

## Green Backup: Save Power, Save Money, Save the Environment

**Small- and medium-sized companies today face the dual demons of continually rising costs and the dramatic growth of corporate data that needs to be managed, stored and retrieved.**

The cost of energy, which was once a small contributor to the overall cost of doing business, has grown into a major portion of overall corporate budgets. At the same time, the data generated and consumed daily by companies has grown exponentially, while the need to store that data has been driven both by corporate business needs and government regulations, like Sarbanes-Oxley. In fact, storage is estimated to be growing at an alarming rate—60% annually, according to an article on Storage.ITWorld.com.

This white paper discusses how using tape backup as part of an overall data storage solution can readily address both of these issues. As a “Zero Power” medium, data tape storage will reduce power consumption, driving energy costs down while simultaneously strengthening an overall backup and archival strategy. With these energy savings, companies will also be contributing to the larger global initiative of reducing CO2 emissions and saving the environment—whether they have this goal as part of their corporate mission or not.

### **TODAY’S CHALLENGE**

#### **The Budget/Resource Dilemma**

Companies today are challenged by limited resources, with budgets across small- and medium-sized businesses (SMBs) coming under increased scrutiny and restraint. Overall, these remain lean and mean as operational expenses, total cost of ownership (TCO) and return on investment (ROI) drive budget planning and spending. Nowhere has this become more acute than in IT departments. Companies now see that it is essential not just to look at the computer in use, but the whole product lifecycle, and the cost of running and maintaining equipment—particularly the energy consumed by each piece of equipment—has become increasingly scrutinized. Once under that microscope, the large impact of energy consumption on TCO and ROI becomes readily apparent.

According to IDC in its report on Worldwide Server Power and Cooling Expense 2006-2010, “for every dollar spent on computer hardware, another 50 cents is spent on energy. Within the next four years, that number will rise by 54%.” While this is bad, Gartner predicts that this trend will get even worse—within the next several years, energy costs will consume up to one-third of IT budgets, according to an article entitled “SNW: Users Thrash Out Green Storage” on SearchStorage.com.

*“Energy costs will consume up to one-third of IT budgets”*

**IDC**

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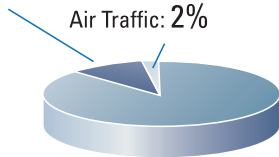
When seen as part of normal business practices, this energy consumption can be particularly startling. According to the German publication *Die Zeit*, “Only one search request at Google consumes as much energy as an energy-saving lamp per hour.” And this becomes even more startling when all of this energy consumption is added up. “IT equipment worldwide is responsible for 2% of CO2 emissions, which corresponds to the amounts of CO2 emitted by air planes,” according to Simon Mingay of Gartner.

*“Only one search request at Google consumes as much energy as an energy-saving lamp per hour.”*

*Die Zeit  
German Publication*

### Global CO2 Emissions

Home & Commercial Use: 13%  
Air Traffic: 2%



### CO2 Emissions Home and Commercial Use

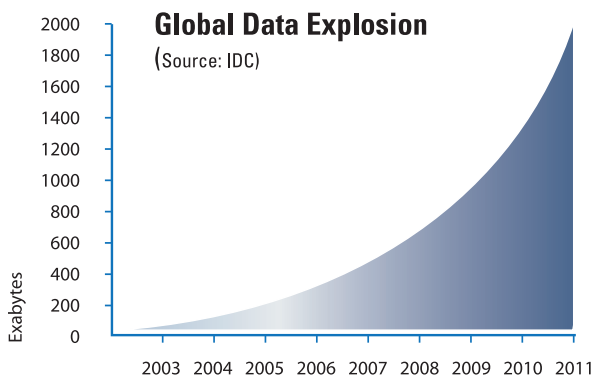
(Source: Wikipedia)

IT Equipment: 14%



### Data, Data Everywhere ...

At the same time that companies battle rising energy costs, they are trying to stay afloat amid an increasing deluge of data. According to IDC, “the world has seen the amount of data grow from 5 exabytes (5 billion gigabytes) in 2003 to 161 exabytes in 2006.” This is truly an amazing amount of data. One exabyte is equal to one quintillion bytes or 10<sup>18</sup>—the equivalent of 50,000 years of DVD quality video,” according to PC World.



