

# StruxureWare PME for Data Centers

## Facility Power Management



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For Michael Gillis

**Schneider**  
Electric

# Power Solutions for segments

## StruxureWare Power Monitoring 7.0 software



- Power Solutions for Data Centers
- Power Solutions for Healthcare
- Power Solutions for Industry
- Others .....

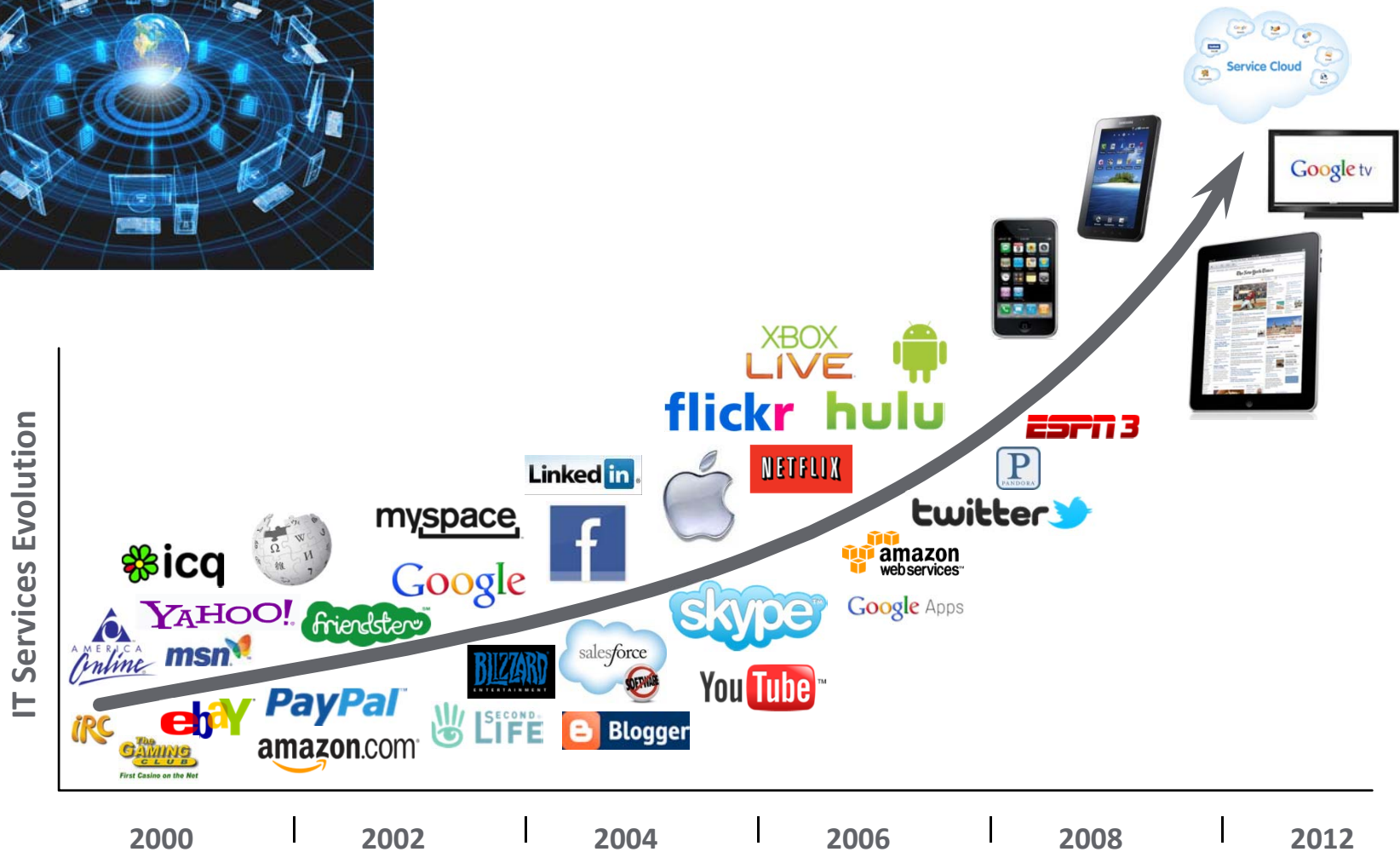
# TVD

Each segment Power Solution focus includes SPM and :

- Standard applications
- Standard architectures
- Testing, testing, testing - 1000 devices w/ an avg of 4 sec real-time updates
- Tools

# Data Center Market Trends

# IT Drives the Need for Data Centers



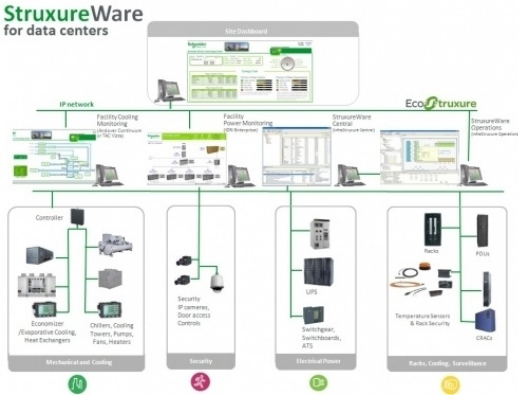
# Facility Infrastructure Trends

## Green IT



Waste heat from servers at the new Telety Paris data center (left) is being used to heat an on-site arboretum (right).

