficits that may accrue while Phase II of the plan is being implemented.

In addition, it is important to note a new energy efficiency funding opportunity that could greatly improve the outcome of this plan. UC is proposing a partnership with California Investor Owned Utilities (IOUs) that is expected to provide the UC system with approximately \$300 million in energy efficiency project funding, requiring about \$200 million in matching funds. The details of the partnership will be negotiated over the next six months. Administrative and Business Services staff are working to ensure that UC Irvine receives a significant portion of this funding. We anticipate that the partnership will enable us to fund currently planned projects, as well as investigate and implement more aggressive measures.

## Causes, Scale, and Intractability of the Utilities Deficit

State funding of the utilities budget (in terms of a per-square foot allocation) has increased slightly since 2000, while utilities costs have soared. The biggest impact is the rising cost of electricity, which represents 70 percent of campus utility cost. However, the increases have been across-the-board for all utilities, resulting in a weighted-average, seven year price escalation of 101 percent. Table 1 illustrates the details:

**Table 1  
Utility Costs**

Fiscal Year	Electricity per kWh	Gas per MMBtu	Water per ccf	Sewer per mgd
FY00	\$0.0557	\$3.577	\$0.6084	\$979
FY01	0.0562	9.256	0.6125	823
FY02	0.0617	6.885	0.6202	942
FY03	0.0905	6.690	0.6715	1,039
FY04	0.0999	6.678	0.7344	1,119
FY05	0.1023	7.204	0.8552	1,441
FY06	0.1037	8.680	0.8788	1,383
FY07	0.1110	8.090	0.9309	1,506
Overall increase 2000 - 2007	99%	126%	53%	54%
<b>Weighted average all utilities prices 2000-2007: +101 percent</b>				

The deficit has been further compounded by the fact that 70 percent of Irvine’s newly completed space has been energy-intensive research facilities, such as Natural Sciences 1, Natural Sciences 2, CalIT<sup>2</sup>, and Croul Hall. Research buildings are 6 to 10 times more energy-intensive than office or classroom space. (The UCOP allocation formula for

utilities does not recognize the costs of operating a research building versus other types of space.)

Also, high energy-consuming equipment is becoming more commonplace as research instrumentation becomes smaller, denser, and more sophisticated. As the campus falls below CPEC space standards, extended operating hours and intensified use of space also increase the utilities expense of research buildings. Taken together, the lack of funding for increased costs and the under-allocation of utility funds are creating a widening budget gap. Equally troubling, the scale and persistence of this problem have not been addressed in Office of the President budget plans or in the “Governor’s Compact.” Several factors make the utilities deficit problem particularly intractable:

- High-payback energy retrofit projects were already completed during the 1990s.
- Most of the campus’ utility expenditure cannot be managed by central administrative actions or policies. Almost two-thirds of the campus’ electric utilities expense stems from the aggregate plug load – the total power consumed by all the devices that building users, campuswide, plug into electrical receptacles, and the associated costs of removing the resultant heat from our buildings.
- UCOP allocation methodology continues to disadvantage UC Irvine as the campus builds a higher proportion of research and laboratory space.
- Planned energy-efficiency projects do not generate savings immediately; meanwhile, the projected deficit and its underlying causes continue to escalate.
- Operational changes and other proposed actions have a significant campuswide impact and are unpopular with faculty and staff. Sharp curtailments in ventilation and air-conditioning, a key element of the plan, negatively impact the daily comfort of building occupants. Additionally, recharges for extraordinary energy usage by research and increases in utility recharges impact operating budgets. All of these actions generate broad and vociferous resistance. Implementation requires a clear directive from the Executive Vice Chancellor and Provost and support from the deans as well as the vice chancellors for research and student affairs.

## Summary of Actions Taken to Date

Below (Table 2) is a summary of actions taken since implementation of the 2005 Utilities Deficit Reduction Plan.

