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Lawrence Berkeley National Laboratory

FY 2010 LBNL SUSTAINABILITY EXECUTABLE PLAN UPDATE

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Produced by:

LBNL Energy Management Program

Lawrence Berkeley National Laboratory

University of California – Berkeley, California – 94720

Lawrence Berkeley National Laboratory
FY 2010 LBNL SUSTAINABILITY EXECUTABLE PLAN UPDATE

The following certify that this document is executed in good faith per the requirements of DOE/UC Contract DE-AC02-05CH11231.

12/15/09

Signature of LBNL Facilities / Operations / Utilities Manger Date

12/15/09

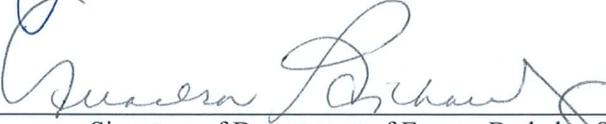
Signature of LBNL Facilities / Operations Department Head Date

12/16/09

Signature of LBNL Facilities Division Director Date

12/16/09

Signature of LBNL Chief Operating Officer & LBNL Energy Champion Date

12/16/09

Signature of Department of Energy Berkeley Site Office Manager Date

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1. Executive Summary

Lawrence Berkeley National Laboratory (LBNL, the Laboratory) is a multi-program scientific research campus operated by the University of California (UC) for the U.S. Department of Energy (DOE). The Laboratory conducts unclassified research to carry out its mission of reaching a deeper understanding of our world and delivering science-based solutions to problems of national significance. This document is the FY 2010 LBNL Sustainability Executable Plan (SEP), and is an update to the FY 2009 SEP submitted on 23-December-2008, and subsequently revised in April-2009.

a. Site Energy Management Vision.

The ultimate goal at LBNL is a Zero-Net-Energy Berkeley - Lab and DOE Complex with minimal carbon footprint. LBNL actions planned to achieve this goal include reducing facilities and transportation energy and other resource utilization, augmented by acquisition of electric power from renewable sources. Progress towards achieving federal savings goals and commitments for future actions are reported to DOE each year in this Sustainability Executable Plan (SEP) Update.

This FY 2010 LBNL SEP Update has been approved by the LBNL Operations Directorate, and the DOE – Berkeley Site Office (DOE-BSO), as is indicated on the preceding Approval Signature Page. The SEP Update is prepared and submitted pursuant to the requirements of DOE Order 430.2B, Departmental Energy, Renewable Energy and Transportation Management, Attachment 1, Contractor Requirements Document (CRD). This document follows guidance provided by the DOE – Office of Science and additional guidance from the DOE – Berkeley Site Office.

b. Major Planning Assumptions and Energy Issues, Including Funding Strategies. The LBNL SEP is developed based on historic facilities and transportation resource consumption and costs. Effects of planned energy and water savings actions and changes to fleet operations are evaluated, along with the contributions from planned building demolitions and new energy efficient building and renovation construction projects.

This FY 2010 LBNL SEP Update shows that LBNL plans to achieve compliance with energy use intensity (EUI) reduction goals primarily from retrofits and improved operations practices.

The previous, FY 2009 SEP relied primarily on an Energy Savings Performance Contract (ESPC) to implement many of the same projects. The ESPC project was cancelled because the 50% Detailed Energy Survey submittal showed that the effort would not make good business sense for the government or for the Laboratory.

Subsequently, an Update to the FY 2009 SEP was submitted in April-2009, wherein LBNL committed to achieving the 30% EUI savings goal before the end of FY 2015. This FY 2009 SEP Update presumed support for identified retrofits and operational changes from operations and maintenance resources.

Whenever possible, energy efficiency and water conservation retrofits will be implemented with direct DOE funding. To this end, LBNL submitted retrofit projects for American Recovery and Reinvestment Act (ARRA) funding early in 2009. Another ARRA funding request will be submitted to DOE in December of 2009. If direct DOE funding is not available, modifications will be supported from operations and

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maintenance funds. The lab will also pursue potentially viable alternate financing mechanisms.

- c. Performance to Last Year's FY 2009 LBNL SEP. The FY 2009 LBNL Sustainability Executable Plan (SEP) included Action Plans documenting measures LBNL will implement each fiscal year through FY 2015 to comply with the various requirements of DOE Order 430.2B, Contractor Requirements Document. LBNL performance toward Action Plan tasks identified for FY 2009, each addressing various aspects of sustainable laboratory operations are appended as Attachment – 1.
- d. Action Plans for FY 2010 Performance. Action Plans documenting measures LBNL plans to implement during FY 2010 and during each fiscal year through FY 2015 to comply with the various requirements are appended as Attachment – 2.
- e. FY 2009 Comprehensive Energy Data Report. Specific data addressing LBNL performance to the goals of DOE O 430.2B are included in an MS – Excel Spreadsheet transmitted electronically, “under separate cover”.

2. DOE Order 430.2B Goal Summary

Goal	Status & Plans
30% energy intensity reduction by FY 2015 from a FY 2003 baseline	LBNL achieved 10.25% EUI savings in FY 2009, much better than projected 6.6% savings. The projected savings by FY2015 will exceed the EUI goal of 30% savings.
16% water intensity reduction by FY 2015 from a FY 2007 baseline	<p>During FY 2009 LBNL saved 11.3 million gallons from FY 2008, however, did not achieve projected savings; water use intensity was 3.4% above baseline.</p> <p>LBNL is currently using FY 2003 baseline usage due to poor FY 2007 records. These records have now been corrected; an updated baseline is proposed.</p> <p>With a corrected FY 2007 baseline, FY 2009 water use intensity savings of 17.6% were achieved, exceeding the FY 2015 savings goal.</p> <p>LBNL cannot maintain these savings as reliance on cost-effective water cooling for planned new high energy using programmatic will cause higher usage.</p>
7.5% of a site's annual electricity consumption from on-site renewable sources by FY 2010	<p>LBNL submitted an On-Site Renewable Energy (RE) Report and Waiver Request with the FY 2009 SEP. On-Site RE is not economical at LBNL.</p> <p>During FY 2009, LBNL acquired 4.4% of total electric power use via Renewable Energy Credits (RECs) and has arranged to secure at least 7.5% of total electric power use via RECs for FY 2010 and beyond.</p>
Every site to have at least one on-site renewable energy generating system	LBNL does have at least one type of application, cost effectively employing renewable energy, consisting of traffic warning and signage along major access and

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Goal	Status & Plans
	transit roads of the main site. This type of signage has been expanded during FY 2009 and is now standard practice where feasible.
10% annual increase in fleet alternative fuel consumption relative to a FY 2005 baseline	<p>During FY 2009 alternative vehicle fuels (AF) was 26% of total fuel use. This was less than the FY 2009 goal of 40%. B20 biodiesel use restarted in late FY 2009, thus, the percentage will improve in FY 2010.</p> <p>LBNL acquired 23 new neighborhood electric vehicles (NEVs), expanding its fleet to 43. These NEVs are not counted as vehicles but many are replacements for selected fleet vehicles.</p> <p>LBNL may not reach the 100% AF usage goal as shuttle bus fuel is B20 biodiesel; with only 20% AF.</p>
2% annual reduction in fleet petroleum consumption relative to a FY 2005 baseline	Savings dropped to 14% for FY 2009 from 24% during FY 2008. This savings still exceeds the 8% savings goal for FY 2009. B20 use and effects of 23 new electric vehicles will improve FY 2010 performance.
75% of light duty vehicle purchases must consist of alternative fuel vehicles	LBNL leased 9 light duty vehicles from GSA. 89% of them are AFVs. Also, 23 GEMs were purchased, but they are not yet counted as "Vehicles" in FAST.
All new construction and major renovations greater than \$5 million to be LEED® Gold certified	<p>All new buildings and major renovations are being designed and constructed to achieve LEED® Gold certifications and exceed ASHRAE Standard 90.1-2004 energy performance by at least 30% where cost effective.</p> <p>Projects of less than \$5 million follow the Guiding Principals of High Performance Sustainable Buildings.</p>
15% of existing buildings to be compliant with the five guiding principles of (HPSB) design	<p>LBNL will achieve this goal before the end of FY 2015. LBNL has assisted DOE in beta testing combined facility & sustainability condition assessments and will continue to evaluate buildings and perform sustainability upgrades as is required.</p> <p>New construction & major renovations and planned demolitions, alone, are projected to result in 29% sustainable facilities, <i>far exceeding the 15% goal.</i></p>
Advanced metering to the maximum extent practicable	<p>LBNL is in and plans to remain in compliance with advanced metering plans for electric, natural gas and water metering. Advanced electric meters were installed during FY 2009 per the SEP.</p> <p>Note that during FY 2009 LBNL acquired all advanced electric, natural gas and water meters needed to complete the metering plans through FY 2015.</p>

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3. Energy Use Intensity

- a. Sitewide Energy Conservation Measures. During FY 2009 LBNL continued operating facilities efficiently. The FY 2009 LBNL Sustainability Executable Plan (SEP), submitted on 23 December 2008, commits to future compliance with the 30% energy use intensity (EUI) goal before the end of FY 2015. The SEP relied heavily on energy conservation measures (ECMs) to be implemented through an Energy Savings Performance Contract (ESPC).

Regrettably, the ESPC project was cancelled in February 2009, following submittal of the 50% Detailed Energy Survey submittal. The overall project, as proposed, did not make good business sense for the Laboratory or for the government.

Following this action, LBNL developed a revised SEP to meet EUI savings goals. An LBNL FY 2009 SEP Update was submitted to the Department of Energy – Berkeley Site Office (DOE-BSO) in April-2009. The updated plan incorporates measures to achieve reduction goals via various actions supported primarily from internal operating funds.

Only one ECM was implemented during FY 2009. This consisted of DOE – Federal Energy Management Program (FEMP) funding assisted Duct Sealing at Buildings 50 and 50B. Many other opportunities had been held in anticipation of ESPC project implementation.

Additional energy savings are anticipated from improved efficiencies to be realized in current new building and major renovations, several of which have received funding assistance through the American Reinvestment and Recovery Act (ARRA).

Energy conservation measures planned to achieve EUI reduction goals are listed on Table 3 – 2 of the appended FY 2009 Consolidated Energy Data Report (CEDR). LBNL has committed to implementing all measures who’s status is shown as “In Development” and anticipates implementing all ”Identified” measures. Conservation measures consist of a mixture of retrofits, operational maintenance and repair enhancements, expanded staffing, improved outreach and selected exclusions of high process energy uses.

FY 2009 energy usage and progress to achieving EUI reduction goals are summarized on Table 1. Past EUI performance and annual progress projected through FY 2015 are shown on Figure 1.

- b. Data Center Energy Improvements. LBNL continues to be a leader in developing data center energy efficiency improvements and, through the Environmental Energy Technologies Division (EETD), is assisting DOE, the EPA and private industry in identifying, developing and promoting best practices and benchmarking tools. LBNL Data Centers located both onsite and in leased offsite facilities have participated in the development of benchmarking tools, energy efficiency improvements and in promoting best [energy] management practices. As a result, Data Center Infrastructure Efficiency (DCiE) has been improved at both locations:

<u>Data Center</u>	<u>FY 2008 DCiE</u>	<u>FY 2009 DCiE</u>	<u>Improvement</u>
Onsite: B50 B R1275 FY 2008	0.52	0.63	20.6%
Offsite B943: NERSC	0.72	0.74	3.0%

Data from DOE Data Center Survey forms submitted for FY 2008 and FY 2009

Table 1. LBNL FY 2009 Energy Use Intensity Performance Summary

Category and Type	FY 2009 Q1	FY 2009 Q2	FY 2009 Q3	FY 2009 Q4	FY 2009 Total
BUILDINGS					
Electricity-MWh	15,139	14,804	15,792	14,291	60,026
Natural Gas-1000 Cu. Ft.	39,916	49,568	36,480	26,883	152,846
METERED PROCESS					
Electricity-MWh	11,118	11,644	12,932	12,107	47,802
TOTALS-Billion Btu					
Buildings (Electricity BTU)	51.654	50.510	53.883	48.762	204.809
Buildings (Natural Gas BTU)	41.153	51.104	37.611	27.716	157.585
Buildings (A)	92.808	101.614	91.494	76.479	362.394
Metered Process (B)	37.935	39.731	44.123	41.310	163.099
Green Energy Credit	REC 1,192 4.54%	1,192 4.51%	1,192 4.15%	1,192 4.52%	4,769 MWh 4.42%
FACILITY AREA (K GSF)					
BUILDINGS					2,084.132 K GSF
METERED PROCESS					40.595 K GSF
LBNL Buildings Energy Use					362.394 B BTU
EUI without REC Credits					173,882 BTU/GSF
REC EUI Calculation Credit					60% (9.763) B BTU
Net, EUI Goal Oriented Reporting					352.631 B BTU
LBNL EUI					169,198 BTU/GSF
Savings from FY 2003 Baseline EUI of		188,528 BTU/GSF			10.25%

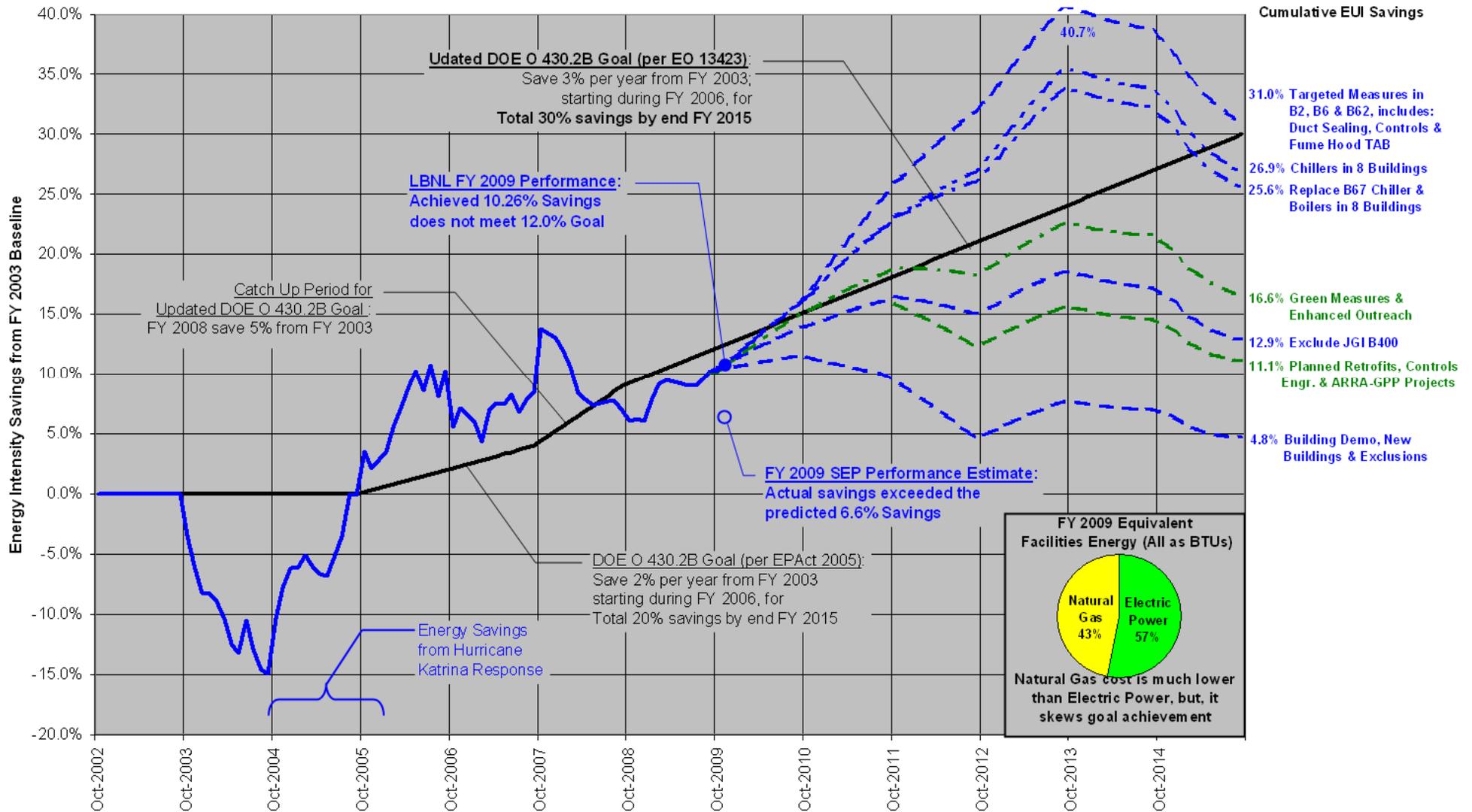
- c. Applications of Best Energy Management Practices. LBNL continues to operate the aging inventory of buildings and facilities as efficiently as is feasible. Ongoing improvements and adjustments during FY 2009 have led to modest additional energy savings. This was accomplished primarily via slightly modifying occupied and unoccupied period temperature (setback/up) setpoints and schedules in buildings where their building automation systems are remotely accessible.

