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Global Power Supply

GPS is a leading provider
of high quality power systems

Expansion or Upgrade

Problems or challenges faced today with upgrading or expanding an existing data center and accomplishing this with zero to little interruption to services and maintaining business continuity.

Self-Contained 1000kVA UPS System

Drivers

- **Efficiency**
  Newer equipment provides increased efficiency lowering cost of operations
- **Reliability**
  Legacy or “end-of-life” equipment no longer is serviceable or has spare parts
- **Increased Capacity**

Challenges

- **N or N+1 Design**
  Data centers built in the late 90’s to early 2000 using Tier 2 design
- **Physical Space Constraints**
  No room to install new until old is removed

History of Data Center Design

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- **80's**
  Data centers were designed for 50W / Sq. Ft.
- **90's**
  Design was increased to 90W / Sq. Ft.
- **2000's**
  Design is 150W-200W / Sq. Ft.
- **Where are we today?**
  Typical situation today with existing infrastructure.
  - Equipment is obsolete and inefficient
  - New equipment represents an opportunity to become more efficient and bring our operating costs down
  - We lack the capacity necessary in either power or cooling to meet todays and tomorrows needs
  - We are faced with a demanding era with regard to reliability and in many cases N or N+1 is not enough

When our centers were originally built it is often the case the space allowed for electrical and cooling was minimized to save money and to allocate space for the revenue side of the equation, i.e., "white space".

When we look to expand or upgrade we find that we lack the needed space. Often it is necessary to remove the old before installing the new.

Identify Your Options

- **Build a new data center**
  - Cost prohibitive
  - Time frame typically 18 months
- **Remodel or Expand**
  - Lower cost than new
  - Shorter timelines
  - Challenge of little or no interruption
- **Externalize Modular Solutions**
  - Short speed of deployment
  - Controlled costs
  - Revenue generating “white” space

Critical Infrastructure Upgrade

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Processes associated with: *Replace existing UPS System*

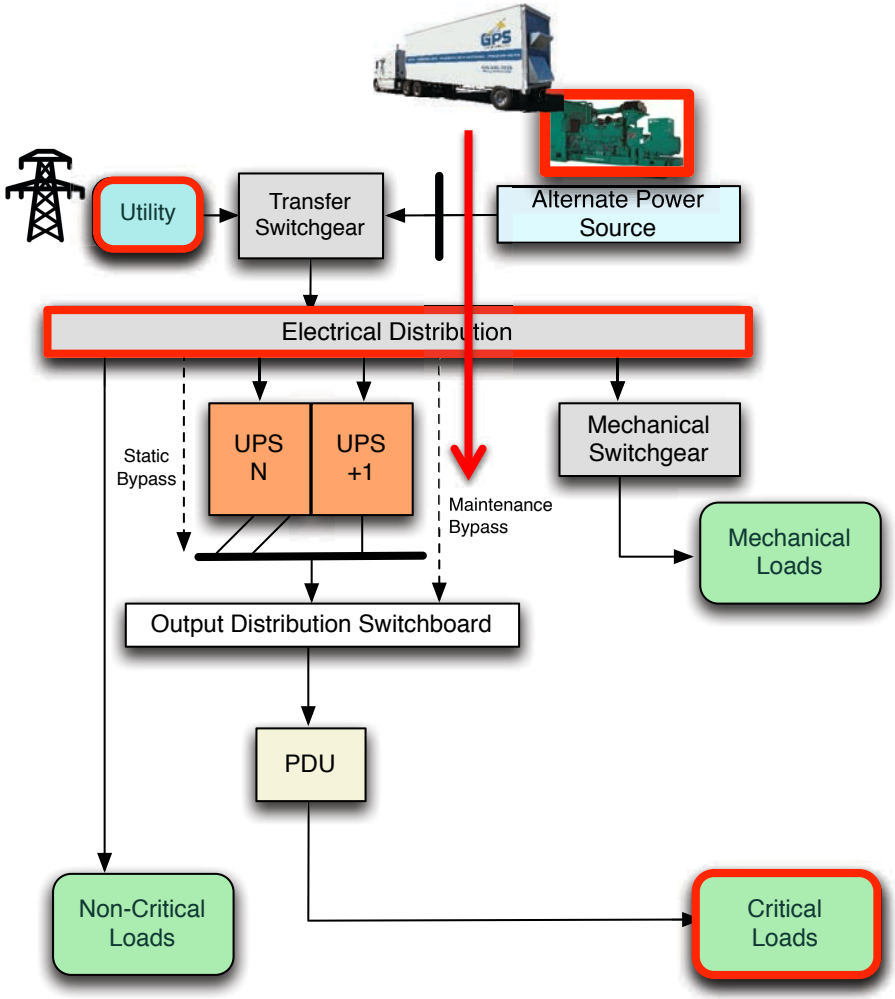
- **Three phases for a successful project**
  - Discovery
  - Planning
  - Execution

