

**Language Template for use by project engineers with Sustainable Design Standards for New Construction**

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Comments, questions, and suggestions may be directed to: Utility Resource Management Team

**​**1.0 ​Introduction

This document is provided to ease implementation of the LANL Sustainable Design requirements for New Construction and the Guiding Principles for Sustainable Federal Buildings. Sustainable design requirements stem from DOE Orders 413.3, 430.1C, federal regulations 10 CFR 433 and 10 CFR 436, and consensus standards such as ASHRAE 90.1. **Therefore, new construction projects are required to implement Sustainable Design requirements even if the LANL Engineering Standards Manual (ESM) or Tailored Standards Manual (TSM) are *not* the code of record.**

This document provides language that Project Engineers or Project Managers could use to copy/paste into key project documents to ensure effective communication and consistent implementation across the Laboratory. Sustainable design requirements are detailed within the LANL ESM – Chapter 14, and in an abbreviated way in the TSM – Chapter 14. This document is not meant to provide ALL the necessary language to ensure Sustainability requirements are met, for example, a Laboratory facility with fume hoods and complex ventilation elements would require additional language to promote success. The Chapter 14 POC is available to review draft documents or provide technical assistance as needed (SustainabilityTeam@lanl.onmicrosoft.com).

For projects that use the ProtoSTAR Design Standards, the use of it plus the LANL addendum should already contain all the language that is relevant, and no additional RCD language should be required. If additional requirements are needed, the addendum can be edited. Other documents may use the language below as needed.

### 2.0​ Sustainable Design Language (Applicability requirements are in ESM Ch. 14)

* 1. ​Requirements and Criteria Document (RCD).
1. **In the Description section:**
2. For buildings over 5,000 GSF: The building shall comply with the Guiding Principles for Sustainable Federal Buildings which require compliance with 6 Guiding Principles (GP) including achieving energy consumption levels at least 30% below the levels of the ASHRAE 90.1-2019 Baseline Building.
3. For buildings $50M and above (or the current threshold identified in DOE O 413.3B): The building shall meet LEED Gold requirements, at a minimum, AND the building shall also comply with the Guiding Principles for Sustainable Federal Buildings including achieving energy consumption levels at least 30% below the levels of the ASHRAE 90.1-2019 Baseline Building.
4. **In the Operational and Performance Requirements section:**
5. For buildings over 5,000 GSF: The building shall comply with the Guiding Principles for Sustainable Federal Buildings and documentation verifying compliance must be provided for the following 6 GPs: 1) Employ Integrated Design/Assessment, Operation, and Management Principles, 2) Optimize Energy Performance, 3) Protect and Conserve Water, 4) Enhance Indoor Environmental Quality, 5) Reduce the Environmental Impact of Materials, and 6) Assess and Consider Climate Change Risks.

For additionally detailed language see 3 below.

1. For buildings $50M and above (or the current threshold identified in DOE O 413.3B): The building shall meet LEED Gold requirements, at a minimum, AND the building shall also comply with the Guiding Principles for Sustainable Federal Buildings which requires compliance with 6 Guiding Principles (GP) 1) Employ Integrated Design/Assessment, Operation, and Management Principles, 2) Optimize Energy Performance, 3) Protect and Conserve Water, 4) Enhance Indoor Environmental Quality, 5) Reduce the Environmental Impact of Materials, and 6) Assess and Consider Climate Change Risks.

For additionally detailed language see 3 below.

1. Additionally detailed 2020 Guiding Principles language for all projects to be adapted as needed. If a criteria is handled institutionally, like benchmarking, or occupant health and wellness, it can be noted as “Institutional” on the GP checklist and not included in the RCD, see GP Checklist for which criteria are “institutional”.

a. Employ Integrated Design/Assessment, Operation, and Management Principles

* 1. A plan for project compliance should be developed early by establishing an Integrated Design Team and conducting a Sustainable Design charrette to consider and mitigate the environmental impacts of the project. The GP checklist should be prepared and used to inform decisions throughout the project, as well as to document final compliance.
	2. Commissioning and recommissioning can be achieved by providing a commissioning report, designing and constructing a Building Automation System (BAS), and confirming communication with LANL’s institutional SkySpark system at project completion.

