

# Choosing Centralized or Decentralized UPS for Hospitals

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## Abstract

This paper discusses key factors for choosing either centralized or decentralized UPS configurations in hospital and health facility environments. The information within is applicable to critical and non-critical medical and medically-related services. Points of interest within this paper include strategies for ensuring power protection for facilities, patients and staff.

## Introduction

UPS systems ensure continuing power for hospitals and healthcare facilities in case of outages and surge protection for critical equipment. Healthcare facilities are complex environments, integrating critical medical areas such as operating theaters, emergency and intensive care units, imaging and diagnostics facilities, laboratories, etc. They also include critical non-medical services, such as IT systems and data centers, lighting and elevators. Ancillary operations must also be protected, including food preparation and laundry processing.

Historically, healthcare facilities often used centralized UPS systems to ensure general power continuity and added decentralized UPS systems for added protection to critical medical equipment. With the increase in digital technology, additional UPS systems have been added over time at the equipment level to ensure the availability of clean power for critical medical applications such as IT and medical imaging and scanning equipment.

However, the accumulation of decentralized add-ons is not necessarily an optimal choice. As facilities expand and as critical requirements increase, decision makers need to understand that it is best to centralize UPS, with the following advantages:

- Cost optimization, including lower energy consumption, reduced labor costs, better use of capital investments and TCO (total cost of ownership)
- Improved management through central monitoring and responsiveness, including remote assistance by Schneider
- Better security in terms of overall control and selected access to critical equipment
- Compliance with standards and regulations

In certain cases, centralized UPS cannot be implemented because of the size of the facility, lack of space and physical layout. There may also be cabling issues and other technical impediments. In these cases, Schneider offers a full range of decentralized solutions that ensure the integration of legacy systems and the highest levels of critical power supply and safety

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in different areas. In all cases, Schneider provides full diagnostic services, expert advice from the design stage onwards and collaborative offerings to ensure patient satisfaction and protection, whilst optimizing resources, investments and future development and expands

### Centralized UPS

Centralized protection of healthcare facilities is based on three-phase UPS systems. These UPS solutions provide global protection and improve TCO (Total Cost of Ownership) through lower Capital Expenditures, controlled installation and facilities management budgets. Schneider centralized UPS solutions support all critical and non-critical equipment throughout the facility. These solutions meet the highest standards required in healthcare environments. Monitoring is facilitated and real-time data is made available to all personnel in the facility as required, with specific configurations for physicians, surgeons, supervisors, nurses, security staff and facility management people. Schneider also ensures full remote intervention services, facilitating crisis management and shorter downtimes.

Schneider Electric designs and provides the widest range of UPS products using a project-by-project approach.

#### **Core offer:**

The Schneider Three-phase UPS Range offers state-of-the-art technology to ensure:

#### **Availability**

- Integrated maintenance bypass
- Redundant functions (communication cards) for parallel UPS setups, complying with industry standards.

#### **Flexibility**

- Scalable power through parallel capacity.

#### **Performance**

- Low-input harmonics and high-input power factor correction and high efficiency.

#### **Adaptability**

- UPS modifications, including impact of specific environmental conditions (dust, water, rodents...) and other requirements (RAL, top/bottom entries, lock, etc.).
- Long-autonomy batteries, low voltage distribution panels, coupling panels, etc.

Centralized protects all critical and non-critical loads within the facility. It offers a number of advantages:

- Lower cost of ownership. - lower operating expenses, easier maintenance, and lower capital investment (for larger facilities).
- Enhanced safety for patients and security for staff
- Highest levels of reliability (parallel switching and redundancy)
- Complete monitoring and crisis management tools

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Schneider Electric products that support the *centralized* approach (hard wired, online technology):

**Easy UPS 3S (10 to 40kVA)**

**Easy UPS 3M (60 to 200kVA)**

**Galaxy VS (20 to 150 kVA)**

**Galaxy VM (160-200kVA)**

**Galaxy VL (250 to 500 kVA)**

## Decentralized UPS

Decentralized protection is based on single-phase UPS systems, generally installed outside the patient vicinity area to improve specific power quality requirements and availability. These versatile systems are easily integrated into existing installations, simply connected to network/loads through power connections. They can be based on off-the-shelf products and adapted in custom-designed configurations to meet a wide range of needs.

### Standard offering - providing great value

The extensive standard single-phase, Smart UPS RT systems of the APC by Schneider Electric family provide great value to customers with demanding power environments in areas without critical networks, with features that include:

- Very wide input voltage range
- Precise output voltage control
- Frequency control
- Internal bypass
- Input power factor correction (available in double input versions)

### Flexibility to meet specific needs

Decentralized solutions are designed around standard products to ensure the required levels of quality and reliability. Products are adapted to specific environments, providing easy-to-install turnkey solutions. These solutions typically combine single-phase UPS units with associated batteries, service bypass panels and specific as well as adapted single-phase products.

