

BEYOND
SMART CITIES



**ASSOCIATE COMMISSIONING
PROFESSIONAL ACP-EXAM PREP**
KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP
COMMISSIONING SPECIALIST CURRICULUM COURSE



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HIGH PERFORMANCE GREEN BUILDINGS
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LEARNING OBJECTIVES



LEED PROGRAM AND BENEFITS

LEED CERTIFICATION & SYSTEMS VERIFICATION

BENEFITS OF LEED COMMISSIONING

GLOBAL SUSTAINABILITY ASSESSMENT SYSTEM (GSAS) PROGRAM

SYSTEMS COMMISSIONING ,GUIDELINES FOR SYSTEMS COMMISSIONING



LEED PROGRAM AND BENEFITS

LEED provides a framework for healthy, efficient, carbon and cost-saving green buildings. LEED certification is a globally recognized symbol of sustainability achievement and leadership.

LEED certified buildings save money, improve efficiency, lower carbon emissions and create healthier places for people. They are a critical part of addressing climate change and meeting ESG goals, enhancing resilience, and supporting more equitable communities.

To achieve LEED certification, a project earns points by adhering to prerequisites and credits that address carbon, energy, water, waste, transportation, materials, health and indoor environmental quality.

Projects go through a verification and review process by GBCI and are awarded points that correspond to a level of LEED certification: Certified (40-49 points), Silver (50-59 points), Gold (60-79 points) and Platinum (80+ points).



LEED RATING SYSTEM GOALS

LEED is a holistic system that doesn't simply focus on one element of a building such as energy, water or health, rather it looks at the big picture factoring in all of the critical elements that work together to create the best building possible.

In fact, 35% of the credits in LEED are related to climate change, 20% of the credits directly impact human health, 15% of the credits impact water resources, 10% of the credits affect biodiversity, 10% of the credits relate to the green economy, 5% of the credits impact community and 5% of the credits impact natural resources. In LEED v4.1, a majority of the LEED credits are related to operational and embodied carbon.



LEED RATING SYSTEM GOALS +

Reduce contribution to global climate change

Enhance individual human health

Protect and restore water resources

Protect and enhance biodiversity and ecosystem

Promote sustainable and regenerative material cycles

Enhance community quality of life





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

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 architects' 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.

FUNDAMENTAL COMMISSIONING AND VERIFICATION

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 11-2007 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 schedule	X
List of systems to be commissioned	X
Verification of Cx activities and roles	X
Cx plan	X
Occupant training and verification	X
OPE, O&M plan	X
Cx report	X

EA- CR(6) - DESIGN

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

ENHANCED COMMISSIONING

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 manual testing.
☒Review building operations 10 months after substantial completion.
☒Develop an on-going commissioning plan. Include all enhanced commissioning tasks in the O&M and BOD.

IMPLEMENTATION

REQUIRED DOCUMENTATION

Documentation	Option 1, Path 1	Option 1, Path 2	Option 2
List of all tasks completed as part of Cx activities	X	X	X
Training outline and participation list	X	X	X
Confirmation of systems manual delivery	X	X	X
Training Cx plan	X	X	X
Inclusion of monitoring and testing in Cx plan		X	
Inclusion of evaluation in Cx plan			X
Verification of additional review per Data Center requirements (Data center only)	X	X	

HOW DO CXA AGENTS USE LEED

Reviewing design plans to ensure they meet owner's objectives and LEED Certification requirements

Providing commissioning services required by LEED Certification requirements

Ensuring that equipment and systems are functioning at the efficiency level for which they were designed

Scheduling site visits and tests throughout the construction cycle to ensure on-going efficiency

Modifying control programs to enhance occupant comfort while reducing energy consumption and increasing operational efficiency



BENEFITS OF LEED COMMISSIONING

Identifying Energy Conservation Measures (ECMs)

Evaluating potential rebates

Tenant/Occupant Comfort

Identifying possible future operational issues

Promote sustainable and regenerative material cycles

Enhance community quality of life



GSAS PROGRAM AND BENEFITS

The primary objective of GSAS is to create a sustainable built environment, considering the specific needs and context of the region.

GSAS certifications aim to evaluate the sustainability of the built environment through providing a performance-based approach for assessment, considering the reduction of the environmental impacts of the built environment by adopting the best practices.

GSAS aims to promote the adoption of sustainability into regulatory requirements and building codes, hence making sustainability business as usual (QCS 2014 Qatar Construction Specifications (Section 7) -Green Constructions) .



GSAS FRAMEWORK DEVELOPMENT

GSAS refers to the Global Sustainability Assessment System, the first performance-based system in the MENA region, developed for rating green buildings and infrastructures in all building phases.

GSAS is based on a bottom up approach that is followed to allow for a seamless integration of specific requirements of the country with high level and multi-dimensional sustainability goals.

2007 marked the start of the development of GSAS Framework (refer Figure 1). It then went through four stages of the development process up until 2009.

Stage (I) of the development process involved the examination of more than 140 building rating systems, tools, guidelines and standards around the globe.



QCS- MANDATORY

INTENT

To develop and implement a commissioning process that ensures the delivery and performance of the systems within the development.

POTENTIAL TECHNOLOGIES & STRATEGIES

1. Confirm the provision of a commissioning report or plan that outlines the scope of works and process adopted for commissioning.

2. Determine the systems to be commissioned.

MO.1 SYSTEMS COMMISSIONING

REQUIREMENTS

1. The Project will assess the testing, adjusting, balancing, and commissioning in addition to training requirements associated with the Project systems.

2. The Project will prepare relevant commissioning plan or report to establish the criterion level.

GSAS ONLINE SUBMITTALS

Final Certification Stage (CDA)	
Types	Descriptions
Document	A narrative explaining any updates or changes in the criterion assessment.
	Updated Commissioning Specification, when applicable.
Plan	For levels 2 and 3, Updated Commissioning Plan, when applicable.
Report	For level 1, Commissioning Report
	Relevant T&C and TAB Reports of the results of the system commissioning.

GUIDELINES FOR SYSTEMS CXA

Consider introducing a commissioning program at the commencement of the project.

Appoint a qualified commissioning party to be responsible for leading the commissioning process, coordinating with the development team throughout the design and construction phases to ensure proper

Develop the OPR in conjunction with the project owner and ensure the requirements are quantifiable and measurable to verify that the development objectives will be achieved.

Review and verify that the commissioning requirements have been included within the construction documents and development specifications.