## Next Generation Management Systems



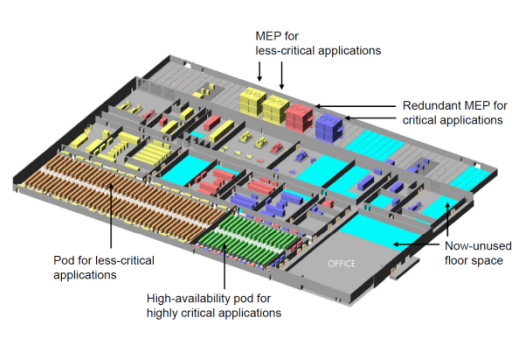
## Growth of Colocation



## Modular Construction



## Flexible Infrastructure

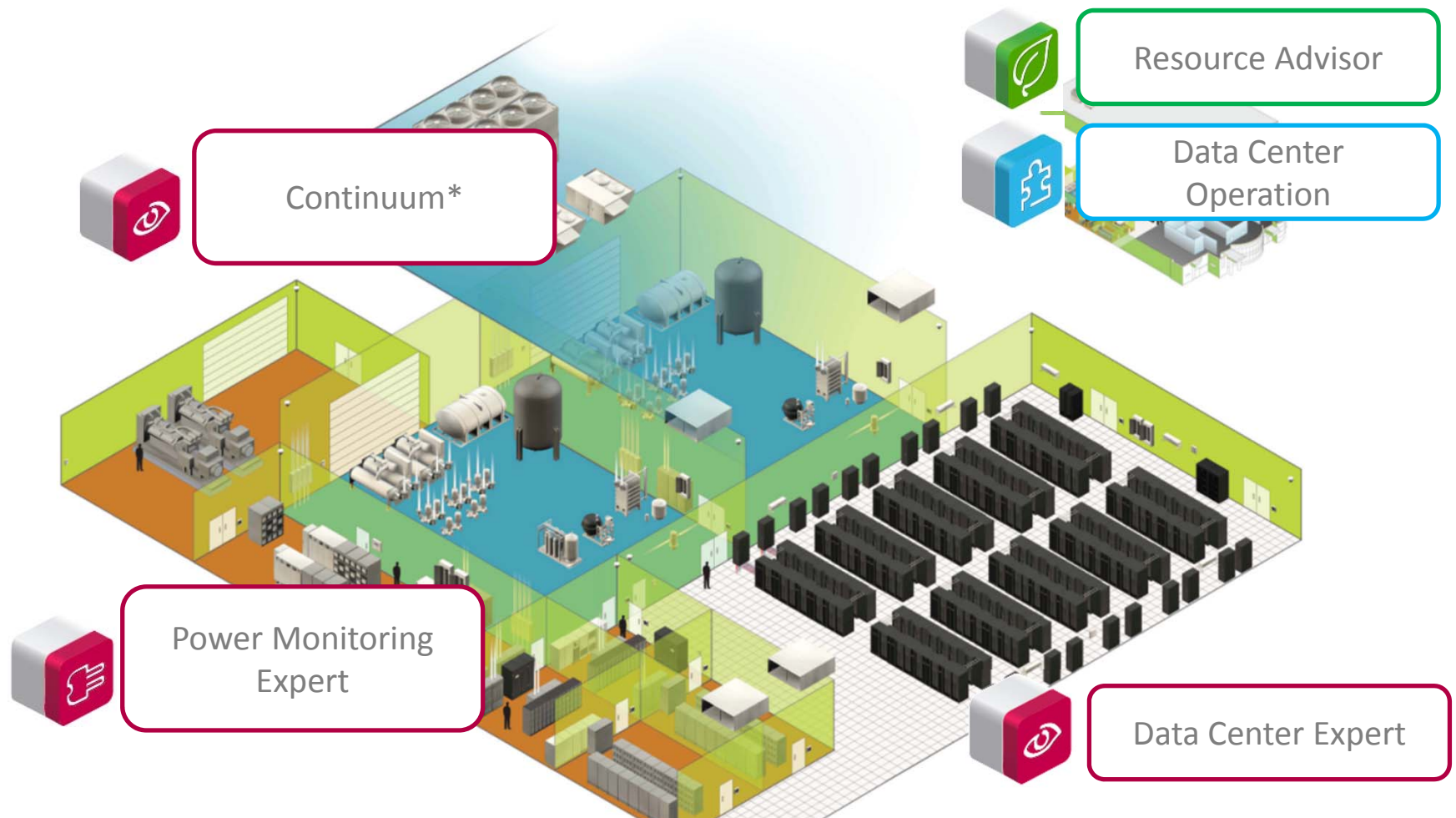


## Innovative Power & Cooling Designs



# Solution Overview

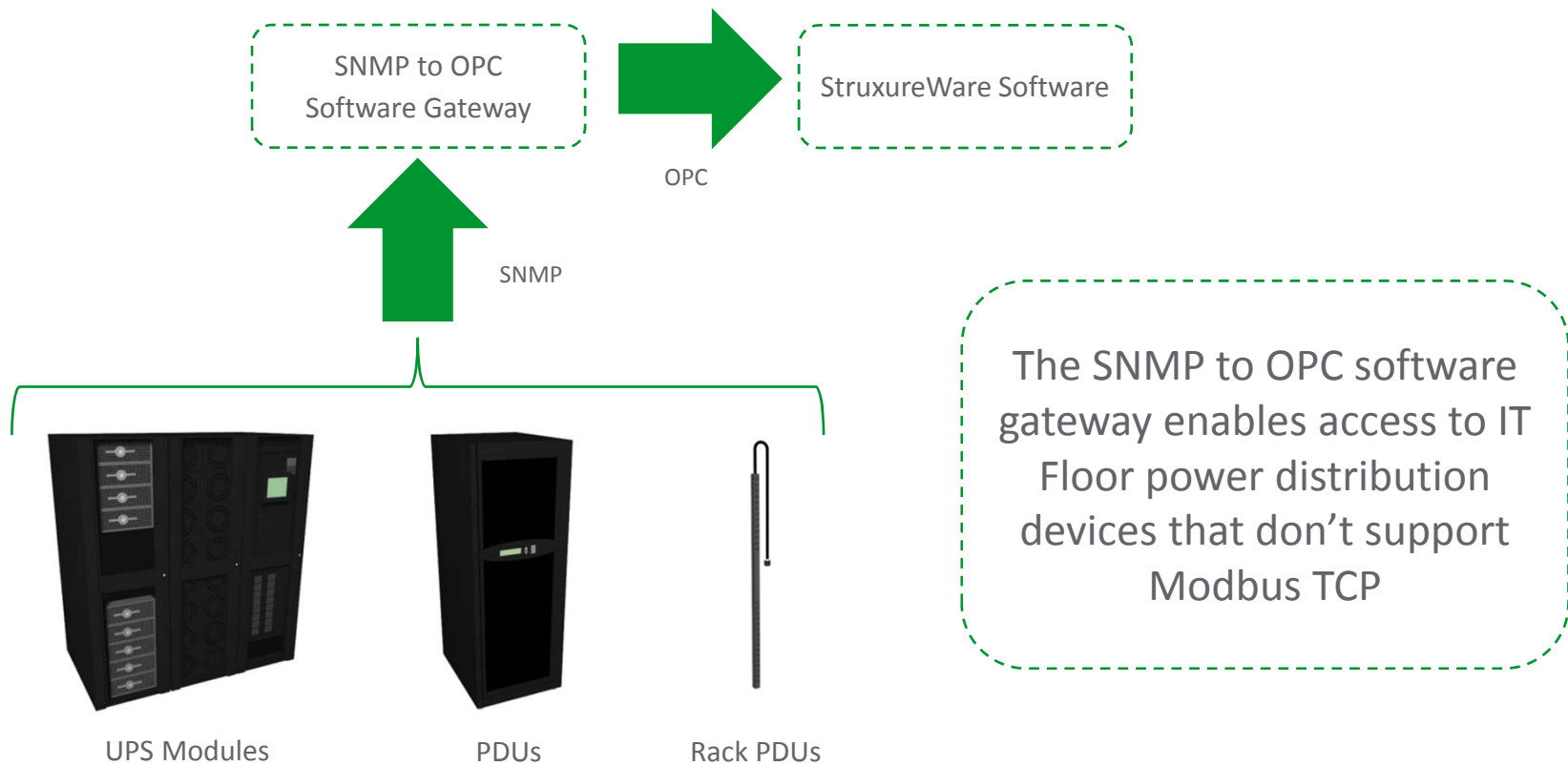
# StruxureWare for Data Centers



**Business-wise, future-driven™**

**From server, to rack, to row, to room, to building, to sites, to the enterprise.**

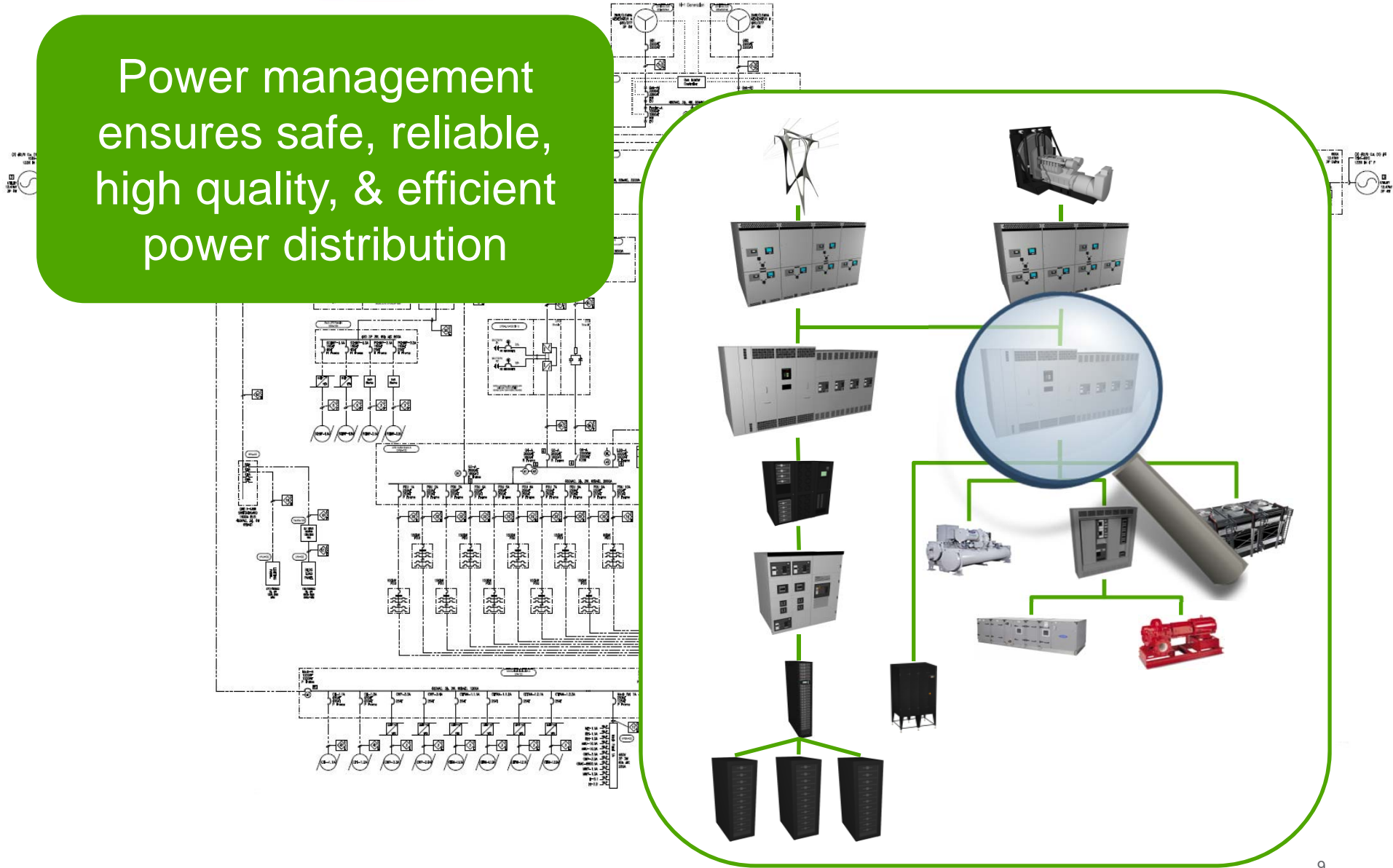
# SNMP to OPC Software Gateway





# StruxureWare Power

Power management ensures safe, reliable, high quality, & efficient power distribution



# StruxureWare Power

Avoid Downtime



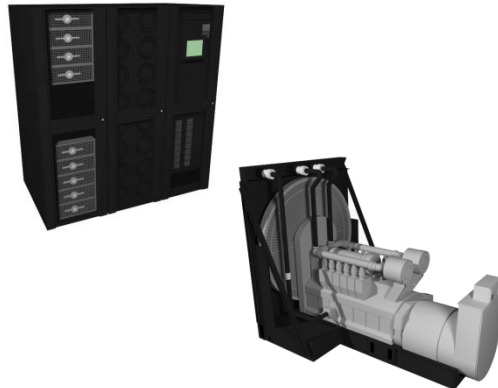
Recover from Downtime



Improve Maintenance



Maximize Asset Utilization



Decrease OPEX



## Decrease the number of unplanned outages

- Identify over loaded IT rack circuits
- Identify redundancy compromised and over loaded UPS and Generator systems
- Identify power equipment maintenance needs (ex: transformer temperature monitoring, UPS module monitoring)
- Automatically document and report on key generator system(s) operational parameters
- Record and analyze key electrical parameters during a Utility outage. This information can then be shared with the Utility to help improve service over time
- Perform a root cause analysis on electrical distribution system events (partial and full outages) to help reduce the probability of the same event occurring in the future



## Reduce the duration of unplanned outages



- Receive critical alarms (breaker trips, ATS events, generator problems, UPS module problems, etc.) via SMS or Email
- View the critical alarm history, sequenced by time, and use that information to help create an action plan
- View real-time electrical distribution system data prior to, during, and after maintenance activities