LBNL’s building automation systems range from legacy systems with spare parts and support no longer available to today’s most advanced systems. Note that LBNL has identified Automated Logic Controls (ALC) as the BAS system of choice for future installations and replacements. LBNL building existing automation controls are indicated in Attachment 3; results are summarized on Table 2. LBNL will continue periodic adjustments during in the future.

Table 2. LBNL Building Automation Systems Summary

Local-Manual	3 Buildings	Consider for BAS expansions in future
Local - Programmable	1 Buildings	Consider converting to remote access in future
BAS - Barrington	44 Buildings	Legacy system – consider future updating to ALC
BAS - JCI Metasys	46 Buildings	Various incompatible versions; consider updating
BAS - ALC	0 Buildings	Current standard for new installations
BAS - Other	5 Buildings	Consider future conversion to ALC with remote access
None or N/A	84 Buildings	Buildings without HVAC systems or are out of service

Figure 1.
LBNL Energy Use Intensity (EUI) Goals and Performance
with Proposed Energy Conservation Measures



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- d. Procurement Procedures. Procurement systems have been considerably improved over the past couple years, providing buyers with links to information concerning the acquisition of energy efficient and sustainable products. Design guidance documentation has been provided to subcontractors responsible for the design and construction of new facilities and both major and smaller renovations. Their subcontracts require achievement of LEED® Gold certification from the USGBC for new buildings and major renovations, otherwise require following the Guiding Principles of Sustainable Design, exceeding ASHRAE Standard 90.1 – 2004 energy performance by at least 30% and other relevant requirements.
- e. Integration into the Environmental Management Systems (EMS). The EMS is the responsibility of the LBNL Environment, Health & Safety [EH&S] Division. Environmental Management Programs (EMPs), or Plans, are prepared addressing a number of environmental aspects of LBNL operations. EMPs maintained by the Environmental Management System include:
- Reduce DPM Emissions
 - Reduce Energy Consumption
 - Increase Solid Waste Diversion
 - Reduce Water Consumption
 - Reduce Vehicle Fleet Petroleum Consumption
 - Increase Procurement of Energy Star Products and Recycled Content Products
 - Reduce Lab Commute Traffic by Optimizing Mass Transit

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4. Water Use Intensity

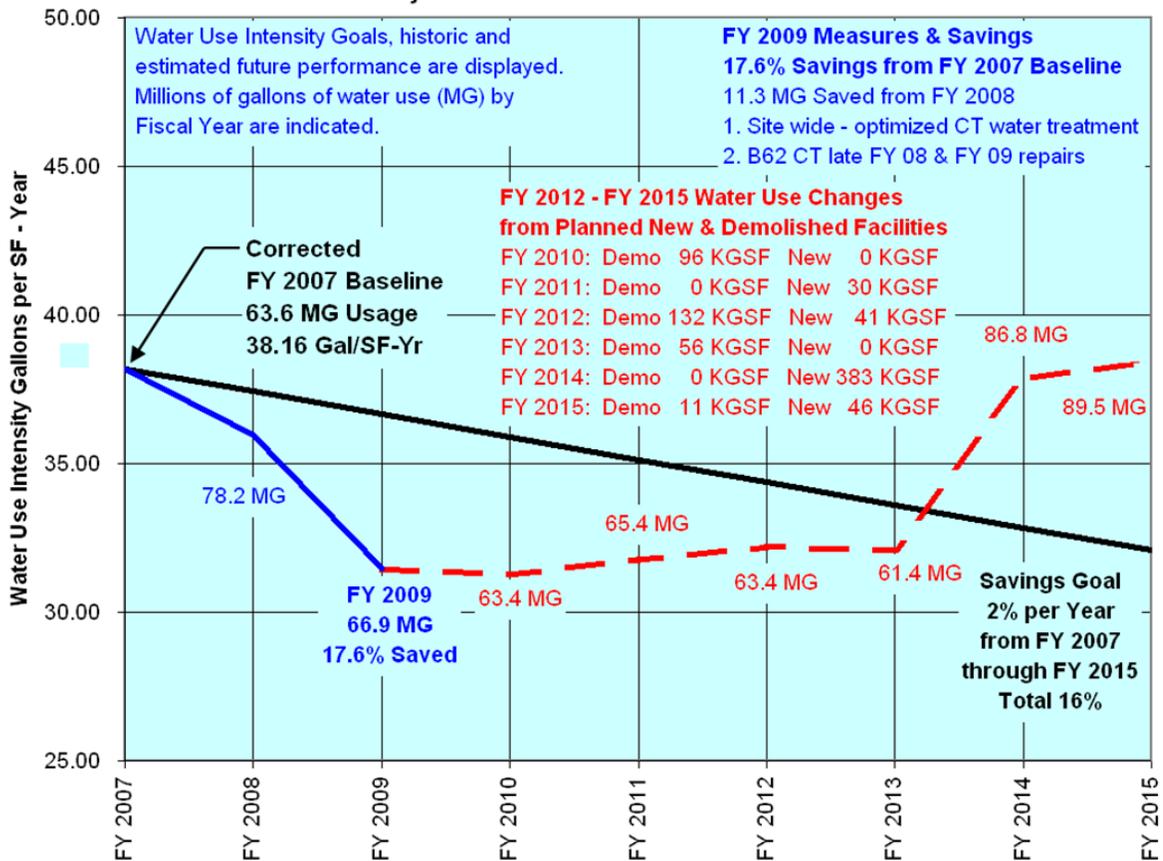
- a. Water Use Intensity Savings Performance and Baseline Correction. The baseline year for water use intensity (WUI) performance reporting was established by DOE O 430.2B as FY 2007. LBNL records of water consumption and costs for FY 2007 were not complete or reliable at that time (February 2008). Thus, LBNL sought and was granted permission to use more reliable and complete FY 2003 data as the baseline.

Since then, LBNL has worked diligently to reconstruct the FY 2007 water consumption and cost record. This SEP and the attached Comprehensive Energy Data Report (CEDR) are prepared using corrected baseline information. A comparison of previous and corrected water use and intensity savings performance under both baselines follows:

Fiscal Year	Water Use	Usage Intensity	FY 2003 Baseline	FY 2007 Baseline
FY 2003	63.59 MG	30.44 Gal / SF - Yr	30.44 Gal / SF - Yr	-
FY 2007	78.52 MG	38.19 Gal / SF - Yr	-	38.19 Gal / SF - Yr
FY 2008	78.19 MG	35.98 Gal / SF - Yr	18.2% Increased Use	5.8% Saved
FY 2009	66.89 MG	31.48 Gal / SF - Yr	3.4% Increased Use	17.6% Saved

Past and predicted future water use intensity, based on the corrected baseline, is shown on Figure 2. As shown, LBNL will remain in compliance with WUI reduction goals through FY 2013. Following FY 2013, planned construction of new scientific facilities requiring significant cooling water services will cause the WUI to rise above the goal line.

Figure 2.
FY 2009 LBNL Water Saving Goals, Performance
and Projections with FY 2007 Corrected Baseline



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- b. Water Conservation Measures. Water consumption was significantly reduced during FY 2009. Water consumption was about 14% (11.3 million gallons) less than during FY 2008. This savings was due primarily to several leak repairs and sitewide optimization of cooling tower (CT) water treatments. Water savings measures identified in Table 3 – 2 of the FY 2009 Consolidated Energy Data Report (CEDR) which contributed to FY 2009 savings include:

i. Cooling Tower Treatment Optimization.

During late FY 2008, LBNL Facilities / Utilities arranged, via subcontract, to correct and optimize cooling tower water treatment practices throughout the main site. Effects of this action were realized during FY 2009. The water treatment consultant reported that the effort increased cycles of concentration from about five (5) cycles to at least fifteen (15) cycles, reducing makeup requirements to about one third of their previous values. High cycles of concentration are feasible at LBNL due to excellent quality of the water supply. Almost 14-million gallons per year of water savings were predicted from this measure.

ii. Convert B34 CT Filter Backwash from City to CT Basin Water.

Implementation of this measure was cancelled, with concurrence of the DOE Berkeley Site Office (BSO), as it would not contribute to water savings, and would, in fact, have increased the amount of water treatment chemicals discharged to the sanitary sewer. Also, there would have been added expenses to make up for treatment chemicals discharged with the CT filter backwash. The status quo was found to be more economical than the proposed modification.

iii. ESPC Identified Restroom Fixture Retrofit Opportunities.

Initial Proposal and DES activities of the cancelled ESPC project included proposed sitewide restroom fixture replacement opportunities that would result in over 3.7 million gallons of water savings per year for a project cost (excluding financing charges) of about \$300,000. The project's simple payback period is 18.3-years. LBNL will consider implementing these retrofits from other funding sources in the future as is indicated on Table 3 – 2 of the FY 2009 LBNL CEDR.

iv. Water Efficient Design Standards.

Design guidelines and master specifications are currently being updated to include the requirements from DOE Order 430.2B regarding WaterSense™ certified products and to assure subcontractors are trained via WaterSense™ accredited programs. Additionally, it is necessary to provide water conservative designs in order to receive relevant LEED® credits for Gold level certification of new buildings and major renovations.

- c. Rationale / Justification - Why Water Savings Goal Cannot be Met. In spite of the significant water savings achieved during FY 2009, LBNL cannot commit to meeting the end FY 2015 water use intensity savings goal of 16% compared to FY 2007. This is due to the fact that water cooled air conditioning condensing systems are far more energy efficient *and life-cycle cost-effective* than are air cooled condensing systems. In other words, energy cost savings from using more efficient water cooled systems is far greater

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than potential water cost savings that would be achieved by employing air cooled systems. There is no other strategy that could reduce water consumption enough to achieve the savings goal.

The aggressive new building and major renovation program at LBNL will result in the construction of over half a million square feet of new energy intensive (thus, cooling intensive) facilities over the next several years. New building plans also include demolition of many older facilities that use very little water. Consequently, in spite of the fact that energy efficient and sustainable facilities will be constructed, increased water use is projected in future years. Past and predicted future water use intensity is shown on Figure 2.

Total water use and facility gross square footage determine water use intensity, differing from EUI determinations where it is allowed to exclude energy intensive programmatic energy from goal calculations. Cooling water use in facilities where a portion of the energy consumption is excluded is still counted.

- d. Integration into the Environmental Management Systems (EMS). An Environmental Management Program (EMP) related to water consumption is employed to track compliance and with various requirements. The Water Use EMP includes considerations of LBNL performance in:
 - i. Submittal of this SEP Update and performance of identified actions.
 - ii. Reporting of water consumption and cost via the DOE – FEMP web-based Energy Management System, version 4 and in the annual Consolidated Energy Data Report.
 - iii. Progress of comprehensive water audits and other investigations.
 - iv. Tracking schedule and performance of several in-house efforts.

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5. Renewable Energy

- a. LBNL Renewable Energy and Renewable Energy Credits. LBNL has been and plans to achieve future compliance with renewable energy requirements by acquiring Renewable Energy Credits (RECs). Current and anticipated REC purchases are summarized on Table 3.
- b. LBNL Renewable Energy Systems. LBNL has limited RE systems in place where they have been found cost effective. An example of an RE application at LBNL consists of crosswalk warning signs along the main Laboratory access roadway. RE systems have not been deployed throughout the Laboratory due primarily to poor economics resulting from our low electric power rates; there is little potential for energy cost savings.
- c. On-Site RE Waiver Request. An On-Site Renewable Energy Report and Waiver Request was submitted to DOE with the LBNL Sustainability Executable Plan on 23 December 2008. The report documents numerous evaluations of on-site renewable energy systems for LBNL; none of the proposed installations have been shown to be economic.
- d. Integration into the Environmental Management Systems (EMS). An Environmental Management Program (EMP) related to energy consumption is employed to track compliance and with various requirements. The Energy Use EMP includes considerations of REC acquisitions to achieve compliance with the goals.

