

UPS Energy Efficiency and Resilience Upgrades

Canonical: <https://northmoregordon.com/technologies/ups/>

Details:

Critical load · Options · Business case · Certificates · Evidence

An uninterruptible power supply must protect the critical load while operating efficiently across normal and failure conditions. An upgrade can involve the UPS modules, battery system, controls, distribution and cooling environment. Northmore Gordon can assess energy performance, investment options, measurement and potential certificate pathways.

Define the critical service

Record the protected loads, power quality, redundancy, ride-through time, maintenance bypass, growth forecast and consequence of failure. Measure the actual load profile rather than sizing from connected nameplate capacity alone. Identify whether the assessment covers one UPS, a parallel group, the battery system, cooling or the complete data-room boundary.

Assess the complete system

right-size or modularise capacity to improve part-load efficiency;
compare operating modes without weakening protection requirements;
improve battery monitoring, charging and replacement planning;
review transformers, distribution losses and power quality;
use aisle containment or airflow management to reduce cooling demand; and
coordinate UPS controls, alarms and facility-management systems.

Battery management and aisle partitioning can contribute to the project, but each measure should have a defined boundary and engineering basis. Reliability, maintainability and safety remain decision criteria alongside energy.

Keep benefit streams visible

| Benefit | Evidence | | --- | --- | | Electrical efficiency | Input and output power across representative load and operating modes | | Cooling reduction | Cooling-system boundary, temperatures, airflow and energy data | | Reliability | Redundancy, battery autonomy, alarms, maintenance and failure-risk analysis | | Maintenance | Replacement schedule, service cost, spares and downtime assumptions | | Certificates | Current scheme, activity, calculation, evidence, price and fees |

Compare options using the same critical-load and redundancy requirements. Show certificate or grant support separately and retain a case without unconfirmed proceeds.

Assess scheme eligibility for the actual project

The applicable environmental certificate depends on the jurisdiction, activity, timing and measured scope. Northmore Gordon's 5G Networks case study reports a UPS, battery-management and aisle-partitioning project with \$85,000 in certificate value, 335 tCO₂-e annual abatement and about \$50,000 in annual operating savings. These are company-reported historical project figures, not a

forecast or eligibility result for another site.

Confirm the current rule and method before procurement. Keep forecast savings, verified performance, issued certificates and commercial payment as separate outcomes. See certificate pathways and government schemes .

Measurement and handover

Collect representative input, output, load, battery and cooling data before changes. Define operating modes, exclusions and adjustments. Record installed equipment, firmware and control settings, commissioning tests, redundancy tests, battery results and concurrent load changes.

Use measurement and verification when a verified result or project-based certificate method is required. The handover should include single-line diagrams, settings, alarm ownership, maintenance plan, warranties and the performance baseline.

Related guidance includes energy audits , battery storage certificates and commercial and industrial operating contexts .

Contact Northmore Gordon with the critical-load profile, UPS topology, battery details, redundancy requirement, energy data and project stage.

What is a UPS (Uninterruptible Power Supply) and why is it relevant for energy optimization?

A UPS is a backup power system that provides immediate electricity during grid outages, protecting critical equipment and operations. In energy optimization, UPS upgrades can improve system efficiency and reduce operating costs. The 5G Networks project exemplifies this: their UPS upgrade delivered approximately \$50,000 in annual operating expenditure savings while maintaining operational resilience. UPS projects may also generate environmental benefits—the 5G Networks upgrade abated 335 tCO₂-e annually and created environmental certificates valued at \$85,000, demonstrating that reliability improvements can align with carbon and financial objectives.

What components typically make up a UPS upgrade project?

A UPS upgrade encompasses the uninterruptible power supply system itself, battery management systems (BMS), and supporting infrastructure like aisle partitioning. The Battery Management System monitors and optimizes battery performance, ensures safe operation, and extends battery life through intelligent charge and discharge management. Aisle partitioning improves cooling efficiency and thermal management by controlling airflow distribution around equipment. Together, these components create an integrated system that enhances both reliability and operational efficiency, as demonstrated in the 5G Networks telecommunications infrastructure project.