## Improve the effectiveness of maintenance activities



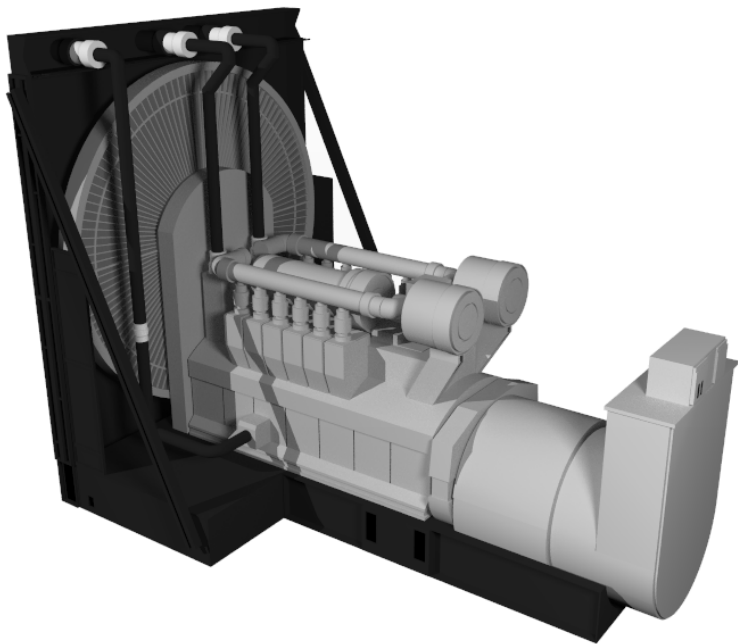
According to an analysis by the Uptime Institute, using 4,500 events over a 15 year period, technician error accounts for 33% of downtime in data centers. Ensuring that technicians have accurate information prior to, during, and after a maintenance activity is critical to minimizing technician error.

Decrease energy  
related OPEX



- Quantify and track the cost of inefficiency in the power distribution infrastructure:
- Transformer losses
  - Harmonic losses
  - UPS losses

## Safely maximize asset utilization



Data center electrical distribution infrastructure is expensive and maximizing the loading of the generator and UPS systems, without compromising data center redundancy design, is critical for safely minimizing future CAPEX.

# Summary

- Decrease the number of unplanned outages
- Reduce the duration of unplanned outages
- Improve the effectiveness of maintenance activities
- Decrease energy related OPEX
- Safely maximize asset utilization




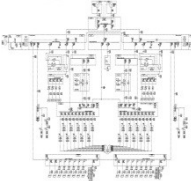


# Solution Details

# Target Market


<b>Data Center Type</b>	Dedicated, Purpose Built Facility	
<b>Data Center Segment</b>	All sub segments; special focus on Co-Location, Internet Services, Finance, & Telecom	
<b>End User</b>	Facility Design	Facility Operations
<b>Project Type</b>	New Construction Site Expansions	Retrofit
<b>Power Design</b>	Tier III or IV (99.982, 99.995)	
<b>IT Load</b>	500 kW +	
<b>IT Floor Area</b>	500 m <sup>2</sup> + 5,000 ft <sup>2</sup> +	

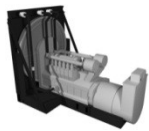
# StruxureWare PME for Data Centers 2012 Offer Management Systems


 **Power Monitoring**

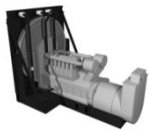
	<p>Monitor the real-time state of the power system</p>		<p>Get notified of critical power system alarms</p>		<p>Determine the cause and sequence of power system events</p>
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Large data center (i.e. up to ~ 10MW IT load, 1,000 devices) support + optional software hot standby configuration.


 **Generator Test**


 Provide documented evidence of regular generator system testing.


 **Generator Power**


 Maximize the loading of the generator system within the constraints of the power system redundancy design.


 **UPS Power**

 Maximize the loading of the UPS system within the constraints of the power system redundancy design.