This solution is recommended for smaller facilities or when a layout does not allow for centralized solutions. Advantages include:

- Easy integration into existing power connections
- Adaptability and flexibility (off the shelf or customized products)
- Good levels of reliability to meet specific standards
- Complete monitoring and crisis management tools

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Schneider Electric products that support the *decentralized* approach (5 to 10 to 40 kVA):

Easy UPS 3S

Smart UPS RT

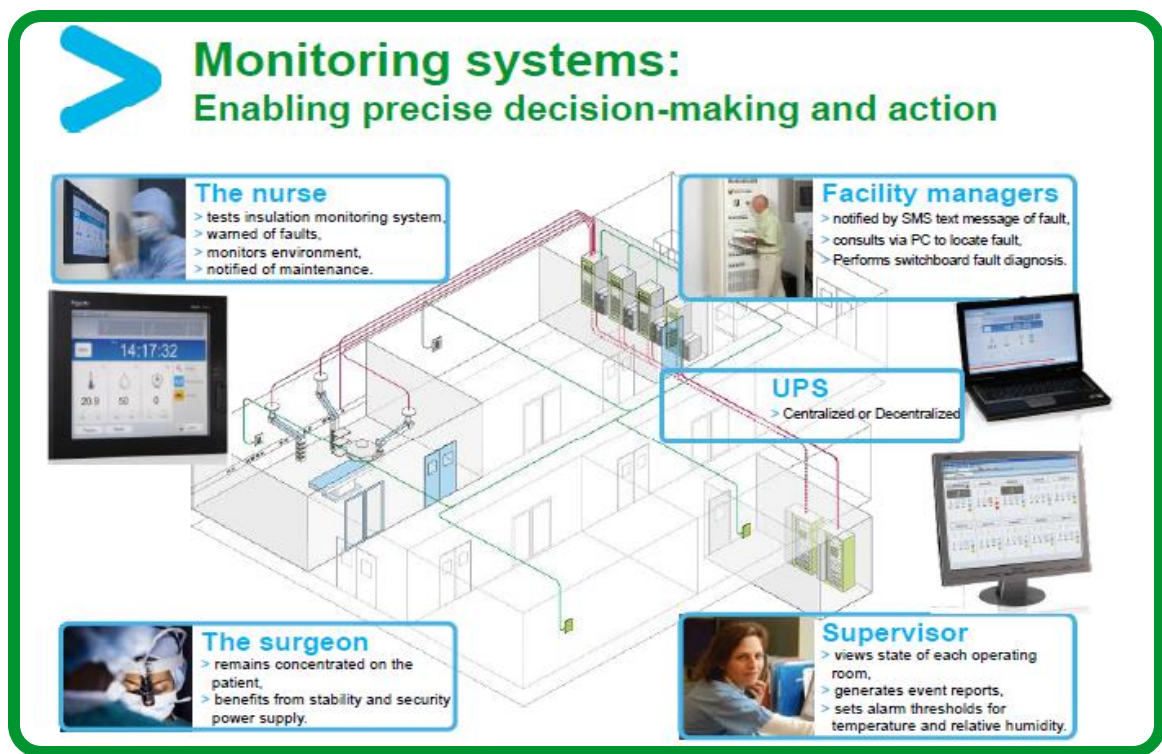
Symmetra LX

## UPS application area recommendations:

Applications	Critical Loads	UPS Ranges	Comment
Operation Theater	<ul style="list-style-type: none"> <li>All loads according to applied installation Standard</li> </ul>	Easy UPS 3S,3M Galaxy VS, VM, VL (centralized) Easy UPS 3S and Smart UPS RT (decentralized)	When Installed Centralized Redundancy is important. Battery back up time min 60 min. Depend on local standard. Standards
Intensive Care Unit	<ul style="list-style-type: none"> <li>Patient Monitoring Systems, Ventilators, Pulmonary Analyzers</li> </ul>	Easy UPS 3S,3M Galaxy VS, (centralized) Easy UPS 3S and Smart UPS RT (decentralized)	Redundancy recommendable for high availability level. Battery back up time min 60 min. Depend on local standard.
Emergency Department, Obstetrics	<ul style="list-style-type: none"> <li>All loads according to applied installation Standard</li> </ul>	Easy UPS 3S,3M, Galaxy VS, VM, (centralized)	Redundancy recommendable for high availability level
Medical Devices, Catheterization Rooms	<ul style="list-style-type: none"> <li>Mandatory when patients are having <u>interveneous</u> treatment</li> </ul>	Easy UPS 3S,3M, Galaxy VS, VM	Size and specifications of the UPS depend on the supplier data
Medical Devices X-Ray Scanner, MRI Scanner, PET Scanners	<ul style="list-style-type: none"> <li>Device (complete coverage) or only a critical part (data adquisition, )</li> </ul>	Easy UPS 3S,3M, Galaxy VS, VM, <u>Symmetra PX</u>	The use of the UPS depends on the quality of the Electrical Network. Be aware of high in-rush current.
Laboratories	<ul style="list-style-type: none"> <li>Blood bank equipment, Laboratory research devices, cold chain solutions and other critical devices</li> </ul>	Easy UPS 3S,3M, Galaxy VS, VM,	Many of the laboratories in the healthcare facility use many equipment who analyzes during 24h and are have critical level.
Data Center	<ul style="list-style-type: none"> <li>Datacenter infrastructure &amp; Cooling</li> </ul>	Galaxy Series, <u>Symmetra LX &amp; PX</u>	Data Center infrastructure is required for EHS. PACS & CPOE

