

*University of California
Lawrence Berkeley National Laboratory*

**BUILDING 59 UPGRADE &
INSTALLATION AND OPERATION
OF NERSC – 9**

**Final Focused Environmental Impact Report
SCH# 2016062007**



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February 2017

Building 59 Upgrade & Installation and Operation of NERSC - 9

Final Focused Environmental Impact Report

**(Including Supplementation of the 2006 LRDP EIR with respect to
Greenhouse Gas Emissions and Energy Impacts)**

SCH # 2016062007

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1.0 INTRODUCTION

1.1 PURPOSE OF THE FINAL ENVIRONMENTAL IMPACT REPORT

Under the California Environmental Quality Act (CEQA) and the University of California procedures for implementing CEQA, following completion of a Draft Environmental Impact Report (EIR), the University is required to consult with and obtain comments from public agencies that have jurisdiction by law or discretionary approval power with respect to the proposed project, and to provide the general public with opportunities to comment on the Draft EIR.

On October 31, 2016, the University of California, as the Lead Agency under CEQA, issued a Draft EIR on the National Energy Research Scientific Computing Center Project (“NERSC-9” or “Project”) proposed by the Lawrence Berkeley National Laboratory (UC LBNL). In addition to serving as a project-level EIR for the NERSC-9 project, the Draft EIR supplemented the EIR for LBNL’s 2006 Long Range Development Plan (LRDP), and updated the program-level analysis of impacts from GHG emissions that would result from the implementation of the LRDP as a whole and also presented an updated energy impact analysis. The 2006 LRDP EIR (SCH No. 2000102046), as previously updated by the “Supplementation of the LBNL 2006 LRDP EIR with respect to Traffic Impacts at One Intersection,” which was included in the Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 Project EIR (SCH No. 2008122030), is incorporated by reference in this EIR.

The NERSC-9 Draft EIR was circulated for a 45-day public comment period that ended on December 15, 2016. During this period, UC LBNL held a public meeting on the Draft EIR on December 8, 2016, to receive verbal comments. No members of the public or agency staff attended the public meeting and no verbal comments were received at the meeting. Furthermore, no comment letters or emails were received by UC LBNL during the public comment period for the Draft EIR.

The Final EIR is an informational document prepared by the Lead Agency that must be considered by decision makers before approving or denying the proposed project. CEQA Section 15132 specifies that the Final EIR shall consist of the following:

1. The Draft EIR or a revision to the draft.
2. Comments and recommendations received on the Draft EIR either verbatim or in summary form.
3. A list of the persons, organizations, and public agencies commenting on the Draft EIR.
4. The response of the Lead Agency to significant environmental points raised in review and consultation process.

5. Any other information added by the Lead Agency.

The Draft EIR, which is incorporated by reference, and this document constitute the Final EIR. Copies of the Final EIR, the 2006 LRDP, 2006 LRDP EIR, and the Seismic Phase 2 EIR, all of which are incorporated by reference in this Final EIR, are available for review during normal business hours at UC LBNL at the following address and Web site:

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One Cyclotron Road, MS 76-234A
Berkeley, California 94720
Contact: Jeff Philliber, Environmental Planning Group Coordinator
planning@lbl.gov
<http://www.lbl.gov/Community/env-rev-docs.html>

The University of California (The University) is responsible for reviewing and certifying the adequacy of this environmental document and making a decision with respect to the proposed project.

1.2 ORGANIZATION OF THIS DOCUMENT

This document has been prepared pursuant to the *State CEQA Guidelines*. As noted above, no comments from public agencies and the general public were received on the Draft EIR analysis. Therefore, this document is organized into five sections.

Section 1.0, Introduction, provides the purpose of the Final EIR and a summary of the environmental review process.

Section 2.0, Executive Summary, summarizes environmental consequences that would result from the proposed project, provides a summary table that denotes anticipated significant environmental impacts, describes identified mitigation measures, and indicates the level of significance of impacts before and after mitigation.

Section 3.0, Revisions to the Draft EIR, presents changes to Draft EIR text based on internal review by UC LBNL. The changes are intended to clarify the text of the proposed mitigation measures.

Section 4.0, Mitigation Monitoring and Reporting Program, presents the full text of the proposed mitigation measures identified in the Final EIR and the monitoring and reporting requirements for each mitigation measure.

