



LEED IMPLEMENTATION GUIDE

FOR DESIGN PROFESSIONALS

KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP

SUSTAINABILITY SPECIALIST ONLINE CURRICULUM COURSE





ENERGY AND ATMOSPHERE - EA

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LEARNING OBJECTIVES





INTRODUCTION ENERGY AND ATMOSPHERE - EA

FUNDAMENTAL COMMISSIONING AND VERIFICATION

MINIMUM ENERGY PERFORMANCE / BUILDING-LEVEL ENERGY METERING

FUNDAMENTAL REFRIGERANT MANAGEMENT / ENHANCED COMMISSIONING

OPTIMIZE ENERGY PERFORMANCE

LEARNING OBJECTIVES +

ADVANCED ENERGY METERING

DEMAND RESPONSE

RENEWABLE ENERGY PRODUCTION

ENHANCED REFRIGERANT MANAGEMENT

GREEN POWER AND CARBON OFFSETS





ENERGY AND ATMOSPHERE



The Energy and Atmosphere (EA) category approaches energy from a holistic perspective, addressing energy use reduction, energy-efficient design strategies, and renewable energy sources

CRITERIA IN THIS CATEGORY

EA PR FUNDAMENTAL COMMISSIONING AND VERIFICATION

EA PR MINIMUM ENERGY PERFORMANCE

EA PR BUILDING-LEVEL ENERGY METERING

EA PR FUNDAMENTAL REFRIGERANT MANAGEMENT

EA CR ENHANCED COMMISSIONING/EA CR OPTIMIZE ENERGY PERFORMANCE

EA CR ADVANCED ENERGY METERING / EA CR DEMAND RESPONSE

EA CR RENEWABLE ENERGY PRODUCTION / ENHANCED REFRIGERANT MANAGEMENT

MAXIMUM POSSIBLE CREDITS : 4 P / 33 C

EA - PR- CONSTRUCTION

FUNDAMENTAL COMMISSIONING AND VERIFICATION

INTENT

To support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability.

POTENTIAL TECHNOLOGIES & STRATEGIES

☒The qualified commissioning authority (CA) chosen to represent the owner's needs should be brought in early in the design process. As a third party, the CXA can verify early on that the architect's and engineers' designs meet the owner's project requirements. During the construction phase, the commissioning team, led by the CXA, will verify that contractors install and program the systems correctly according to the design.

REQUIREMENTS

Complete the following commissioning (Cx) process activities for mechanical, electrical, plumbing, and renewable energy systems and assemblies, in accordance with ASHRAE Guideline 0-2013 and ASHRAE Guideline 1.1-2007 for HVAC&R Systems, as they relate to energy, water, indoor environmental quality, and durability. Develop the OPR. Develop a BOD.

IMPLEMENTATION

REQUIRED DOCUMENTATION	
Documentation	All projects
Commissioning plan	X
Commissioning report	X
List of systems to be commissioned	X
Verification of Cx activities and results	X
Cx plan	X
Documentation of testing and verification	X
PRC OPR sign	X
Cx report	X

Documentation	A3 equipment	Phase2 required
Equipment type		X
Refrigerant type		X
CFC conversion or replacement plan		X
Refrigerant leakage into, quantity		X
Phase-out completion date		X
Confirmation that no new or existing equipment contains CFCs	X	

EA- CR(6) - DESIGN

ENHANCED COMMISSIONING

INTENT

To further support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability.

POTENTIAL TECHNOLOGIES & STRATEGIES

Enhanced commissioning is a natural extension of the fundamental commissioning (Cx) process. It provides owners, via the commissioning authority (CxA), further oversight and verification that the building will meet their expectations and requirements beyond the first day of occupancy. Enhanced commissioning gives the CxA the power to act as the owner's advocate by conducting in-depth reviews of the basis of design, design documents, and construction submittals. Training and a postconstruction verification visit are some of the enhancements that contribute to ongoing quality building control and operations.

REQUIREMENTS

Implement, or have in place a contract to implement, the following commissioning process activities in addition to those required under EA Prerequisite Fundamental Commissioning and Verification.

The commissioning authority must do the following:

- ✓ Review contractor submittals.
- ✓ Verify inclusion of systems manual requirements in construction documents.
- ✓ Verify inclusion of operator and occupant training requirements in construction documents.
- ✓ Verify systems manual updates and delivery.
- ✓ Verify operator and occupant training delivery and effectiveness.
- ✓ Verify seasonal testing.
- ✓ Review building operations 10 months after substantial completion.
- ✓ Develop an on-going commissioning plan. Include all enhanced commissioning tasks in the OPR and BOD.

IMPLEMENTATION

REQUIRED DOCUMENTATION

Documentation	Option 1_Path 1	Option 1_Path 2	Option 2
List of all tasks completed as part of Co activities	X	X	X
Training outline and participation list	X	X	X
Confirmation of systems manual delivery	X	X	X
Ongoing Co plan	X	X	X
Inclusion of monitoring and tracking in Co plan		X	
Inclusion of evaluation in Co plan			X
Verification of additional reviews per Data Center requirements (data centers only)	X	X	

EA- CR(18) - DESIGN

OPTIMIZE ENERGY PERFORMANCE

INTENT

To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use that disproportionately impact frontline communities.

POTENTIAL TECHNOLOGIES & STRATEGIES

Create an energy model of the proposed design, or expand the scope of the preliminary model, to analyze HVAC system alternatives early in the design process (see EA Prerequisite Minimum Energy Performance, Further Explanation, Modeling Potential HVAC Systems).

REQUIREMENTS

Analyze efficiency measures during the design process and account for the results in design decision making. Use energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings, or published data (e.g., Advanced Energy Design Guides) from analyses for similar buildings. Analyze efficiency measures, focusing on load reduction and HVAC-related strategies (passive measures are acceptable) appropriate for the facility. Project potential energy savings and holistic project cost implications related to all affected systems.

IMPLEMENTATION

REQUIRED DOCUMENTATION

Documentation	Option 1	Option 2
Appendix G energy modeling inputs	X	
Input and output reports from modeling software	X	
Renewable energy (if applicable)		X
Exceptional calculations (if applicable)	X	
Target Pexco results and summary	X	X
Energy consumption and demand for each building and use and fuel type	X	
Fuel rates	X	
AEQG compliance tables		X
List of process equipment efficiencies (detail only)		X

EA- CR(1) - DESIGN

ADVANCED ENERGY METERING

INTENT

To support energy management and identify opportunities for additional energy savings by tracking building-level and system-level energy use.

POTENTIAL TECHNOLOGIES & STRATEGIES

- Design and install an advanced metering system.
- Refer to the credit requirements for types of equipment, measurement frequency, communication protocols, and data storage requirements (see Further Explanation, Meter Selection).
- Locate the meters to capture the usage of major end users (see Further Explanation, Electricity Metering Strategies).
- Install and calibrate the meters according to the manufacturers' recommendations

REQUIREMENTS

Install advanced energy metering for the following:

- ☒ all whole-building energy sources used by the building; and
- ☒ any individual energy end uses that represent 10% or more of the total annual consumption of the building.

IMPLEMENTATION

REQUIRED DOCUMENTATION

Documentation	All projects
List of all advanced meters to be installed, including type, energy source metered	X
Manufacturers' cutsheets	X


