Supporting Mid Power Mission Critical Applications

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TOTAL POWER SOLUTIONS – TOTAL SUPPORT

OBJECTIVE

NIGICO SA activated mainly in the design, installation and support of power electronics, batteries and renewable in every business field, offers complete power and energy solutions since 1996.

STRATEGIC ORIENTATION

Our Mission

Our mission is to provide safety, to provide solutions for all power needs. We aim at supporting the companies with efficiency and flexibility, providing them with peace of mind, not just products.

Our Vision

Our goal is to be established as the leading force in energy in the region of Cyprus & the Balkans, by supporting the constant growing energy demands.

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SOLUTIONS THAT MEET YOUR NEEDS

- UPS
- TELECOM RECTIFIERS
- BATTERIES
- DATA CENTER SOLUTIONS
- INDUSTRIAL SYSTEMS
- HPAC SYSTEMS
- MARINE SYSTEMS
- RENEWABLE ENERGY
- ADVANCED SERVICES

TARGET GROUPS # *The Whole market…that needs …* *stability* *efficiency* *Secure*

- IT BUSINESS
- MEDICAL SECTOR
- TELECOMMUNICATIONS
- FINANCIAL SECTOR
- CONSTRUCTING SECTOR
- ENERGY
- OTHER MISSION CRITICAL BUSINESS…..from LOW….to **MID**….up to MVA+

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SOLUTIONS FOR….everyone…

RACKS PDUs

- Modular Rack PDU for maximum flexibility & scalability

KVM SWITCH

- TRIPPLITE solutions for KVM Switches, Rack Consoles and Console Servers

RACKs

- A system building box that offers up to 15000 different assembly options

COOL THERM

- Knurr Solution for Water-Cooled Server Rack

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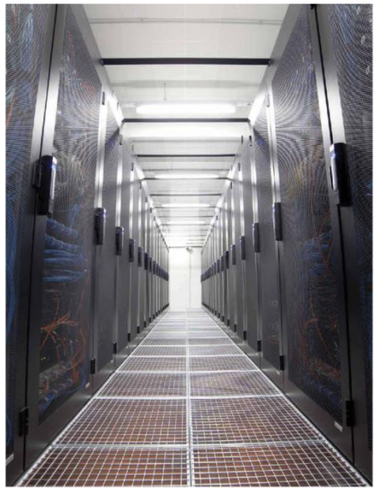
SOLUTIONS FOR….everyone…



SMART AISLE	COOLING RACKS	INFRASTRUCTURE
•Smart Aisle Solutions •Smart Aisle Containments	•Intelligent air flow control for more efficiency in rack cooling	•Raised floor panels and reinforced profiles