**Summary of Actions Taken in Phase I of Utilities Deficit Reduction Plan  
Table 2**

Project Description	ORIGINAL PROJECTED ANNUAL SAVINGS	ACTUAL SAVINGS		Remarks
Measures		FY 05-06	FY 06-07	
Move electricity purchases from direct access to regulated utility (SCE).	<b>\$1,000</b>	<b>\$600</b>	<b>\$600</b>	Complete. However, SCE subsequently increased rates, reducing net savings. Electricity rates are expected to continue to increase.
ENERGYSTAR refrigerators and freezers -- rebate and change policy.	<b>\$2</b>	<b>\$0</b>	<b>\$0</b>	Awaiting ENERGYSTAR certification for laboratory refrigerators and freezers.
Charge for energy used by water coolers.	<b>\$16</b>	<b>\$0</b>	<b>\$8</b>	Modified/completed. Replaced all water coolers to ENERGYSTAR.
Eliminate air-conditioning and ventilation of non-lab and non-classroom spaces, off-hours	<b>\$50</b>	<b>\$45</b>	<b>\$45</b>	Complete. Some areas were not adjusted due to unique needs.
Eliminate air-conditioning in office wings of lab buildings, off-hours.	<b>\$75</b>	<b>\$23</b>	<b>\$23</b>	Lack of adequate building control systems on older buildings has limited opportunities for implementation.
Set temperatures for classrooms, seminar rooms, conference rooms, etc. to heat to 68° and cool to 78°.	<b>\$50</b>	<b>\$50</b>	<b>\$50</b>	Difficulty controlling temperatures in older buildings, otherwise complete.
Eliminate after-hours heating and cooling in newer lab buildings that have suitable controls.	<b>\$20</b>	<b>\$18</b>	<b>\$18</b>	Complete. Some exceptions accommodated due to servers and computer rooms within office wings.
Eliminate heating and cooling of lecture halls and large classrooms when unoccupied.	<b>\$16</b>	<b>\$13</b>	<b>\$13</b>	Complete. Additional occupancy sensor installations currently planned.
Eliminate air conditioning and ventilation in spaces with operable windows.	<b>\$31</b>	<b>\$0</b>	<b>\$0</b>	Numerous exceptions accommodated due to servers and computer rooms within office wings. Mechanical system limitations have rendered this measure essentially infeasible.
End-of-year holiday closure	<b>n/a</b>	<b>\$35</b>	<b>\$39</b>	\$104,000 ongoing savings already in base budget; incremental savings increase as utility prices increase.
Eliminate domestic hot water in restrooms.	<b>\$60</b>	<b>\$60</b>	<b>\$66</b>	Complete
Fully recharge housing areas for utilities costs.	<b>\$50</b>	<b>\$50</b>	<b>\$51</b>	Complete
Ensure full utility cost recovery for all non-State users, e.g. increase electrical recharge for vending machines campus-wide.	<b>\$120</b>	<b>\$108</b>	<b>\$108</b>	Complete. Some vending machines were removed from service as a result of increased recharge.

Project Description	PROJECTED ANNUAL SAVINGS	SAVINGS		Remarks
		FY 05-06	FY 06-07	
Measures				
Recharge for electrical usage by streetlights and bikeway path lighting at Vista del Campo.	\$2	\$0	\$0	Budget Office considered this measure infeasible.
Recharge UNEX and Summer Session full cost of utilities. Evaluate source of funds for Summer Session costs, currently not handled by OMP.	\$94	\$0	\$63	Permanent allocation provided in FY06/07.
Fume hood stickers reminding faculty to close fume hoods.	\$3	\$1	\$3	Complete. "Green Campus" student interns continue to place energy conservation stickers on fume hoods. This will be integrated with Campus Lab Audits.
Renegotiated water/sewer rates.	n/a	\$185	\$189	Complete
Implement a public awareness campaign	n/a	n/a	n/a	Complete
Consolidate weekend and after-hours activities into specific buildings.	n/a	\$0	\$0	n/a
Recharge Student Center for displaced utilization until construction is complete.	\$150	\$0	\$0	Budget Office considered this measure infeasible.
Install Zone Presence Sensors on Fume hoods	\$13	\$0	\$13	Complete. Ref # EC0009
Install programmable thermostat & occupancy sensors	\$5	\$0	\$5	Complete. Ref # EC0013
Retrofit/Upgrade Elevator Lighting	\$14	\$0	\$14	Complete. Ref # EE0633
UC/CSU IOU EE Partnership Program Lighting retrofit project in 4 campus buildings	\$38	\$0	\$38	Complete. REF # EE0496
UC/CSU IOU EE Partnership Program Monitoring Based Commissioning MBCx Phase 1, McGaugh & Berkeley Place	\$126	\$0	\$130	Complete. Ref # PU001, PU002
Install solar film in high-priority locations. Berkeley Place, GSM.	\$12	\$0	\$0	\$50,000 of original request funded through Small Cap. Requires additional \$70,000 funding. Ref. #5071637
Complete lighting retrofits to replace electrical lamps, ballasts, and fixtures with more efficient equipment in multiple buildings.	\$341	\$0	\$287	Complete
Install bi-level stairwell lighting in multiple campus buildings.	\$17	\$0	\$0	Project Complete. CPUC/DM funds. Ref. # 5095581
<b>Total</b>	<b>\$2,305</b>	<b>\$1,188</b>	<b>\$1,763</b>	