Section 5.0, Report Preparation, provides a list of the individuals involved in the preparation of this Final EIR.

2.0 EXECUTIVE SUMMARY

2.1 PURPOSE

This Final Focused EIR evaluates the potential for significant environmental impacts from the Building 59 Upgrade & Installation and Operation of NERSC-9 project (“NERSC-9 project”) proposed by the University of California Lawrence Berkeley National Laboratory (“UC LBNL,” “Berkeley Lab,” or “the Lab.”). In addition to serving as a project-level EIR for the NERSC-9 project, this document supplements the EIR prepared for LBNL’s 2006 Long Range Development Plan (LRDP). It updates the program-level analysis of impacts from greenhouse gas (GHG) emissions that would result from the implementation of the LRDP as a whole. This Final EIR also presents an updated program-level energy impact analysis.

This Executive Summary provides the decision makers, responsible agencies, and the public with a clear, simple, and concise description of the proposed project and its potential significant environmental impacts. Section 15123 of the *California Environmental Quality Act (CEQA) Guidelines* requires that the summary identify each significant effect, applicable mitigation measure(s), and alternatives that would minimize or avoid potential significant impacts. The summary is also required to identify any areas of controversy known to the lead agency, including any issues raised by agencies and the public and issues to be resolved. Such issues may include alternatives selections and whether or how to mitigate significant effects. This section focuses on the major areas of importance in the environmental analysis for the proposed project and utilizes non-technical language to promote understanding.

2.2 PROJECT LOCATION

The proposed NERSC-9 project would be located in the western portion of the LBNL site within the existing Shyh Wang Hall (formerly known as the “Computational Research and Theory” [CRT] facility, and also referred to as “Building 59”). Building 59 is an approximately 140,000-gsf building with 32,000 gsf of high-performance computing (HPC) space on one floor and office space on two upper floors. A mechanical floor is located beneath the HPC floor and an electrical room is adjacent to the HPC space. The building is immediately east and upslope of the LBNL’s Blackberry Canyon Gate entrance. The facility entrance is on Perlmutter Road and the building is within walking distance, or a short shuttle bus trip, of the UC Berkeley Physical and Computer Science Departments.

Chu Road and LBNL’s Building 50 office complex are north and east of Building 59. LBNL’s Building 70 complex, consisting mainly of laboratory space, is to the east. Other surrounding land uses include: Cyclotron Road and UC Berkeley Campus athletic, academic, and recreational facilities to the south; and Cyclotron Road, the Blackberry Canyon entrance gate, and Building 88, which houses a large Cyclotron

facility, to the west. Multi-family residential neighborhoods in the City of Berkeley and UC Berkeley student housing are also further to the west.

2.3 PROJECT DESCRIPTION

The proposed project includes the installation and operation of a new high-performance computing system called NERSC-9, up to three new cooling towers, a backup generator, water pumps, water distribution piping, heat exchangers, electrical substations, electrical distribution panels, air handling units, an additional uninterruptible power supply panel, and exhaust fans. All upgrades and improvements would take place inside the existing Building 59 or within a paved, exterior area adjacent to the southeastern corner of the building. The proposed project would not involve construction of or exterior modifications to any buildings. The (up to) three new cooling towers would be installed adjacent to four existing cooling towers; these would be partially visible from some off-site areas near the LBNL hill site. The project would not increase the number of employees and visitors that would be present in the building. The project components are described below.

High-Performance Computing System

The proposed NERSC-9 high-performance computing system would be installed on the HPC floor of Building 59. In order to operate seamlessly while upgrading high performance computing systems, the building was designed and constructed to accommodate simultaneous operation of two systems. This allows the current generation high-performance computing system to continue to function if a next generation is installed and phased into operation. Currently, the NERSC-7 system is operating in Building 59 and the installation of the NERSC-8 system has recently been completed and is fully operational. After NERSC-7 is phased out and then removed, NERSC-9 would be installed and gradually phased in.

The building interior itself would not undergo major structural modification, as the 32,000-gsf HPC floor is contiguous and largely column-free and has headroom to maximize flexibility in configuring supercomputer arrays. It includes a raised-floor system that provides access for data and electrical cable and mechanical piping; it also serves as a supply air chase for air-cooled equipment.

