Power Auditing for Data center / Telco closet infrastructure design

What is **Power Audit?**

- A **Power Audit** is the means by which your total **electricity** consumption is measured and apportioned to each electrical equipment that uses it.

Get Answers to Key Questions about Your Power Systems

- What is the current capacity of the system
- What is the health of the power system?
- Are there any safety issues that require action?
- What remediations or changes are needed?
- What can be done to improve energy efficiency?

- A comprehensive audit will ascertain the current health and capacity of your power systems, and define the actions necessary to get them to the desired state. Audits include primary DC, AC and battery plant audits along with generator systems audit

DC Power Audit

- reviews all plant DC power components to determine current configuration and available vacant space for the following:
- • Main power board
- • Supplemental power boards
- • Primary breaker and fuses
- • Primary distribution cabinets
- • Battery Distribution Fuse Bay (BDFB)
- • BDFB panels
- • Rectifiers
- • Battery disconnects
- • Batteries
- • Controllers

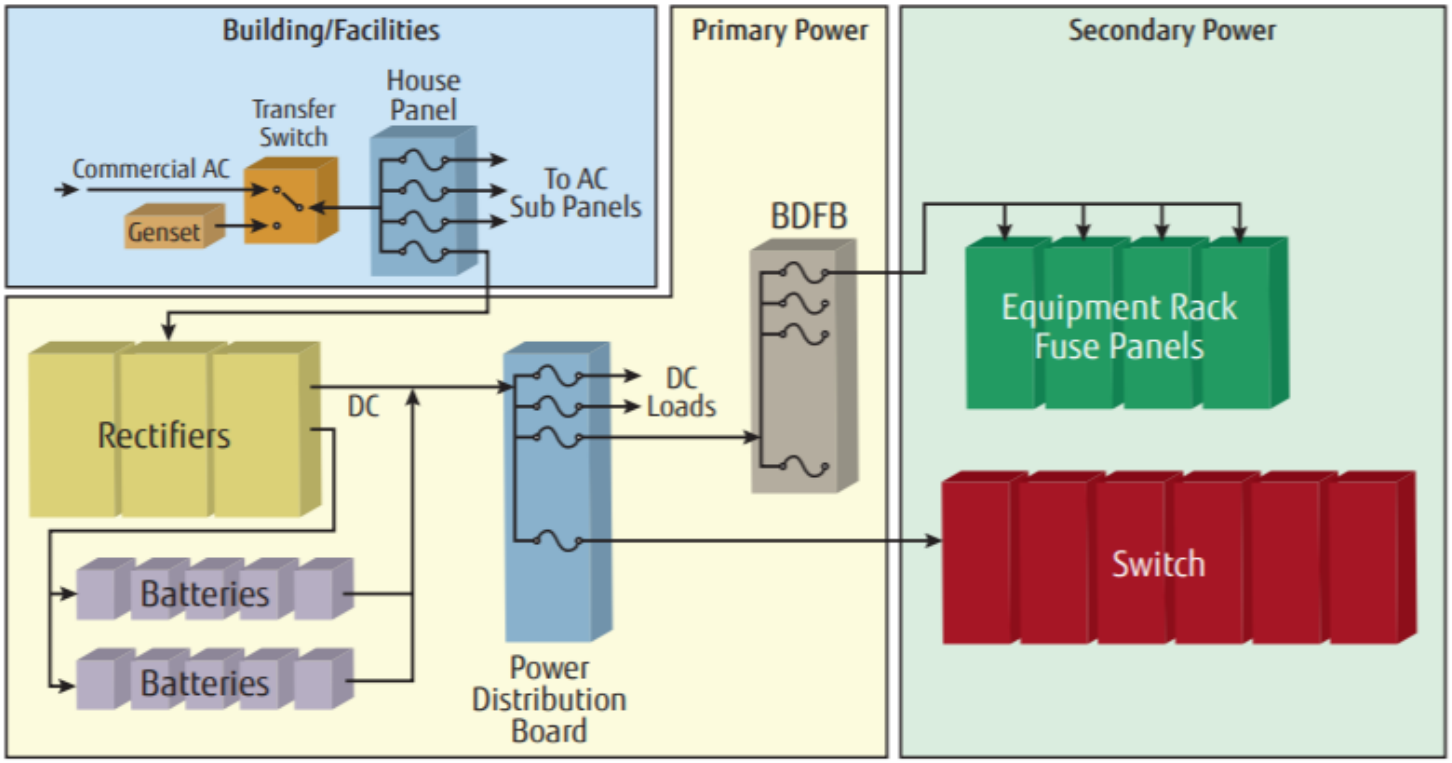
AC Power Audit AC Power Audits

- include a review of all building AC power components to determine current configuration and available breaker space for the following:
- • AC utility Panels
- • AC sub panels
- • AC breakers and fuses
- • Inverters
- • Transfer switch
- • Transformers

Backup Power System Audits

- Backup generation equipment is visually inspected as is the fuel tank.
- Meter readings are taken for current and voltage values and batteries whenever available.
- Any parts removed during the audit are replaced as required.

Backup System



Allocate adequate level of backup power

- component needed to ensure 100% availability of the data center. The IT power infrastructure should be designed as per the following specifications:

Tier-2: A tier-2 data center setup has two UPSes (uninterruptible power supply) that run in parallel to ensure redundancy. So if one fails, the other takes over through a bypass.

Tier-3:This setup has three UPSes to help the organization ensure redundancy and concurrent maintainability. It requires at least n+1 redundancy, that is, when one path is running, the other is redundant.

There needs to be zero power distribution (PD) and no difference between earth and neutral. The transformer inbuilt into the UPS should be located 75 feet from the load, failing which it creates a harmonic PD in voltage, resulting in noise. Voltage fluctuation may have disastrous effects on the server and collaterally on the IT power infrastructure.

Assess your technology requirements–

- The IT power infrastructure setup depends on the IT workload, that is, the power factor consisting of IT servers, storage, and networking equipment. Server arrangements help to distribute the power and load by reconfiguring the load arrangements to work in tandem with power and cooling requirements.
- deally, opt for energy optimizers in the UPS. This creates an intelligent integrated infrastructure (III) that senses the load, and changes dynamically to improve the overall efficacy and efficiency. The lower the loads, the lower will be the efficiency of the product. For example, if the load is equally shared among four UPSes, then efficiency will be lower by almost 92%. On the other hand, energy optimizers built into the UPS will stack 80% of the load in only one UPS and keep the other three in idle position thus increasing the efficiency to 96%.
- An absolute dust and water-free environment is needed to maintain the IT power infrastructure in the data center, including under the raised floor. The cleaning should be done with high efficiency particle arrester (HEPPA filters) vacuum filters, as blowers are harmful. Make certain there is zero water leakage in the datacenter as water is a PCB spoiler.

Arrange the data center equipment appropriately

- Place UPS systems away from the server room to protect it from the electromagnetic field. The power distribution unit (PDU) should be kept close to the IT load, preferably attached to the rack to reduce their physical footprint. The basic norm is to have zero PD between earth and neutral into the load, failing which there may be noise with a probability to boot the system as mentioned earlier.
- Finally, without maintenance, even the best data center may become defunct. Once the power and data center cables are running below the raised floor, ensure they aren’t running in parallel as it may create an electromagnetic field hampering the data center’s functioning. They should ideally have a minimum gap of 60cms between them

Let do some lab calculation

- What size of Ups
- What size of cable
- How many Ah batteries http://www.batterysizingcalculator.com/
- How to test earth
- Safety tips

Acknowledgement

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Thanks