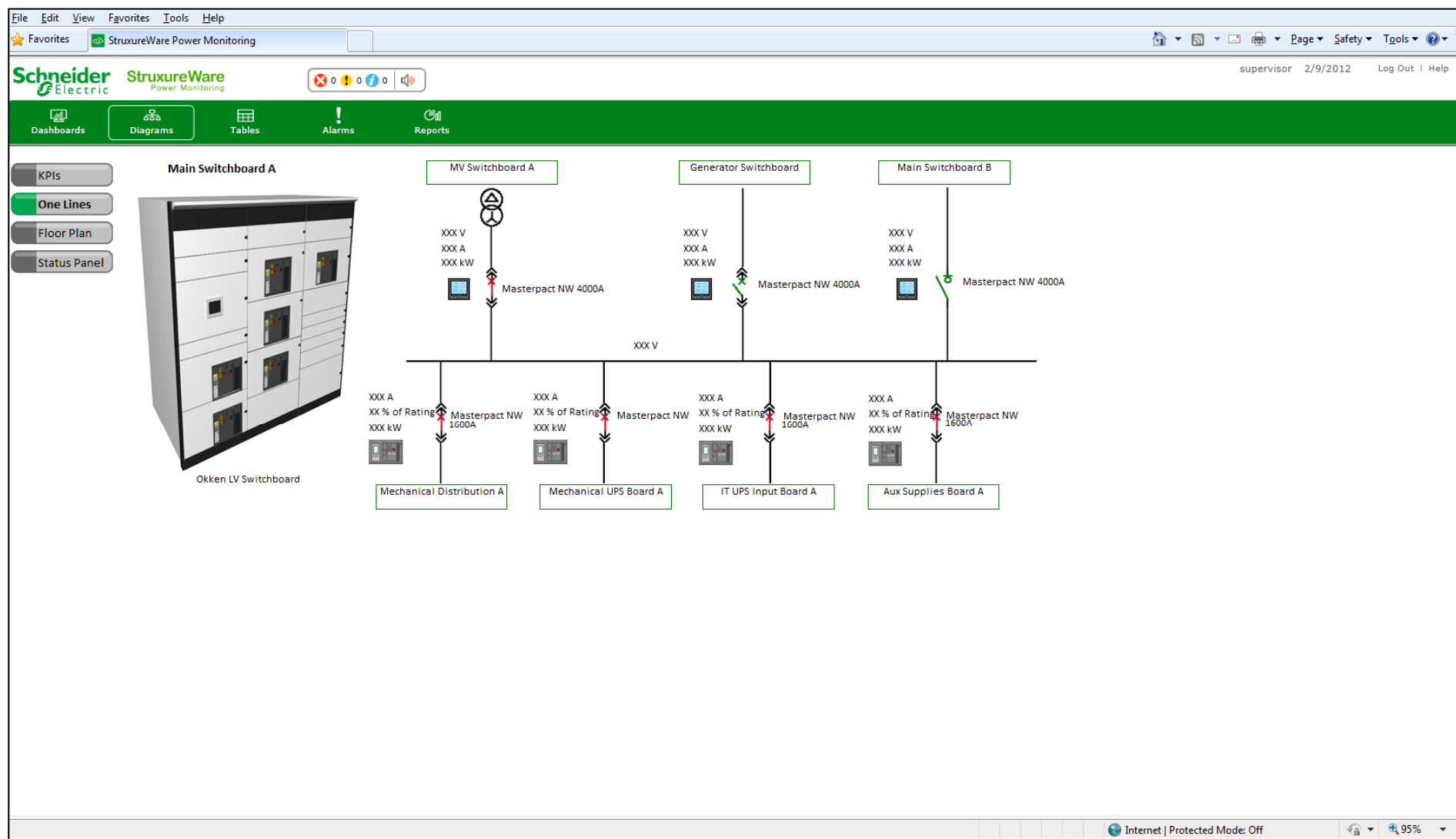
 **Power Losses**

 Quantify the cost of inefficient power delivery: transformers (MV & LV), UPS modules, and harmonics.

 **Power Usage Effectiveness (PUE)**

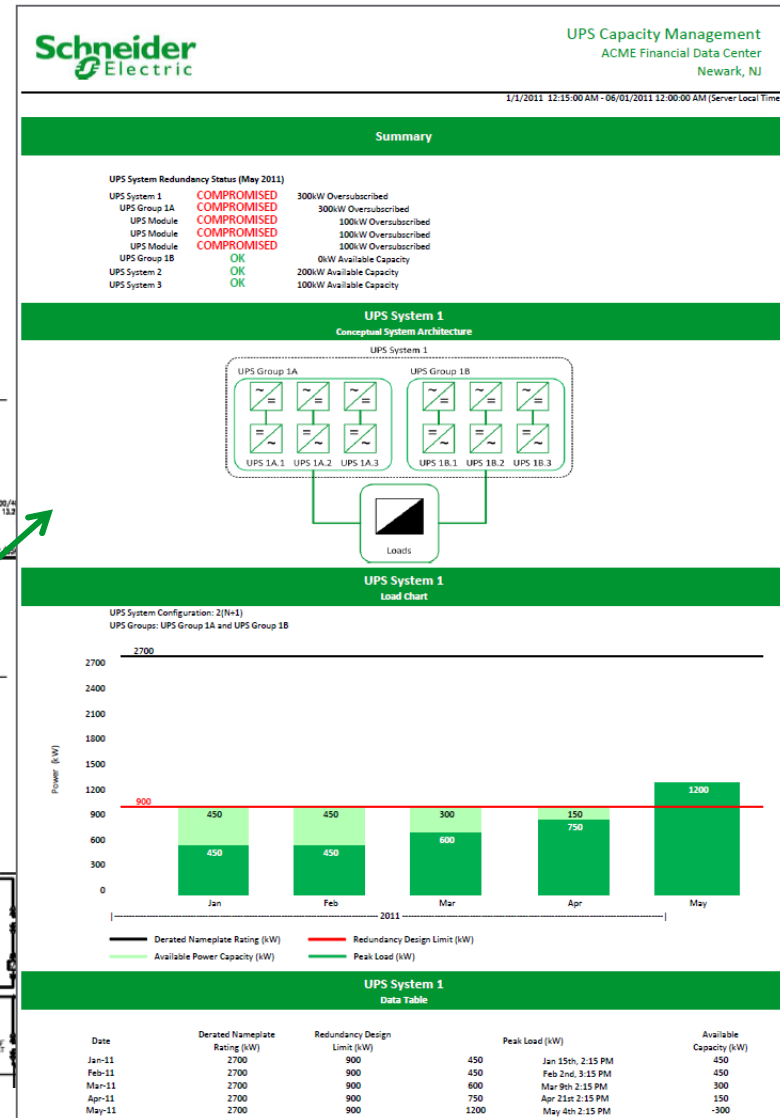
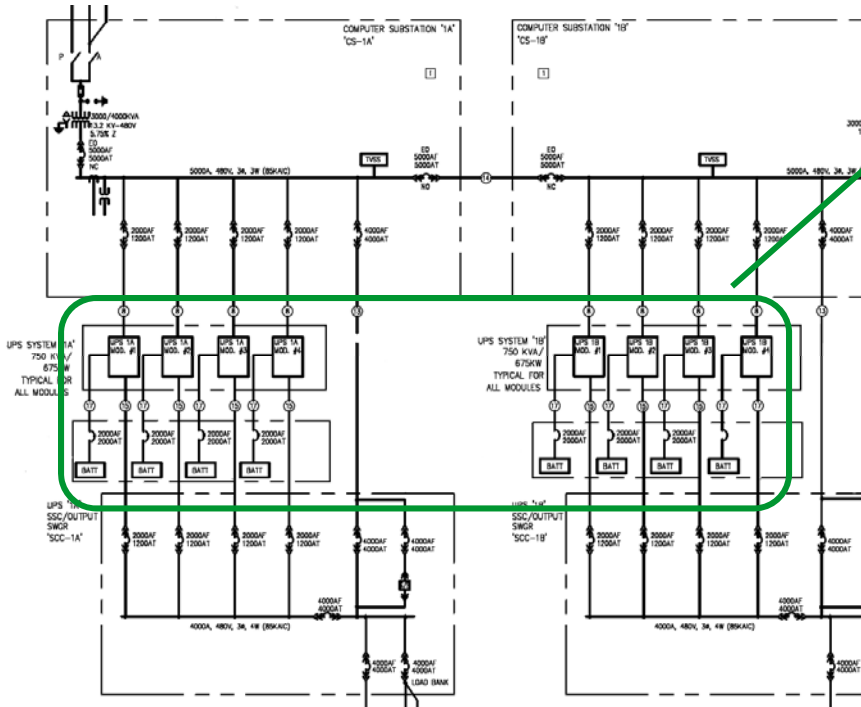
 Report on PUE: in real-time and over time.

