Eaton 3ph UPS technologies
Total Cost of Ownership (TCO)

The lowest lifetime costs of a UPS

Powering Business Worldwide

Lifetime of value

You could buy a UPS based on its list price. Or you could buy a UPS that works out cheaper over its lifetime.

While you may know the upfront cost of buying a UPS, the list price doesn't tell you the final price you'll pay. Do you know what it will cost to run and maintain over its lifetime or what factors you need to consider, including the cost of battery replacement and annual energy use? When considering purchasing a UPS, and comparing products or vendors, you need to look at the broader **Total Cost of Ownership (TCO)**. After all, even a single percentage improvement in efficiency could save you more than the UPS purchase price over its lifetime.

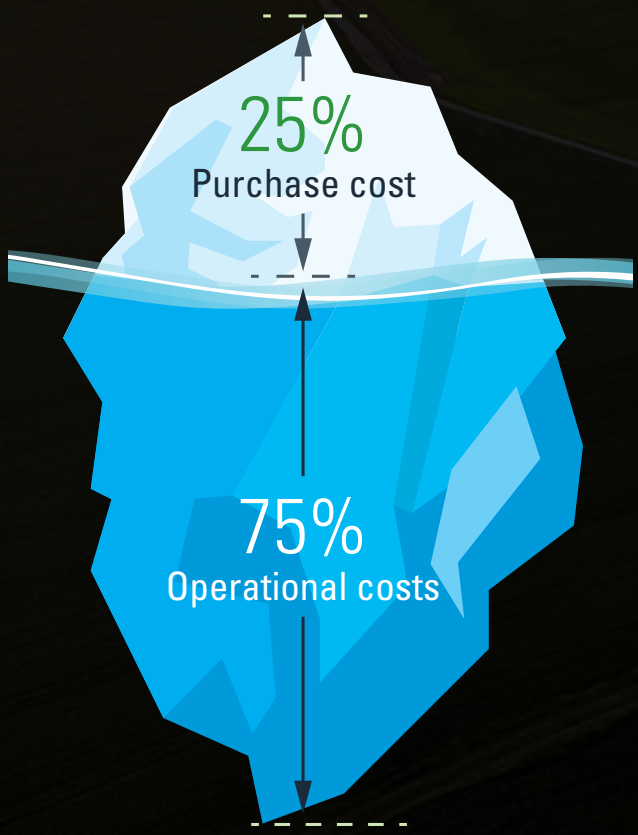
A UPS should be measured by its value and not by its cost. What it brings to the business is business continuity, resilience and disaster recovery – values that will ensure a business can continue to operate even in the event of prolonged and unexpected power outages. Even so, every business should do its due diligence to compare purchase costs and understand what value it can derive from its UPS investment.

Eaton designs its UPSs with a low total cost of ownership in mind and equips them with unique technologies to make them more efficient and to reduce maintenance and servicing costs. Ultimately, part of the value of an Eaton UPS is its ability to lower lifetime costs in a wide range of 8 kVA UPS to 6,000 kVA system.

What is Total Cost of Ownership?

- Total Cost of Ownership (TCO) is a financial metric that evaluates the total investment that you will make throughout the lifetime of the purchase, including direct and indirect costs
- It includes Capital Expenses (CAPEX), Operating Expenses (OPEX) and Maintenance

Total cost = puchase cost + operational costs



Choosing a UPS – The Capital Expense

Capital Expenses (CAPEX) comprise the initial purchase price of the UPS, as well as the costs of installing the UPS, where it will be housed (its physical footprint) and cooling requirements. The initial purchase and installation costs account for between 25-40% of the TCO.

Savings enabled by a modern UPS

The evolution of UPS technology has brought significant improvements in UPS performance, which have a direct impact on reducing initial installation expenses. The costs vary depending on the size of the UPS, dictated by the load the UPS needs to protect and the level of redundancy in the system.

Comparing to a legacy product, **UPS power density has improved by greater than 50%** – that means UPSs can be built to smaller footprints to reduce space requirements. **UPS generated heat losses have reduced by 40%** due to lower power losses which reduces cooling requirements and associated costs. Modern IGBT rectifiers enable excellent performance and efficiency gains that are lowering losses, optimizing power performance and lowering running costs.

Easy to deploy

Eaton UPSs are easy to deploy, since their flexible modular structure means they can be matched for site specific requirements for UPS capacity and bypass. **Eaton static bypass comes with integrated short-circuit protective fuse and backfeed isolation contractor**, which are important and mandatory safety components within the electrical installation. There's no need to design and fit them into the upstream panel – they are **pre-designed, pre-tested and pre-installed into all Eaton modular UPS eliminating any unnecessary costs and effort installing an external device**.

Driving down Operating Expenses

Lifetime costs can quickly exceed initial investments. When budgeting for a UPS, it's crucial to account for the ongoing Operating Expenses (OPEX) of power consumption, cooling, preventive maintenance and servicing, upgrades, management and more.

Energy efficiency

The UPS's operating efficiency is one of the determining factors in operating expenses. Eaton's 3 Phase UPSs have market-leading double conversion efficiency to reduce energy losses and consumption. Moreover, Eaton has developed leading technologies and unique features to give its UPSs some of the industry's highest efficiency ratings of up to 99%.