Cooling Towers

Cooling to the HPC floor and office space is currently provided by a bank of four high-efficiency evaporative cooling towers, approximately 30 feet high, located near the exterior southeastern corner of the HPC portion of Building 59. The cooling towers are seated on a concrete pad/foundation that is enclosed by a concrete wall. A fifth cooling tower, which was part of the previously approved CRT

project but has not yet been installed, would be installed in conjunction with the NERSC-9 project. This already-approved fifth cooling tower is conservatively considered a part of this project for CEQA analysis purposes. In addition to this already approved, fifth cooling tower, the proposed NERSC-9 project would add up to two additional cooling towers for a total of up to three new cooling towers. All three would occupy the existing concrete cooling tower foundation/pad that currently accommodates four cooling towers, and which was designed to hold up to seven cooling towers. All seven cooling towers would serve liquid cooled computational equipment and the air handling and rooftop HVAC units. The cooling towers would operate at full capacity only during the warmest days of the year, typically in August.

Backup Generator and Fuel Tank

Building 59 is currently equipped with a 1.25 megawatt (MW) standby generator. To accommodate the planned high-performance computing installation, the proposed project may also install a second 1.25 MW standby generator or multiple smaller generators with equivalent combined capacity, adjacent to the existing unit. Diesel fuel would be stored in a new, approximately 2,300 gallon above-ground fuel tank to service the new standby generator(s).

Other Equipment

Up to six electrical substations would be installed in the building's electrical rooms, and six water pumps, three heat exchangers, up to four air-handling units, and additional uninterruptable power supply (UPS) equipment would be installed on the mechanical level.

2.4 PROJECT OBJECTIVES

Key objectives of the proposed project are to:

- Upgrade the high-performance computing system in Building 59 to leverage improving technology to maximize computational capacity in order to best meet the rapidly increasing demands of science.
- Upgrade Building 59 facility power and cooling capability to accommodate the NERSC-9 supercomputer system.
- Flexibly accommodate data sharing between NERSC-9 and the existing NERSC-8 system and provide for highly efficient access to Building 59 facility storage and high-bandwidth.
- Operate project computing power and cooling systems with exceptional energy efficiency.
- Provide Building 59 facility upgrades and operations in a cost-effective and timely manner.

2.5 TOPICS OF KNOWN CONCERN

To determine which environmental topics should be addressed in this Draft Focused EIR, UC LBNL prepared an Initial Study and circulated it along with a Notice of Preparation (NOP) in order to receive input from interested public agencies and members of the public. Only one comment letter from East Bay Municipal Utility District (EBMUD) was received in response to the NOP. The letter does not articulate any particular concerns about the proposed NERSC-9 project; rather, it provides standard guidance and suggestions for any project on the Lab hill site. Copies of the NOP, Initial Study, and the letter from EBMUD are presented in Appendix 1.0 of the Draft Focused EIR. Based on the Initial Study, this Focused EIR addresses the following environmental topics in depth:

- Greenhouse Gas Emissions
- Tribal Cultural Resources
- Energy

2.6 IMPACT SUMMARY

In accordance with the *State CEQA Guidelines*, a summary of the NERSC-9 project's impacts is provided in **Table 2.0-1, Summary of NERSC-9 Project Impacts and Mitigation Measures**, presented below. A detailed discussion regarding the proposed project's potential environmental impacts is provided in **Section 4.0, Environmental Setting, Impacts, and Mitigation Measures**, of the Draft Focused EIR and in the Initial Study. Although the impact of the proposed NERSC-9 project related to GHG emissions would be potentially significant, the proposed mitigation measures reduce the impact to a less than significant level. All other impacts of the proposed project are less than significant and no mitigation measures are required.

2.7 ALTERNATIVES TO THE PROPOSED PROJECT

The alternatives evaluated in this Focused EIR focus on reducing the project's impacts related to GHG emissions and energy use. Project alternatives that are analyzed include the following:

Alternative 1: No Project Alternative. CEQA requires that a "No Project" alternative be considered. A No Project alternative is required to describe the consequences of not approving and implementing a proposed project. Under the No Project Alternative, the NERSC-9 HPC system would not be installed. The current NERSC-7 system would not be replaced but would continue to operate, as would the recently installed and fully functional NERSC-8. No upgrades to the building systems would be made and the

electricity use in Building 59 would remain at the current level of about 9 MW. A previously approved fifth cooling tower would be installed.