Note: All numbers are in thousands.

## Proposed Measures for Eliminating the Operating Utilities Deficit

Implementation of future savings measures is estimated to yield a total four-year benefit of approximately \$14.8 million dollars to the utilities budget. This includes approximately \$12.9 million from multiple energy efficiency projects. The remaining \$1.9 million stems from constructing less energy intensive buildings and reducing building ventilation.

### Gains from less energy-intensive buildings

Four reduced energy-intensive buildings are planned or under construction. Table 3 provides detailed savings information.

**Gains from Less Energy Intensive Buildings  
Table 3**

Project Name	FY	OGSF	Projected Utilities OMP	Projected Cost of Utilities (low building)	Savings 08-09	Savings 09-10	Savings 10-11
Social & Behavioral Sciences	08-09	116	\$ 457	\$ 267	\$ 190	\$196	\$201
Humanities Building	09-10	75	\$ 295	\$ 172		\$ 122	\$ 126
Fine Arts Building	09-10	64	\$ 251	\$ 147		\$ 104	\$ 107
Telemedicine	09-10	52	\$ 203	\$ 118		\$ 84	\$ 87
<b>Total</b>					<b>\$ 190</b>	<b>\$506</b>	<b>\$521</b>

Note: All numbers are in thousands.

### Reduced air changes

Reduce air changes in laboratory buildings to 4x or 6x/hr. for all operating hours, wherever technically feasible. Lab occupants will be advised to use window coverings and to dress comfortably. Table 4 summarizes the projected savings for reduced air change projects.

**Reduced Air Change Projections  
Table 4**

<b>Building</b>	<b>FY 06/07</b>	<b>FY 07/08</b>	<b>FY 08/09</b>	<b>FY 09/10</b>	<b>FY 10/11</b>
Sprague Hall	\$0	\$0	\$25	\$ 51	\$53
Bren	\$0	\$0	\$0	\$18	\$18
Natural Sciences II	\$0	\$0	\$0	\$77	\$79
Croul Hall	\$0	\$0	\$18	\$37	\$38
Hewitt	\$0	\$0	\$0	\$45	\$47
Engineering Tower	\$0	\$0	\$0	\$0	\$41
Engineering 3	\$0	\$0	\$0	\$0	\$115
Social Science Hall/Lab	\$0	\$0	\$0	\$0	\$23
<b>Total Annual Savings</b>	<b>\$0</b>	<b>\$0</b>	<b>\$43</b>	<b>\$ 228</b>	<b>\$414</b>

Note: All numbers are in thousands.

**Multiple energy efficiency projects**

The following energy efficiency projects will be implemented in the next four years (see table 5):