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HOW IT ALL COMES TOGETHER

- Thermal Management
- Power Management
- IT Management

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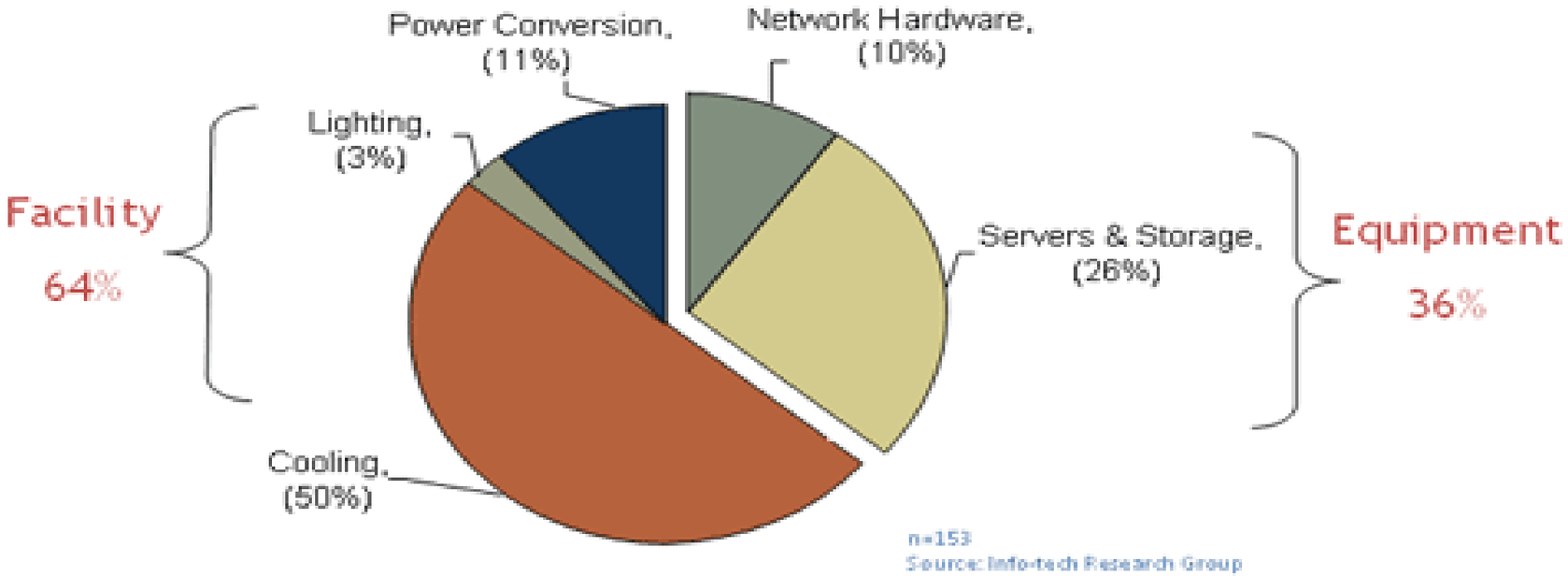
UPS Optimized TCO

ENERGY MANAGEMENT

Typical Data Center Energy Consumption



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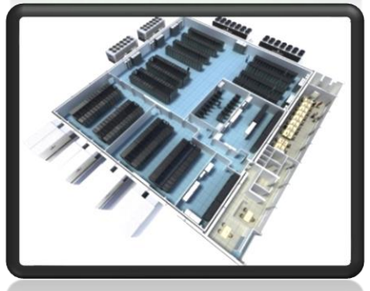
Energy in = Energy out

Thermal Power is being rejected in the environment in different form: hot air, hot humid air, hot water etc.



01001100 11010011 10010011... Microprocessors, memories, require power to work. This power is transformed in heat that need to be removed and rejected.

Power is generated, transported and distributed. Depending on the kind of application, electrical power can be tranformed in mechanical power, other electrical power (ie charging a battery), HEAT.