Table 3. LBNL Renewable Energy Action Plan Summary

Fiscal Year	Units	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Electric Power	MWH	107,828	136,080	128,670	205,094	245,588	252,453	252,347
Natural Gas (Thermal)	MCF	152,846	0	0	0	0	0	0
Equivalent Energy (1)	B BTU	525	464	439	700	838	861	861
Existing RECs (2)	MWH	4,769	3,186	-	-	-	-	-
Existing REC Prices	\$/MWH	\$1.00	\$1.00	-	-	-	-	-
Percent Total Power	%	4.4%	2.3%	-	-	-	-	-
Percent Total Energy	%	3.1%	2.3%	-	-	-	-	-
EPACT-2005 & EO 13423 - superceded by TEAM and DOE O 430.2B presented below								
Total Electric (3)	%	3.0%	5.0%	5.0%	5.0%	7.5%	7.5%	7.5%
Electric RE Required	MWH	3,235	6,804	6,434	10,255	18,419	18,934	18,926
TEAM & DOE O 430.2B Renewable Energy								
Total Electric RE (4)	%	3.0%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%
Total Thermal RE (5)	%	0.0%	0.0%	7.5%	7.5%	7.5%	7.5%	7.5%
Equivalent Electric REC	MWH	3,235	10,206	9,650	15,382	18,419	18,934	18,926
Preliminary Allocation (6)	MWH	4,372	10,688	13,991	-	-	-	-
Additional RECs Required								
Equivalent Electric REC	MWH	0	7,020	9,650	15,382	18,419	18,934	18,926
New REC Prices (6)	\$/MWH	-	\$5.53	\$5.81	\$6.10	\$6.40	\$6.72	\$7.06
Total REC Costs	\$	\$5 K	\$42 K	\$56 K	\$94 K	\$118 K	\$127 K	\$134 K

Notes

1. Energy use projections are partly based on schedules of new buildings, several of which may be delayed.
2. Preliminary allocations, per Annual Meeting of 17 June 2009, of REC purchases contracted through FY 2010 by WAPA for the Northern California Power Purchase Consortium; LBNL is a member.
3. Basis is total on and offsite electric power consumption without considerations of exclusions.
4. TEAM initiative requires accelerated compliance with RE goals.
5. RE includes thermal energy starting in FY 2011. Use "new" RECs &/or RE to satisfy this goal.
6. Preliminary REC allocations and pricing is based on data presented at the 9-December-2009 Consortium Mid-Year meeting, assuming 5% per year escalation.

6. Fleet and Transportation Management

a. Major Fleet Measures Accomplished and Planned. Several measures have led LBNL to improve on already exemplary performance towards fleet related conservation goals.

i. Vehicle Fleet Downsizing and Conversion to Alternative Fuels.

LBNL continues to reduce vehicle fleet size. The fleet was reduced from 198 vehicles in FY 2008 to 189 vehicles in FY 2009. The fleet is now over 35% smaller than it was in FY 2001, a significant reduction. This is shown on Figure 3.

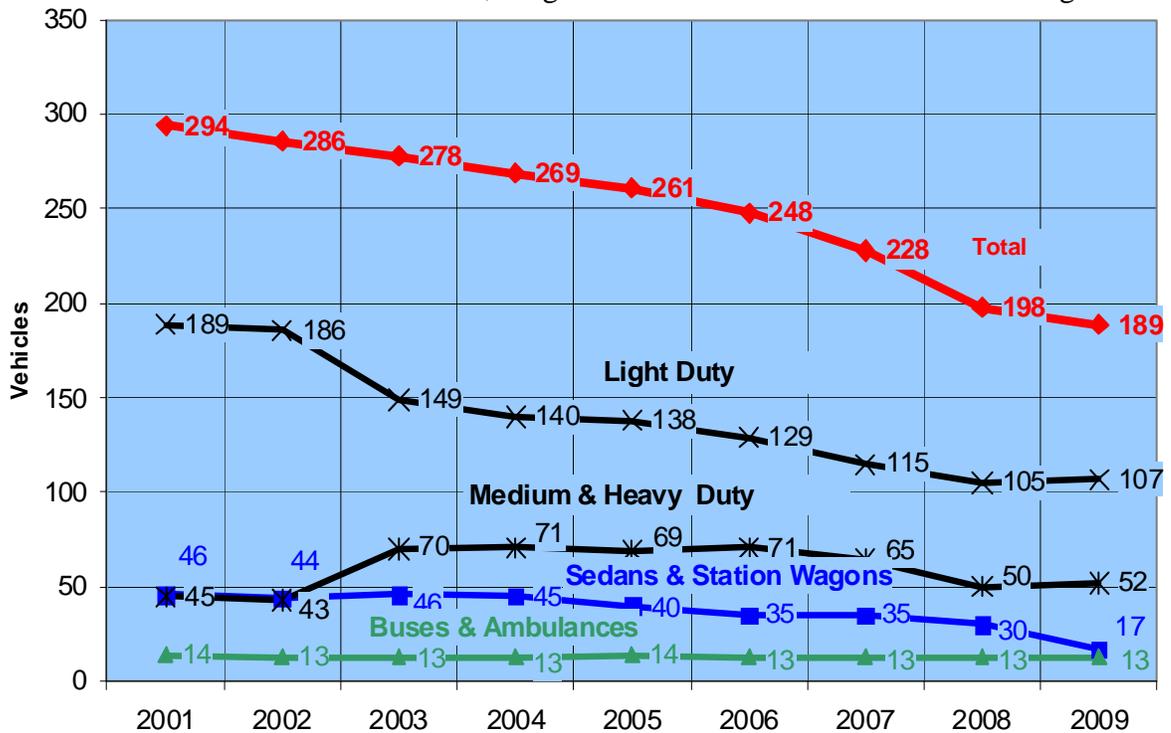


Figure 3. LBNL Historic Vehicle Fleet Inventory

Alternative fueled vehicles (AFVs) are requested for replacements from GSA. All sedans and station wagons are now AFVs as shown on Table 4. AF work vehicles are also requested. Over half of the light duty pickup trucks are now alternatively fueled. The ultimate goal is a completely alternatively fueled fleet. This goal will be achieved with the help of GSA, as the availability of AFVs is improved.

Table 4. Current LBNL Alternative Fuel Vehicles

Vehicle Type	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sedans & Station Wagons	46	44	46	45	40	35	35	30	17
AFV Sedans & Station Wagons	0	4	6	8	10	12	15	20	17
Percent AFV's	0%	9%	13%	18%	25%	34%	43%	67%	100%

ii. Reduced Vehicle Miles Traveled and Improve Vehicle Efficiency.

LBNL has reduced vehicle utilization by 9% since FY 2008. FY 2009 vehicle mileage is shown on Table 5. Business travel has been reduced; however, shuttle bus services have increased miles traveled, and consequently, unfortunately

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reduced efficiency. With over half of the LBNL employees either carpooling or using public transit, commuter traffic is reduced. This, however, places a higher burden on the shuttle bus services, which provide transportation to and from the Lab from public transit locations. This may explain why miles per gallon have dropped for FY 2009, in spite of more efficient replacement vehicles entering the fleet.

Table 5. Historic LBNL Vehicle Fuel Efficiency

LBNL Vehicle Use	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total Vehicle Miles	846,650	769,263	795,890	774,910	732,306	709,198	655,942
Total Gallons Fuel	115,256	117,410	95,750	126,499	101,459	93,756	111,095
Miles per Gallon	7.35	6.55	8.31	6.13	7.22	7.56	5.90

iii. Petroleum Fuels Reduction.

DOE O 430.2B requires 2% petroleum fuel savings per year from FY 2005 with a 20% reduction by FY 2015. LBNL performance suffered during FY 2009 due to increased shuttle bus use and a delay until July in reestablishing biodiesel use as is shown on Figure 4. The delay occurred due to availability of replacement shuttle buses from GSA. FY 2010 performance will improve as a full year of biodiesel usage will be captured.

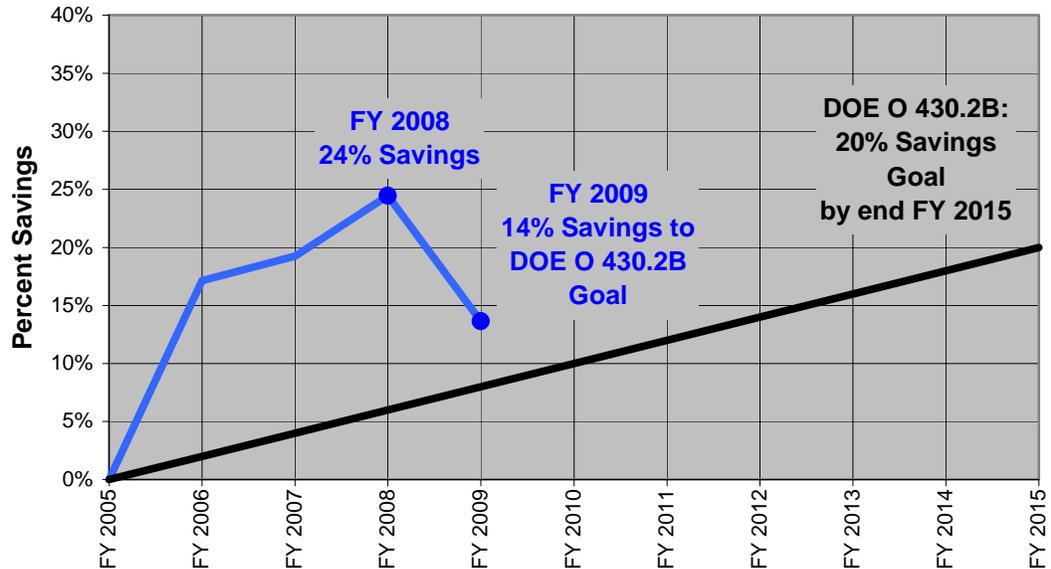


Figure 4. Percent Petroleum Fuel Savings

iv. Increased Alternative Fuels Usage.

A 10% increase in alternative fuels usage per year from FY 2005 is required.

LBNL had been leading in achieving this goal, however, in FY 2007 Biodiesel use was suspended for incompatibility with LBNL's aging fleet of diesel vehicles, principally the shuttle buses. Replacement busses have been secured from GSA capable of biodiesel use; biodiesel fueling was reestablished in July 2009. LBNL's performance to this goal is shown on Figure 5. FY 2010 performance will improve with a full year of biodiesel use by shuttle buses.

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It has been anticipated that acquisition of Neighborhood Electric Vehicles (NEVs) would assist in meeting the AF vehicle acquisition and AF fuel use goals. LBNL now has 43 NEVs; many have replaced standard vehicles. However, the latest DOE draft guidance indicates they may not be considered as “vehicles”. Thus, neither their energy usage nor mileage is included in current metrics.

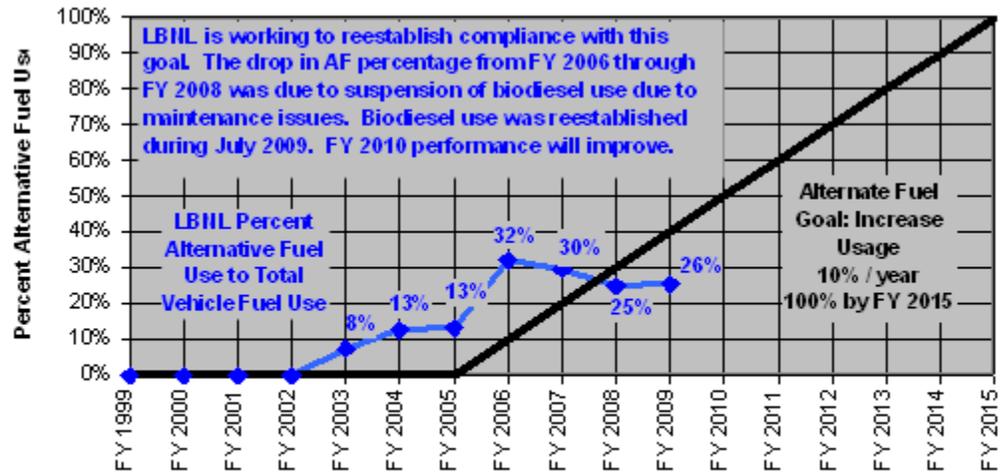


Figure 5. Percent Alternative Fuel Usage

v. Usage of Plug-In Hybrid Vehicles.

DOE O 430.2B requires usage of plug-in hybrid vehicles (PIHs) when they are commercially available and life-cycle cost-effective. They are not yet commercially available at reasonable prices. In lieu of acquiring PIHs, LBNL has purchased electric vehicles (EVs) for onsite use. Seventeen (17) EVs were acquired before FY 2009. Their use has been so successful that an additional 26 EVs were acquired during FY 2009. A dozen of the new EVs replaced standard vehicles. The LBNL now has a fleet of 43 EVs.

- b. Aggregating Alternative Fuel Demand via the DOE Clean Cities Program. LBNL has explored developing a cooperative agreement with University of California, Berkeley Campus, to share shuttle bus services. Such an agreement was found impractical due to site security requirements at LBNL. No plan could be developed that would be effective due to this requirement.
- c. Availability & Accessibility of Alternative Fueling Stations. LBNL has an on-site E-85 fuel station operating under a research permit from the State of California. All GSA supplied vehicles that are capable of using E-85 are restricted to E-85 dispenser fueling only. This is affected through the computerized refueling card system.

LBNL had planned to convert the underground (UG) diesel storage tank to biodiesel B20 use. However, LBNL has since arranged to have the fleet of shuttle busses refueled with biodiesel B20 by a subcontractor utilizing a tanker truck. During FY 2010, shuttle bus services will be subcontracted; the subcontractor will continue to refuel the shuttles from a tanker truck. Remaining vehicles and equipment needing non-biodiesel fuel will be fueled from the existing LBNL infrastructure.

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7. High Performance Sustainable Buildings

- a. New Construction and Major Renovations. Ten (10) new buildings and major renovation projects are listed on CEDR Tab 7 – New Building Construction and on Tab 8 – Existing Bldgs. All of these projects will be LEED® Certified (sustainable) as indicated.

All projects will meet or exceed the requirement to use 30% less energy than required by ASHRAE Standard 90.1 – 2004. In fact, the major renovation of laboratory building 74 (Seismic Phase 2) is being designed to *far exceed the requirement, at a 42% savings*.

- b. Existing Buildings' 15% High Performance Sustainable Building Goal. LBNL plans to exceed this goal, predicting about 29% sustainable existing facilities by the end of FY 2015. This level of sustainable facilities will be achieved primarily through planned demolitions and construction of new buildings and major renovations of existing buildings. Future compliance with this requirement is summarized on Table 6.
- c. Evaluations of Existing Buildings. LBNL has begun evaluating existing buildings. Working with subcontractor VFA, LBNL is assisting DOE, developing a procedure that cost effectively combines standard Facility Condition Assessments for “facilities sustainment” with HPSB sustainability assessments. To date, four (4) buildings have been assessed in this program. Measures needed to achieve sustainability are identified and order-of-magnitude costs of compliance are reported. LBNL will implement identified life-cycle cost-effective measures as is required, but within funding limitations to continuously improve. Additional coverage of building auditing and evaluations appear below, in Section 9.
- d. Integration into the Environmental Management Systems (EMS). An Environmental Management Program (EMP) related to energy consumption is employed to track compliance and with various requirements. The Energy Use EMP includes considerations of building audits and evaluations to achieve compliance with the goals.