# Power System Monitoring & Alarming



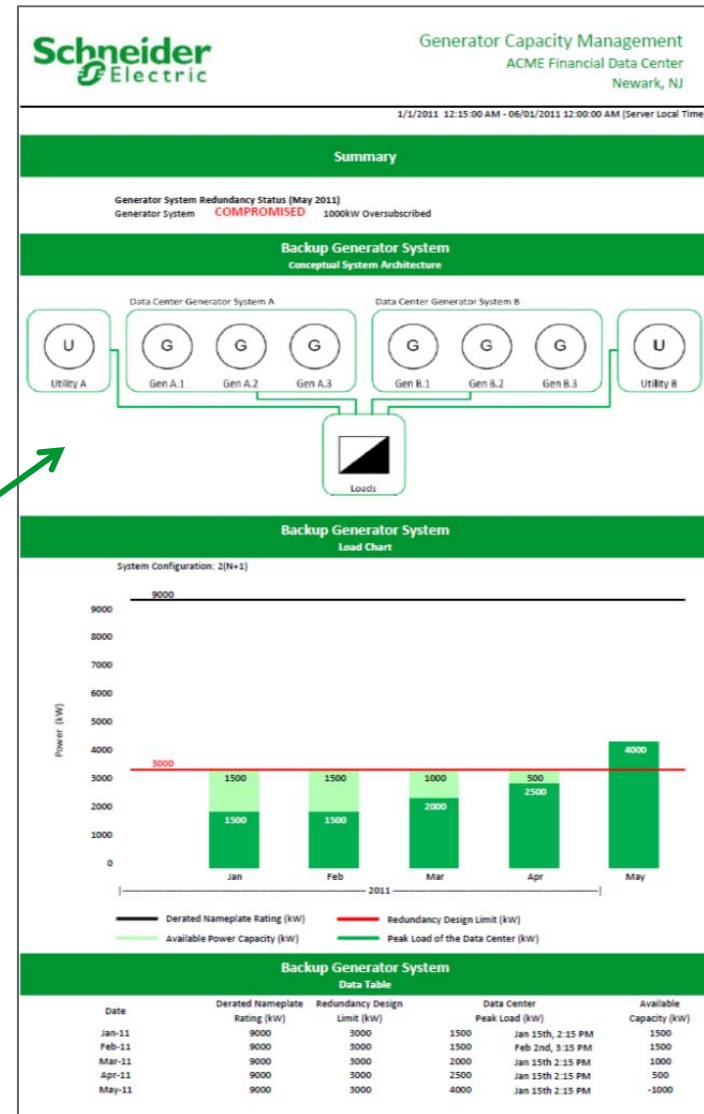
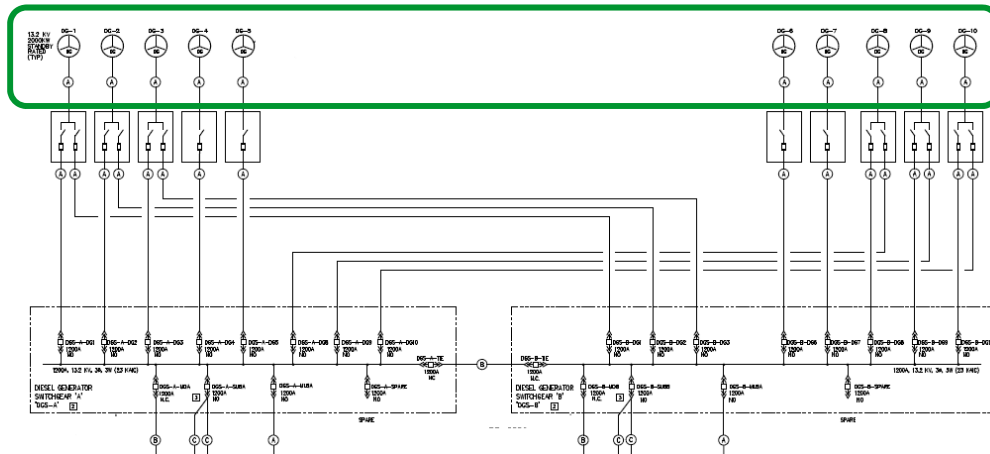
# UPS System Capacity Management

- Maximize the utilization of the UPS systems.
  - Identify periods when UPS capacity is over subscribed.
- Supports N, N+1, 2N, 2(N+1), ...



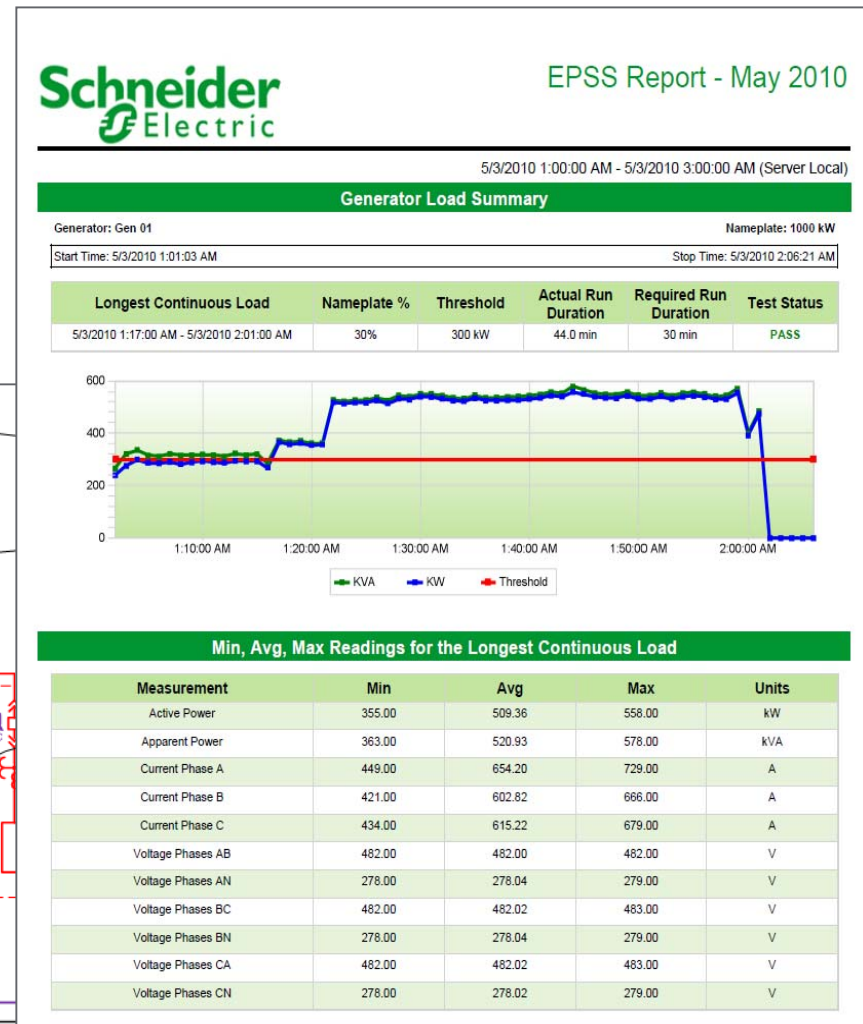
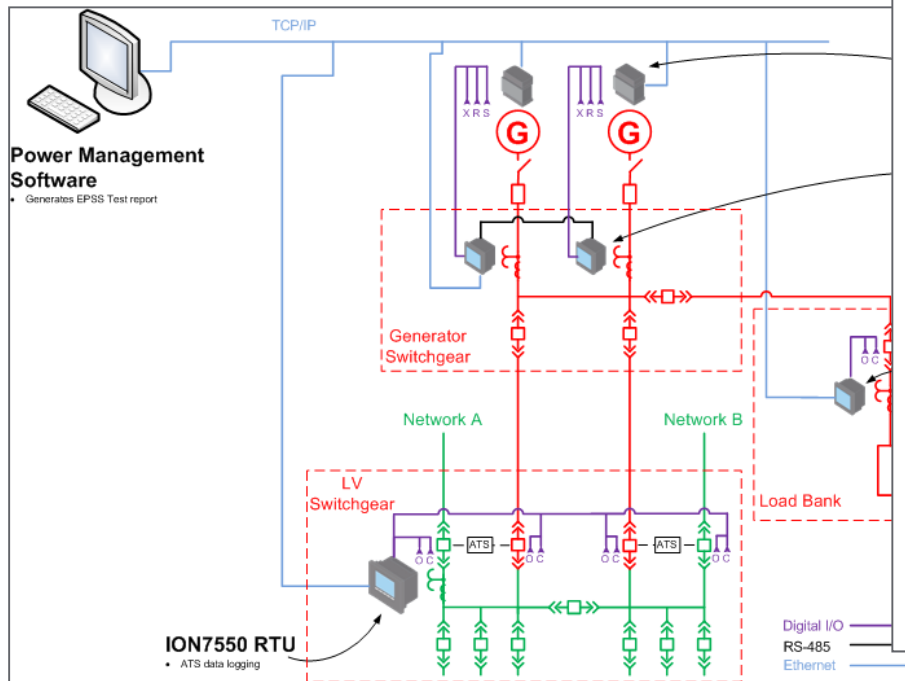
# Generator System Capacity Management