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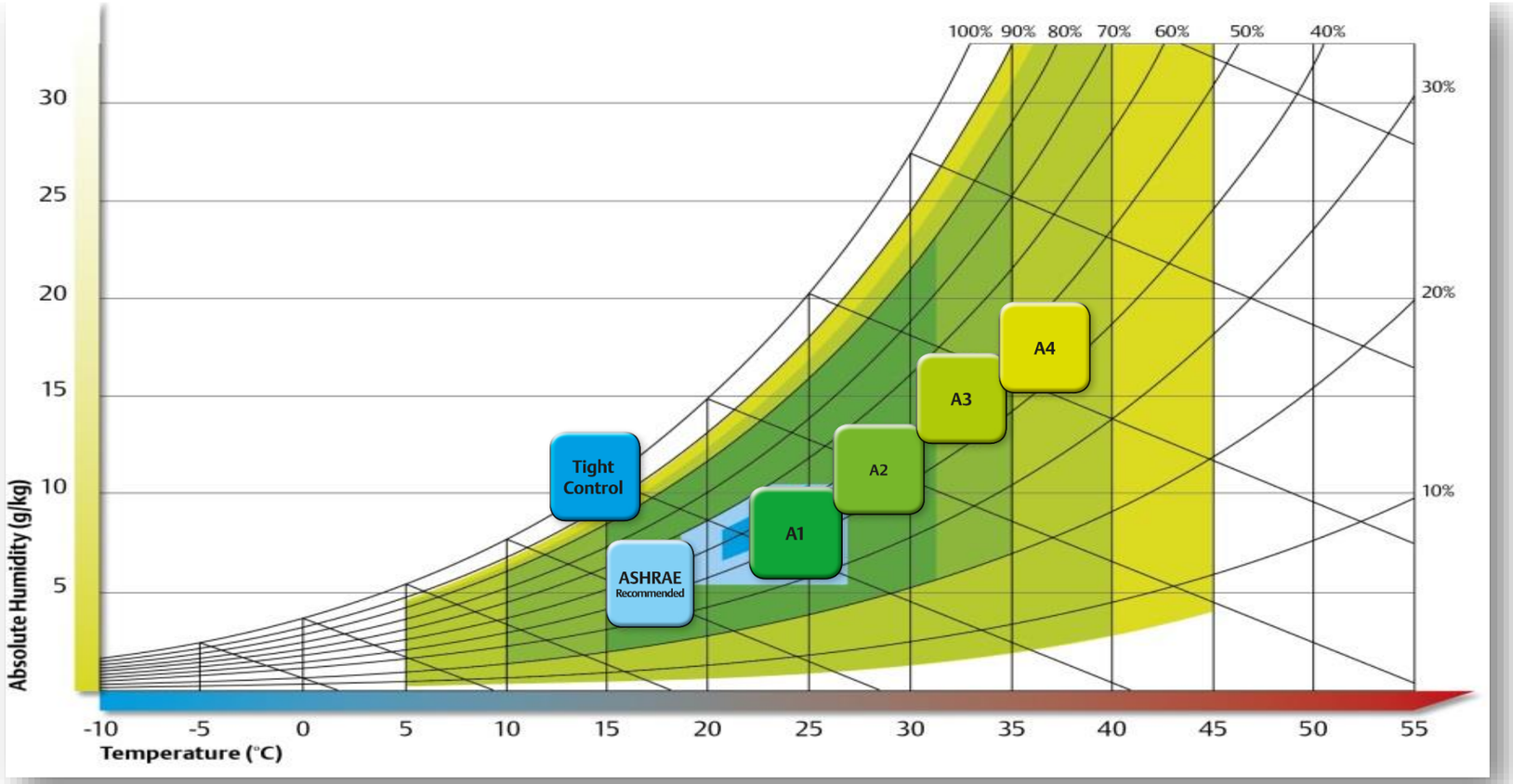
The Data Center World Guidelines

ASHRAE* defines different working ranges for temperature and humidity based upon installation and technologies. This graph shows the typical representation Ashrae pre-defined working envelopes.

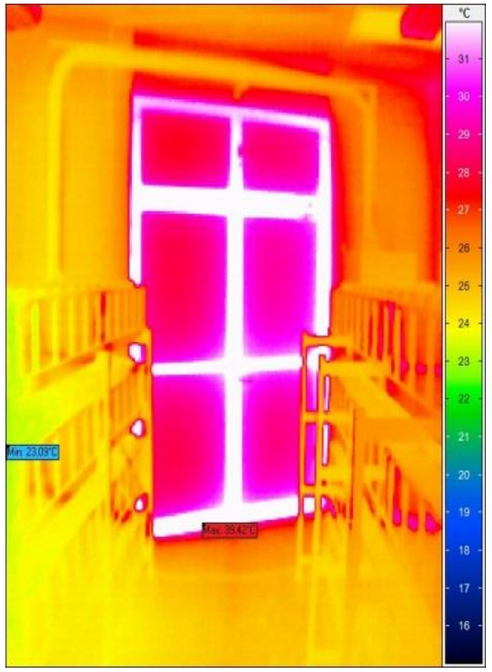


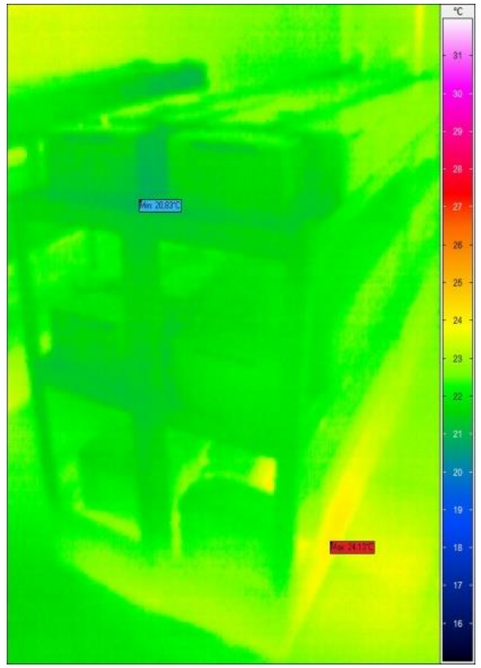
ASHRAE* – American Society of Heating, Refrigerating & Air Conditioning Engineers