**Table 2.0-1
Summary of NERSC-9 Project Impacts and Mitigation Measures**

Environmental Topic and Impact		Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.1 Greenhouse Gas Emissions				
NERSC Impact GHG-1	The proposed project would generate greenhouse gas emissions, either directly or indirectly, that could have a significant impact on the environment.	Significant	NERSC Mitigation Measure GHG-1: Berkeley Lab shall monitor GHG emissions each year and develop or purchase renewable energy (RE) and/or purchase renewable energy certificates (REC) or other verifiable GHG offsets to reduce project-related GHG emission impacts from Building 59 to below significance levels. Based on projections in this EIR, mitigation in the amount of 35,092 MTCO ₂ e/year would be required starting at the end of FY 2021; actual mitigation would be adjusted based on actual emissions and the project schedule such that project-related Building 59 GHG emissions impacts would be below significance levels.	Less than significant
NERSC Impact GHG-2	Operation of the proposed project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.	Significant	NERSC Mitigation Measure GHG-2: Implement NERSC Mitigation Measure GHG-1.	Less than significant
4.2 Tribal Cultural Resources				
NERSC Impact TCR-1	The proposed project would not cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Section 21074.	Less than significant	No mitigation measures are required.	NA

Environmental Topic and Impact		Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.3 Energy				
NERSC Impact EN-1	Construction and operation of the proposed project would increase the use of energy resources on the project site but would not result in wasteful, inefficient or unnecessary consumption of energy resources.	Less than significant	No mitigation measures are required.	NA

Alternative 2: Modified NERSC-9 Alternative. Under the Modified NERSC-9 Alternative, previously approved building system upgrades would be implemented, including installation of a fifth cooling tower and additional substations so that Building 59 would be set up to operate at up to 17 MW of power. Under this alternative, the NERSC-8 system would operate at full utilization and NERSC-7 would be removed and replaced with a new high-performance computing system that could operate within the constraints of 17 MW of power for the entire building. Although this HPC system (“modified NERSC-9”) would not match the computational capabilities of the proposed NERSC-9, it would be newer technology than NERSC-7 and therefore would provide improved computational capabilities and better energy efficiency compared to the No Project Alternative, described above.

Table 2.0-2, Summary Comparison of NERSC-9 Project Alternatives, presented below, provides a comparison of the significant environmental impacts of each alternative to those that are expected to result from the proposed project. Details on the comparative merits of these alternatives are presented in **Section 5.0** of the Draft Focused EIR.

Based on the analysis presented in the Draft Focused EIR, Alternative 2, Modified NERSC-9 Alternative, is identified as the Environmentally Superior Alternative.

**Table 2.0-2
Summary Comparison of NERSC-9 Project Alternatives**

NERSC-9 Project Impact		Proposed NERSC-9 Project (Before Mitigation)	No Project Alternative	Modified NERSC-9 Alternative
4.1 Greenhouse Gas Emissions				
NERSC Impact GHG-1	The proposed project would generate greenhouse gas emissions, either directly or indirectly, that could have a significant impact on the environment.	Significant	No Impact Less than the proposed project	Significant Reduced impact compared to proposed project
NERSC Impact GHG-2	Operation of the proposed project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.	Significant	Less than significant Less than the proposed project	Significant Reduced impact compared to proposed project
4.2 Tribal Cultural Resources				
NERSC Impact TCR-1	The proposed project would not cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Section 21074.	Less than significant	Less than significant Similar to the proposed project	Less than significant Similar to the proposed project
4.3 Energy				
NERSC Impact EN-1	Construction and operation of the proposed project would increase the use of energy resources on the project site but would not result in wasteful, inefficient or unnecessary consumption of energy resources.	Less than significant	Less than significant Less energy efficient than the proposed project	Less than significant Similar to the proposed project in energy efficiency

2.8 ISSUES TO BE RESOLVED/AREAS OF CONTROVERSY

This EIR addresses environmental issues associated with the proposed project that are known to the lead agency. No issues to be resolved or areas of controversy were identified for the proposed project during the scoping process or through agency and public review of the Draft Focused EIR. The one comment letter that was received, which was submitted in response to the NOP, does not raise any issues. No public comments were received at the scoping meeting or at the Draft EIR public hearing for the project.