Table 6. FY 2015 LBNL Predicted HPSB Status

Facility Type Description	GSF
Buildings - On Site	1,738,493
Trailers & Other Structures - On Site	79,035
Leased Facilities - Offsite not including Joint Genome Institute	307,199
Planned New Construction / Major Renovations - <i>All to be LEED® Certified</i>	545,724
Total FY 2015 Projected Facilities	2,670,451
Buildings currently "Cold & Dark" and planned for demolition before FY 2015 end	174,018
Bldgs & Trailers to be demo'd before end FY 2015 or justified not worth assessing	281,959
Total Facilities Not Requiring Assessments	455,977
Net Enduring Buildings - Basis for Sustainability (Total FY 2015 less above)	2,214,474
Enduring Building Required to be Sustainable by FY 2015 (15%)	332,171
Facilities Already or Planned to be Sustainable before FY 2015 (Baseline)	
B67 Molecular Foundry - Received LEED-Gold® v 2 end FY 2007	97,155
Planned New Construction - must be LEED-Gold® and follow Guiding Principals	545,724
Sustainable Facilities Projected end FY 2015 with no needed actions	642,879
Percent of FY 2015 Projected Total Enduring Buildings	29.0%
	Goal
Deficit of Sustainable facilities to meet 15% Sustainability Goal	Exceeded

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8. Metering

- a. Metering Plans at LBNL. Advanced Metering Plans were submitted to the DOE – Berkeley Site Office (DOE – BSO) during April 2009. These plans address DOE O 430.2B CRD requirements for the advanced metering of electric power, natural gas and water consumption.

Uses of metered energy and water consumption data for other than rebilling purposes includes assistance in identifying poorly operating building systems to prioritize repairs. Metered data will also assist in measuring and verifying the performance of conservation retrofits. Further use of the metered data will be explored during FY 2010 for employee outreach. Selected buildings’ energy performance and savings improvements will be published, compared and contrasted to promote employee cognizance of savings opportunities. It is anticipated that employees will be inspired to improve their individual resource consuming practices.

Using FY 2009 year-end funding, LBNL has managed to purchase all advanced electric power, natural gas and water meters scheduled for future installation as detailed in the three (3) Advanced Metering Plans. This is an advantage that will expedite and accelerate the planned installations.

Advanced metering plans for electric power, natural gas and potable water are addressed below.

- i. FY 2009 Advanced Electric Metering Plan Update.

The advanced electric metering plan update shows that there are 48 life-cycle cost-effective (LCCE) locations for advanced electric meters for LBNL. DOE O 430.2B CRD requires completion of advanced electric meter installations by FY 2012. Plans for future installations are as follows:

LBNL Advanced Electric Meters – Installation Plan Summary

Existing Advanced Electric Meters	12	Advanced Electric Meters
Planned for Installation in FY 2009	8	Advanced Electric Meters
Planned for Installation in FY 2010	10	Advanced Electric Meters
Planned for Installation in FY 2011	10	Advanced Electric Meters
Planned for Installation in FY 2012	8	Advanced Electric Meters
LCCE Advanced Electric Meters	48	Advanced Electric Meters

All eight (8) meters identified in the plan were installed during FY 2009.

Meter data is used for several purposes, as is addressed above. The primary purpose of electric metering is to accurately identify electric power consumption for rebilling purposes. Programs are recharged for electric power usage at LBNL. Being charged for electric energy induces the programs to manage their energy usage to save costs. Sophisticated power meters are also capable of measuring power quality. Used as an operations tool, power quality metering will help to assure continues reliable operations.

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ii. FY 2009 Advanced Natural Gas Metering Plan.

Of forty four (44) candidate locations for natural gas metering, eighteen (18) were determined to be justified for economic and/or operational reasons. Plans for future installations are as follows:

LBNL Advanced Natural Gas Meters – Installation Plan Summary

Planned for Installation in FY 2010	4	Advanced Natural Gas Meters
Planned for Installation in FY 2011	3	Advanced Natural Gas Meters
Planned for Installation in FY 2012	3	Advanced Natural Gas Meters
Planned for Installation in FY 2013	3	Advanced Natural Gas Meters
Planned for Installation in FY 2014	3	Advanced Natural Gas Meters
<u>Planned for Installation in FY 2015</u>	<u>2</u>	<u>Advanced Natural Gas Meters</u>
Total Advanced Natural Gas Meters	18	Advanced Natural Gas Meters

One (1) advanced natural gas meter has been installed, ahead of schedule, during FY 2009, at Building 90, to assist the LBNL Energy and Environmental Technologies Division in their research and development efforts to monitor building and system energy uses.

Several additional advance natural gas meters will be installed early in FY 2010, along with high efficiency condensing boiler replacements scheduled for the building 50 complex.

iii. FY 2009 Advanced Water Metering Plan.

There are numerous manual read water meters throughout the LBNL site. Most serve cooling tower (CT) systems, measuring makeup, blowdown and overflows. Many additional meters are installed to measure consumption of industrial hot water (IHW), low conductivity water (LCW) and other treated water flows where consumption is significant. There are few whole building water meters.

Advanced water meter installations are planned primarily at CT, LCW and ICW system makeup supplies. Meters are not planned to meter whole building domestic water consumption. This is because the overwhelming majority of water consumption at LBNL is for the above makeup supplies. Conservation of “normal” domestic water uses is affected through restroom fixture replacements and by properly specifying new and replacement high efficiency, WaterSense™ certified, water using fixtures.

Sixteen (16) of the identified advanced water meter locations are justified economically, the additional twelve (12) locations serve operational needs.

It is difficult to find water meter locations that are LCCE. For example, if only 20% of LBNL’s potable water use is non-process (non cooling tower or other makeup related), a savings of 2.5% per the above referenced guidance, would generate only \$2,350 of potential cost savings. This is not enough to justify installing even a single water meter. Thus, this metering plan is focused on improving metering at LBNL cooling tower systems.

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Plans for future installations are as follows:

LBNL Advanced Water Meters – Installation Plan Summary

Planned for Installations in FY 2010	6	Advanced Water Meters
Planned for Installations in FY 2011	11	Advanced Water Meters
Planned for Installations in FY 2012	3	Advanced Water Meters
Planned for Installations in FY 2013	4	Advanced Water Meters
<u>Planned for Installations in FY 2014</u>	<u>4</u>	<u>Advanced Water Meters</u>
Total Advanced Water Meters	28	Advanced Water Meters

- b. Integration into the Environmental Management Systems (EMS). EMPs related to energy and water consumption are employed to track compliance and with metering requirements. The Water Use EMP tracks compliance with advanced water metering requirements.

9. Energy Management

- a. Funding Mechanisms. LBNL had placed reliance on an alternatively financed ESPC project to implement major energy and water conservation measures identified during project development activities. Unfortunately, the 50% Detailed Energy Survey submittal showed that the overall project was not economically justified, requiring a multi-million dollar “buy-down” to allow the project to be financed within the statutory limit of 25-years. The project was cancelled as it did not make good business sense for the government or for the Laboratory.

Current energy conservation measures are being supported primarily from internal institutional funds.

A relatively small project, to seal ducts in the building 50 complex, was completed during FY 2009. This project was supported by funding received during a prior fiscal year from the DOE Federal Energy Management Program.

LBNL will, and has sought direct DOE funding to support energy and water conservation efforts. A funding request was submitted in January 2009 for American Recovery and Reinvestment Act (ARRA) funding support. Although LBNL received significant ARRA funding, much in support of projects that will result in more efficient resource utilization, no funding was awarded exclusively for dedicated conservation efforts.

- b. Status of Energy / Water Assessments, Commissioning and Retro-Commissioning. DOE O 430.2B and the Energy Independence and Security Act of 2007 require all onsite facilities to be assessed every (4) four years. Requirements are met by evaluations performed in conjunction with the site’s energy management program or under ESPC projects. Facilities/sites meeting current guidelines, excluding buildings not worth assessing or not applicable for assessments total almost 1.7 million GSF in FY 2010.

The recently cancelled ESPC project incorporated energy and water audits of the most significant LBNL on-site energy using facilities, about 975,300 GSF; including buildings currently excluded from energy use intensity savings goals. This represents over 46% of the LBNL building area and over 54% of onsite building area. Since this level of completed auditing placed LBNL well ahead of the audit requirements, only a few audits were conducted during FY 2009. These audits consisted primarily of “standard” Facility Condition Assessments (FCAs) conducted by subcontractor VFA. These FCAs were enhanced with additional “Green” considerations for sustainability, identifying the measures and their costs to align the buildings with the Guiding Principles of High Performance Sustainable Buildings. These “Green” audits by VFA are scheduled to recommence in FY 2010 with auditing of about 196,000 GSF of selected buildings.

Additional audits completed during FY 2008/9 (and not previously reported for FY 2008) totaled 186,661 GSF, over 11% of LBNL’s onsite enduring building area, including:

Building 70	63,441 GSF – FCAs with enhanced Sustainability audits
Building 72	5,352 GSF – FCAs with enhanced Sustainability audits
Building 72C	8,409 GSF – FCAs with enhanced Sustainability audits
Building 84	55,031 GSF – FCAs with enhanced Sustainability audits
Building 88	54,428 GSF – Dedicated comprehensive audit

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Specific comprehensive energy and water audits are planned for Joint Genome Institute building 400 comprising 29,323 GSF of building area during FY 2010 to address criteria required to exclude buildings from energy use intensity savings goal performance reporting. Note that the JGI audit had been planned for FY 2009, however, the subcontractor, Taylor Engineering, a prominent energy engineering firm, could not schedule the work then due to other priorities consisting mostly of other project related work at LBNL.

A comprehensive audit and Retro-Commissioning project is planned for 118,573 GSF building 6, the Advanced Light Source (ALS) during FY 2010.

Building 77 (68,937 GSF), which is currently undergoing an extensive mechanical and electrical renovation, will also be audited during FY 2010. This audit is limited to lighting systems, an area not addressed in the renovation. The mechanical and electrical project upgrades and optimizes space conditioning energy usage, thus, with completion of the lighting audit, the building will be considered audited, in total.

The area of JGI facilities, the ALS and building 77 is 216,833 GSF, almost 13% of the total FY 2010 enduring building area. Additional facilities will be identified to receive energy and water conservation (sustainability) audits during FY 2010 by LBNL subcontractor VFA, comprising any deficit in Covered Facility square footage audit requirements.

Planned performance of building evaluations towards the EISA-2007 goal of 100% every four (4) years is shown on Table 7 and in the appended Action Plans. The plan shows maintenance of 4-year 100% enduring building evaluations through FY 2015 with the exception of FY 2012.

The overall percentage was allowed to drop below 100% for FY 2012 in order to maintain approximate level investment requirements from year-to-year, as internal funding is anticipated to support these efforts. Should direct funding from DOE become available, LBNL will consider the efforts planned for FY 2012.

c. Personnel Management and Resources.

i. Energy and Water Management Staffing and Training.

DOE O 430.2B requires that Energy Management Program train personnel at the facility/site to direct energy and water management programs and dedicate all or a substantial portion of their time to the effective implementation of energy and water management plans.

LBNL's Energy Management Program is managed by the LBNL Sustainability Coordinator, assigned to Operations / Facilities / Utilities. The Sustainability Coordinator is responsible for coordinating energy and water management activities and in assuring that the Lab is properly aligned with sustainable building design and operating practices.

The program is adequately staffed by Full Time Employees (FTEs), including a full-time Sustainability Coordinator / Energy Manager and assistance, as-needed, from Facilities Division mechanical and electrical engineers. Additional assistance is also provided from the Energy and Environmental Technologies Division.

Table 7. Current and Planned Status of LBNL Building Assessments

Description	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Enduring Building Total GSF	1,668,750	1,668,750	1,668,750	1,668,750	1,744,132	1,785,132	1,785,132	2,214,474	2,214,474
New (LEED-Gold) Buildings	97,155	0	0	0	75,382	41,000	0	429,342	0
Planned & Done Assessments	0	1,044,093	207,377	412,726	0	0	0	0	0
Additional Evaluations Needed				0	420,000	435,000	435,000	435,000	440,000
Percent of Enduring Buildings	6%	68%	81%	106%	124%	89%	102%	103%	100%

ESPC IP & DES Audits	975,300								
VFA Green Assessment									
B 070	63,441								
B 072	5,352								
B 072C	8,409								
B 084	55,031								
B 054	15,451								
B 076	31,698								
B 050	48,719								
B 062	55,904								
B 066	44,121								
Additional LBNL Assessments									
B 090 - Rumsey Engineering	89,509								
B 088 - Cogent Engineering	54,428								
B 077 - Cogent Engineering	68,937								
B 006 - Pending Retro-Cx	118,573								
B 400 - Taylor Engineering	29,323								
New Buildings (LEED Gold)									
B 67/67A Molecular Foundry	97,155								
B 15 ALS User Support Building	30,000								
B 74 Modernize (Seismic Ph 2)	45,382								
Gen Purp Lab (Seismic Ph 2)	41,000								
B 45 Replacement	3,342								
Sequestration Bldg.	30,000								
Lease Replacement Bldg.	200,000								
SERC Building	20,000								
Algal Building	50,000								
Energy Research Building	80,000								
Gen Purp Lab (Seismic Ph 3)	46,000								

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Personnel associated with the Energy Management Program are kept current with developments in the field by attending the annual federal energy conference, GovEnergy, participating in the EFCOG Energy Efficiency Working Group (EEWG) Steering Committee, and regularly attend training classes offered by industry. Participation in PG&E's Pacifica Energy Center classes is of particular benefit. As is reported in the Annual Data Report, for FY 2009, LBNL spent over \$27.6 K for these activities.

These practices will be continued.

ii. Employee Incentive Program.

DOE O 430.2B requires implementation of an employee incentive programs to reward exceptional individual and team performance in increasing energy efficiency and water conservation, deploying renewable energy, minimizing waste, reducing utility costs, and reducing greenhouse gas emissions.

LBNL maintains an employee awards program available to recognize contributions of employees. LBNL also participates in federal and departmental awards programs and has often received Energy Management Achievement Awards.

iii. Outreach Programs to Motivate Employees.

DOE O 430.2B requires implementation of outreach programs to motivate employees to be more efficient in their use of energy, water, and green products and services, and to minimize waste.

Each year, the LBNL Energy Management Program distributes promotional materials provided by DOE – FEMP. Periodic articles are also posted to the LBNL electronic newspaper, Today-at-Berkeley-Lab (TABL), promoting energy and water efficiency, providing tips on how to conserve both at work and at home. Frequent additional TABL articles regarding LBNL research and development activities in the areas of energy efficiency, high performance sustainable building design, and alternative fuels developments assure that energy efficiency and environmental consciousness are ever present in day-to-day activities.

d. Computational Resource Management Practices. DOE O 430.2B incorporates several requirements originally addressed in EO 13423 involving computational resources and electronic equipment utilized by laboratory employees. Compliance with these requirements is tracked and reported through the EMS system.

i. Energy Star Features – Computers and Monitors.

Energy Star features are required to be implemented on computer systems and monitors. This is a standard practice at LBNL. Information Technology Division (IT) technicians routinely set up desktop and laptop systems to align with this requirement as a standard practice.

ii. Extend Useful Life of Electronic Equipment.