How can UPS upgrades contribute to environmental outcomes and certificate value?

UPS upgrades can reduce operational energy consumption and associated emissions, creating environmental benefits beyond operational cost savings. The 5G Networks project generated 335 tCO₂-e of annual emissions abatement and environmental certificates valued at \$85,000. These certificates may be eligible under various Australian schemes depending on the project's specific characteristics, location, and timing. We assess environmental certificate eligibility separately from the technical upgrade, ensuring that the commercial case accounts for equipment savings, emissions reductions, and potential certificate revenue as distinct variables rather than overlapping benefits.

What should an organization consider when evaluating a UPS upgrade investment?

An effective UPS upgrade evaluation should separate operating expenditure savings, capital costs, implementation risks, and potential environmental certificate proceeds into distinct components. The investment case should compare the project with and without conditional support such as certificates, so management understands the decision if that support is delayed or unavailable. For the 5G

Networks project, approximately \$50,000 annual operating savings and \$85,000 in certificate value were achieved; however, these specific outcomes are tied to that project's circumstances, timing, and approved methods. A proportionate scope, clear measurement boundaries, and realistic assumptions strengthen the case.

What is the role of a Battery Management System in improving UPS performance?

A Battery Management System (BMS) is critical infrastructure within a UPS upgrade that monitors battery health, optimizes charge and discharge cycles, and extends operational life. It ensures safe battery operation by managing voltage, current, and temperature conditions. By maintaining battery performance over time, a BMS reduces the frequency of battery replacements and associated maintenance costs, contributing to the overall operating expenditure savings captured in projects like the 5G Networks upgrade. Proper BMS configuration and monitoring also support the reliability improvements that UPS systems are designed to provide.

How does aisle partitioning improve UPS system efficiency?

Aisle partitioning controls airflow distribution in server rooms and equipment facilities, preventing hot and cold air streams from mixing and reducing cooling load. This targeted thermal management improves the efficiency of backup power and cooling systems working together. In the 5G Networks UPS upgrade, aisle partitioning was included alongside the UPS and BMS to create a comprehensive infrastructure improvement. By reducing the energy required for cooling while maintaining equipment reliability, aisle partitioning contributes to both the operating cost savings and the operational stability that modern telecommunications facilities require.

What should be documented before proceeding with a UPS upgrade project?

Before a UPS upgrade begins, establish the site's actual operational problem, existing power reliability and efficiency performance, proposed equipment specifications, implementation timeline, and measurement approach. A project brief should capture current operating loads, electrical supply constraints, the intended operational outcomes, and any firm deadlines. If environmental certificates are being considered, project timing and prior incentive arrangements must be documented early, as some schemes have eligibility prerequisites tied to project commencement dates. Our delivery approach recommends clarifying these details in the Assess and Build the Case stages before proceeding to procurement and installation.

Can a UPS upgrade be combined with other energy or environmental support pathways?

Yes, a UPS upgrade may potentially access multiple support routes—such as operating cost savings, efficiency certificates, and emissions-reduction instruments—but each pathway must be assessed separately for eligibility and compatibility. The 5G Networks project demonstrates a successful combination: operating expenditure savings, emissions abatement, and environmental certificate value were achieved and tracked distinctly. However, not every project qualifies for every incentive, and programme eligibility depends on the specific activity, location, timing, and evidence. We recommend checking applicable schemes early to identify evidence requirements and avoid conflicts between different incentive pathways.

How does Northmore Gordon support UPS upgrade projects?

We deliver scope definition, technical assessment, commercial evaluation, measurement planning, and post-implementation verification for UPS projects. Our six-stage delivery approach—Assess, Build the Case, Capture Value, Deliver, Procure, and Perform—provides a structured pathway from identifying opportunities through demonstrating verified outcomes. For UPS upgrades, this includes feasibility assessment, investment case development, environmental certificate pathway evaluation, project management, measurement and verification, and ongoing performance monitoring. Our engagement should include clear scope, deliverables, evidence responsibilities, and confirmation of any conditional support before proceeding.