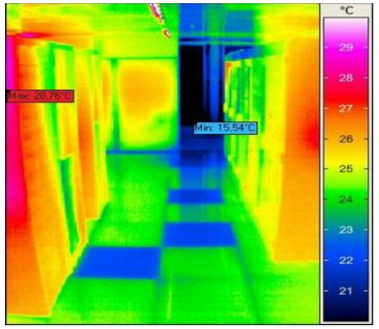
Data Center Assessment
Hot Spot Analysis – Identify Air Loss

Thermal Photos

- Aisles
- Racks
- Interesting part like doors, batteries etc…







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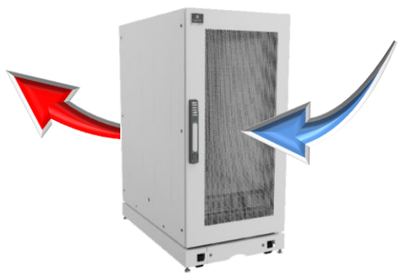
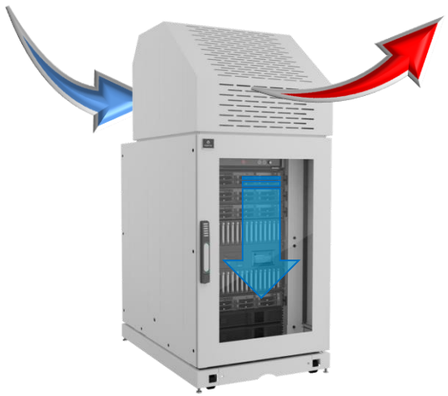
Smart Cabinet – Cooling Systems



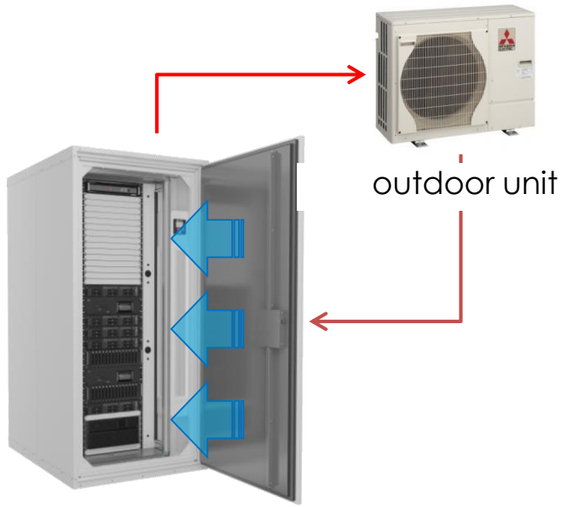
Open cabinet, meshed door

Direct cooling with room air
Good for ASHRAE class A2 IT equipment
Suitable for room aircon
IT heat into the room
IT noise into the room
"free cooling"



Closed cabinet, compact ACU

Active cooling, temperature kept at low temperature (25°C e.g.)
IT equipment protected against coarse particles (IP40)
More heat into the room
IT noise reduction - ACU noise
Plug and play



Closed cabinet, split cooling unit

Active cooling, temperature kept at low temperature (25°C e.g.)
Protection against dust, smoke, fire, water (IP56)
No heat into the room
Strong noise dampening
Installation required:
-installation outdoor unit
- pipework installation
- refrigerant filling, commissioning

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Cooling needs of IT equipment

25°C ➡  ΔT ≈ 7K ➡ 32°C 470 m³/h per kW

25°C ➡  ΔT ≈ 15K ➡ 40°C 220 m³/h per kW

25°C ➡  ΔT ≈ 25K ➡ 50°C 130 m³/h per kW

Temperature and humidity at equipment intake:

ASHRAE TC 9.9 Thermal Guidelines 2008 / modified 2011 for Class A1*)