Maximize IT loading while ensuring that the intended power system redundancy design of the backup generator system is not violated.



# Generator System Testing

Provide documented evidence of regular generator system testing and identify any generator and transfer switch problems that could prevent a transfer to backup power.



# Generator Battery Health report

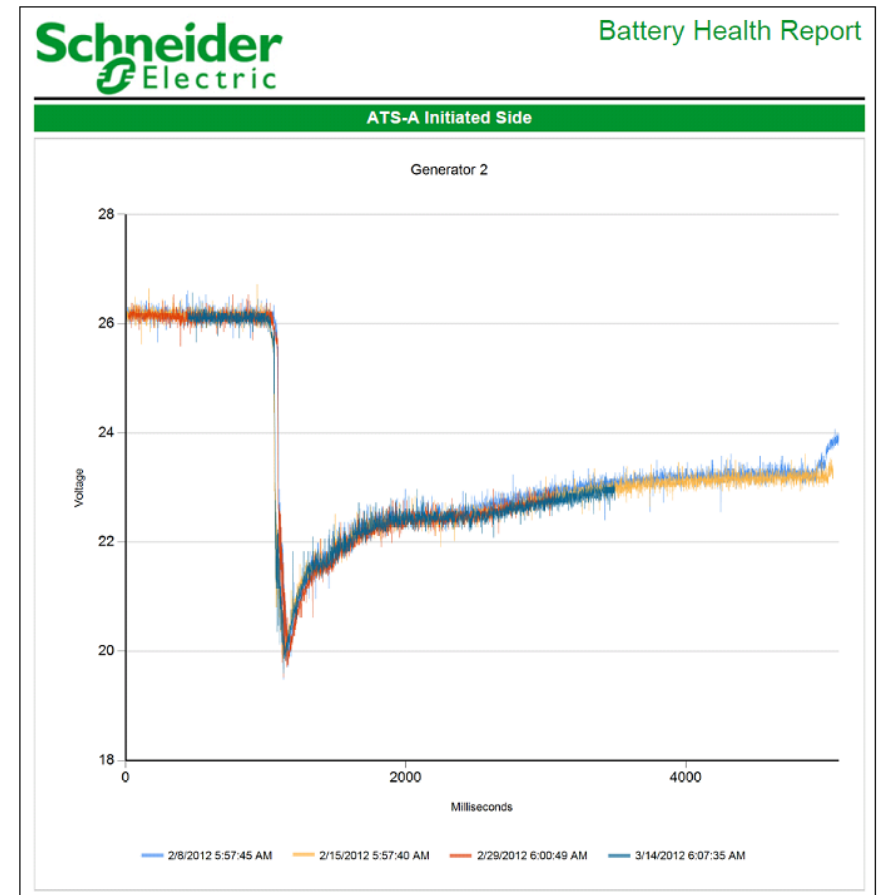
Batteries are usually replaced on a schedule (e.g. every 2 years), but could either fail before that or they may last much longer

Battery voltage signatures are analyzed to detect when battery health is compromised to the point where the engine may not start

- > Battery voltage signature is captured during time of engine start
- > Power meter on generator is required