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As data continues to grow and more content is created digitally so too do data storage capacity requirements—and the physical size of the data center—because of a convergence of factors: companies today require 24x7 access to increasingly large amounts of data; compliance regulations now extend the retention periods for documents and data that needs to be kept; and companies' have gained a growing awareness of the need to back up their data as part of an overall business continuity or disaster recovery plan.

Having instant access to data when and where needed is standard business practice today, either in the office, on the road or working remotely. At the same time, the expanding body of government legislation and compliance requirements now mandates how and when certain types of information may be used, stored, retained and destroyed. Certain industries also have regulations mandating how information must be stored and made available, and the Internet has produced a spate of privacy laws. Some of these include the Healthcare Information Portability and Accountability Act (HIPAA) for medical records and other health information, Sarbanes-Oxley to protect investors by improving the accuracy and reliability of corporate disclosures and Gramm-Leach-Bliley (GLBAA), which requires that all financial institutions disclose their policies and practices for protecting the privacy of the non-public, personal information of their customers.

REGULATION	REGULATORY AGENCY	ORGANIZATIONS IMPACTED	REQUIREMENTS
17a-3 & 17a-4 CFR (Code of Federal Regulations)	S.E.C.	Financial Services	Type and length of data retention, storage media, audit trail, integrity, etc. Record retention requirement up to 6 years.
21 CFR (Code of Federal Regulations) part 11	Food and Drug Administration	Pharma; medical devices and manufacturers	Security, intergration, audit-ability. Record retention requirement up to 7 years.
Sarbanes-Oxley Act (SOX)	Securities and Exchange Commission	Publicly-held companies, accounting firms	Data protection; data permanence to protect against alteration or destruction of data. Record retention requirement up to 7 years.
HIPAA (Health Information Portability and Administration Act)	U.S. Health and Human Services	Health Insurance, healthcare providers	Privacy, security, very long retention records. Record retention requirement up to 3 years past patients death.
DOD 5015.2-STD	Department of Defense	U.S. Military Branches	Strong authentication; auditability, retention, retrieval
Gramm-Leach-Bliley Act (or GLBA)	Federal Trad Commission	Financial Services	Encryption, secure backup, data destruction
Basel Capital Accord (or Basel II)	G-10 Nations	Financial Services	Reduce risk through archival of transaction data
Data Protection Act(s)	Eurpoean Union, Uk, Data Commissioner	European Operations, global firms	Protect privacy; archiving and supportig privacy through data mgmt.

### Data Regulations and Compliance Requirements

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Companies have also seen the necessity of disaster recovery programs that include the regular backup and archiving of data so that in the event of a natural disaster (fire, water damage, etc.) they can quickly access another copy of their corporate data and be back up and running again quickly. Redundancy and physical separation are crucial to effective disaster recovery programs, and two or more copies are better than one to safeguard priceless data against disaster.

### The Data Center As Energy Center

But all of this attention to data storage is coming at an increasing price—that's where companies consume a lot of power. Data centers are filled with "constantly on" servers whose continually spinning disk drives not only consume energy, but they then generate heat that must in turn be cooled to keep the data center operational.

According to the Environmental Protection Agency (EPA), the amount of energy consumed by corporate data centers doubled between 2000 and 2006. In 2006, data centers accounted for 1.5% of electricity use in the U.S. and that number may double in the next three years.

At the same time, the EPA also forecasted that power failures and brownouts—when voltage drops from its normal level and then returns—will affect more than 90% of the data centers in the U.S., and half of large data centers will lack the power and cooling capabilities to run high-density equipment this year. In the future, the EPA predicts that half of the world's data centers will become obsolete because of power and space restrictions.