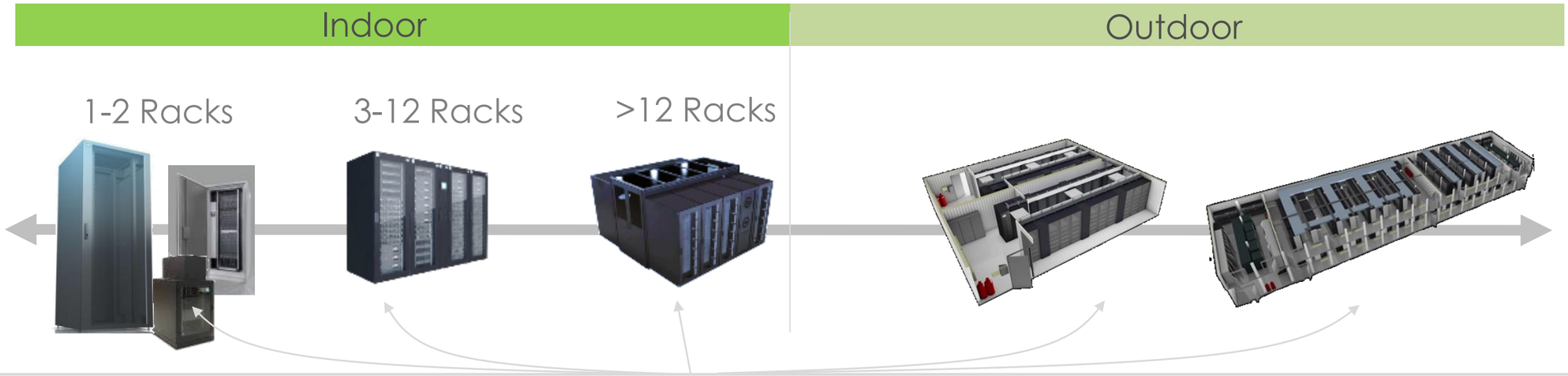
Recommended:	18 - 27°C, 5.5°C DP - 60% RH and 15°C DP
Allowable:	15 - 32°C, 20% RH - 80% RH (Class A1)
	10 - 35°C, 20% RH - 80% RH (Class A2)

*2011 Thermal Guidelines for Data Center Processing Environments - Expanded Data Center Classes and Usage Guidance (ASHRAE Whitepaper)

Traditional Room vs Smartcabinet

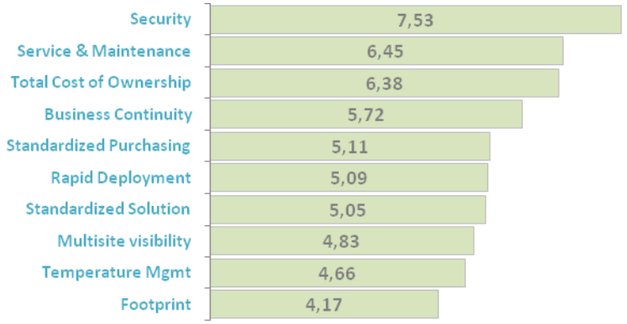
	TRADITIONAL ROOM	SMARTCABINET™
Room preparation	Required and complex	Not required
Design and construction	Multi-vendor Time-consuming Multiple issues	Factory designed and pre-configured
Cost of preparation	High	Low
Power distribution	Requires wall-mounted electrical distribution box costly	Built-in system
Site preparation period	2-3 weeks	1 - 2 days
Aesthetics	Different design, color, sizes, etc.	Integrated design
Area required	10 - 20 sqm	approx. 6 sqm
Monitoring system	Individual systems Low capability Low integration	Integrated system Factory Installed / Connected / Tested
User interface	Different interfaces for different equipment	One integration system for all equipment
Post-sales support	Multi-vendors Poor technical support	Single vendor provides full support
Relocation	High cost Difficult	Low cost Easy
Pre-assembled	Not possible	yes
Pre-connected	Not possible	yes
Factory tested	Not possible	yes

Current Trends demand pre-integration & Remote Connectivity particularly at the edge



Security & Access Control | Sensors | Gateways | Cooling | UPS | Cameras | KVM | PDUs