Project Description Measures	Projected Annual Savings	Savings				Remarks
		FY 07-08	FY 08-09	FY 09-10	FY 10/11	
Consolidate weekend and after-hours activities into specific buildings.	n/a	\$0	\$0	\$0	\$0	n/a
Install Zone Presence Sensors on Fume hoods	\$13	\$13	\$14	\$14	\$14	Complete. Ref # EC0009
Install programmable thermostat & occupancy sensors	\$5	\$5	\$5	\$6	\$6	Complete. Ref # EC0013
Retrofit/Upgrade Elevator Lighting	\$14	\$14	\$14	\$15	\$15	Complete. Ref # EE0633
UC/CSU IOU EE Partnership Program Lighting retrofit project in 4 campus buildings	\$38	\$39	\$40	\$42	\$43	Complete. REF # EE0496
UC/CSU IOU EE Partnership Program Monitoring Based Commissioning MBCx Phase 1, McGaugh & Berkeley Place	\$126	\$130	\$134	\$138	\$142	Complete. Ref # PU001, PU002
Install solar film in high-priority locations. Berkeley Place, GSM.	\$12	\$6	\$6	\$6	\$7	\$50,000 of original request funded through Small Cap. Requires additional \$70,000 funding. Ref. #5071637
Complete lighting retrofits to replace electrical lamps, ballasts, and fixtures with more efficient equipment in multiple buildings.	\$341	\$290	\$299	\$308	\$317	Complete
Install bi-level stairwell lighting in multiple campus buildings.	\$17	\$15	\$16	\$16	\$17	Project Complete. CPUC/DM funds. Ref. # 5095581
<b>CONSTRUCTION / IMPLEMENTATION PHASE</b>						
Install occupancy sensor switches for restroom fans, and right size motors wherever cost-feasible campus wide.	\$16	\$13	\$13	\$14	\$14	CPUC/DM funded project. Ref. Project # 5098705
Perform HVAC MBCx re-commissioning to review, replace, repair, and optimize air handling equipment and building systems in multiple buildings.	\$168	\$84	\$143	\$156	\$168	Project funded via MBCx / CPUC/DM funds. Sprague # 5095528, NS-1 #5095526, Gillispie # 5095525
Implement VAV+ control parameters (in conjunction with building MBCX re-commissioning) in newer buildings where it is technically feasible.	\$36	\$0	\$34	\$35	\$36	This measure will be implemented in conjunction with the MBCx Projects.
Upgrade building HVAC filter systems to high efficiency low pressure drop MERV 14, 95% filter system.	\$309	\$155	\$201	\$216	\$309	Project funded - CPUC/DM funds. # 5098704
Install ultra-low flow urinals and dual-flush Sloan valves in men's and women's restrooms. First phase will install 1 60 units.	\$4	\$2	\$3	\$3	\$4	Savings based on first phase of project. Will identify financing to fund subsequent phases of retrofit. Second phase will replace 50-100 fixtures.
Laboratory energy audit. A student-led audit and fume hood sticker initiative.	\$4	\$0	\$11	\$20	\$35	Green Campus student intern initiative
<b>CONTRACTS / DESIGN STAGE</b>						
Install occupancy sensors, controls, dimming and upgrade lighting systems.	\$210	\$74	\$137	\$158	\$210	This project has been funded.
Replace 28 watt and 32 watt fluorescent tubes with 25 watt tubes where possible while meeting efficiency standards.	\$45	\$0	\$45	\$45	\$45	25 Watt lamps to be phased in during group re-lamping starting in 07/08 in conjunction with the occupancy sensor project.
Replace fixed-speed, constant-duty motors with "right-sized" HP based on measured load, wherever cost-effective.	\$9	\$5	\$9	\$9	\$9	This project has been combined with the restroom occupancy sensors and exhaust fan project.