b. Optimize Energy Performance

1. Energy efficiency, 30% better than the ASHRAE 90.1-2019 standard, must be achieved by using a whole building energy performance evaluation, and a life cycle cost (LCC) analysis verifying greatest efficiency reduction achievable. A whole building energy model (simple box method) should be completed as early as possible, preferably to be used during the Sustainable Design charrette, to allow the IPT to make decisions about the energy using elements of the building prior to 30% or conceptual design completion. Energy efficiency strategies and measures that may be considered for inclusion in the project are as follows: upgraded envelope (insulation, windows/doors, passive solar strategies, system efficiency (lighting and mechanical), renewables, and plug and process load management.
2. Energy efficient equipment and appliances must be selected, per 10CFR436 subpart C, and compliance documented with purchase orders, submittals, or contracts.
3. Renewable energy systems should also be considered, and if not used the decision shall be supported by a life-cycle cost analysis. (Solar thermal systems have not been found life cycle cost effective at LANL and calculations are not required.)
4. Metering electricity, natural gas, and/or steam with network connected “smart” meters is required prior to project close-out. See Chapter 14, Attachment 2 for more information.
5. Benchmarking will be achieved, institutionally by LANL. However, network connected electric **[and natural gas]** “smart” meters will be required prior to project close-out. See Chapter 14, Attachment 2 for more information.
6. Protect and Conserve Water
7. Water meters with network connected “smart” meters is required prior to project close-out. See Chapter 14, Attachment 2 for more information.
8. Specify and install low-flow plumbing fixtures such as WaterSense certified, water conserving appliances, and water conserving HVAC systems. Design may not include single pass cooling.
9. Design water efficient landscapes and meter irrigation water where used. Potable water used for irrigation must be limited to at least 50% below conventional practices as defined in ASHRAE standard 189.1-2004.
10. If irrigating, consider alternative water sources only if life-cycle cost-effective.
11. Stormwater management techniques that meet or exceed the 2017 National Pollutant Discharge Elimination System Construction General Permit and the Energy Independence and EISA section 438 must be implemented. Low Impact Development/Green Infrastructure techniques should be used to design sustainable, water-efficient landscaping that also fulfill storm water management requirements. See the LANL Engineering Standards Manual, Chapter 3, Section G20GEN for details.
12. Enhance Indoor Environmental Quality
13. Design and document that the building meets the current ASHRAE 55 and 62.1 standards for ventilation and thermal comfort.
14. Design should take advantage of daylighting, automatic dimming controls, task lighting, and shade and glare control.
15. Indoor air quality must be addressed by using low emitting materials, integrated pest management techniques, and detailing a continuous air and water barrier to protect indoor air quality during construction and in the finished building.
16. Occupant health and wellness must be addressed by promoting opportunities for voluntary increased physical movement of building occupants such as making stairwells an obvious choice, access to daylight, and exterior views, and providing water bottle refilling stations.
17. Reduce the Environmental Impact of Materials
18. The project must specify certain products, See Chapter 14, Attachment 1, that have recycled material content per RCRA section 6002, have biobased content per FSRIA section 9002, and avoid ozone depleting compounds and high global warming potential chemicals.
19. Provide reuse and recycling areas in the building for occupant use, and near the building for collection of recyclables, non-hazardous, non-construction material.
20. During construction the project must provide reuse and recycling services and divert at least 50% of non-hazardous non-construction related materials and 50% of construction and demolition from landfills. Engage a LANL waste management coordinator.
21. Assess and Consider Risks
22. Consider design features to mitigate risk factors based on the long-term mission criticality of the physical asset and operations to be housed in the facility. Employ low and no cost resilience measures to address predicted conditions, prioritized against criticality, cost, and security.
23. Floodplain development should be avoided whenever there is a practicable alternative.
24. **In the Architectural section (when referring to interior finish considerations):**
25. While several LANL master spec sections have been revised to specify Environmental Preferable Products (EPP) (recycled content, biobased) where required, not all specifications are up to date with the listing of required EPP products posted as Attachment 1 to LANL ESM Chapter 14. The EOR is responsible for editing specifications to include required attributes.
	1. A/E Contract (Exhibit D)
26. **Include the following text (adapt as needed and include other specifics based on type of facility):**
27. For all projects: A/E Team shall have relevant experience with cost effective environmentally sustainable design, as described in the LANL ESM, Chapter 14, Sustainable Design. The Offeror should note in its A-E Qualifications form, any projects with exemplary energy or water performance, and/or that achieved certification at least a LEED™ Gold level or the Guiding Principles for Sustainable Federal Buildings compliance and should note all proposed Team members that participated.

Additional language for projects over $50M (or the current threshold identified in DOE O 413.3B): A/E team should consist of at least one LEED accredited professional.

1. For all projects: A/E Team should have relevant experience using energy models to estimate as-operated energy performance and experience verifying modeled energy performance with measured performance post-occupancy. The Offeror should include in its A-E Qualifications form recent relevant project experience involving the use of energy models that estimate energy performance relative energy performance design targets, and the as-operated energy use performance compared to the final design model and should note all proposed Team members that participated.

Additional language for projects over $50M (or the current threshold identified in DOE O 413.3B): Performance exceeding ASHRAE 90.1 by a minimum of 30% would be considered exemplary.

1. For all projects: A/E Team should have relevant experience in energy efficiency, pollution prevention, waste reduction, and the use of environmentally preferable materials.  The Offeror should include in its A-E Qualifications form projects that included design for energy and water efficiency, pollution prevention, waste reduction, and the use of environmentally preferable materials.
2. For all projects: The design shall meet the sustainability requirements as noted in the LANL Engineering Standards Manual Chapter 14, Sustainable Design.
3. For all projects: Commissioning shall meet the requirements of LANL Engineering Standards Manual Chapter 15, Commissioning. A Commissioning Agent (CxA) will be provided directly by LANL.  When the LANL Commissioning organization cannot perform commissioning activities with qualified personnel, then the CxA shall be a first-tier subcontractor to LANL. The CxA will review and approve preliminary and final designs including commissioning specifications, coordinate commissioning activities and report to the PM. The CxA will write the Commissioning Plan.

The A/E team will become a member of the Commissioning Team. The A/E Team’s responsibilities in commissioning will include, as applicable:

* 1. Review and approve the Commissioning Plan.
	2. Attend the commissioning planning and kick-off meetings and selected commissioning team meetings. The mechanical and electrical engineers should attend the controls integration meetings.
	3. Perform submittal reviews, construction observations, and Operations & Maintenance (O&M) manual review.
	4. Assist the Trade Subcontractors and Commissioning Authority in the development of the emergency power and fire alarm response matrix.
	5. Review and approve the coordination curve / study drawings.
	6. Assist in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings, or equipment documentation is not sufficient for writing detailed testing procedures.
	7. Witness selected testing.
	8. Assist in resolution of system deficiencies and warranty issues identified during commissioning.
	9. Provide design basis and design narratives documentation for the O&M manual.