The IT Division recovers usable components from excessed equipment as a standard operating procedure.

iii. Use Environmentally Sound Practices in the Disposition of Electronic Equipment.

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Disposal of excessed electronic equipment is arranged through an electronics recycling firm. No excessed electronic equipment waste is land filled.

- e. Procurements of Goods and Services. LBNL procurement systems are being updated continuously to improve performance in the acquisition energy efficient and sustainable products and services. An Environmental Management [System] Program (EMP) addressing procurements of Energy Star / DOE – FEMP recommended equipment and products with recycled content is employed to track and monitor compliance and material acquisition requirements. Energy Management Program coordinates with CFO – Procurement operations to assure they are aware of new requirements. LBNL procurement considerations include:
- Implementing new procurement tracking software elements
 - Tabulating recycled content product (RCP) purchases
 - Developing strategies for improving RCP purchases and implement them
 - Auditing buyer entry of Energy Star Product and RCP data against FMS Items Descriptions & Categories and providing feedback to relevant personnel.
 - Tabulating RCP purchases and comparing them to the RCP baseline year
 - Developing and distributing procurement specification clauses for buyers
 - Identifying existing subcontracts adding green clauses as needed
 - Exploring continued use of green janitorial chemicals by the LBNL custodians
 - Identifying and implementing improvements in procurement electronic systems including eBuy to direct users towards RCP
 - Adding Environmentally Preferable Products (EPP) data capture for PCard orders when they are added to the PeopleSoft system
 - Monitoring bio-based packaging and supplies for the cafeteria
 - Tabulating RCP purchases
 - Evaluating purchases of ESP and EPEAT products
 - Modifying PCard system to capture EPP purchase data
 - Modifying PeopleSoft PO and PCard systems to require buyers to enter values for EPP for items which could potentially have them.
 - Updating EMP to address new federal and departmental requirements
 - Tabulating FY 2009 EPP statistics
 - Reviewing FY 2009 results and developing strategies to improve performance

Procurement systems have been considerably improved, providing buyers with links to information concerning the acquisition of relevant products. DOE O 430.2B requires at least 95% of electronic product purchases qualifying under the Electronic Product Environmental Assessment Tool (EPEAT). Performance towards this goal during FY 2009 shows LBNL is in compliance, EPEAT purchases are summarized on Table 7.

LBNL will consider making improvements to electronic procurement systems during FY 2010, to make it easier to purchase Energy Star and DOE-FEMP recommended products and to track performance.

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Table 8. FY 2009 EPEAT Product Purchases

Description	Desktop Computers	CRT Monitors	LCD Monitors	LapTop Computers
EPEAT Registered Bronze	1	0	0	1
EPEAT Registered Silver	1	0	139	70
EPEAT Registered Gold	881	0	69	703
Not EPEAT Registered	37	0	12	46
Totals	920	0	220	820
EPEAT Registered	883	0	208	774
Percentage	96.0%	N/A	95%	94%
Overall Percentage	95.2%			

- f. Emergency Energy Supply Conservation. LBNL maintains emergency action plans to mitigate the effects of sudden disruptions in electric power and natural gas supplies. These plans are reviewed annually and updated when conditions and/or criteria change.

Attachment 1
LBNL Performance to
FY 2009 – Action Plans

- Action Plan A LBNL Energy Efficiency Management Action Plan
- Action Plan B LBNL Renewable Energy Management Action Plan
- Action Plan C LBNL Water Management Action Plan
- Action Plan D LBNL Transportation / Fleet Management Action Plan
- Action Plan E LBNL HPSB Management Action Plan
- Action Plan F LBNL Additional DOE O430.2B Energy Management Action Plans

LBNL Energy Efficiency Management Action Plan - FY 2009 Performance

Yes Exceeded Performance Goal
 Yes Met Performance Goal
 No Did not meet goal - explanation

<u>LBNL GOALS</u>	<u>SEP</u> <u>FY 2009</u>	<u>Done</u> <u>Y / N</u>	<u>FY 2009 Performance Notes</u>
<u>SUBMIT SUSTAINABILITY EXECUTABLE PLAN UPDATES</u>			
Submit Draft ExPlan Updates to BSO	15-Sep	14-Sep	Submitted to BSO 14-Sep-2009
Receive BSO Comments	15-Oct	Various	DOE-BSO & SC Comments received in time
Submit Final ExPlan to DOE - FEMP	31-Dec	-	-
<u>BY END FY 2015, ACHIEVE ≥ 30% ENERGY INTENSITY REDUCTION</u>			
Energy Consumption (B BTU per Year)	369.731	357.087	Estimated awaiting FY20 09 Q4 data
Projected "Buildings" Area (K-SF)	2,132.3	2,086.2	Estimated awaiting FY20 09 Q4 data
Energy Use Intensity (Million BTU/SF-Yr)	173.396	171,167	Estimated awaiting FY20 09 Q4 data
Plan: Reduce Energy Use Intensity	6.6%	10.25%	Exceeded projected savings significantly
<u>SUBMIT ANNUAL EXCLUSION SELF-CERTIFICATION SPREADSHEET TO BSO</u>			
Submit Self-Certs. with verifications	15-Sep	14-Sep	No changes from FY 2008
Comprehensive Energy Audits & 3rd Party verifications of audits & LCCE ECMs done in past 4-years			
B6 ALS Accelerator Power	N/A	N/A	Task scheduled after FY 2009
B50B Datacenter & HVAC Power	N/A	N/A	Task scheduled after FY 2009
B943 NERSC Computer & HVAC	N/A	N/A	Task scheduled after FY 2009
B88 - 8-inch Cyclotron Power	N/A	Yes	Early performance during FY 2009
JGI Facilities Process Energy	Audit	No	Taylor Engrs. Busy rescheduled to FY10
<u>IMPLEMENT APPROVED ENERGY CONSERVATION MEASURES</u>			
Data Center Improvements	Complete	Yes	Measures completed; more planned
B67 Chiller Retrofit	N/A	N/A	Programmed for FY 2010
B6 ALS Replace Lighting & Controls	N/A	N/A	Programmed for FY 2010
B50 & B50B Duct Sealing	Complete	Yes	Project Completed
Boilers at B54 & B77	N/A	Yes	Boilers replaced during FY 2009
Boilers at B2,50, 66, 70, 71, 74 & 76	N/A	N/A	
Boilers at B6, 50A,50B,50A/B,88	N/A	N/A	Work has started on B50A & B50B
<u>COMPLETE AMERICAN RECOVERY AND REINVESTMENT ACT (ARRA) FUNDED PROJECTS</u>			
B62 & B66 Labs, B6 AHU's & B2 Infrastructure	N/A	N/A	
B71 BELLA	N/A	N/A	
<u>SECURE PG&E REBATES FOR NATURAL GAS SAVINGS PROJECTS</u>			
Apply for Rebate: New B77 Boilers	Request	Yes	Rebate application to PG&E
Apply for Rebates: other New Boilers	N/A	N/A	
<u>RETAIN VERIFIED SAVINGS FROM ECM / WCM PROJECTS TO REINVEST</u>			
Retain savings from In-House Projects			
B67 Chiller Replacement	N/A	N/A	
B6 ALS Lighting Icteron Retrofit	Analysis	No	Defer to project completion for M&V
B50 & B50B Duct Sealing	Analysis	Yes	Savings ID'd; communicated to COO
<u>ADVANCED METERING PLAN AND EXECUTION</u>			
Advanced Metering Plan Update to BSO	April	Yes	Plan Update to BSO on time
Implement Electric Metering Plan	10%	Yes	Meters ID'd in Plan Installed in FY09
Develop / Implement Natural Gas Metering Plan			
Inventory & assess existing meters	100%	Yes	Meters inventoried and assessed
Determine costs; develop plan	100%	Yes	NG Metering Plan to BSO in April-09
Secure funding to implement plan	N/A	N/A	
Implement metering plan	N/A	Yes	Four (4) NG meters installed early
Implement Water Metering Plan			
<u>DEVELOP & IMPLEMENT AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) WITH MEASURABLE OBJECTIVES INCLUDING ENVIRONMENTAL, ENERGY [WATER] AND TRANSPORTATION OBJECTIVES</u>			
The EMS is operated by Life & Environmental Sciences / Environment, Health & Safety Division			
Reduce Energy Consumption	Update	Yes	EMP Updates posted as-needed

LBNL Renewable Energy Management Action Plan - FY 2009 Performance

Yes Exceeded Performance Goal
 Yes Met Performance Goal
 No Did not meet goal - explanation

<u>LBNL GOALS</u>	<u>FY2008</u>	<u>SEP FY 2009</u>	<u>Done Y / N</u>	<u>FY 2009 Performance Notes</u>
<u>ON-SITE RENEWABLE ENERGY (RE)</u>				
Maximize on-site RE projects for 7.5% total on-site electric power	1-small	Several PVs	Yes	Several PV powered traffic warning signs were placed at the main access road
<u>ON-SITE RENEWABLE ENERGY WAIVER REQUEST</u>				
On-Site RE Waiver Request	Draft	Final	Yes	Waiver Request submitted with SEP on 23-Dec-2008
<u>ACQUIRE REQUIRED RENEWABLE ENERGY OR RENEWABLE ENERGY CREDITS (RECs)</u>				
Minimum RE Requirements	3%	3%	N/A	
Electric Power Use (MWH)	106,421	106,008	N/A	Estimated FY 2009 Q4 Data
Natural Gas (MCF)	N/A	N/A	N/A	
Goal Energy Use (B BTU)	363	362	N/A	
Goal RE or RECs (MWH)	3,192	3,179	N/A	
Consortium RECs (MWH)	3,572	4,769	N/A	Per 6-18-2009 Annual Consortium Meeting
REC Percentage	3.4%	4.5%	Yes	Per 6-18-2009 Annual Consortium Meeting
RE &/or REC Cost (\$K)	\$3.57	\$4.77	N/A	Added cost of RECs at \$1.00 per MWH

LBNL Transportation / Fleet Management Action Plan - FY 2009 Performance

Yes Exceeded Performance Goal
 Yes Met Performance Goal
 No Did not meet goal - explanation

<u>LBNL GOALS</u>	<u>Baseline</u>	<u>Latest</u>	<u>SEP</u>	<u>Actual</u>	<u>Done</u>	
	<u>FY2005</u>	<u>FY2008</u>	<u>FY 2009</u>	<u>FY 2009</u>	<u>Y / N</u>	<u>FY 2009 Performance Notes</u>
<u>ALTERNATIVE FUEL VEHICLE ACQUISITION</u> AFV % Goal 100% by FY2010						
Total Vehicles	261	198	189	189	Yes	Vehicle fleet count was reduced
Alternative Fuel Vehicles	10	89	94	75	N/A	Significant GEM acquisitions - see below
LBNL AFV %	4%	45%	50%	40%	N/A	Significant GEM acquisitions - see below
Vehicle Metric Counting GEM Electric Vehicles (not currently considered vehicles for federal purposes)						
Total Vehicles	261	215	-	189	N/A	Vehicle fleet count reduced - see above
AF Vehicles + GEMs	10	106	-	118	Yes	GEM acquisitions would help to exceed goal
LBNL AFV + GEMs %	4%	49%	-	62%	Yes	GEM acquisitions would help to exceed goal
<u>PETROLEUM FUEL USE REDUCTION</u> (Gasoline Equivalent Gallons)						
Total Fuels	106,072	93,498	93,498	105,617	N/A	
Alternative Fuels	14,208	20,039	21,165	26,986	N/A	
Petroleum	91,865	69,405	72,333	78,631	N/A	Increase from expanded Shuttle Bus service
Reduction % 2% per Year	Base	24%	21%	14%	Yes	FY 2008 performance reduced in FY 2009
Total 20% by FY2015	LBNL achieved thi+C74s FY 2015 goal in FY 2008 and is working regain savings.					
<u>INCREASE NON-PETROLEUM FUEL USE 10% PER YEAR: 100% BY FY 2015</u> (corrected metric calculation from SEP)						
GOAL: Increased Non-Petrol User		30%	40%	40%	N/A	
Non-Petrol Use by FY	13%	21%	23%	26%	No	B20 use increased, but is not 100% AF
<u>VEHICLE MILEAGE REDUCTION</u>						
Miles Traveled (all vehicles)	795,890	709,198	709,198	655,942	N/A	
Reduction from Baseline	Base	10.9%	10.9%	17.6%	Yes	Cannot perform mission w/ lower mileage
<u>ACQUISITION OF HIGHER FUEL ECONOMY VEHICLES</u>						
HEV, EV & NEVs	0	17	17	43	Yes	Note GEM NEVs counted as AFVs not per Guidance 26 new GEMs; 12 replacing fleet vehicles
<u>ALTERNATIVE FUEL AVAIL/USE - ON-SITE FACILITIES</u>						
E85 Infrastructure in Place	E-85	E-85	E-85	E-85	Yes	E-85 fueling cabability on-site
B20 Infrastructure in Place	B20	-	B20	B20	N/A	Subcontract; B20 not allowed in UG tanks
<u>DEVELOP & IMPLEMENT AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) WITH MEASURABLE OBJECTIVES INCLUDING ENVIRONMENTAL, ENERGY [WATER] AND TRANSPORTATION OBJECTIVES</u>						
The EMS is operated by Life & Environmental Sciences / Environment, Health & Safety Division						
Reduce Vehicle Petroleum Use	N/A	Update	Updated	Updated	Yes	TDM EMP Updated during FY 2009
Reduce Commute Traffic	N/A	Update	Updated	Updated	Yes	TDM EMP Updated during FY 2010

LBNL HPSB Management Action Plan - FY 2009 Performance

Yes Exceeded Performance Goal
 Yes Met Performance Goal
 No Did not meet goal - explanation