2.9 SUPPLEMENTATION OF THE LBNL 2006 LRDP EIR

In addition to providing project-level CEQA review of the NERSC-9 project this EIR supplements the current program EIR for LBNL's 2006 Long Range Development Plan (LRDP). This supplement updates the GHG and energy impacts analyses that would result from LRDP implementation. GHG and energy impacts of the 2006 LRDP are summarized in **Table 2.0-3, Updated 2006 LRDP GHG and Energy Impacts and Mitigation Measures**, presented below.

**Table 2.0-3
Updated 2006 LRDP GHG and Energy Impacts and Mitigation Measures**

Environmental Topic and Impact		Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.1 Greenhouse Gas Emissions				
LRDP Impact GHG-1	Growth at Berkeley Lab under the 2006 LRDP would result in greenhouse gas emissions, either directly or indirectly, that could have a significant impact on the environment.	Significant	<p>LRDP Mitigation Measure GHG-1: Berkeley Lab shall set a goal to reduce its net Scope 1, 2, and 3 GHG emissions to 20 percent below its FY1990 GHG emissions by the end of FY2025. For Berkeley Lab, this corresponds to net GHG emissions below 44,800 MTCO₂e/year (20 percent below the Lab's 1990 emissions of 56,002 MTCO₂e) by the end of FY2025.</p> <p>Reductions in emissions will be achieved in a manner consistent with any applicable federal sustainability executive order. This currently includes targeting reductions in Scope 1 and 2 GHG emissions by 50 percent by the end of FY2025 from a FY2008 baseline and Scope 3 GHG emissions by 25 percent by the end of FY2025 from a FY2008 baseline.</p> <p>Berkeley Lab shall monitor GHG emissions each year, evaluate upcoming projects at Berkeley Lab for their potential to increase LBNL GHG emissions, and implement project-specific and Lab-wide GHG reduction measures to reduce LBNL GHG emissions in accordance with the 44,800 MTCO₂e/year goal for 2025. The</p>	Less than significant

Environmental Topic and Impact		Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
			<p>Lab-wide GHG reduction measures may include further enhancements to LBNL's TDM program and additional energy efficiency measures.</p> <p>In the event that adequate reduction is not achieved by these measures, Berkeley Lab will develop or purchase renewable energy and/or renewable energy credits or other verifiable GHG offsets to keep LBNL's net emissions at or below 44,800 MTCO₂e/year.</p>	
LRDP Impact GHG-2	Implementation of the 2006 LRDP could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.	Significant	<p>LRDP Mitigation Measure GHG-2:</p> <p>Implement NERSC-9 Mitigation Measure GHG-1 and LRDP Mitigation Measure GHG-1.</p>	Less than significant
LRDP Impact EN-1	Implementation of the 2006 LRDP would increase the use of energy resources at Berkeley Lab but would not result in wasteful, inefficient, or unnecessary consumption of energy resources.	Less than significant	No mitigation measures are required.	NA

3.0 REVISIONS TO DRAFT EIR

3.1 INTRODUCTION

This chapter shows revisions to the Draft EIR, subsequent to the document's publication and public review. The revisions are presented in the order in which the text appears in the Draft EIR and are identified by page number in respective chapters and sections. Complete sentences in which changes were made are provided, with text added to the Draft EIR shown in underline format and deleted text in ~~strikethrough~~.

3.2 DRAFT EIR TEXT REVISIONS

2.0 Executive Summary

Table 2.0-1, Summary of NERSC-9 Project Impacts and Mitigation Measures, page 2.0-5

The text of **Mitigation Measure GHG-1** in Draft EIR Table 2.0-1 has been revised for clarity as shown below.

