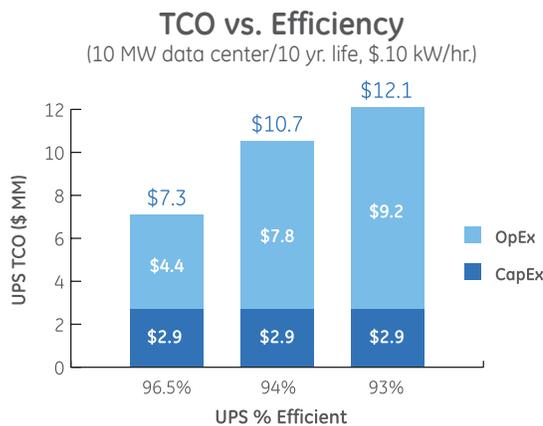


Why 1 Percent Energy Efficiency Matters in Data Centers: Using Total Cost of Ownership (TCO) for Power Equipment Purchases can Save Millions of Dollars

Every business executive, IT professional, facilities or operations manager, regardless of their industry, understands the textbook definition of total cost of ownership (TCO). Total cost of ownership, the sum of capital expenditures (CapEx) and operational expenditures (OpEx), is a critical metric to understanding true and long-term costs when designing a new facility or selecting equipment. Yet with the explosion of data center expansion, identifying TCO variables when specifying, building and operating a data center may be more elusive, costing companies millions of dollars every year.

Energy is one of those critical TCO variables because data centers are significant consumers of energy. Servers and data equipment account for 55 percent of the energy used by a data center, followed by 30 percent for the cooling equipment to keep the facility operational. Electrical power distribution losses, including uninterruptible power supply (UPS) losses, consume an additional 12 percent, with three percent used for lighting.

Energy efficiency gains in any of these areas have a significant impact on TCO, especially on high power, long life assets. For example, let's look at a one percent efficiency improvement for a UPS deployment at a 10 megawatt (MW) data center. As the chart (Figure 1) below shows, while CapEx is fixed, a TCO evaluation of the OpEx costs of operating a UPS over 10 years creates an operational savings of \$1.4 million when energy efficiency improves a single percent – from 93 to 94 percent efficiency. With newer UPS technologies that offer up to 96.5 percent efficiency, that savings jumps to almost \$3.4 million. Therefore, a one percent gain in energy efficiency matters.



UPS % Efficient	96.5%	94%	93%
CapEx	\$2.9	\$2.9	\$2.9
OpEx	\$4.4	\$7.8	\$9.2
TCO Total	\$7.3	\$10.7	\$12.1

Figure 1



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Wrestling with TCO OpEx versus CapEx Demands

To realize these potential energy savings, data center managers must retain the TCO criteria established for a data center’s design through the procurement of equipment. Unfortunately, the TCO model is often abandoned when the project phase turns to selecting power system components, such as a UPS, because of short-term CapEx concerns over the initial cost. Deciding what equipment to buy is analogous to buying a car on price without considering the price of gasoline, fuel economy and maintenance costs.

While the capital expenditures for UPS systems are relatively the same, the OpEx for UPS energy consumption can easily exceed the CapEx over the life of the equipment due to differences in energy efficiency.

This pressure between short-term CapEx purchasing criteria and long-term OpEx TCO evaluations are easy to understand. Decisions for purchasing power systems typically are driven by two groups: (1) the real estate organization or project team with a mandate to reduce capital expenditures to deliver a data center “on time and on budget” and; (2) data center operators responsible for reducing operational expenditures, including energy consumption and maintenance costs over the life of the system.

As we know, CapEx includes the cost of equipment and installation expenses. Often times equipment efficiency is specified at a minimum level, and the purchasing decision is solely based on meeting the minimum level specified with no evaluation credit given for exceeding the minimum efficiency level. Instead, the purchase price and how it compares to budgeted amounts and the immediate availability of equipment often play a larger role in procurement decisions.

Even when senior management identifies OpEx as a key factor early in the planning of a power system, buying decisions made with the more immediate pressures of component price and availability are often made at the expense of OpEx criteria. When purchasing is outsourced to contractors, a divergence from management’s original intent is even more likely.

Furthering this short-term CapEx versus OpEx vantage is that most of the “hardware” in a data center comprises servers and networking equipment. Typical data center TCO evaluations (Figure 2) for an asset like a server, with a typical life span of two to three years, is a very different calculation than the long-term critical power requirements of a complete data center with a life span of 10 to 15 years.

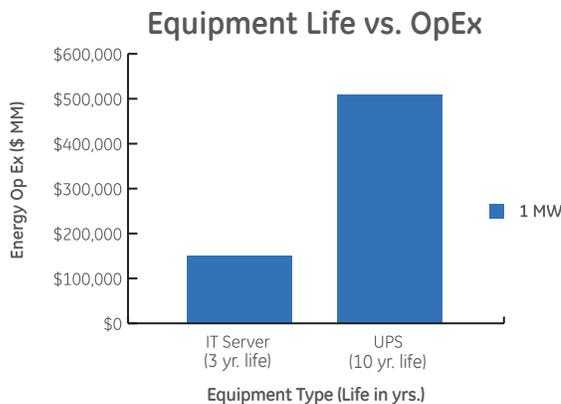


Figure 2

Conclusion

Savings of millions of dollars are available to data center managers who apply a TCO model when purchasing components for critical power systems. This is particularly true for energy-intensive equipment, such as UPS systems, where electricity costs can easily exceed their purchase price in only a few years, but also where energy efficiency ratings of a few percentage points can add to significant operational cost savings. Technologies, such as GE's TLE Series UPS with eBoost technology, improve the long-term efficiency of data centers.

To realize the long-term benefits and cost savings of a TCO evaluation and purchase model, data center managers have an opportunity to align their CapEx-centric purchasing team with the OpEx goals of their operational teams. TCO can become a common metric for both groups as they work together to create energy efficient data centers that return long-term value.



imagination at work

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