<u>LBNL GOALS</u>	<u>SEP FY 2009</u>	<u>Done Y / N</u>	<u>FY 2009 Performance Notes</u>
<u>NEW BUILDINGS OVER \$5-MILLION (at CD-1 during FY 2008 and thereafter)</u>			
<u>Achieve LEED® for New Construction - Gold Certification</u>			
General Purpose Laboratory		N/A	Committed to LEED® - Gold Certification
User Support Building - LEED® Silver		N/A	Committed to LEED® - Silver Certification
<u>MAJOR RENOVATIONS OVER \$5-MILLION (at CD-1 during FY 2008 and thereafter)</u>			
<u>Achieve LEED® for Existing Buildings - Gold Certification</u>			
B74 Modernization		N/A	Committed to LEED® - Gold Certification
B77 Ph 2 Mech & Elec Upgrade	N/A	N/A	
<u>MAJOR RENOVATIONS LESS THAN \$5-MILLION (at CD-1 during FY 2008 and thereafter)</u>			
<u>Comply with Guiding Principals for Federal Leadership in High Performance Sustainable Buildings</u>			
BELLA Conventional Facilities	Report	N/A	
B71 Rm 146 (LOASIS)	N/A	N/A	
<u>DESIGN TO ACHIEVE ENERGY SAVINGS 30% BELOW ANSI/ASHRAE/IESNA STANDARD 90.1-2004</u>			
General Purpose Laboratory			
User Support Building (ALS)	≥ 30%	Yes	30.1% = Final design energy use simulation result
B74 Modernization		Yes	46% = Current design; far exceeds the 30% minimum
B77 Ph 2 Mech & Elec Upgrade	N/A	N/A	
BELLA Conventional Facilities		N/A	
B71 Rm 146 (LOASIS)	N/A	N/A	
<u>NEW BUILDINGS: MEET OR EXCEED ENERGY STAR® BUILDING CRITERIA</u>			
General Purpose Laboratory		N/A	
User Support Building (ALS)		N/A	
<u>UTILIZE LABORATORIES FOR THE 21ST CENTURY PARTNERSHIP PROGRAM FOR DESIGN</u>			
General Purpose Laboratory	Evidence	Yes	Labs-21/EETD is involved in all LBNL high tech designs
<u>HIGH PERFORMANCE BUILDING PLAN REPORT PER DOE O 430.2B ATTACHMENT 1, CRD, ¶ 7.c IN AUGUST</u>			
Update LBNL Design Guidelines	25%	Yes	33 of 123 relevant specification sections updated = 27%
Submit Annual Report in August	Report	Yes	Routine reports to BSO & HQ; specific report unknown
<u>ENSURE 15% OF ENDURING BUILDINGS COMPLIANT WITH GUIDING PRINCIPALS OF EO 13423 (K-SF)</u>			
Initial Sustainability Assessments	1,348.6	Yes	Refer to FY 2010 SEP Update Table 7 for details
3rd Party Formal Assessments		Yes	276 K SF Audits by VFA & other subs - done early
Design/Plan/Fund/Perform Retrofits		N/A	
Reassess Buildings after Retrofits		N/A	
Report Sustainable Status in FIMS	5.3%	Yes	FY 2009; only B67/67A is LEED® - Gold Certified
Percentage of Building Areas	5.3%	Yes	No change from FY 2008
Report Status by Building Count	1	N/A	This metric will no longer be used, per DOE-SC-HQ
Percentage of Building Count	1.1%	N/A	This metric will no longer be used, per DOE-SC-HQ
<u>UPDATE LEASE & RENEWAL TERMS</u>			
	Update	Yes	N/A; no new leases. Briefed Procurement re requirement

LBLN Additional DOE O430.2B Energy Management Action Plans - FY 2009 Performance

Yes Exceeded Performance Goal **Yes** Met Performance Goal **No** Did not meet goal - explanation

This Action Plan addresses additional requirements of the DOE O 430.2B Contractor Requirements Document not specifically been addressed in Action Plans covering other subject areas. There is no corresponding text summary.

<u>LBLN GOALS</u>	<u>SEP</u>	<u>Action</u>	<u>Done</u>	<u>FY 2009 Performance Notes</u>	
	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2009</u>	<u>Y / N</u>	
<u>DEVELOP & IMPLEMENT AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) WITH MEASURABLE OBJECTIVES INCLUDING ENVIRONMENTAL, ENERGY [WATER] AND TRANSPORTATION OBJECTIVES</u>					
The EMS is operated by Life & Environmental Sciences / Environment, Health & Safety Division					
Energy Star & Recycled Products	N/A	NA	N/A		
Minimum 95% EPEAT Products	95%	95.2%	Yes	FY 2009 EPEAT Performance Report	
<u>ENERGY PURCHASING</u>					
	IRP	NA	Yes	NoCal Power Purchase Consortium	
<u>PARTICIPATE IN LOCAL UTILITY DEMAND RESPONSE PROGRAMS</u>					
Continue in PG&E DRP & CPP Prgms	Continue	Continued	Yes	LBLN continues with these rate structures	
<u>PROCURE ENERGY STAR® - QUALIFIED OR FEMP DESIGNATED PRODUCTS</u>					
Include in Design Guidelines/Specs	Update		Yes	Design guidance is currently being updated	
<u>EMERGENCY CONSERVATION PLANS: MITIGATE EFFECTS DISRUPTIONS IN CRITICAL ENERGY SUPPLIES</u>					
Electric Power & Natural Gas Plans	Update		Yes	Emergency Conservation plans are in place	
<u>PERFORM ENERGY & WATER AUDITING OF ALL FACILITIES EVERY 4-YEARS</u>					
Existing Status	Percent	68%	81%	81%	Yes VFA and dedicated B88 audit exceed scope
Cumulative 4-Years	K-SF	1,141	1,349	1,349	Yes VFA and dedicated B88 audit exceed scope
Future Audits	Percent	Prior ESPC Audits		N/A	
<u>INTEGRATE LBNL SUSTAINABILITY EXECUTABLE PLAN WITH TYSP & ISM</u>					
Integrate Planning with TYSP & ISM	Done	Done	Yes	Sustainable ops & new Bldg plans in TYSP	
<u>PERSONNEL MANAGEMENT</u>					
Staffing & Training are adequate	Done	Done	Yes	Numerous classes and conferences	
Employee Incentive Program in Place	Done	Done	Yes	Employees rewarded for cost savings ideas	
Outreach Program is effective	Done	Done	Yes	Posters placed & TABL articles published	

Attachment 2
LBNL FY 2010 – Action Plans

- Action Plan A LBNL Energy Efficiency Management Action Plan
- Action Plan B LBNL Renewable Energy Management Action Plan
- Action Plan C LBNL Water Management Action Plan
- Action Plan D LBNL Transportation / Fleet Management Action Plan
- Action Plan E LBNL HPSB Management Action Plan
- Action Plan F LBNL Additional DOE O430.2B Energy Management Action Plan

FY 2010 LBNL Energy Efficiency Management Action Plan December 2009

<u>LBNL GOALS</u>	<u>FY2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>FY2014</u>	<u>FY2015</u>	<u>Notes</u>
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SUBMIT SUSTAINABILITY EXECUTABLE PLAN UPDATES

Submit Draft ExPlan Updates to BSO	15-Sep	15-Sep	15-Sep	15-Sep	15-Sep	15-Sep	
Receive BSO Comments	15-Oct	15-Oct	15-Oct	15-Oct	15-Oct	15-Oct	
Submit Final ExPlan to DOE - FEMP	31-Dec	30-Dec	31-Dec	31-Dec	31-Dec	31-Dec	

BY END FY 2015, ACHIEVE ≥ 30% ENERGY INTENSITY REDUCTION

Plan: Reduce Energy Use Intensity	15.9%	25.1%	31.9%	40.7%	38.7%	31.0%	1
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SUBMIT ANNUAL EXCLUSION SELF-CERTIFICATION SPREADSHEET TO BSO

Submit Self-Certs. with verifications	15-Sep	15-Sep	15-Sep	15-Sep	15-Sep	15-Sep	2
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Comprehensive Energy Audits, LCCE ECMs done in past 4-years & 3rd Party verifications

B6 ALS Accelerator Recommissioning	R-Cx		ECMs				
B50B Datacenter & HVAC Power		ECMs					
B77 Lighting Audit	Audit		ECMs				3
B88 - 8-inch Cyclotron (FY 2009 Audit)			ECMs				
JGI Facilities Process Energy (Part H)	Audit		ECMs				3

IMPLEMENT APPROVED ENERGY CONSERVATION MEASURES

B67 Chiller Retrofit	Complete						
B6 ALS Replace Lighting & Controls	Complete						
Boilers at B2			Complete				
Boilers at B50, 66, 70, 71, 74 & 76		Complete					
Boilers at B6, 50A,50B,50A/B,88				Complete			

COMPLETE AMERICAN RECOVERY AND REINVESTMENT ACT (ARRA) ASSISTED PROJECTS

B62, B66 & B74, B6 AHU's & B2 Infrastructure	Complete						
B71 BELLA Project			Complete				

SECURE PG&E REBATES FOR NATURAL GAS SAVINGS PROJECTS

Apply for Rebates: New Boilers as completed	Request	Request	Request	Request			
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ADVANCED METERING PLAN AND EXECUTION

Advanced Metering Plan Updates to BSO	April	April	April	April	April	April	
Implement Advanced Electric Metering Plan	25%	67%	100%				
Implement Advanced Nat Gas Metering Plan	17%	33%	50%	67%	83%	100%	
Implement Advanced Water Metering Plan	17%	33%	50%	67%	83%	100%	

DEVELOP & IMPLEMENT AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) WITH MEASURABLE OBJECTIVES INCLUDING ENVIRONMENTAL, ENERGY [WATER] AND TRANSPORTATION OBJECTIVES

The EMS is operated by Environment, Health & Safety Division

EMP: Reduce Energy Consumption	Update	Update	Update	Update	Update	Update	
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Abbreviations

BSO: DOE - Berkeley Site Office	ECM: Energy Conservation Measure	FEMP: Federal Energy
LCCE: Life-Cycle Cost-Effective	WCM: Water Conservation Measure	Management Program

Notes

1. Savings shown are estimates, assuming implementation proposed measures. Performance is subject to change due to the weather, mission changes, funding decisions, project development & building exclusions.
2. Prior to exclusion under Part H, third party verifications will be submitted to DOE - FEMP for approval.
3. LBNL will audit selected facilities in FY 2010. Implementation of LCCE ECMs planned within 2 FYs. These activities are subject to internal LBNL funding availability and priorities. Audit not needed for B943-part of bldg.

**FY 2010 LBNL Renewable Energy Management Action Plan
December 2009**

<u>LBNL GOALS</u>	<u>FY2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>FY2014</u>	<u>FY2015</u>	<u>Notes</u>
<u>ON-SITE RENEWABLE ENERGY (RE)</u>							
Maximize on-site RE projects for 7.5% total energy use	If LCCE	1, 2					
<u>ON-SITE RENEWABLE ENERGY WAIVER REQUEST</u>							
On-Site RE Waiver Request	FY 2009	3					
<u>ACQUIRE REQUIRED RENEWABLE ENERGY OR RENEWABLE ENERGY CREDITS (RECs)</u>							
Minimum RE Requirements							
Electric Power	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	4
Thermal [Natural Gas]	0.0%	7.5%	7.5%	7.5%	7.5%	7.5%	
Electric Power Use (MWH)	136,080	128,670	205,094	245,588	252,453	252,347	5
Natural Gas (MCF)	189,207	188,655	187,948	189,402	192,000	193,898	5
Total Energy Use (B BTU)	659	634	894	1,033	1,059	1,061	
Goal RE or RECs (MWH)	10,206	13,926	19,641	22,711	23,285	23,320	
Consortium RECs (MWH)	10,688	13,991	TBD	TBD	TBD	TBD	6
REC Percentage							
RE / REC Cost (\$/K)	\$71.80	\$159.90	\$199.30	\$212.70	\$226.10	\$240.30	7

Notes

1. PV-Powered Crosswalk warning signs installed near B65 in FY 2008; similar opportunities to be evaluated yearly.
2. RE is economic at LBNL only where remote from standard power supplies where installation costs are less than extending conventional power supplies. PV lighting will be considered when appropriate. No specific applications are currently identified.
3. An On-Site RE Waiver Request was submitted to the DOE - Berkeley Site Office on 23-September-2008.
4. FY 2010 = 7.5% of total electric power consumption per DOE O 430.2B, CRD paragraphs 5.b and 6.b. EPACT 2005 requires 5.0% of Total Electric power consumption through FY 2011; 7.5% thereafter. FY 2010 and beyond goals = 7.5% of total electric power and thermal energy consumption per DOE O 430.2B
5. Projected LBNL energy usage as of 12/9/2009 provided to Exeter Associates, the Northern California [DOE] Power Purchase Consortium (Consortium) consultant.
6. Consortium allocations are preliminary per 12/9/2009 Mid-Year meeting.
7. RE/RECs costs are estimated. Purchases of RE and/or RECs are arranged through LBNL operating funds. A portion of FY 2010 RECs are at \$1/MWH.

**FY 2010 LBNL Water Management Action Plan
December 2009**

LBNL GOALS

REDUCE POTABLE WATER CONSUMPTION INTENSITY AT LEAST 16% FROM BASELINE FY 2007

LBNL cannot meet this goal due to programmatic processes which require excessive amounts of cooling water.

	<u>Baseline</u>	<u>Actual</u>	<u>Predicted Values</u>						<u>Notes</u>
	<u>FY2003</u>	<u>FY 2009</u>	<u>FY2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>FY2014</u>	<u>FY2015</u>	
Savings Goal (Gal/SF-Yr)	30.44	-	-	-	-	-	-	25.57	1
Total Facility Area (K-SF)	2,089	2,125	2,029	2,059	1,968	1,912	2,292	2,327	2
Water Use (Million Gallons)	63.59	61.63	63.43	65.43	63.40	61.39	86.79	89.47	3
(Gallons/SF-Yr)	30.44	29.01	31.26	31.78	32.22	32.11	37.87	38.44	
Savings from Baseline Year	0%	4.7%	-2.7%	-4.4%	-5.8%	-5.5%	-24.4%	-26.3%	

	<u>Corrected Baseline</u>	<u>Actual</u>	<u>Predicted Values</u>						<u>Notes</u>
	<u>FY2007</u>	<u>FY 2009</u>	<u>FY2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>FY2014</u>	<u>FY2015</u>	
Savings Goal (Gal/SF-Yr)	32.08	-	35.90	35.13	34.37	33.61	32.84	32.08	4
Total Facility Area (K-SF)	2,056	2,125	2,029	2,059	1,968	1,912	2,292	2,327	2
Water Use (Million Gallons)	78.52	66.89	63.43	65.43	63.40	61.39	86.79	89.47	3
(Gallons / SF-Yr)	38.19	31.48	31.26	31.78	32.22	32.11	37.87	38.44	
Savings from Baseline Year	-	17.6%	18.1%	16.8%	15.6%	15.9%	0.8%	-0.7%	5

Implement water savings projects.