Existing UPS Systems to be replaced

Site completed with new UPS Systems

UPS Replacement N Design

Project Description: *Replace existing UPS System*



- **Identify is the utility adequate for the expansion or upgrade**
- **Identify is the generator adequate**
- **Identify main distribution switchgear capabilities and breaker configuration**
- **Identify and take reading of existing load to determine proper size of temp UPS**
- **Identify physical location of temp UPS**
  - Note rental UPS Systems come in both typical “indoor” configurations as well as self-contained trailers designed for installation outside of facility
  - Note it’s also important to determine the conductors lengths required for the location of “temp UPS”
- **Temporary UPS installed feeding external maintenance bypass**

Planning Phase

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- **Implementation of Temporary Generators**
  In stock up to 2 MW with capabilities to parallel beyond that.

- **Temporary Switchgear**
  Up to 6,000A @ 480V
  *rentalized NEMA 3R cage and frame.

- **Temporary UPS Systems**
  Self-contained UPS trailers or “indoor” from small 10 kVA up to multi-megawatt.

- **Power Distribution & Static Switches**

*NEMA 3 R – Cage and frame constructed for ease of movement – sizes up to 6,000A @ 480V

UPS Replacement 2N Design

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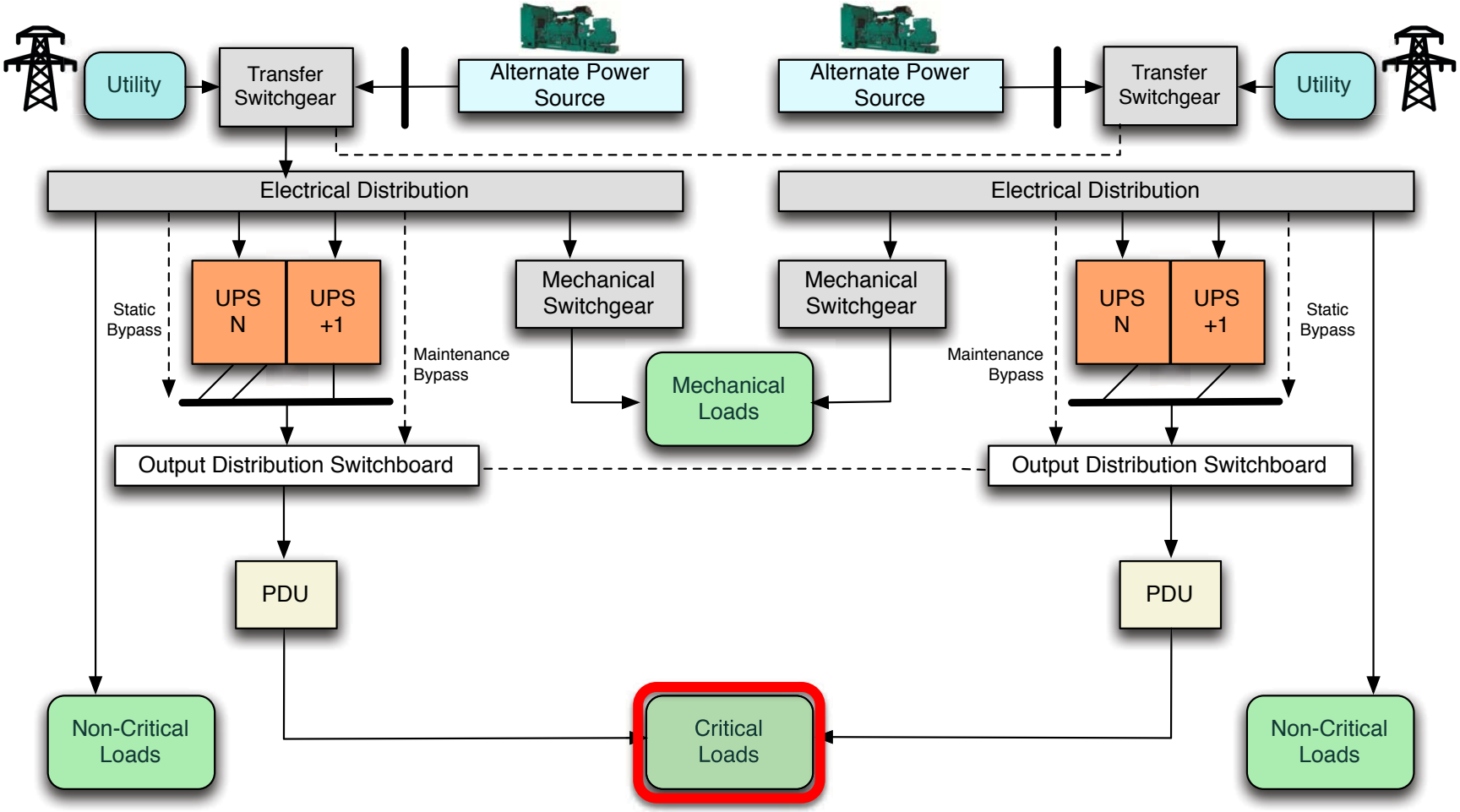
Project Description: *Replace existing UPS System*