With that in mind, making data centers more efficient will reduce operating costs from power utilization and can also reduce capital expenditures by slowing or even eliminating data center equipment purchases. In fact, according to IDC, "for every server removed from the data center, approximately 11.4 tons of CO<sub>2</sub> emissions are eliminated."

By adopting existing energy-saving techniques, the EPA estimates that data centers could cut their energy use nearly in half, potentially saving \$14 billion by 2011.

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**IDC**

### The Economics of Being "Eco"

So, for companies of all sizes, reducing power and cooling requirements and overall energy use makes sense from an economic perspective. But while this has a direct correlation to the environment, "green storage" is more of a dollar issue than an environmental one. It just makes smart business sense.

However, whether it's about economics or the environment, many companies are already pursuing strategies that embrace both areas without knowing it. According to The StorageIO Group and founder Greg Schulz, while no more than 10% of the 1,000 users he's spoken with said they have existing green initiatives, at least 80% said that they are concerned with power and cooling.

As part of that quest for energy and cost savings, a recent survey from the Linear Tape-Open (LTO) Program shows that companies that use hard disk-only storage are now looking at tape storage technology as part of a tiered storage infrastructure to support backup and archiving. In fact, more than 80% plan to add tape storage within the next 12 months due to its low energy consumption, low cost of ownership and portability for data protection. Studies have shown that tape-based backup and

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archiving solutions can deliver substantial TCO benefits and energy savings, particularly as compared to spinning disks, particularly with reports that 90% of the data stored on servers will never be accessed again.

### Benefits of Tape over Disk

Tape is an ideal medium for the long-term archival of data. The simple fact is that while there are industry professionals that believe that disk drives are so cheap that one should simply archive to disk, they are not a viable, long-term option for reasons of cost, space and practicality. Adding disk drives is far more costly than tape—once a reasonably sized disk array is full, it is far more practical and secure to migrate data to tape than to add drives—and when the required infrastructure surrounding disk is added in, they are many times more costly than archiving on tape.

Implementing better data management procedures and archiving to tape will significantly reduce backup and restore times, which produces the dual benefits of reducing wear and tear on the server while simultaneously reducing power consumption. Constantly spinning disks constantly consume power and add points of failure so they are only ideal for short-term storage. While state-of-the-art disk drives carry phenomenally good reliability statistics, these figures are based on spinning drives. Designed for daily use, disk drives might not be compatible with future hardware, software and protocols, thereby making them a risky proposition for long-term archiving. Put one on a shelf for a few years, and it may never spin again.

*“Constantly spinning disks constantly consume power and require cooling”*

On the other hand, tape has evolved into a highly cost-effective, high-capacity backup and archival medium with multiple benefits. In addition to low cost, other primary benefits include portability, reliability and reusability. Tape media can be written, rewritten and safely stored for years. Its steadfast reliability ensures mobility and safeguards companies from disaster. Having vital company data on a physical piece of media endows it with a unique set of reliability characteristics: It can be placed in a vault; copied, stored and maintained in multiple locations; and physically moved to locations when and where needed.

Tape drives also provide backward compatibility to eliminate the risk of hardware obsolescence. In addition, tape adds scalability. When storage volume increases, additional tapes and drives can be easily added.

