DATA CENTER KNOWLEDGE

ComRent®
Global Leader in Load Bank Rentals & Service

Load Bank Solutions in Data Center Commissioning:

How to minimize life-cycle cost while maintaining a competitive edge

A white paper by

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This paper explores how data center operators who execute thorough commissioning and use proper load bank testing equipment can reduce overall data center life-cycle cost. This paper is intended as a cautionary explanation of the dangers of a penny-wise and pound-foolish approach.

Using load testing to reduce life-cycle cost :

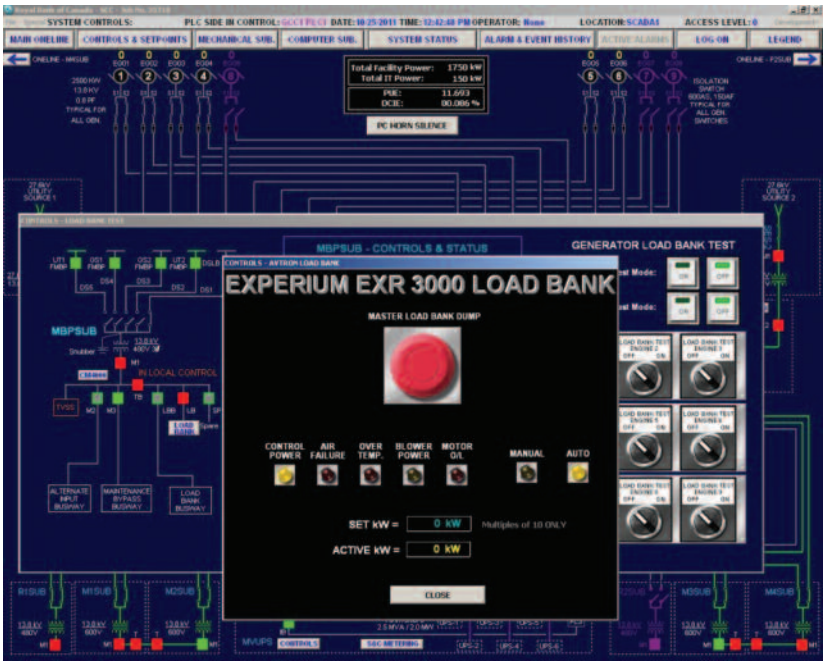
The competitive advantages of getting the data center commissioning process right the first time are obvious. Early in the design phase, it is vital to assess how new technology can accelerate schedules and reduce labor costs. This paper addresses the benefits of employing sophisticated load bank testing and partnering with a top-notch equipment/services provider to ensure full operational availability of a new data center upon deployment.

Identifying and correcting problems early is of course preferable to costly late-stage project delays or operational downtime. A proactive, structured approach to load bank testing during the design phase of a data center provides precise validation of infrastructure power and cooling requirements prior to deployment. Room design, equipment placement, and cooling-system effectiveness can either be validated or referred back to engineers and facility designers for redesign while keeping a data center project within schedule and on budget.

State-of-the-art load bank testing systems offer precise simulation of future thermal and electrical loads in a specific physical setting, thus ensuring that all test specifications are planned for and met. Early validation of data center design specifications contributes significantly to keeping the construction project on schedule and within budget. With typical costs of $60K for load bank rental and $300K for commissioning, any costs related to partnering with a premium load bank provider are easily offset by the avoidance of expensive problems post-deployment. According to historical data provided by ComRent, enterprises can save at least 10% in labor costs during the typical five- to ten-year life span by using appropriate levels of load testing during commissioning.

Benefits of structured data center commissioning

Beyond the obvious advantage of ensuring operational success of a newly constructed data center via validation of system design and performance, load bank testing is also critical to success in the following activities:



- Minimizing data center configuration changes during commissioning process
- Ensures project on time and within budget
- Validates adequacy of configuration for immediate post-deployment operations
- Documenting thermal and electrical load requirements
- Reassures clients of uninterrupted service by confirming that equipment meets all test specifications
- Reduces technical and financial risk of future data center upgrade or expansion
- Uses baseline test data to evaluate performance
- Ensuring accuracy of budgetary data
- Validates capital expenditure (CAPEX) budget by confirming that equipment meets all test specifications
- Confirms power and cooling requirements for incorporation into operating expense (OPEX) budget
- Supporting the client through various bureaucratic procedures
- Provides integrated commissioning plan to fulfill requirements of contact award/negotiation process
- Ensures compliance with local, state and federal environmental regulations – vital to construction permits
- Assists client in attaining Leadership in Energy and Environmental Design (LEED) certification

Incorporating load testing into data center planning and design

Even a simplified project management timeline for a data center should include integrated testing and commissioning plans early in the design phase. This will ensure that all power consumption and cooling specifications are addressed long before production systems are installed. Sometimes managers question the extra effort and expense of load bank testing, not realizing its tremendous value to successful data center commissioning, deployment, operation and future upgrades or expansions.