NERSC Mitigation Measure GHG-1: Berkeley Lab shall monitor GHG emissions each year and develop or purchase renewable energy (RE) and/or purchase renewable energy certificates (REC) or other verifiable GHG offsets to reduce project-related GHG emission impacts from Building 59 to below significance levels. Based on projections in this EIR, mitigation in the amount of at least 35,092 MTCO₂e/year would be required by starting at the end of FY 2021 to reduce GHG emissions from Building 59; actual mitigation would be adjusted based on actual emissions and the project schedule such that project-related Building 59 GHG emissions impacts would be below significance levels.

Table 2.0-3, Updated 2006 LRDP GHG and Energy Impacts and Mitigation Measures, page 2.0-8

LRDP **Mitigation Measure GHG-1** has been revised to read more coherently as follows:

LRDP Mitigation Measure GHG-1: Berkeley Lab shall set a goal to reduce its net Scope 1, 2, and 3 GHG emissions to 20 percent below its FY1990 GHG emissions by the end of FY2025. For Berkeley Lab, this corresponds to net GHG emissions below 44,800 MTCO₂e/year (20 percent below the Lab's 1990 emissions of 56,002 MTCO₂e) by the end of FY2025.

Reductions in emissions will be achieved in a manner consistent with any federal sustainability executive order. This currently includes targeting reductions in, including targets to reduce net Scope 1 and 2 GHG emissions by 50 percent by the end of FY2025 from a FY2008 baseline and ~~to reducing~~ Scope 3 GHG emissions by 25 percent by the end of FY2025 from a FY2008 baseline.

Berkeley Lab shall monitor GHG emissions each year, ~~evaluate~~ monitor upcoming projects at Berkeley Lab LBNL for their potential to increase LBNL the Lab's GHG emissions, and implement project-specific and Lab-wide GHG reduction measures to reduce LBNL Berkeley Lab's GHG emissions in accordance with the 44,800 MTCO₂e/year goal for 2025. The Lab-wide GHG reduction measures may include further enhancements to LBNL's TDM program, and additional energy efficiency measures.

In the event that adequate reduction is not achieved by these measures, Berkeley Lab will develop and/or purchase renewable energy or purchase renewable energy credits or other verifiable GHG offsets to keep the Lab's net emissions at or below 44,800 MTCO₂e/year.

4.1 Greenhouse Gas Emissions

Project Impacts and Mitigation Measures, page 4.1-30

The changes to the text of **NERSC Mitigation Measure GHG-1** were also made on page 4.1-30 in the Draft EIR Section 4.1, as shown below.

NERSC Mitigation Measure GHG-1: Berkeley Lab shall monitor GHG emissions each year and develop or purchase renewable energy (RE) and/or purchase renewable energy certificates (REC) or other verifiable GHG offsets to reduce project-related GHG emission impacts from Building 59 to below significance levels. Based on projections in this EIR, mitigation in the amount of at least 35,092 MTCO₂e/year would be required by starting at the end of FY 2021 to reduce GHG emissions from Building 59; actual mitigation would be adjusted based on actual emissions and the project schedule such that project-related Building 59 GHG emissions impacts would be below significance levels.

Supplement to the 2006 LRDP EIR

Impacts and Mitigation Measures, page 13

The text of **LRDP Mitigation Measure GHG-1** on page 13 of the Supplement has been revised as shown below.

LRDP Mitigation Measure GHG-1: Berkeley Lab shall set a goal to reduce its net Scope 1, 2, and 3 GHG emissions to 20 percent below its FY1990 GHG emissions by the end of FY2025. For Berkeley Lab, this corresponds to net GHG emissions below 44,800 MTCO₂e/year (20 percent below the Lab's 1990 emissions of 56,002 MTCO₂e) by the end of FY2025.

Reductions in emissions will be achieved in a manner consistent with any federal sustainability executive order. This currently includes targeting reductions in ~~including targets to reduce net~~ Scope 1 and 2 GHG emissions by 50 percent by the end of FY2025 from a FY2008 baseline and ~~to~~ ~~reducing~~ Scope 3 GHG emissions by 25 percent by the end of FY2025 from a FY2008 baseline.

Berkeley Lab shall monitor GHG emissions each year, ~~evaluate~~ monitor upcoming projects at Berkeley Lab LBNL for their potential to increase LBNL ~~the Lab's~~ GHG emissions, and implement project-specific and Lab-wide GHG reduction measures to reduce LBNL Berkeley Lab's GHG emissions in accordance with the 44,800 MTCO₂e/year goal for 2025. The Lab-wide GHG reduction measures may include further enhancements to LBNL's TDM program, and additional energy efficiency measures.