UPS Replacement Discovery Phase

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Project Description: *Branch Circuit Discovery*

Most problems are at the branch level. Working in tandem with the IT/Operations survey and visually inspect each rack and connected loads. Goal is to identify:

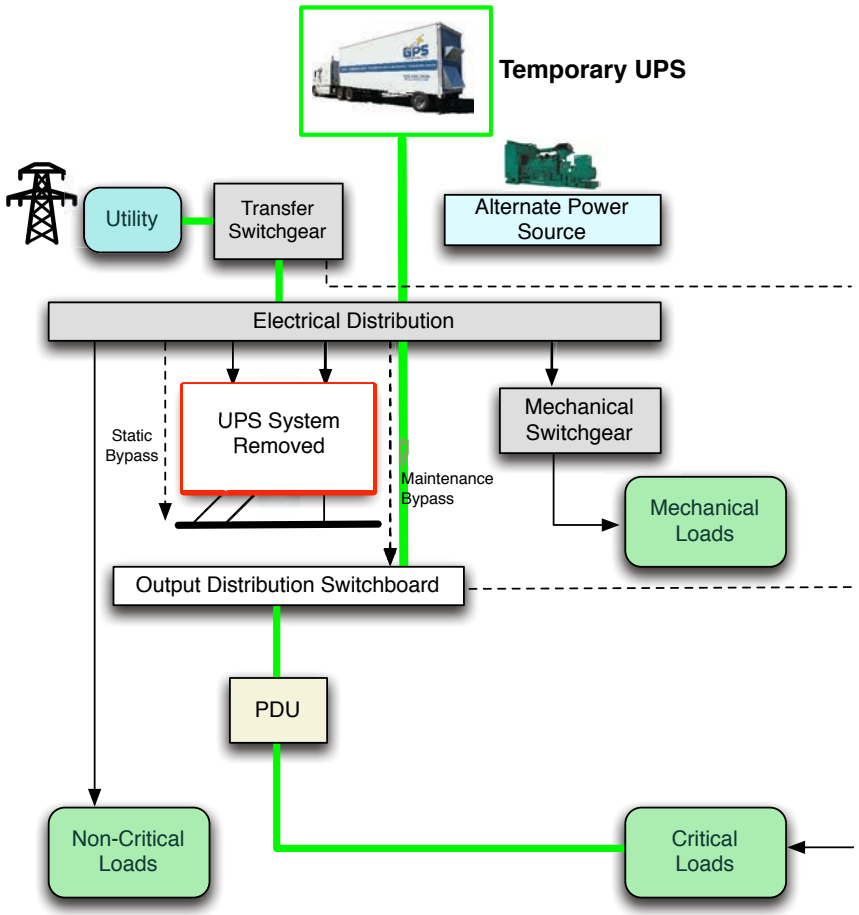
✦ Single Corded Loads

- Implications of shutting down loads
- Controlled shut down and installation of static switch

✦ Dual Corded Loads

- Plugged into the A and B properly
- Many times we find they are plugged into the same circuit or not distributed properly. Using an amp probe identify the load on the circuit. Can the circuit accept the entire load? Often times we find that the load will exceed the circuit.