## Overview of monitoring systems

The illustration below identifies how various personnel within the healthcare facility are supported by UPSs that monitor power and offer power protection.



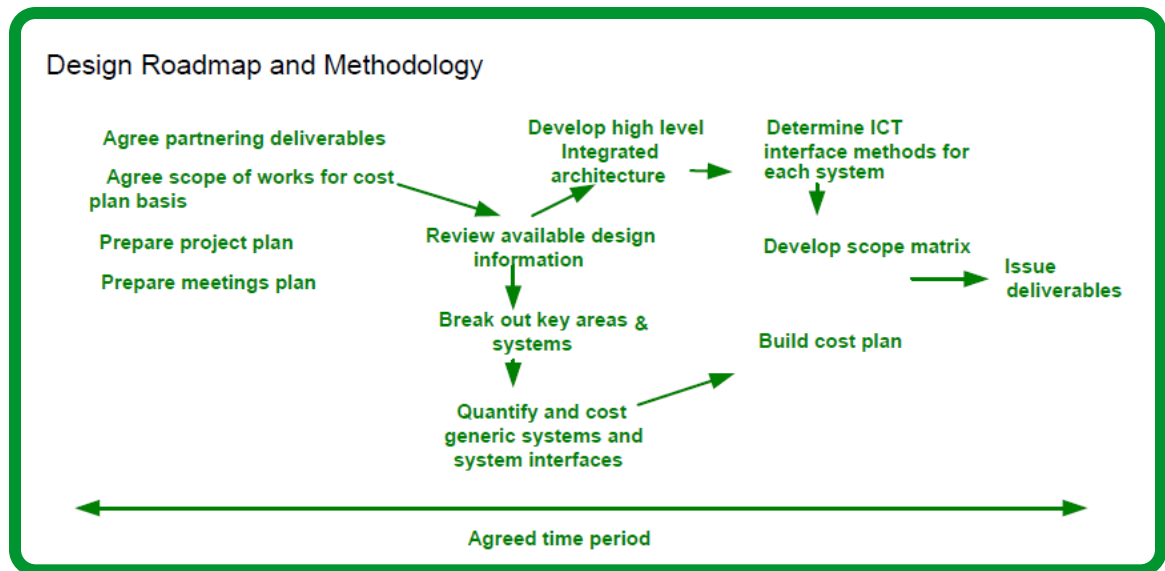
## Designing and Delivering Dependability

Schneider Electric provides its customers with upstream design support to ensure that the electrical power infrastructure and related facilities will provide the highest levels of performance and reliability. Schneider Electric's expert personnel and services work closely with the health facility's in-house staff to ensure success from the initial planning phases to final operations. Services include:

- Defining project scope and costing plans
- Acting as an interface between the health facility and contractors to ensure that strategic and operating needs are fulfilled

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- Guaranteeing that all design decisions are generic (i.e. not based on any one particular manufacturer) and offer flexibility in procurement options
- Certifying that installations comply with existing standards and are based on open protocols to be future-proofed for new regulatory requirements
- Providing a roadmap for deliverables and testing to respect deadlines and budget
- Securing efficiency in Facilities Management, including cost, energy savings, risk management, development options



## Project Management and Support Services

With an unrivaled range of adaptable or specific systems and customizable solutions, backed up by global services and worldwide project capabilities, Schneider Electric and its engineering partners are the natural and best-in-class technology and service providers for customers in key medical sectors. Their unique project management processes ensure you are equipped with a global solution, taking into consideration the specific constraints of your medical facility and service environment.

- **Availability** - Availability is based on access to an extensive worldwide service network, to support you where and when you need it.
- **Adaptability** - With over 50 years' experience of providing Secure Power Systems, Schneider Electric's highly skilled project teams combine their core competencies to design the architecture and deliver the best Secure Power Solutions for each medical facility, on schedule and within budget.
- **Performance** - Schneider Electric's equation of peak performance and efficiency depends on the capability to offer a perfectly tailored response to the very specific needs of each facility, infrastructure and building. The initial design and planning consultation is a key stage to ensure successful and sustainable performance with significant long-term energy efficiency, reliability and cost savings.