Ranking of top purchase considerations of EMEA Edge infrastructure Customers



Ranking scale 1-10, 160 survey respondents

- Security - Remote connectivity, physical security, monitoring
- Service & Maintenance - Field trip avoidance, condition monitoring, service reach and availability
- Total cost of ownership - Standardization (build, ship and install pre-integrated equipment), easy installation, optimized integration

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ΕΝΕΡΓΕΙΑΚΗ ΑΝΑΒΑΘΜΙΣΗ ΤΩΝ DATA CENTERS

HALL C1
NIGICO presentation
LAYER ONE GREECE 2019 CONFERENCE
14:00-14:30

Dimitris Nomikos – CEO

Sotiris Mamalis - HPAC Systems Product Manager

Challenges for small sites

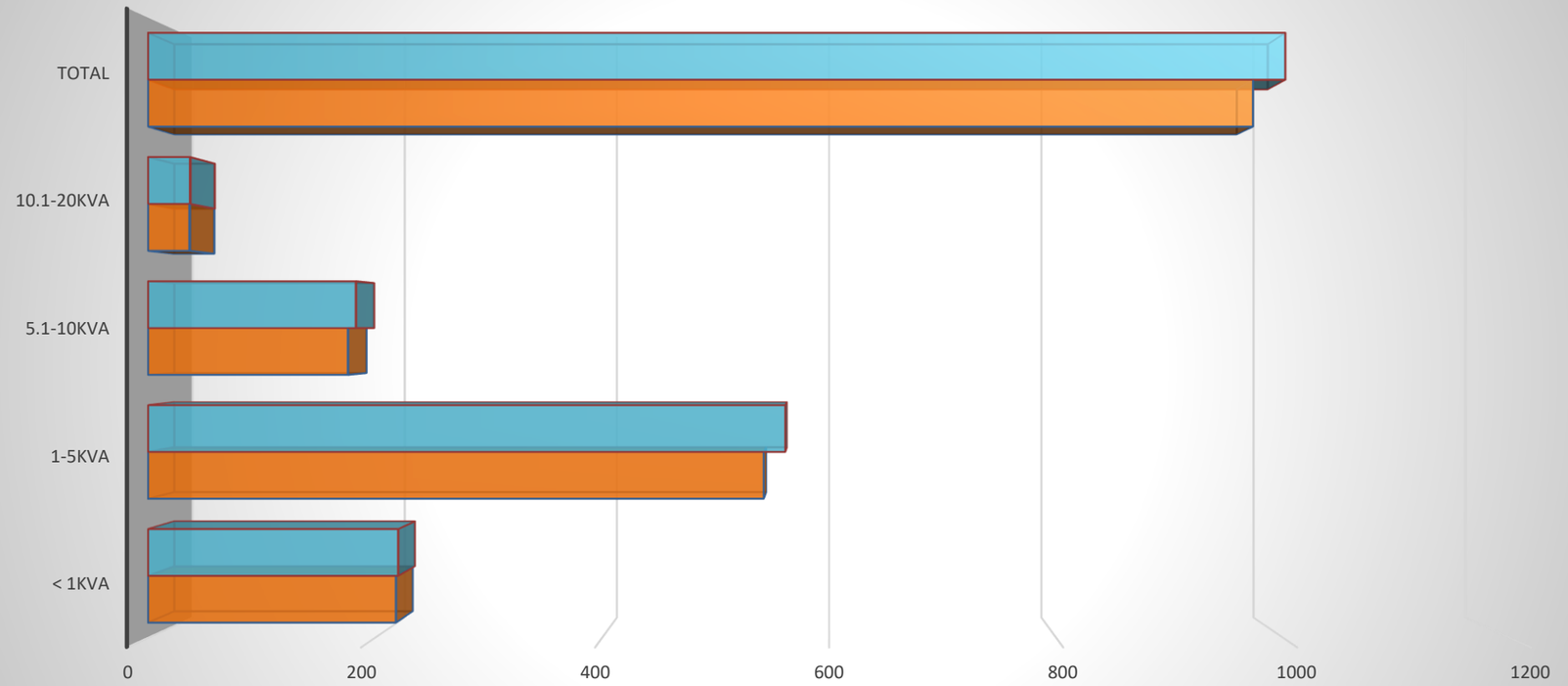
- Requirements as for big data centers
- Comprehensive planning and design
- Higher capex and opex per compute capacity
- Reserve capacity for peak-loads and future growth needs to be deployed
- Limited scalability
- Typically many distributed locations

