MISSION CRITICAL

WHITEPAPER

THE CRITICAL ROLE OF DESIGN REVIEW IN DATA CENTRE COMMISSIONING

A COMMISSIONING AGENT PERSPECTIVE

The Critical Role of Design Review in Data Centre Commissioning

EXECUTIVE SUMMARY

As the demand for resilient, scalable, and energy-efficient data centres continues to rise, the role of the Commissioning Agent (CxA) has become pivotal in helping to ensure optimal system performance. One of the most undervalued yet crucial responsibilities of the CxA is the design review process. This whitepaper explores the value that early-stage design reviews bring to data centre projects, confirming constructability, maintainability, reliability, energy efficiency, and alignment with owner project requirements (OPR). By integrating CxA expertise at the design stage, stakeholders can mitigate risks, reduce lifecycle costs, and prevent operational inefficiencies.

INTRODUCTION

The commissioning process in mission-critical environments like data centres is a quality-oriented process that guarantees systems are designed, installed, tested, and capable of being operated and maintained according to the owner's needs. The CxA plays a key role in this process, particularly during the design phase. Yet, the design review is often underestimated or introduced too late to influence decisions effectively.

THE ROLE OF THE CXA IN DATA CENTRE PROJECTS

The CxA serves as an independent third-party expert, engaged to verify that all systems and components of a data centre are designed, installed, and tested to meet operational requirements. Their scope typically includes:

- Reviewing Owner's Project Requirements (OPR)
- Performing design document reviews
- Developing and managing commissioning plans
- Conducting functional performance testing
- Leading final acceptance and turnover processes

Among these, early design review has the greatest potential in reducing long-term project risks and helps ensure success.

WHY DESIGN REVIEW MATTERS

ALIGNS DESIGN WITH OPERATIONAL INTENT

The CxA validates that the Basis of Design (BoD) aligns with the Owner's Project Requirements (OPR). Misalignment here can lead to costly retrofits or functional failures later in the project.

IDENTIFIES DESIGN CONFLICTS EARLY

Interdisciplinary design conflicts—between mechanical, electrical, controls, fire protection, and BAS systems—are easier and cheaper to fix during the design stage. The CxA brings practical, operational experience that may not be fully captured by design consultants.

ENHANCES SYSTEM RELIABILITY AND MAINTAINABILITY

CxA's emphasize design decisions that favour redundancy and maintainability—critical for 24/7 mission-critical operations.

PREVENTS COMMISSIONING DELAYS

Poor designs lead to commissioning phase delays due to last-minute design revisions, rework, or unclear sequences of operation. CxA design reviews mitigate these risks.

PROMOTES ENERGY EFFICIENCY AND SUSTAINABILITY

CxA's often review design for energy performance—ensuring that systems can operate efficiently and sustainably, in line with ASHRAE, LEED, and ISO standards.

DESIGN REVIEW SCOPE FOR A DATA CENTRE CXA

KEY ELEMENTS TYPICALLY REVIEWED INCLUDE:

- HVAC and cooling systems: capacity, N+1 or 2N configurations, containment strategy, energy efficiency
- Electrical systems: UPS topology, switchgear coordination, generator sizing, reliability
- Control systems: BMS integration, alarms, sequences of operation, failover logic
- Fire and life safety systems: fire suppression, detection coverage, system
- Space planning: equipment accessibility, clearances, cable management
- Testing strategies: temporary loads, bypasses, isolation capabilities

The CxA evaluates not just what is designed, but how it will be tested and operated.

BENEFITS TO STAKEHOLDERS

STAKEHOLDER	BENEFIT OF EARLY CXA DESIGN REVIEW
Owners	Reduced lifecycle costs, better alignment with mission needs
Designers	Objective feedback and risk mitigation support
Contractors	Fewer design change orders and commissioning delays
Facilities	Easier operations and maintenance, with better documentation and training

INDUSTRY STANDARDS SUPPORTING CXA DESIGN REVIEW

- ASHRAE Guideline 0 – The Commissioning Process
- ASHRAE Standard 202 – Commissioning Process for Buildings and Systems
- Uptime Institute Tier Certifications
- ISO/IEC 30134 KPIs for data centres
- LEED v4 Enhanced Commissioning credits

These standards emphasize the importance of early and continuous commissioning engagement.

RECOMMENDATIONS

- Engage the CxA during schematic or 30% design phase, not after construction begins
- Include formal design review deliverables in CxA contracts
- Require designers to respond to CxA review comments in a structured manner
- Treat the CxA as a strategic partner, not a late-stage auditor

CONCLUSION

In today's landscape—where downtime can cost millions and sustainability is no longer optional—design reviews led by a qualified Commissioning Authority (CxA) are not just beneficial, they are essential. Engaging the CxA early in the project lifecycle empowers data centre stakeholders to deliver facilities that are reliable, maintainable, and energy-efficient from day one.

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CAI Mission Critical
August 2025

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