

Untapped Potential in Power Infrastructure for Operational Benefits.

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Datacenter Consumption : Past / Present & Future



Nobel Prize Winning Thesis for Dr. Abhijit Banerjee



"Experimental approach to alleviating Global poverty"

This brought economic theories of incentives closer to direct application, fundamentally transforming the practice of development economics, **by using practical, verifiable and quantitative knowledge to isolate causes of poverty and to devise adequate policy based on behavioral responses.**



Parameters which Affects ROI in Typical Data-Center.

Powering Business Worldwide



How to Improve ROI on Power Consumption.

Power-14%



How to Improve ROI on Cooling Consumption.

Cooling-42%



IT-Occupancy How to Improve ROI on IT Occupancy. Locate Vented Floor tiles correctly ACTIONS **Install Blanking Panels** Many vented tiles are located incorrectly in the average data center or the wrong number are **Decrease server inlet temperature** installed Also saves on energy by Guidance **Correct locations are NOT** • increasing the CRAC return air intuitively obvious temperature A professional assessment can • ensure an optimal result Side benefit – reduced hot spots Savings 3%-8% 2%-5% Only for data centers using a raised Limitation For any data center, old or new • floor

Space Utilization How to Improve ROI on Space Utilization. ACTIONS **Efficient Floor Layout** Adoption of New Technology Modular and Scalable UPS with Floor layout has a large effect on • reduced footprint and increased the efficiency of the air power Density. conditioning system Guidance **Adoption of Lithium ION Battery** Involves hot-aisle/ cold-aisle which benefits nearly 70% arrangement with suitable air reduced footprint and avoids conditioner locations separate Battery room Savings 5%-12% 17%-19% Limitation For New Design/Expansion & Retrofit For new designs •

Operation

How to Improve ROI on Operation.



There is Always Room for Improvement.

The largest room in the world is the room for improvement!



Your Solutions will Have Some Features which you would Never Explored



UPS as a Reserve/ The Balance of The Demand & Supply. The balance of the Demand and Supply



The grid management with reserves

Normal condition frequency containment



Frequency needs to remain as close as possible to 50hz.

The Max power reaches is Max when the frequency is out of limits.

The Customer Demand Management



- Peak Shaving and shifting:
- To avoid high tariffs
- Based on forecasts
- Energy intensive
- Proactive measure





Frequency needs to remain as close as possible to 50hz.

The Max power reaches is Max when the frequency is out of limits.



Frequency containment:

- Based on real time grid Hz
- Uses power to regulate Hz
- Reactive measure
- Paid for availability

UPS as a Reserve/ The Balance of The Demand & Supply.

How and Why Datacenters could help?



The UPS is designed to operate is new modes:

- Critical load (As conventionally for Datacenter)
- Reserve mode (To be used to support the Grid)
- Saving battery mode (When the max support time has been reached for the Grid support)

Datacenters have <u>stranded capacities</u>. They typically use half the capacity at TIER3 to TIER4 to achieve secure operations.

25% to 50% Load Max per feed

Datacenters can make available their extra capacity to the grid



Datacenters have <u>similar design than</u> <u>BESS</u> (Battery energy storage system) technology used in managing the



Datacenters would receive incentives to provide their non used capacity.

60,000 US\$



/ MW and / Year 12

Maximize UPS's Efficiency through it's Modularity Eaton Patented VMMS Technology can Help You



If You Can't Measure it, You Can't Manage





'You cannot fatten a cow by weighing it.'

Improvement is not about measurement, but ...

How do we know if a change is an improvement?

'If you can't measure it, you can't improve it'

- If you Can't Measure...You Can't Manage
- If You Can't Manage....You Can't Control
- If You Can't ControlYou Can't Improve

Next Génération Intelligent Infrastructure

Multi-layer solution architecture