B34 CT Filter BW from CT Basin Water	Cancelled	-	-	-	-	-	-	-	6
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INSTALL POTABLE WATER METERS IN EACH BUILDING AND OTHER FACILITY

Develop Advanced Water Metering Plan									
Inventory & assess existing water met	100%	Update							
Reevaluate and Update Water Meterii	April	April	April	April	April	April	April	April	
Implement metering plan	N/A	17%	33%	50%	67%	83%	100%		7

PURCHASE WATERSENSESM LABELED PRODUCTS

Update LBNL Design Guidelines	100%	-	-	-	-	-	-	-	8
Purchase Watersense SM Products for O&M		May	9						

CHOOSE IRRIGATION CONTRACTORS CERTIFIED THROUGH A WATERSENSESM LABELED PROGRAM

Update subcontractor evaluation criteria	100%	Verify	-	-	-	-	-	-	
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REQUEST DIRECT APPROPRIATED FUNDING FOR Water Savings Measures

Respond to DOE Calls for Project Funding	ARRA	Request	10						
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Notes

1. The savings goal is based on FY 2003 data by agreement with DOE - FEMP due to poor data from FY 2007.
2. Data from FIMS entries for baseline with D&D and construction plans for out-years.
3. Future year estimates include water saving measures, and the effects of new buildings and building demolitions.
4. LBNL has now assembled a complete record for FY 2007; corrected performance to savings goals is indicated.
5. LBNL predicts not meeting water savings goals by end of FY 2015 as water cooling is more cost effective.
6. Cancelled due to no water savings - BSO Concur
7. Perform water meter retrofit work, prioritized in the Advanced Water Metering Plan, subject to availability of funding.
8. Reference Part E - High Performance Sustainable Building Action Plan for design guidance / specifications.
9. Advise O&M materials buyers and LBNL suppliers of requirement; spot check before April Metering Plan Update.
10. Assure water savings measures are included in direct funding requests to DOE-FEMP in response to calls.

**FY 2010 LBNL Transportation / Fleet Management Action Plan
December 2009**

LBNL GOALS	Baseline FY2005	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	Notes
<u>ALTERNATIVE FUEL VEHICLE ACQUISITION</u>								
Total Vehicles	261	189	189	189	189	189	189	1
Alternative Fuel Vehicles	10	87	99	111	123	135	147	1, 2
LBNL AFV %	4%	46%	52%	59%	65%	71%	78%	
Vehicle Metric with GEM Electric Vehicles (not currently considered vehicles for federal purposes)								
Total Vehicles	261	232	232	232	232	232	232	
AFVs + NEVs (GEMs)	10	130	142	154	166	178	190	
LBNL AFV %	4%	56%	61%	66%	72%	77%	82%	3
<u>PETROLEUM FUEL USE REDUCTION (Gasoline Equivalent Gallons)</u>								
Total Fuels	106,072	105,617	105,617	105,617	105,617	105,617	105,617	4
Alternative Fuels	14,208	31,304	35,622	39,940	44,258	48,576	52,893	5
Petroleum	91,865	74,313	69,995	65,677	61,359	57,041	52,724	
Reduction % 2% per Year	Base	19%	24%	29%	33%	38%	43%	
Total 20% by FY2015	LBNL has achieved this FY 2015 goal in FY 2008.							
<u>INCREASE NON-PETROLEUM FUEL USE 10% PER YEAR: 100% BY FY 2015</u> (corrected metric calculation from SEP)								
GOAL: Increased Non-Petrol Use		50%	60%	70%	80%	90%	100%	
Non-Petrol Use by FY		30%	34%	38%	42%	46%	50%	4
<u>VEHICLE MILEAGE REDUCTION</u>								
Miles Traveled (all vehicles)	795,890	655,942	655,942	655,942	655,942	655,942	655,942	8
Reduction from Baseline	Base	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	
<u>ACQUISITION OF HIGHER FUEL ECONOMY VEHICLES</u>								
HEV, EV, NEV (GEMs)	0	53	63	73	83	93	103	7
<u>ALTERNATIVE FUEL AVAIL/USE - ON-SITE FACILITIES</u>								
E85 Infrastructure in Place	E-85	E-85	E-85	E-85	E-85	E-85	E-85	
B20 Infrastructure in Place	B20	B20	B20	B20	B20	B20	B20	8
<u>DEVELOP & IMPLEMENT AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) WITH MEASURABLE OBJECTIVES INCLUDING ENVIRONMENTAL, ENERGY [WATER] AND TRANSPORTATION OBJECTIVES</u>								
The EMS is operated by Life & Environmental Sciences / Environment, Health & Safety Division								
Reduce Vehicle Petroleum Use		Update	Update	Update	Update	Update	Update	9
Reduce Commute Traffic		Update	Update	Update	Update	Update	Update	9

Notes

1. LBNL coordinates new vehicles from GSA with the DOE - Berkeley Site Office (BSO). Selections are based on availability and budget. Whenever these conditions allow, AFV's will be acquired.
2. Based on replacing 12 vehicles / year. Assumes all replacement vehicles are AF capable.
3. Several heavy duty service vehicles require standard diesel; not cost effective to replace.
4. Increased petroleum usage from FY 2008 due to expanded B20 fueled Shuttle Bus services.
5. Alternative fuel usage for FY 2009 and beyond is scaled based on the proportion of AFVs to the total fleet.
6. Cannot reduce mileage below this level and still perform the mission and maintain facilities.
7. LBNL has 43 NEV's now. HEV's and EV's are not yet available for lease from GSA, but will be requested, as well, when available. Assumes acquisition of 10 NEV's / Year per available funding. NEVs are not AFVs per guidance.
8. B20 biodiesel fueling in FY 2010 and beyond by subcontracted shuttle bus service provider.
9. These EMPs document critical performance above. Annual updates are provided to indicate performance.

**FY 2010 LBNL HPSB Management Action Plan
December 2009**

<u>LBNL GOALS</u>	<u>FY2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>FY2014</u>	<u>FY2015</u>	<u>Notes</u>
<u>NEW BUILDINGS / MAJOR RENOVATIONS OVER \$5-MILLION: Achieve LEED® Gold Certification and NEW BUILDINGS MEET OR EXCEED ENERGY STAR® BUILDING CRITERIA</u>							
B 15 ALS User Support Building		Certify					1
B 74 Modernize (Seismic Ph 2)		Certify					6
Gen Purp Lab (Seismic Ph 2)			Certify				2
B 45 Replacement					Certify		6
Sequestration Bldg.					Certify		
Lease Replacement Bldg.					Certify		
SERC Building					Certify		
Algal Building					Certify		
Energy Research Building					Certify		
Gen Purp Lab (Seismic Ph 3)					Certify		
B77 Ph 2 Mech & Elec Upgrade	Report						3
<u>MAJOR RENOVATIONS LESS THAN \$5-MILLION</u>							
<u>Comply with Guiding Principals for Federal Leadership in High Performance Sustainable Buildings</u>							
BELLA Conventional Facilities		Report					3
B71 Rm 146 (LOASIS)							4
<u>DESIGN TO ACHIEVE ENERGY SAVINGS 30% BELOW ANSI/ASHRAE/IESNA STANDARD 90.1-2004</u>							
B 15 ALS User Support Building		≥ 30%					
B 74 Modernize (Seismic Ph 2)		≥ 30%					5
Gen Purp Lab (Seismic Ph 2)			≥ 30%				
B 45 Replacement				≥ 30%			
Sequestration Bldg.				≥ 30%			
Lease Replacement Bldg.				≥ 30%			
SERC Building				≥ 30%			
Algal Building				≥ 30%			
Energy Research Building				≥ 30%			
Gen Purp Lab (Seismic Ph 3)				≥ 30%			
B77 Ph 2 Mech & Elec Upgrade							4
BELLA Conventional Facilities		≥ 30%					
<u>UTILIZE LABORATORIES FOR THE 21ST CENTURY PARTNERSHIP PROGRAM FOR DESIGN</u>							
All New Construction & Renovations	Evidence	Evidence	Evidence	Evidence	Evidence	Evidence	7
<u>ENSURE 15% OF ENDURING BUILDINGS COMPLIANT WITH GUIDING PRINCIPALS</u>							
Enduring Building Total GSF	1,668,750	1,744,132	1,785,132	1,785,132	2,214,474	2,214,474	8
New (LEED-Gold) Buildings Planned	0	75,382	41,000	0	429,342	0	
Planned & Completed Assessments	412,726	0	0	0	0	0	
Additional Assessments Needed	0	420,000	435,000	435,000	435,000	440,000	
New Buildings and Planned Audits	412,726	495,382	476,000	435,000	864,342	440,000	
Percent of Enduring Buildings in 4-Yrs	106%	124%	89%	102%	103%	100%	
<u>UPDATE LEASE & RENEWAL TERMS</u>							
	Verify						

Notes

1. This performance schedule is based on the current LBNL Facilities Capital Project Schedule. The schedule is subject to change from unforeseen circumstances. This action plan will be updated each year.
2. Committed to LEED® - Gold Certification
3. Prepare a report showing how the project design complies with specific requirements of the Guiding Principals.
4. This project was designed before FY 2008; construction is underway. Current requirements are not applicable.
5. Current design ~ 42% less than ASHRAE Standard 90.1-2004, far exceeding the 30% minimum
6. Score energy performance using Energy Star® Portfolio Manager Rating Tool; not applicable to these buildings.
7. Evidence: Copies of correspondence / calculations / design showing partnering with Labs-21, as appropriate.
8. Based on ESPC audits, VFA Standard & Green Facility Assessments, dedicated audits and new construction

**FY 2010 LBNL Additional DOE O430.2B Energy Management Action Plan
December 2009**

This Action Plan addresses additional requirements of the DOE O 430.2B Contractor Requirements Document not specifically been addressed in Action Plans covering other subject areas. There is no corresponding text summary.

<u>LBNL GOALS</u>	<u>FY2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>FY2013</u>	<u>FY2014</u>	<u>FY2015</u>	<u>Notes</u>
<u>DEVELOP & IMPLEMENT AN ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) WITH MEASURABLE OBJECTIVES INCLUDING ENVIRONMENTAL, ENERGY [WATER] AND TRANSPORTATION OBJECTIVES</u>							
The EMS is operated by Life & Environmental Sciences / Environment, Health & Safety Division							
Energy Star & Recycled Products by CFO	Update	Update	Update	Update	Update	Update	1
Minimum 95% EPEAT Products	>95%	>95%	>95%	>95%	>95%	>95%	2
<u>ENERGY PURCHASING</u>							
	IRP	IRP	IRP	IRP	IRP	IRP	3
<u>PARTICIPATE IN LOCAL UTILITY DEMAND RESPONSE PROGRAMS</u>							
Continue in PG&E DRP & CPP Prgms	Continue	Continue	Continue	Continue	Continue	Continue	
<u>PROCURE ENERGY STAR® - QUALIFIED OR FEMP DESIGNATED PRODUCTS</u>							
Include in Design Guidelines/Specs	Update	Update	Update	Update	Update	Update	4
<u>EMERGENCY CONSERVATION PLANS: MITIGATE EFFECTS DISRUPTIONS IN CRITICAL ENERGY SUPPLIES</u>							
Electric Power & Natural Gas Plans	Update	Update	Update	Update	Update	Update	5
<u>INTEGRATE LBNL SUSTAINABILITY EXECUTABLE PLAN WITH TYSP & ISM</u>							
Integrate Planning with TYSP & ISM	evidence	evidence	evidence	evidence	evidence	evidence	6, 7
<u>PERSONNEL MANAGEMENT</u>							
Staffing & Training are adequate	evidence	evidence	evidence	evidence	evidence	evidence	7
Employee Incentive Program in Place	evidence	evidence	evidence	evidence	evidence	evidence	7
Outreach Program is effective	evidence	evidence	evidence	evidence	evidence	evidence	7

Notes

1. The Environmental Management System (EMS) is the responsibility of the LBNL Environment, Health & Safety [EH&S] Division. Performance of the EMS is monitored under other contract performance measures. Energy Management Programs (EMPs), or Plans, are prepared addressing a number of environmental aspects of LBNL operations. Only those EMPs for which the Energy Management Program has responsibility or are related to the TEAM Initiative are addressed in this Action Plan.
2. Updating of Procurement of Goods and Services EMP is performed by the Office of the Chief Financial Officer.
3. Submit an annual report of energy past and predicted future consumption, The Integrated Resource Plan (IRP).
4. Relevant LBNL procurement documents already include these requirements; they will be updated each year.
5. LBNL maintains emergency plans for electric power and natural gas - plans will be updated annually as appropriate.
6. Ten Year Site Plan (TYSP) and Integrated Safety Management (ISM)
7. Evidence of promotional material (poster) placements, copies of news articles on TABL and on LBNL web page.

Attachment 3
LBNL FY 2009 Building Automation System Status

Attachment 3. LBNL FY 2009 Building Automation System Status

Type	ID	Name	Quantity	Unit of Measure	HVAC BAS System Type	Schedule Control	Temperatuer Setback/Up	Remarks
B	002	Laboratories & Research Offices	85,506	GSF	BAS-Metasys	Yes	Yes	
B	002A	Central Chemical Storage	182	GSF	None			
B	004	Offices	10,176	GSF	BAS-Metasys	Yes	Yes	
B	005	Laboratories & Research Offices	7,176	GSF	BAS-Metasys	No	No	
B	006	Advanced Light Source (ALS)	118,573	GSF	BAS-Barrington	No	No	All offices have TOD control
B	007	Assembly, Offices & Labs (ALS Support)	21,435	GSF	BAS-Barrington	Yes	Yes	
B	007A	Storage	128	GSF	None			
B	010A	Telecommunications Equipment	242	GSF	None			
B	013A	Environmental Monitoring Station	76	GSF	None			
B	013B	Environmental Monitoring Station	76	GSF	None			
B	013C	Environmental Monitoring Station	76	GSF	None			
B	013D	Environmental Monitoring Station	76	GSF	None			
B	013H	Environmental Monitoring Station	90	GSF	None			
B	014	Laboratory and Offices	4,201	GSF	None			
B	016	Laboratories and Research Offices	11,808	GSF	BAS-Barrington	No	No	Incomplete
B	016A	Storage	339	GSF	None			
B	017	Shop, Assembly & Offices	2,222	GSF	None			
B	025	Labs, Shops & Offc (red-tagged)	20,303	GSF	BAS-Barrington			Bldg. Out of Service
B	025A	Shop, Assembly & Offices	7,514	GSF	BAS-Metasys	Yes	Yes	
B	025B	Waste Treatment Unit Shelter	360	GSF	None			
B	026	Medical Services, Labs & Offices	10,562	GSF	BAS-Metasys	Yes	Yes	
B	027	Dry Lab & Offices (Special Instrument)	3,299	GSF	None			
B	028	Radio Shelter Facility	544	GSF	Local-Programmable	No	No	24/7 Operation
B	031	Chicken Creek Bldg	7,327	GSF	BAS-Metasys	Yes	Yes	
B	033A	Strawberry Gate Guard House	52	GSF	Local-Manual			
B	033B	Blackberry Gate Guard House	94	GSF	Local-Manual			
B	033C	Grizzly Peak Gate Guard House	80	GSF	Local-Manual			
B	034	ALS Chiller Building	5,163	GSF	None			
B	036	Grizzly Electrical Substation	880	GSF	None			
B	037	Utility Services Building	5,833	GSF	None			
B	040	Dry Lab, Assembly & Storage	993	GSF	None			
B	041	FA offices and storage	995	GSF	BAS-Barrington	Yes	Yes	
B	043	Standby Gen. Shelter (Compressor House)	1,020	GSF	BAS-Barrington	No	No	
B	044	Dry Lab, Assembly & Storage	805	GSF	BAS-Barrington	Yes	Yes	
B	045	Fire Apparatus	3,342	GSF	None			
B	046	Laboratories, Shops & Offices	54,133	GSF	BAS-Metasys	Yes	Yes	
B	046A	Offices	5,563	GSF	BAS-Metasys	Yes	Yes	
B	047	Offices	6,242	GSF	BAS-Metasys	Yes	Yes	
B	048	Fire Station, Emerg. Operations Ctr.	6,622	GSF	BAS-Barrington	No	No	24/7 Operation
B	050	Labs, Shops & Offices	48,719	GSF	BAS-Metasys	Yes	Yes	
B	050A	Labs, Shops & Offices	66,628	GSF	BAS-Metasys	Yes	Yes	
B	050B	Laboratories, Shops & Offices	63,695	GSF	BAS-Metasys	Yes	Yes	