In the event that adequate reduction is not achieved by these measures, Berkeley Lab will develop and/or purchase renewable energy or purchase renewable energy credits or other verifiable GHG offsets to keep the Lab's net emissions at or below 44,800 MTCO₂e/year.

4.0 MITIGATION MONITORING AND REPORTING PROGRAM

The California Environmental Quality Act (CEQA) requires the Lead Agency approving a project to adopt a monitoring program for changes to the project that it adopts or makes a condition of project approval, including mitigation measures intended to eliminate or reduce potentially significant impacts of the project, in order to ensure compliance during project implementation. CEQA (Public Resources Code Section 21081.6(a)(1)) requires that a Mitigation Monitoring and Reporting Program (MMRP) be adopted at the time that the agency determines to carry out a project for which an EIR has been prepared, to ensure that mitigation measures identified in the EIR are fully implemented.

As noted in Section 3.0 of the Draft Focused EIR, the proposed Building 59 Upgrade & Installation and Operation of NERSC-9 project (herein after referred to as the “NERSC-9 project”) is an element of the growth projected under the LBNL 2006 Long Range Development Plan (LRDP). The mitigation measures adopted by The Regents in conjunction with the approval of the 2006 LRDP that are relevant to the proposed project are included in and a part of the NERSC-9 project. The full text of these mitigation measures is provided in the Initial Study (Appendix 1.0 of the Draft Focused EIR). These mitigation measures are a part of the proposed project and would not be readopted. These measures will be monitored pursuant to the existing 2006 (LRDP) Final EIR mitigation monitoring program previously adopted by the University in connection with its approvals of the 2006 LRDP.

The analysis in the Draft Focused EIR identifies the need for additional project-specific mitigation measures to mitigate the proposed NERSC-9 project’s impacts related to greenhouse gas (GHG) emissions. The MMRP for the NERSC-9 project is presented in **Table 4.0-1, NERSC-9 Project Mitigation Monitoring and Reporting Program**, presented below, and includes the full text of the project-specific mitigation measures identified in the Final EIR and the monitoring requirements.

As noted in Section 1.0 of the Draft Focused EIR, in addition to serving as a project-level EIR for the NERSC-9 project, the Draft EIR supplements the EIR for LBNL’s 2006 LRDP, and updates the program-level analysis of impacts from GHG emissions that would result from the implementation of the LRDP as a whole and also presented an updated energy impact analysis. The analysis in the Supplement to the 2006 LRDP EIR identifies the need for mitigation measures to mitigate the 2006 LRDP’s impacts related to GHG emissions. **Table 4.0-2, 2006 LRDP Amended Mitigation Monitoring and Reporting Program**, presented below, amends the previously adopted MMRP for the 2006 LRDP to include the additional mitigation measures.

Both MMRPs describe implementation and monitoring procedures, responsibilities, and timing for each mitigation measure identified in the EIR, and include the following:

- **Environmental Topic and Impact:** Identifies the impact number and statement from the Final EIR.
- **Mitigation Measures:** Provides full text of the mitigation measure as provided in the Final EIR.
- **Monitoring/Reporting Action(s):** Designates responsibility for implementation of the mitigation measure and when appropriate, summarizes the steps to be taken to implement the measure.
- **Mitigation Timing:** Identifies the stage of the project during which the mitigation action will be taken.
- **Monitoring Schedule:** Specifies procedures for documenting and reporting mitigation implementation.

The University of California, Lawrence Berkeley National Laboratory (UC LBNL) may modify the means by which a mitigation measure will be implemented, as long as the alternative means ensure compliance during project implementation. The responsibilities of mitigation implementation, monitoring, and reporting extend to several UC LBNL departments and offices. The manager or department lead of the identified unit or department will be directly responsible for ensuring the responsible party complies with the mitigation. The Planning, Design, and Construction Department (PD&C) is responsible for the overall administration of the program and for assisting relevant departments and project managers in their oversight and reporting responsibilities. PD&C is also responsible for ensuring the relevant parties understand their charge and complete the required procedures accurately and on schedule.