Appropriate solutions

- Compact micro data center instead of expensive development / equipping on an IT-room
- Integration of a complete infrastructure into a cabinet or a row
- Factory installed and tested, fast and easy deployment and commissioning
- No qualified personnel required on site, remote monitoring, management & administration
- Service from one hand

SINGLE PHASE UPS MARKET

Single Phase UPS Market EMEA

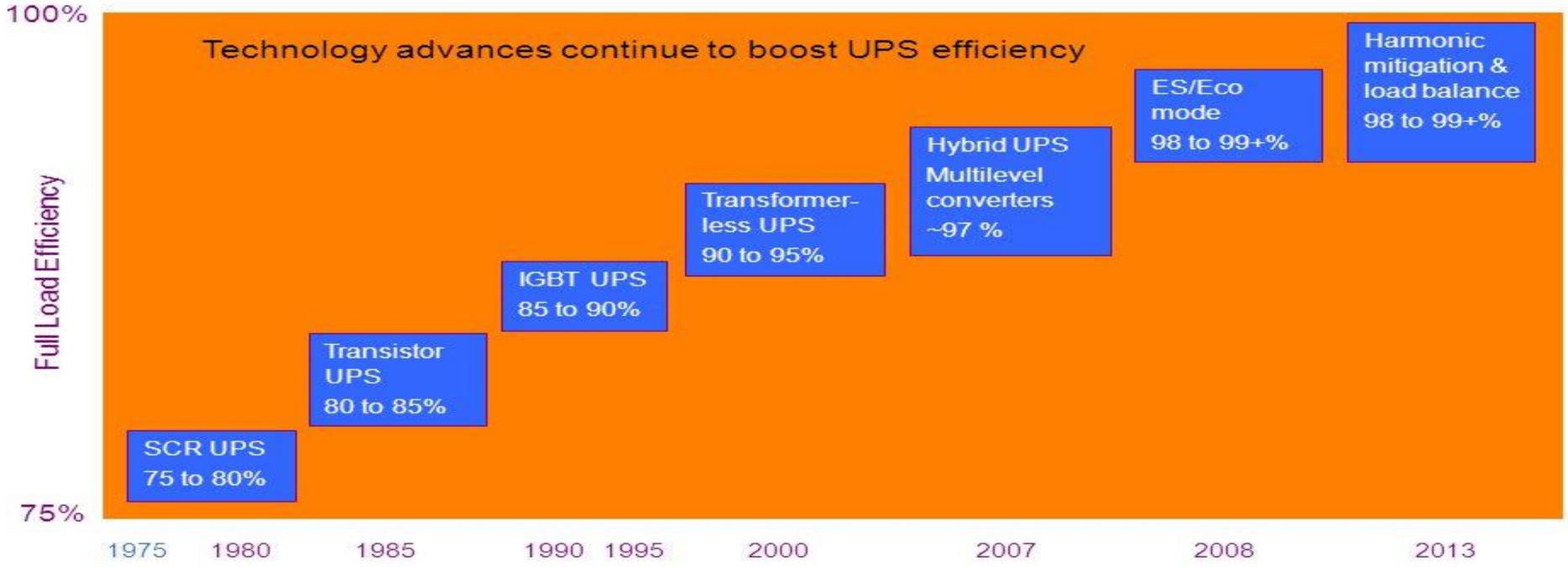


	< 1kVA	1-5kVA	5.1-10kVA	10.1-20kVA	Total
2019	220.4	561.3	183.1	37.1	1001.9
2018	218.4	542.3	176.1	36.6	973.4