Attachment 3. LBNL FY 2009 Building Automation System Status

Type	ID	Name	Quantity	Unit of Measure	HVAC BAS System Type	Schedule Control	Temperatuer Setback/Up	Remarks
B	050C	Offices	2,786	GSF	BAS-Metasys	Yes	Yes	
B	050D	Offices (red-tagged)	4,959	GSF	N/A			Bldg. Out of Service
B	050E	Offices	10,673	GSF	BAS-Barrington	Yes	Yes	
B	050F	Offices	9,449	GSF	BAS-Barrington	Yes	Yes	
B	051	Former Bevatron (Demo Project Underway)	96,562	GSF	N/A			Bldg. Out of Service
B	051A	Former Bevatron (Demo Project Underway)	28,478	GSF	N/A			Bldg. Out of Service
B	052	Dry Laboratory & Offices	6,425	GSF	BAS-Barrington	Yes	Yes	
B	052A	Storage	516	GSF	None			
B	053	Laboratories, Shops & Offices	6,944	GSF	BAS-Barrington	Yes	Yes	
B	054	Cafeteria	15,451	GSF	BAS-Metasys	Yes	Yes	
B	054A	Automated Teller Machine Shelter	195	GSF	None			
B	055	Laboratories and Research Offices	19,048	GSF	BAS-Barrington	Yes	Yes	
B	055A	Laboratory & Research Office	1,529	GSF	BAS-Barrington	Yes	Yes	
B	055B	Standby Generator Shelter	209	GSF	None			
B	056	Accelerator & Research Office	1,782	GSF	BAS-Barrington	Yes	Yes	
B	058	Highbay Lab, Shops & Offices	10,279	GSF	BAS-Metasys	Yes	Yes	
B	058A	Highbay Lab, Shops & Offices	12,653	GSF	BAS-Metasys	Yes	Yes	
B	060	Highbay Lab	3,615	GSF	None			
B	061	Storage	323	GSF	None			
B	062	Laboratories, Shops & Offices	55,904	GSF	BAS-Metasys	Yes	Yes	
B	062B	Telephone Equip. Storage	169	GSF	None			
B	063	Laboratories	2,696	GSF	None			
B	064	Laboratories, Shops, Assembly & Offices	29,357	GSF	BAS-Metasys	Yes	Yes	
B	065	Offices	3,423	GSF	BAS-Barrington	Yes	Yes	
B	066	Laboratories & Offices	44,121	GSF	BAS-Metasys	Yes	Yes	
B	067/67A	Molecular Foundry (Labs-Shops-Offices)	97,155	GSF	BAS-Metasys	Yes	Yes	
B	068	Water Distribution Pump Shelter	500	GSF	None			
B	069	Shipping & Receiving, Archives, Offices	20,461	GSF	BAS-Barrington	Yes	Yes	
B	070	Laboratories, Shops & Offices	63,441	GSF	BAS-Metasys	Yes	Yes	
B	070A	Laboratories, Shops & Offices	68,440	GSF	BAS-Metasys	Yes	Yes	
B	070B	Telephone Equip. Storage	382	GSF	None			
B	071	Laboratories, Shops & Offices	54,427	GSF	BAS-Barrington	Yes	Yes	
B	071A	Lab & Office	4,041	GSF	N/A			
B	071B	Shops & Offices	6,892	GSF	BAS-Barrington	Yes	Yes	
B	072	Nat'l Ctr for Electron Microscopy (NCEM)	5,352	GSF	BAS-Metasys	Yes	Yes	
B	072A	NCEM TEAM 0.5 Microscope	2,532	GSF	BAS-Metasys	No	No	Process Control Building
B	072B	NCEM TEAM 1.0 Microscope	4,508	GSF	BAS-Metasys	No	No	Process Control Building
B	072C	Nat'l Ctr for Electron Microscopy (NCEM)	8,409	GSF	BAS-Metasys	Yes	Yes	
B	073	Previously Labs/Shops/Offic (red-tagged)	4,228	GSF	N/A			Bldg. Out of Service
B	073A	Utility Equipment Bldg. (red-tagged)	403	GSF	N/A			Bldg. Out of Service
B	074	Laboratories & Offices	45,382	GSF	N/A			Bldg. Out of Service
B	074F	Dog Kennel	1,560	GSF	N/A			Bldg. Out of Service

Attachment 3. LBNL FY 2009 Building Automation System Status

Type	ID	Name	Quantity	Unit of Measure	HVAC BAS System Type	Schedule Control	Temperatuer Setback/Up	Remarks
B	075	Laboratories & Offices	8,499	GSF	BAS-Barrington	Yes	Yes	
B	075A	EH&S Lab	4,000	GSF	BAS-Barrington	Yes	Yes	
B	075C	EH&S Calibration Building	450	GSF	None			
B	075D	Storage - EHS	1,895	GSF	None			
B	076	Facilities Div Offices	31,698	GSF	BAS-Barrington	Yes	Yes	
B	077	Central EG Shops, Assembly & Labs	68,937	GSF	BAS-Metasys	Yes	Yes	
B	077A	Composites Lab and Assembly Facility	12,118	GSF	BAS-Barrington	Yes	Yes	
B	077H	Utility Storage	576	GSF	None			
B	078	FA Maintenance Shops	5,391	GSF	BAS-Barrington	Yes	Yes	
B	079	Salvage Processing Facility	4,564	GSF	BAS-Barrington	Yes	Yes	
B	080	Laboratories, Shops & Offices	29,912	GSF	BAS-Barrington	Yes	Yes	
B	080A	Offices	960	GSF	BAS-Barrington	Yes	Yes	
B	081	FA Chemical & Other Storage	1,129	GSF	None			
B	082	Water Distribution Pump Shelter	537	GSF	None			
B	083	Laboratories & Offices	6,856	GSF	BAS-Barrington	Yes	Yes	
B	084	Laboratories & Offices	55,031	GSF	BAS-Barrington	Yes	Yes	
B	084B	Utility Building	1,633	GSF	None			
B	085	Hazardous Waste Handling Facility (HWHF)	15,405	GSF	BAS-Barrington	Yes	Yes	
B	085A	HWHF Storage Racks	885	GSF	None			
B	086	Animal Care Facility	5,006	GSF	BAS-Metasys	Yes	Yes	
B	088	88 Cyclotron User Facility	54,428	GSF	BAS-Barrington	Yes	Yes	
B	088D	88 Standby Generator Shelter	265	GSF	None			
B	090	Offices	89,509	GSF	BAS-Metasys	Yes	Yes	
B	100	Joint Genome Institute (JGI)	27,526	GSF	BAS-Other	Yes	Yes	
B	310	Joint Genome Institute (JGI)	17,689	GSF	BAS-Other	Yes	Yes	
B	400	Joint Genome Institute (JGI)	29,323	GSF	BAS-Other	Yes	Yes	
B	500	JGI Warehouse	4,604	GSF	N/A			
B	904	LBNL warehouse	49,678	GSF	N/A			
B	943	Oakland Scientific Facility	51,901	GSF	BAS-Metasys	Yes	Yes	
B	962	Wash. DC L'Enfant Plaza - Offices	2,228	GSF	N/A			
B	965	Livermore Network Operations Ctr (NOC)	2,547	GSF	N/A			
B	977	717 Potter Street - Labs & Offices	60,833	GSF	BAS-Other	Yes	Yes	
B	978	Joint BioEnergy Institute (JBEI)	65,645	GSF	BAS-Other	Yes	Yes	
T	007C	Offices	479	GSF	BAS-Barrington	Yes	Yes	
T	031A	Offices	623	GSF	BAS-Barrington	Yes	Yes	
T	044A	ALS offices	481	GSF	BAS-Metasys	Yes	Yes	
T	044B	Offices	1,441	GSF	BAS-Metasys	Yes	Yes	
T	046B	Offices	1,238	GSF	BAS-Metasys	Yes	Yes	
T	046C	Offices	1,029	GSF	BAS-Metasys	Yes	Yes	
T	046D	AFR	771	GSF	BAS-Metasys	Yes	Yes	
T	051F	Dry Labs	1,499	GSF	N/A			Bldg. Out of Service
T	053B	Offices	519	GSF	BAS-Barrington	Yes	Yes	

Attachment 3. LBNL FY 2009 Building Automation System Status

Type	ID	Name	Quantity	Unit of Measure	HVAC BAS System Type	Schedule Control	Temperatuer Setback/Up	Remarks
T	056A	Offices	4,902	GSF	None			
T	062A	Offices	1,238	GSF	BAS-Metasys	Yes	Yes	
T	064B	Offices	480	GSF	BAS-Metasys	Yes	Yes	
T	065A	Offices	1,453	GSF	BAS-Barrington	Yes	Yes	
T	065B	Offices	1,020	GSF	BAS-Barrington	Yes	Yes	
T	071C	Offices	511	GSF	BAS-Barrington	Yes	Yes	
T	071D	Offices	520	GSF	BAS-Barrington	Yes	Yes	
T	071F	Offices	516	GSF	BAS-Barrington	Yes	Yes	
T	071J	Offices	1,289	GSF	BAS-Barrington	Yes	Yes	
T	071K	Offices	474	GSF	BAS-Barrington	Yes	Yes	
T	071P	Offices	511	GSF	BAS-Barrington	Yes	Yes	
T	071Q	Restroom Trailer	357	GSF	BAS-Barrington	Yes	Yes	
T	071W	Offices	384	GSF	None			
T	071X	Offices	452	GSF	None			
T	075B	Offices	4,640	GSF	BAS-Barrington	Yes	Yes	
T	075E	Offices (red-tagged)	410	GSF	N/A			Bldg. Out of Service
T	076K	Offices	371	GSF	None			
T	076L	Offices	1,439	GSF	None			
T	083A	Lab Equipment & Offices	507	GSF	None			
T	085B	Offices	3,601	GSF	None			
T	090B	Offices	1,443	GSF	BAS-Metasys	Yes	Yes	
T	090C	Offices	1,189	GSF	BAS-Metasys	Yes	Yes	
T	090F	Offices	2,464	GSF	BAS-Metasys	Yes	Yes	
T	090G	Offices	1,851	GSF	BAS-Metasys	Yes	Yes	
T	090H	Offices	1,849	GSF	BAS-Metasys	Yes	Yes	
T	090J	Offices	2,845	GSF	BAS-Metasys	Yes	Yes	
T	090K	Offices	2,846	GSF	BAS-Metasys	Yes	Yes	
T	090P	Offices	2,133	GSF	BAS-Metasys	Yes	Yes	
T	090Q	Restroom Trailer	425	GSF	BAS-Metasys	Yes	Yes	
T	090R	Transformer Equipment Shelter	160	GSF	None			
S	115KVA SW A1 GRIZZLY	Grizzly Peak Substation	115	KVA	None			
S	12KV SW ST A6 (64C)	Blackberry Canyon Sw Station	18,000	KVA	None			
S	071T	EETD Windows Test Facility	1	EACH	None			
S	UNIT SUBSTATIONS	Sitewide Unit Substations	52,125	KVA	None			
S	12KV SW ST A4-(35)	Original Lab Site Sw Station (near 45)	9,000	KVA	None			
S	12KV SW ST A3 (6A)	Switching Station for the ALS	52,125	KVA	None			
S	12KV SW ST A5 (66A)	East Canyon Sw Station (NE of 66)	9,000	KVA	None			
S	DIESEL GENERATOR	Generator located near 64	2,000	KVA	None			
S	070E	Storage Container	432	SQFT	None			
S	048A	Storage Container	320	SQFT	None			
S	079A	Drum Storage Rack Container	216	SQFT	None			
S	085J	Storage Container	193	SQFT	N/A			

Attachment 3. LBNL FY 2009 Building Automation System Status

Type	ID	Name	Quantity	Unit of Measure	HVAC BAS System Type	Schedule Control	Temperatuer Setback/Up	Remarks
S	070G	Storage Container	173	SQFT	N/A			
S	005A	Storage Container	160	SQFT	N/A			
S	005B	Storage Container	160	SQFT	N/A			
S	017A	Storage Container	160	SQFT	N/A			
S	076A	Storage Container	160	SQFT	N/A			
S	076D	Storage Container	160	SQFT	None			
S	030A	Storage Container	157	SQFT	None			
S	030B	Storage Container	157	SQFT	None			
S	030R	Storage Container	157	SQFT	None			
S	030S	Storage Container	157	SQFT	None			
S	031B	Storage	157	SQFT	None			
S	031C	Storage	157	SQFT	None			
S	077P	Storage Container	157	SQFT	None			
S	077T	Steel Container	157	SQFT	None			
S	085F	Storage Container	157	SQFT	None			
S	085G	Storage Container	157	SQFT	None			
S	017B	Storage Container	130	SQFT	None			
S	BUS STOPS	site-wide bus stops	10	EACH	None			
S	077L	Storage Container w/pwr & FP	81	SQFT	None			
S	077R	Storage Container w/pwr & FP	81	SQFT	None			
S	077S	Storage Container w/pwr & FP	81	SQFT	None			
S	077M	Storage Container w/pwr & FP	80	SQFT	None			
S	085D	Storage Container	75	SQFT	None			
S	013E	Sewage Monitoring Station	1	EACH	None			
S	085E	Storage Container	67	SQFT	None			
S	085K	Storage Container	67	SQFT	None			
S	077J	Storage Container w/pwr & FP	49	SQFT	None			
S	077K	Storage Container w/pwr & FP	49	SQFT	None			
S	077N	Storage Container w/pwr & FP	49	SQFT	None			
S	077Q	Storage Container w/pwr & FP	49	SQFT	None			
S	013F	Sewage Monitoring Station	1	EACH	None			
S	062C	Storage Container	36	SQFT	None			
S	062D	Storage Container	36	SQFT	None			
S	031D	Storage Container	34	SQFT	None			
S	085H	Storage Container	21	SQFT	None			

Attachment 4
LBNL FY 2009
Comprehensive Energy Data Report

MS – Excel Workbook transmitted electronically,
“under separate cover”