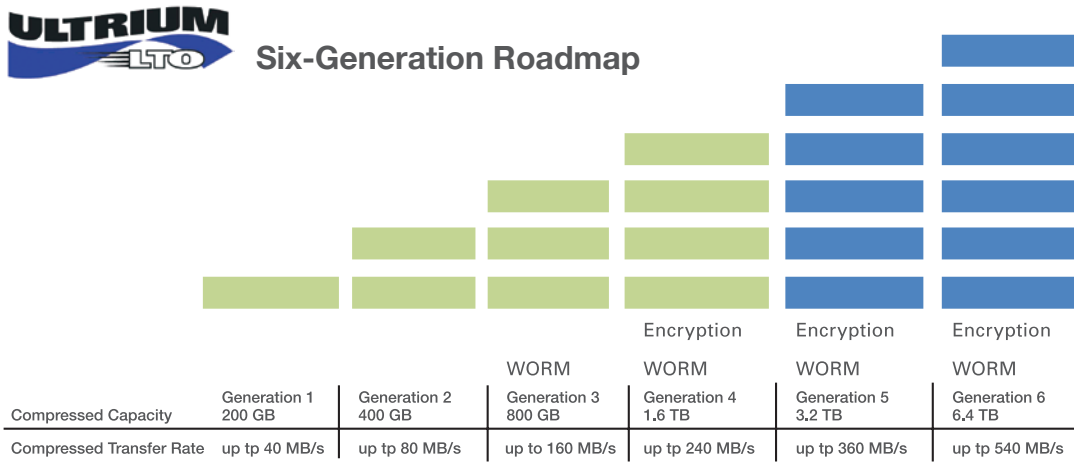
### Why Tandberg Data

Tandberg Data offers a powerful combination to meet the needs of SMBs looking for a tape solution to address the dual demons of rising energy costs and growing data storage requirements: products that offer the lowest environment “footprint” and evolve with customer requirements. Tandberg Data is a leading storage company focused on the SMB market, offering companies choice with a clear focus on backup and archiving.

As a manufacturer and supplier of LTO, VXA and SLR tape drives, Tandberg Data offers a comprehensive range of full-height and half-height drives that is suited for SMBs looking for a tape storage solution that can meet many of their business requirements at the same time: cost-effectiveness, reliability and scalability while providing maximum backward-compatibility and long-term investment protection.

According to IDC in its Worldwide Tape Drive Forecast and Analysis, May 2007, with its six-generation roadmap, including four generations that are currently available, and a market share of 90%, LTO has become the de facto standard in its class.

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LTO Ultrium Six-Generation Roadmap

Tandberg Data’s feature-rich tape drives offer some of the lowest power consumptions in the industry. A selection of Tandberg Data’s LTO drives, for example, consumes at least 30% less power than drives currently available from other companies.

In addition to providing an energy saving, the low power consumption improves reliability and increases the mean time between failure (MTBF) because less heat is produced. In simple terms, the drives have a very long and useful life.

### Talking ‘bout My Generation

And this low power consumption doesn’t compromise storage capacity or speed.

Tandberg Data offers a range of LTO drives; its LTO-2, 3 and 4 Half Height drives, with capacities from 200 to 1600GB (compressed) and compressed transfer rates up to 120 MB/s. Tandberg Data also offers the LTO-3 and LTO-4 Full-Height drive. Tandberg Data’s latest-generation LTO-4 tape drive provides 100% more capacity and 50% greater transfer speed than the popular LTO-3 drive, bringing native capacity to 800GB (1.6TB compressed) and native transfer speed to 120MB per second (240MB/sec compressed). The increased capacity and speed shortens the time needed for backup and restore processes—a key benefit for SMBs with increasing data storage requirements and shrinking resources and backup windows.

Backwards read and write compatibility ensures investment protection today while again “future-proofing” the system to ensure future scalability and compatibility to maximize TCO and ROI.

Building on its 30-year history in data protection, Tandberg Data has established a strong, product roadmap that presents a clear choice for companies seeking to standardize on a tape technology.

The LTO drives are integrated into Tandberg Data’s tape automation solutions. By enabling drive technology upgrades and expansion in tape libraries and autoloaders as well as offering scalable solutions such as the StorageLibrary T40+, customers will be able to continue to match their backup and archiving solution with their requirements. Upgrading existing solutions protects their investment while at the same time furthering best practices in storage energy efficiency.