Project Description Measures	Projected Annual Savings	Savings				Remarks
		FY 07-08	FY 08-09	FY 09-10	FY 10/11	
Improve energy management systems and controls in multiple lab buildings to reduce energy usage. Reines Hall Fume Hood Controls Upgrade (Phase 1)	\$91	\$36	\$91	\$91	\$91	CPUC/DM/EC funded project for Reines Hall. CPUC funds have been requested to supplement DM funds. Current projection based on partial year savings and scope reduction. Full year savings will be realized in 2008-09. # 5079605
Reduce airflows in teaching labs in Steinhaus Hall to zero outside of scheduled class hours to the extent technically feasible.	\$75	\$38	\$75	\$75	\$75	Project funded - CPUC/DM funds. # 5099163
McGaugh Hall - This project will replace existing old, inefficient air handlers and associated mechanical equipment. The new system will save energy and maintenance cost. This project will replace aging vane axial fans, replace cooling coils, and install VFD's.	\$204	\$75	\$133	\$153	\$205	Project funded - CPUC/DM funds. # 5079608
<b>READY TO PROCEED w/ DESIGN – UNFUNDED</b>						
Install energy management controls and variable frequency drives on air handlers for the MPST, Crawford Hall, MOB an MAB Buildings.	\$102	\$0	\$34	\$77	\$102	Requires CPUC/DM/EC project funding of \$870K to proceed.
Retrofit office trailers with high efficiency heat pumps and occupancy sensors for air-conditioning.	\$17	\$0	\$0	\$9	\$18	Requires Small Cap or DM/EC/CPUC funding of \$120K to proceed.
Replace air handlers in Berkeley Place.	\$46	\$0	\$0	\$23	\$46	Requires \$715K energy conservation/deferred maintenance project to proceed.
Compressor and control upgrades, walk-in refrigeration units in McGaugh Hall. (18 units) These units are in desperate need of repairs.	\$17	\$0	\$0	\$9	\$17	Requires CPUC/DM/EC project funding in order to proceed.
MCgaugh Hall – Retrofit and upgrade fume hoods to Phoenix VAV Controls.	\$135	\$0	\$0	\$0	\$135	Requires CPUC/DM/EC project funding in order to proceed.
Rowland Hall – Retrofit and upgrade constant volume fume hoods to VAV and Phoenix. Energy retrofit measures to replace or supplant features not funded in Rowland Hall major capital project.	\$375	\$0	\$150	\$250	\$375	DM funded project for Rowland Hall HVAC system. Current projected savings reflects Phoenix valves being deleted from DM project.
Implement Demand Control Ventilation (DCV) in large lecture halls. Schneiderman, Physical Science, Social Science Plaza 1, McDonnell Douglas.	\$18	\$0	\$9	\$14	\$18	Requires Small Cap or CPUC/DM/EC project funding in order to proceed.
Retrofit constant-volume fume hoods with higher efficiency units. Requires a \$1M project.	\$91	\$0	\$0	\$0	\$91	Requires CPUC or EC/DM funding in order to proceed (Reines Phase 2).
Replace Defective Electric Meters and Upgrade Obsolete Meters	TBD	\$0	\$0	\$0	\$0	This project will upgrade existing obsolete and defective meters to new Smart meters as described in the UCI metering plan.
<b>ENERGY STUDY NEEDED – UNFUNDED</b>						
Retrofit air-handling equipment in Engineering Gateway.	\$205	\$0	\$102	\$154	\$205	Requires \$1.9M energy conservation/deferred maintenance project in order to proceed.

Project Description	Projected Annual Savings	Savings				Remarks
		FY 07-08	FY 08-09	FY 09-10	FY 10/11	
Measures						
Reduce airflows in teaching labs in Rowland Hall to zero outside of scheduled class hours to the extent technically feasible.	T.B.D.	\$0	\$0	\$0	\$0	Requires study in order to proceed.
For non-lab buildings, install fan controls and VSD motors to enable a "low occupancy" fan setting for partial occupancy periods using CO2 based controls. HIB, Krieger Hall, Humanities Hall	\$45	\$0	\$0	\$0	\$0	Requires study in order to proceed.
Central Plant Energy Efficiency/Optimization	TBD	\$0	\$0	\$0	\$0	Requires study in order to proceed.
Central Plant Chiller Replacement Study	TBD	\$0	\$0	\$0	\$0	Requires study in order to proceed.
Install Energy Recovery Unit to Capture Waste Heat From Cogen HRSG	TBD	\$0	\$0	\$0	\$0	Requires study in order to proceed.
<b>DEMONSTRATION / PILOT IN-PROGRESS</b>						
Nat Sci I - install auto sash positioning systems to close fume hood sashes when not in use.	\$43	\$0	\$0	\$43	\$65	Pilot project initiated. CPUC and Small Cap funds required in order to proceed with full project. When full project is completed, projected annual savings will be \$140,000.
This pilot project will implement server based PC power management software to evaluate energy savings and user acceptability on campus computers. (1400 PCs)	\$35	\$12	\$23	\$26	\$35	Green Campus student intern initiative-1,400 PCs will save \$35K per year, will require \$75K investment. The project is currently in a no-cost demonstration phase in the Library.
ENERLUME Controller- This project will evaluate the energy saving potential in reducing the power use in lighting systems.	TBD	\$0	\$0	\$0	\$0	This is a no-cost demonstration in Sprague.
<b>DEMONSTRATION / PILOT PROJECT NEEDED - UNFUNDED</b>						
CRT/LCD exchange program	T.B.D.	\$0	\$0	\$0	\$0	Green Campus student intern initiative
This project will evaluate energy savings opportunities by installing LED based task lighting in combination with reducing general overhead lighting in labs	\$2	\$0	\$1	\$1	\$2	Robin Stiffler has volunteered a lab space in McGaugh for testing. Currently making arrangements with CA Lighting Tech Center for LED hardware.
<b>INITIAL EVALUATION / INVESTIGATION</b>						
Provide stipends to Building Facility Managers (BFM) who are willing to perform periodic energy audits and ongoing, day-to-day monitoring.	\$75	\$0	\$0	\$20	\$40	Training program is under development.
Project to upgrade EMS in selected campus buildings including Central Plant.	T.B.D.	\$0	\$0	\$0	\$0	Upgrade EMS in older campus buildings with pneumatic controls to allow implementation of energy conservation strategies. Will seek CPUC funds to finance this project.
Install GIS Building Metering Information	T.B.D.	\$0	\$0	\$0	\$0	Green Campus student intern initiative
Implement LEED EB in campus buildings with student involvement	T.B.D.	\$0	\$0	\$0	\$0	Green Campus student intern initiative
<b>Total</b>	<b>\$4,499</b>	<b>\$2,283</b>	<b>\$3,031</b>	<b>\$3,426</b>	<b>\$4,206</b>	

