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DATA CENTER DECISIONS: BUY LEASE OR SELL? *by Linda J. Morrow*

To build, buy, or lease their next data center is an issue that keeps many C-level executives up at night. The decision may rest on many diverse factors such as available capital, timeline, degree of desired control, and simple human ego. Being able to assess current and future IT needs accurately and build an appropriate data center under the same roof is a challenging task for even the most competent. The significant upfront costs and the man-hours required to build, operate, and maintain such a center need to be fully realized at the onset of the decision-making process for enterprises considering the build option. Employing a cadre of skilled laborers able to work on the many systems involved in a data center (e.g., cooling, electrical, UPSs, and generators) is an ongoing cost for those who choose to own their own data center.

Furthermore, those enterprises involved in a business or service that would risk significant financial loss with any downtime need to do an evaluation of internal skill sets and experience to determine if being wholly responsible of their IT domain makes economic sense. Outsourcing this task would allow the enterprise to concentrate on its core business and might be a more attractive option if there are any perceived weaknesses in the level of expertise required.

Then there's the question of reliability. The Tiers classification system was created by the Uptime Institute approximately 20 years ago for the purpose of classifying a data center in terms of its availability, or uptime.

As stated on the Uptime Institute's website, "The Tier Classification System provides the data center industry with a consistent method to compare typically unique, customized facilities based on expected site infrastructure performance, or uptime. Furthermore, Tiers enables companies to align their data center infrastructure investment with business goals specific to growth and technology strategies." The Tiers classification system consists of four tiers, and is a progressive system, meaning that each successive tier incorporates the features of the one immediately below it.

Interestingly, the Uptime Institute removed reference to the "expected downtime per year" from its globally recognized standard in 2009, citing that operational behaviors can have just as much effect on uptime, if not more, than a data center's physical infrastructure.

Figure 1 provides a summary of the Tier Classification system. A close examination of the Tiers Classification system is recommended to determine the specific level of availability an organization will need.

	Tier I	Tier II	Tier III	Tier IV
Active Capacity Components to Support the IT Load	N	N+1	N+1	N After Any Failure
Distribution Paths	1	1	1 Active and 1 Alternate	2 Simultaneously Active
Concurrently Maintainable	No	No	Yes	Yes
Fault Tolerance	No	No	No	Yes
Compartmentalization	No	No	No	Yes
Continuous Cooling	No	No	No	Yes

Figure 1. Data Center Site Infrastructure Tier Standard: Topology, Source: Uptime Institute, LLC, 2012.

Considerations for Data Centers

Footprint. Space is at a premium for today's data centers, especially colocation houses. Every square foot of space must justify its necessity. When it comes to allocating space for power protection equipment, thinking outside the box is essential: What can be done to reduce the footprint?

Consider redefining the space. Mission critical data centers often require multiple UPSs and battery cabinets to protect connected loads for a period of time long enough to either ride out the power outage or to transfer to the facility's generator successfully. Instead of lining up the UPSs side-by-side, a back-to-back modular layout can alternatively be used to reduce the amount of space required. This layout can be achieved by using a bus backplane that eliminates conventional conduits and cable runs. And there are UPS systems that use high capacity front terminal batteries, so fewer batteries (and sometimes even fewer battery cabinets) are required.

Scalability. It is essential for power protection capacity to adjust with changing power requirements, whether it up or down. Many of today's on-line, double-conversion UPSs are designed to scale up in order to meet the increased power load in the future. However, additional UPS units and batteries will require more square footage in a data center. With a modular approach, scalability is achieved quickly due to the building block layout—essentially a plug-and-play approach.

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UPSs built in a single or multi-module configuration facilitate a flexible architecture. For example, if power needs increase, power modules can be added to existing equipment. If the power requirement decreases, then a module can be removed and used elsewhere as a single unit that can be paralleled for capacity or redundancy. This ability benefits organizations with changing power protection demands as it allows for the purchase of power protection equipment incrementally.

Efficiency. Floor space is not the only consideration when it comes to power protection equipment. Reducing operating and cooling costs has become a primary objective of facility executives and other stakeholders. There are a few UPSs that can achieve as much as 97% efficiency through innovative design and the use of advanced semiconductor power devices also known as Insulated Gate Bipolar Transistors (IGBTs). The use of Carrier Stored Trench-Gate Bipolar Transistors—the fifth generation of IGBTs—achieves higher speeds in switching and achieves lower switching losses among other features.

IGBT devices have become the preferred power device for UPS systems. But it is how the IGBT is controlled that is the key to achieving optimum UPS performance.

True, on-line, double-conversion UPS systems have become the preferred topology for mission critical applications because they offer lower risk of electrical load loss.

Return on Investment. When it comes to power protection, it's important to know that not all UPSs are created equal. Look for UPSs that will provide high levels of reliability and efficiency. This will reduce cost of ownership and improve power usage effectiveness (PUE). Scalability and modularity go a step further in increasing return on investment as well as achieving flexibility that hasn't been readily available in large UPS installations until now.

The insatiable appetite for electricity continues to increase and as technology advances, our demand for 24×7 power grows exponentially. The advances in the Smart Grid have made great strides, but the U.S. electrical grid is still very vulnerable to outages. Smarter power protection that is scalable, flexible, efficient and more configurable is a welcomed trend for today's facility executives.

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