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While the decline of tape storage has been predicted countless times as new technologies have emerged for data backup applications, innovators in the tape storage industry have responded each time by developing and introducing technological advancements that:

- Significantly increase the capacity and performance of tape storage products
- Dramatically reduce the price of storage on tape compared to other media
- Allow customers to store data and comply with stringent legal requirements  
(write once read many, or WORM)

As a result of these innovations, tape has been extraordinarily resilient in surviving these challenges and remains the IT managers' first choice for data backup and archiving. It continues to provide long-term archival, unmatched price/performance and removability. In addition, amid today's explosive data growth and growing energy concerns, tape offers the key benefits of being a "Zero Power" medium to reduce power consumption, driving energy costs down while simultaneously strengthening an overall backup and archival strategy that meets today's rigorous compliance and security standards.

*"Tape is a 'Zero Power' medium"*

### Devising A Green Strategy

While it is important for equipment manufacturers to have a green product roadmap, it is important that the industry establishes its own "green storage" best practices and develops a common terminology.

SNIA, the Storage Networking Industry Association, for example, has set up a task force and technical working group to address green storage. Because it is difficult to obtain the independent information needed to determine data center efficiencies, calculate companies' carbon footprints and do energy modeling, they are planning to develop resources to help IT managers understand and address environmental issues.

For companies, it is important to consider these three areas: an assessment of the data center with the goal of reducing power consumption; a formal assessment of IT equipment recycling; and a carbon footprint analysis.

An important first step in that formal assessment of the data center is to determine how much energy your storage consumes and what that energy costs. The basic numbers on power consumption and heat production can often be obtained from equipment manufacturers. If not, it may be possible to measure power consumption by installing temporary meters on the circuits feeding the storage devices and the air conditioning.

Once energy usage has been determined, the next step is to calculate your costs. However, commercial electric rates include a number of factors so it is best to contact the provider directly to determine the cost. Once power consumption and costs have been determined, recommendations can be developed on how energy usage could be decreased without compromising business needs.

### The Future

Tandberg Data recognizes that small- and medium-sized companies see the need to move toward a more energy-efficient model and understands the current and future issues, the opportunities for improvement and SMBs' concerns and requirements.

Curtailing energy consumption and meaningfully addressing climate change is a significant global challenge that must be addressed by a range of stakeholders today—one that will require governments,

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industries and individuals around the world to seek solutions. To achieve real and lasting results, all of these groups—on a global basis—must make real, long-term commitments for a sustainable future.

Governments around the world are grappling with policy decisions about how rising energy costs and increased energy usage are contributing to climate change. They are attempting to set targets to meet stringent global objectives for reducing power consumption. Companies can expect to see an increasing environmental push from storage vendors as “green” compliance standards make their way from Europe to the U.S., such as the Restriction of Hazardous Substances (RoHS).

In addition, existing regulations on facility compliance like ISO 14000 are part of a series of international standards on environmental management and product compliance that includes legislation like RoHS and Waste Electrical and Electronic Equipment (WEEE).

In the U.S., the EPA has established such guidelines as its “Energy Star Qualifications for PCs and Peripherals” and has issued a “Report to Congress on Server and Data Center Energy Efficiency.”

At the same time, industries are shaping new business strategies to reduce their energy use and find workable solutions for what is likely to be an increasingly carbon-constrained world. Clearly, the IT industry must make deep and fundamental changes over the next several decades to reduce the carbon footprint of our products and our business. Companies need to quickly ramp up development of green technology roadmaps.

Tandberg Data is committed to being part of the green solution. With that in mind, we support actions and policies that will improve energy efficiency and enable the use of renewable fuels while aligning end user behavior and demand with climate and energy goals.

Tandberg Data has seen—and understands—the future of SMB data storage requirements and is taking a leadership role in this new carbon-constrained world. The challenge is complex, but our vision for success is clear: We know affordability is critical to end users, and we are committed to addressing energy efficiency in data centers by continuing to offer the most affordable, highly efficient data storage solutions for SMBs.

**Use less. Save more. Green is the new black.**

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