Depending on the power rating, choosing the latest UPS over a legacy product yields operation cost savings between

€10,000 to €200,000

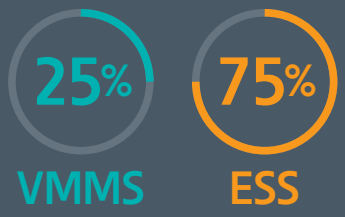
per unit during the product lifetime.

Optimised double conversion

Eaton Variable Module Management System (VMMS) technology helps achieve high efficiency even when UPS load levels are low. VMMS can optimize the load levels of power modules in a single UPS or in parallel UPS systems, by suspending extra UPS capacity. The result is optimal online efficiency at all load levels.

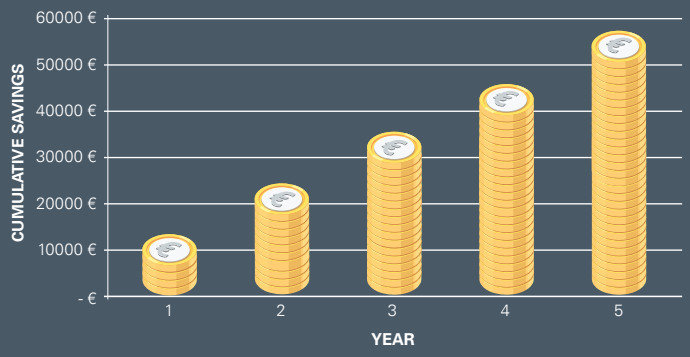
Double conversion on-demand

Eaton Energy Saver System (ESS) improves UPS efficiency levels to 99%. ESS is the most proven and reliable energy saving system in the market with many years of usage within a wide install base. Even when comparing to extremely high double conversion efficiency, ESS mode can further reduce the losses by 74% with a typical UPS load. It is simply the most advanced, most reliable, fastest-reacting energy saver architecture available.



REDUCTION IN OPERATION EXPENSES

Maximized savings with higher efficiency



More than **DOUBLE YOUR SAVINGS** by utilizing **ESS MODE**

140,000 €/5 years

Data used for calculation

Power Xpert 9395P 96,07% vs. 94% efficiency UPS
Electricity price 0,121 € / kWh (Euro area average)
Cooling ratio 20%, 400 kW load

Maintenance and servicing

Effective preventive maintenance saves time and money by minimizing business interruption and the costs of downtime, as well as extending the lifespan of critical power equipment. Eaton's UPSs are built on the latest developments in power management and proven technologies to make them reliable and resilient, and to keep maintenance and servicing costs low.

Advanced Battery Management (ABM)

Batteries are the most critical component in the reliability of any UPS. Extending the battery life can provide significant savings, while neglect can be costly. **Eaton's ABM technology** is exclusive in the UPS industry and helps **to provide early detection of battery problems to protect it from failure**. It uses a unique three-stage charging technique that significantly extends battery service life and optimizes recharge time, compared to traditional trickle charging.

Testing a **2,5 MW** system **annually =** savings up to **€100,000** with **ECT**

Reducing costs and complexity in battery autonomy testing

Battery autonomy testing is a vital part of preventative maintenance as it tests the operational and battery performance of the UPS, but it can be costly, time consuming and complicated. Eaton has an **Easy Capacity Test (ECT)** feature that makes the tests easier and cheaper. Eaton's ECT recirculates energy from the UPS for testing, so there's no need to spend money renting load banks and no time or energy wasted on temporary load connections.

You may save **30-40%** of the UPS purchase price with DC capacitors lasting the UPS lifetime

Component lifetime

Eaton has designed its UPS components to provide a longer lifetime and to enable longer periods between maintenance by increasing their Mean Time Between Failure. Clever circuit design also helps to increase lifetime and reliability, for example Eaton places heat-sensitive components (such as capacitors) directly after fans to maximize cooling and before any heat-generating components (such as power electronics and inductors).

Serviceability

Eaton offers lifetime support for its UPS solutions, using the most recent technologies to monitor systems remotely and perform accurate interventions. Eaton UPSs are designed to minimize the Mean Time to Repair (MTTR) and any potential downtime. Service time and costs are kept down by placing replaceable parts (such as fans) within easy access.

Replacing fans **takes less** than **10min** and **saves** expensive **downtime**

A return on your UPS investment

Eaton's UPS-as-a-Reserve (UPSaaR) is the data center industry's first service that enables organisations to contribute to renewable energy and earn from their existing technology investments. It puts data centers in control of their energy, letting them offer capacity back to the grid, and to say when and at what price.

How it works

Using Eaton's UPS-as-a-Reserve, the UPS works as part of a virtual power plant to enable data centers to take part in the high-value FCR and demand-side market. The UPS can be used to regulate demand from the grid, as well as for up and down stream charging, to discharge the battery back to the grid. Energy providers will compensate data center operators for abstaining from energy consumption when needed to maintain grid frequency. This means data centers can generate revenue from their UPS.

A data center could expect typical returns up to

€50,000

per MW of power allocated to grid support per year.

Eaton's **Total Cost of Ownership calculator** and comparison tool helps you to quantify the value and compare the total cost of an Eaton UPS against different UPSs and discover how much you could be saving.

Eaton's TCO calculator can factor in cumulative costs, power and cooling losses, electricity prices, inflation, UPS efficiency and the payback time you need from your investment to help you make informed choices.

Find out more:

eaton.eu/TCO

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