**Table 4.0-1
NERSC-9 Project
Mitigation Monitoring and Reporting Program**

Environmental Topic and Impact	Mitigation Measures	Monitoring/Reporting Responsibility and Action(s)	Mitigation Timing	Monitoring Schedule
Greenhouse Gas Emissions				
NERSC Impact GHG-1	NERSC Mitigation Measure GHG-1			
The proposed project would generate greenhouse gas emissions, either directly or indirectly, that could have a significant impact on the environment.	Berkeley Lab shall monitor GHG emissions each year and develop or purchase renewable energy (RE) and/or purchase renewable energy certificates (REC) or other verifiable GHG offsets to reduce project-related GHG emission impacts from Building 59 to below significance levels. Based on projections in this EIR, mitigation in the amount of 35,092 MTCO ₂ e/year would be required starting at the end of FY 2021; actual mitigation would be adjusted based on actual emissions and the project schedule such that project-related Building 59 GHG emissions impacts would be below significance levels.	UC LBNL Monitor GHGs and develop or purchase RE and/or purchase RECs or other verifiable GHG offsets necessary to reduce projected-related GHG emissions to below significance levels.	At the beginning of project operation (e.g., 2021); through the operational lifetime of the project.	Annually (through operational lifetime of project).
NERSC Impact GHG-2	NERSC Mitigation Measure GHG-2			
Operation of the proposed project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.	Implement NERSC Mitigation Measure GHG-1.	Same as above	Same as above	Same as above

**Table 4.0-2
2006 LRDP
Amended Mitigation Monitoring and Reporting Program**

Environmental Topic and Impact	Mitigation Measures	Monitoring/Reporting Responsibility and Action(s)	Mitigation Timing	Monitoring Schedule
Greenhouse Gas Emissions				
<p>LRDP Impact GHG-1</p> <p>Growth at Berkeley Lab under the 2006 LRDP would result in greenhouse gas emissions, either directly or indirectly, that could have a significant impact on the environment.</p>	<p>LRDP Mitigation Measure GHG-1</p> <p>Berkeley Lab shall set a goal to reduce its net Scope 1, 2, and 3 GHG emissions to 20 percent below its FY1990 GHG emissions by the end of FY2025. For Berkeley Lab, this corresponds to net GHG emissions below 44,800 MTCO_{2e}/year (20 percent below the Lab’s 1990 emissions of 56,002 MTCO_{2e}) by the end of FY2025.</p> <p>Reductions in emissions will be achieved in a manner consistent with any applicable federal sustainability executive order. This currently includes targeting reductions in Scope 1 and 2 GHG emissions by 50 percent by the end of FY2025 from a FY2008 baseline and Scope 3 GHG emissions by 25 percent by the end of FY2025 from a FY2008 baseline.</p> <p>Berkeley Lab shall monitor GHG emissions each year, monitor upcoming projects at Berkeley Lab for their potential to increase LBNL GHG emissions, and implement project-specific and Lab-wide GHG reduction measures to reduce LBNL GHG emissions in accordance with the 44,800 MTCO_{2e}/year goal for 2025.</p>	<p>UC LBNL</p> <p>Set goal in 2017.</p> <p>Monitor and document emissions annually as per mitigation monitoring timing and schedule.</p> <p>Implement reduction measures as specified in MM GHG-1.</p>	<p>Starting in 2017 (through the active timespan of the 2006 LRDP).</p>	<p>Annually (through the active timespan of the 2006 LRDP).</p>

LRDP Impact GHG-1, Continued

The Lab-wide GHG reduction measures may include further enhancements to LBNL's TDM program, and additional energy efficiency measures.

In the event that adequate reduction is not achieved by these measures, Berkeley Lab will develop and/or purchase renewable energy or purchase renewable energy credits or other verifiable GHG offsets to keep the Lab's net emissions at or below 44,800 MTCO_{2e}/year.

LRDP Impact GHG-2

LRDP Mitigation Measure GHG-2

Implementation of the 2006 LRDP could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Implement NERSC-9 Mitigation Measure GHG-1 and LRDP Mitigation Measure GHG-1.

Same as above

Same as above

Same as above

5.0 REPORT PREPARATION

5.1 LEAD AGENCY

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