Note: All numbers are in thousands. Please note that not all projects are currently funded.

## Risk Factors That Could Improve or Reduce Deficit Relief

The cogeneration project, which recently became operational, could have a positive impact on the deficit in coming years. However, analysis shows that cogeneration will not have a positive initial impact if the markets for natural gas and electricity remain out of balance; that is, if the price of natural gas remains high relative to electricity. During such conditions, regulated utilities lose money and so will cogeneration. However, over the long-term, markets adjust and cogeneration is projected to have a positive impact.

Other factors could improve upon, or reduce and delay, the deficit relief projected in this plan:

- Some energy-saving capital improvements could be completed early if funding is available.
- Utility prices could affect the plan in either the positive or negative direction, depending on whether prices moderate or continue to rise.
- The campus may not be able to sustain unpopular actions and curtailment measures, particularly in the face of PI criticism.
- Borrowed money for energy-saving capital projects may be difficult to obtain. Other funds may be made available through rebates or through the proposed partnership with California IOUs that could provide the UC system with \$300 million in project funding. UCOP is exploring finance options to come up with the required matching funds.
- UC could obtain system-wide budget relief, especially in view of the system-wide scale and extent of the utilities deficit problem.
- The weather could be warmer in the summer or colder in the winter than has been the pattern in recent years.
- Installation of aircurity (a system that reduces air changes in buildings) is expected to save considerable money. However, the technology is new and performance data is limited. Thus, system performance may fall short of, or exceed, our expectations.

# Summary Comparing All Planned and Proposed Actions Against Projected Deficits

**Utilities Debt Analysis  
Table 6**

Deficit					
	FY 06/07	FY 07/08	FY 08/09	FY 09/10	FY 10/11
FY Projected Deficit	-\$3,021	-\$3,887	-\$4,526	-\$4,755	-\$5,108
Remaining deficit from Previous Year	\$0	-\$858	-\$2,462	-\$3,724	-\$4,319
<b>Net Deficit</b>	<b>-\$3,021</b>	<b>-\$4,745</b>	<b>-\$6,988</b>	<b>-\$8,479</b>	<b>-\$9,427</b>

Savings					
Gain from Less Energy Intensive Buildings	\$0	\$0	\$190	\$506	\$521
Reduce Air Changes	\$0	\$0	\$ 43	\$ 228	\$414
Multiple Energy Efficiency Programs	\$1,763	\$2,283	\$3,031	\$3,426	\$4,206
<b>Total Savings Measures*</b>	<b>\$2,163</b>	<b>\$2,283</b>	<b>\$3,264</b>	<b>\$4,160</b>	<b>\$5,141</b>

Resulting Deficit/Surplus					
Total Debt for the year after savings measures (current year)	-\$858	-\$1,604	-\$1,262	-\$595	\$33
<b>Remaining Debt</b>	<b>-\$858</b>	<b>-\$2,462</b>	<b>-\$3,724</b>	<b>-\$4,319</b>	<b>-\$4,286</b>

Includes Cogen operating cost & debt service. Thus, \$400,000 is included in FY 06-07.  
Note: All figures are in thousands of dollars.