UPS Replacement Execution



- Transfer “A” building load to generator
- Check rental UPS system and ensure it is in bypass mode
- Place existing UPS system in bypass
- Close output breaker from the rental UPS’s
- Open feeder breaker from existing UPS system to output panel
- Ensure rental UPS has picked up the load
- Shutdown existing UPS System and open AC & DC breakers
- Temporary UPS is on line and carrying load transfer building load back to utility
- Existing UPS are ready to be removed
- Repeat these steps for “B” side of data center

Externalize Your Infrastructure

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Expansion is necessary but time or space pose challenges

- **CIMs** - (critical infrastructure module)
  - IT
  - Electrical
  - Cooling
  - Integrated (“all in one”)

CIM Purpose-Built Solutions

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Macy's Brooklyn

Roof Top Installation

CIM Purpose-Built Solutions

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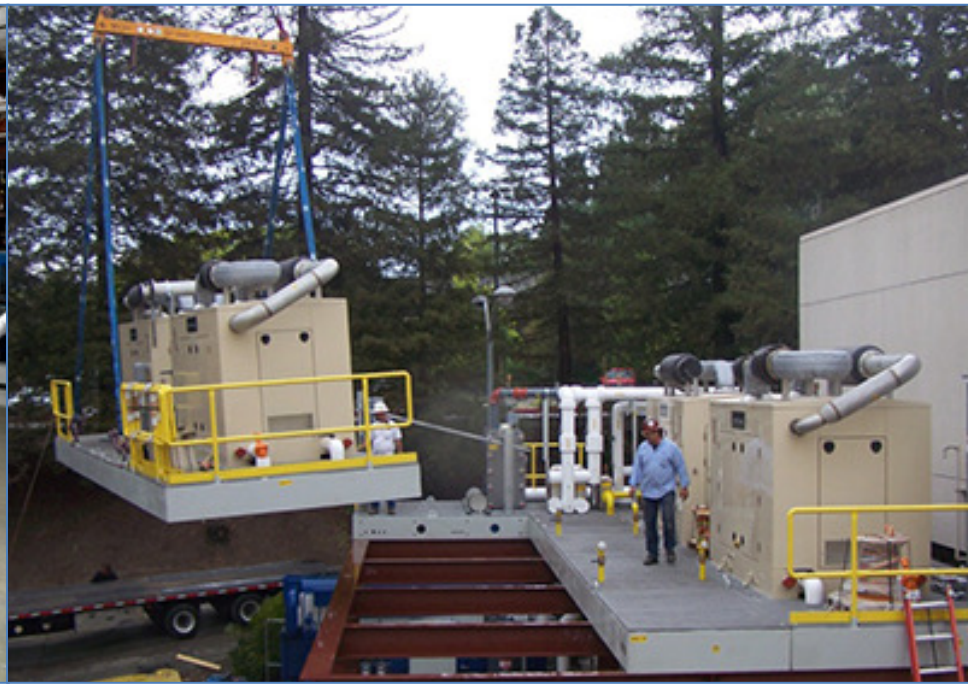

John Muir Medical Center

Raised Platform

Benefits of Modular Construction

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Expansion is necessary but time and space won't allow.

- Scalable by Design
- Concurrent Mfg
- Less Change Orders
- Less On-Site Hours
- Factory Built
- Lower CAPEX
- Predictive Schedule
- Predictive Cost
- Lower Safety Risk
- Reduced Onsite Waste

Speed of Deployment

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Traditional

Modular

30% to 50% Faster

Time Savings

Critical infrastructure modules can be deployed in 90 days.

Thank You

- Buy, Sell, Rent & Lease
- New, Surplus & Refurbished
- Generators, UPS & Cooling

Any Questions?

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