Select either a specific startup (by date) or most recent number of starts

i.e. Last 4 starts



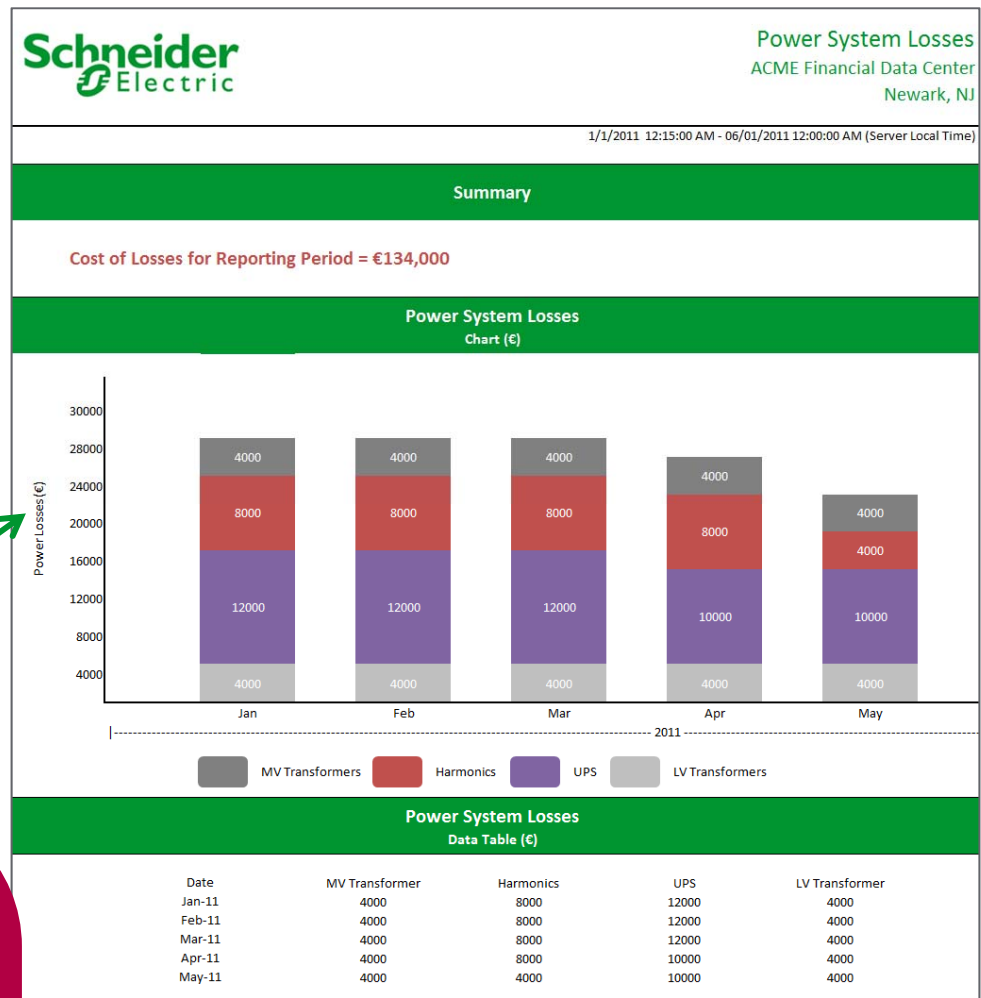


# Power System Losses

Quantify the cost of inefficient power delivery, specifically: transformers (MV & LV), UPS modules, and system harmonics.

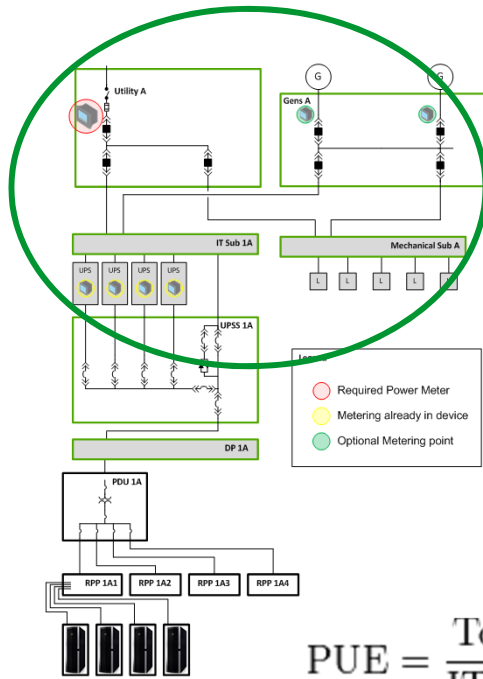


Power system losses are equivalent to **~ 10%** of a data center's electrical use – up to €3M lost in a 20MW data center with a PUE of 1.75 & a rate of €0.10 per kWh



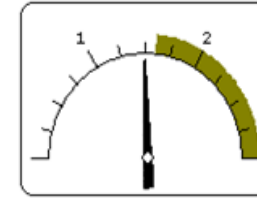
# PUE

Track and verify the efficiency of the power distribution system and the effectiveness of power & cooling energy efficiency programs.



$$PUE = \frac{\text{Total facility power}}{\text{IT equipment power}}$$

## Power Usage Effectiveness (PUE)



1.45

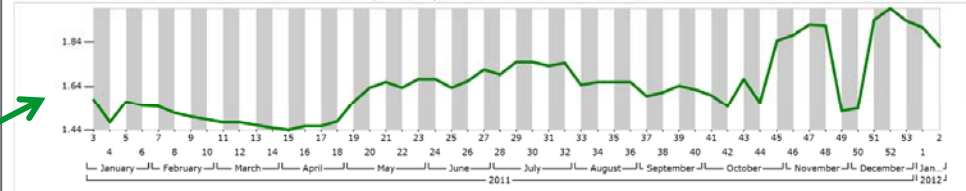
Schneider Electric

Category 1

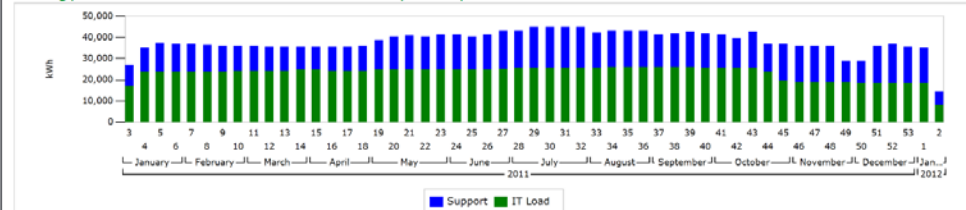
Wednesday, January 11, 2012

	24 hours	7 days	30 days	Last 12 Months
PUE	1.83	1.84	1.93	1.64
ITEquipment	111 kW	111 kW	110 kW	141 kW
DataCenter	203 kW	204 kW	212 kW	233 kW

PUE Trend - Last 12 Months with Weekly Rollup Values



Energy Trend - Last 12 Months with Weekly Rollup Values



Improving PUE to 1.75 from 1.60

equates to €2.6M

in annual savings for a 20MW IT

load data center with a rate of

€0.10 per kWh.

# ***PUE Customer quote***

**Typically a PUE of 1.26 that increases suddenly increased to 1.5!**

- >We dispatched a service technician who discovered that the filters on the chiller had become dirty and clogged
- >The filters were replaced and the PUE immediately returned to 1.26
- >Our expert software identified a significant efficiency issue that would otherwise have gone undetected until the chiller was due for service many months later, potentially impacting SLAs and increasing energy costs.

# ***Demo Site of SMP Power Solution for Data Centers***

**[www.PS4DC.Biz](http://www.PS4DC.Biz)**

***Thank You!***

**Questions?**