Effective data center planning involves two phases of testing/commissioning:

Phase 1 - Integrated Testing Plan

An integrated testing plan is developed in the first phase of planning for commissioning of the data center. This enables the business enterprise to integrate the commissioning plan as early as possible into the design phase. The integrated testing plan supports a thorough risk assessment that focuses on:

- Reducing or eliminating financial and technical risks of re-engineering
- Verifying system performance prior to production using a simulated operating environment
- Identifying path toward LEED certification

Phase 2 - Integrated Commissioning Plan

After the integrated testing plan is complete, a more detailed integrated commissioning plan is developed. The commissioning plan enables a timely focus on the practicalities of data center infrastructure requirements. Commissioning plans provide a template for the following:

- Validation of production systems before design is locked in place
- Development of power consumption and cooling specifications
- Collection of data to support future expansions/upgrades

TABLE ! - Planning for data center commissioning – 2 case studies *

Factors impacting choice of one global provider vs. specialized providers

APPROACH	Customer A Just in Time	Customer B Proactive Planning
Planning	Assumed any deficiencies would be corrected during commissioning process Began coordination with load bank provider one year before start of commissioning	Began coordination with load bank provider one year before start of commissioning
Testing	No formal testing plan	Integrated testing plan with simulation of thermal & electrical loads
Commissioning	No formal commissioning plan	Integrated commissioning plan to validate design specs & operational performance
Schedule	Construction project in jeopardy, required last minute rescue by ComRent	Highly reliable data center completed on time
Financial	Incurred great financial risk due to delays and technical problems	Cost-efficient data center delivered within budget

**Actual examples as summarized by ComRent*

"Just in time" planning vs. proactive approach to data center construction

As summarized in Table 1, Customer A waited until it became clear that its data center construction project was in jeopardy to call in ComRent to the rescue. Load bank systems had been delivered during the deployment phase from another source, with minimal testing/planning. Project engineers had apparently assumed that they could address any unforeseen deficiencies during the actual commissioning process. As a result, there were numerous costly data center configuration changes and delays in deployment leading to threatened client defections.

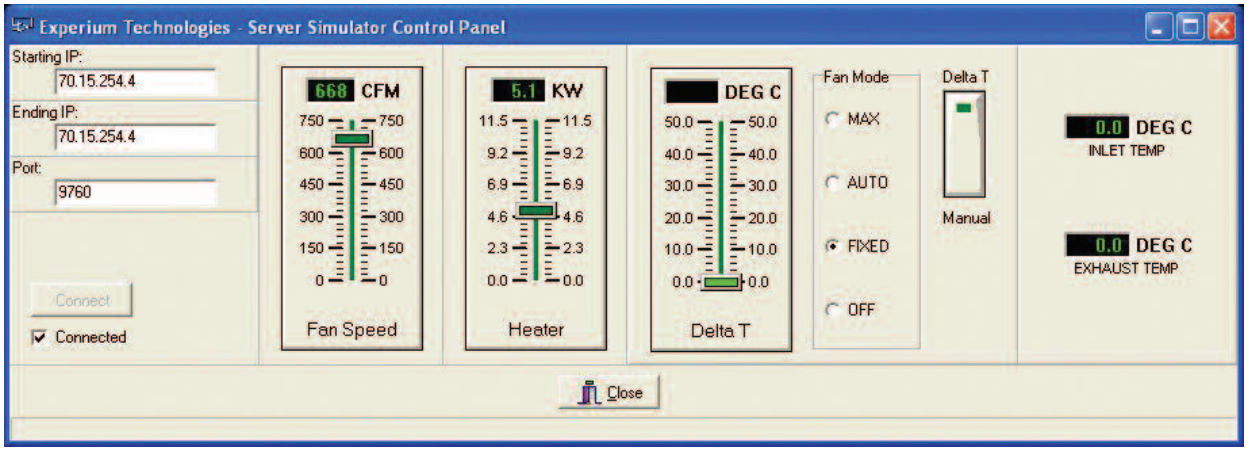
ComRent developed comprehensive solutions to problems involving electrical and thermal load specifications, lack of coordination between the commissioning agent and various contractors/ subcontractors, reconfiguration of cable runs, and placement of equipment.

Customer B started planning one year before the start of data center construction. This customer involved its load bank contractor (ComRent) in the development of integrated testing and commissioning plans - including exact heat and power simulation of servers and communication equipment. This proactive approach enabled Business B to validate design specifications and operational performance before deployment. Simulation of data center thermal and electrical loads revealed several thermal and electrical load issues that were promptly corrected while staying within existing schedule and budget.

Expanding use of technology to build and maintain a state-of-the-art data center

"ComRent is proud of our pioneering role in using Wi-Fi enabled communications on laptops and Android devices to remotely manage load testing systems. Over the past fourteen years we have conducted over 30,000 load tests with increasingly sophisticated equipment, achieving a 99.99% on-site performance record. Our technicians work with customers every step of the way to ensure that the right power-generation and cooling equipment are always integrated into a proven design."

Advance planning helps identify data center infrastructure requirements upfront, rather than by retroactive implementation. Skimping on testing of power generation and cooling systems is best described as penny wise and pound foolish. Project managers realize the usefulness of an integrated testing plan as a blueprint for simulating actual data center operating



conditions prior to equipment installation. They know that test data can pinpoint problems and aid in the development of solutions that ensure that infrastructure, upon deployment, is able to perform to its design capacity. Unfortunately, there can sometimes be a temptation to skimp on testing plans in order to move more quickly into construction. This is not effective project management from either a cost or schedule perspective! Correcting deficiencies that arise during commissioning is expensive and leads to unforeseen consequences.

To learn more about how ComRent can help you build reliability into your data center infrastructure (new or upgraded), please visit www.comrent.com or call us at 888-881-7118.