2019 2018

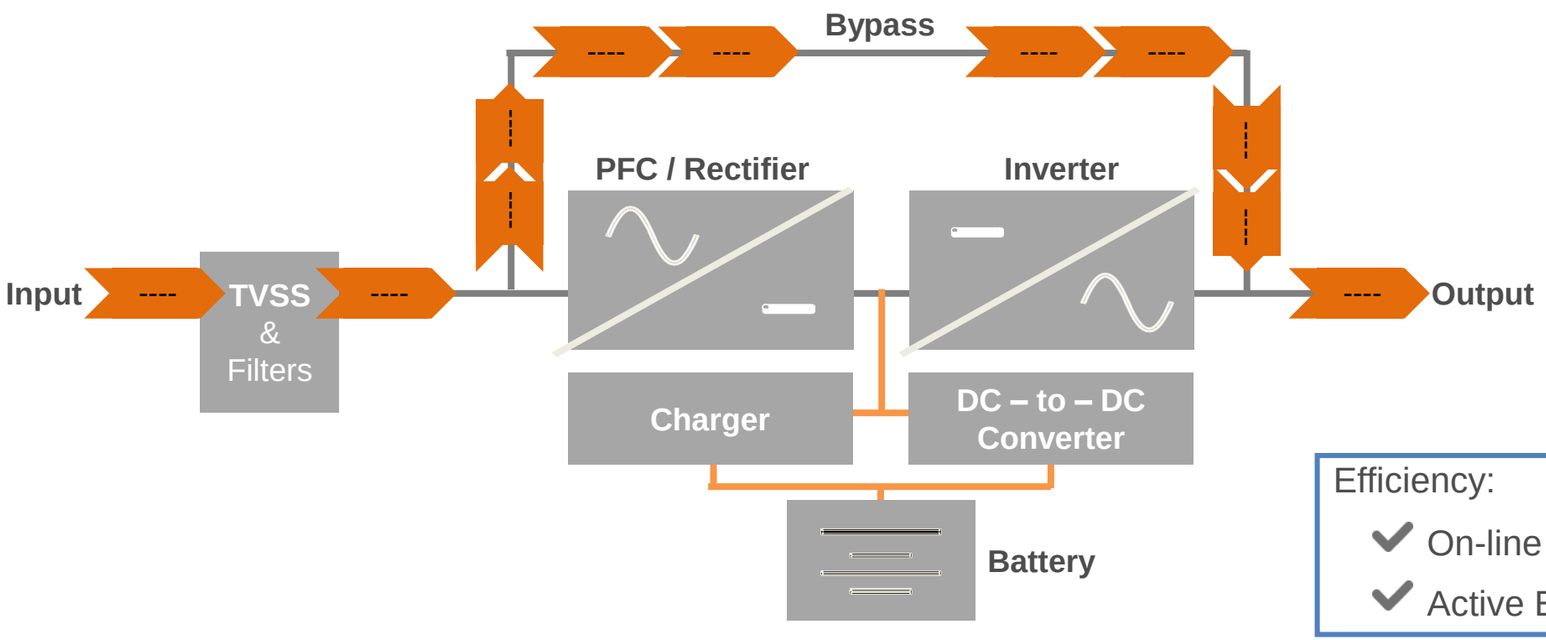
UPS TECHNOLOGY USAGE TS BASE VS TSLESS UPS

Technology and Efficiency over the Years



https://www.youtube.com/watch?v=YphLv2XEJbQ

HIGH EFFICIENCY
FOR MISSION CRITICAL APPLICATIONS



Efficiency:

- On-line mode: up to **95%**
- Active ECO mode: **98%**

"ENERGY STAR is the trusted, government-backed symbol for energy efficiency helping us all save money and protect the environment through energy-efficient products and practices"

https://www.energystar.gov/products/how-product-earns-energy-star-label

WE SELL ENERGY STAR

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INTELLIGENT & EFFICIENT UPS PROTECTION FOR MISSION CRITICAL APPLICATIONS

ENERGY STAR

New !!!

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BENEFITING FROM PRODUCT FEATURES IN MISSION CRITICAL APPLICATIONS

Product Features	Value / Benefit
Rack / Tower convertible systems	Flexible installation
Internal battery for minimum rack space	Hot swappable batteries, no downtime replacement
Scalable runtimes with external battery cabinets	Long duration outage support (6 attached cabinets) External temperature compensation sensors available for prolonged battery life in these external battery cabinets
Improved air flow management – cooling and durability	Efficiency, high temp environment • Full load up to 40°C • Power derating up to 50°C (PF=0.9 with 230V output)S Dirty / contamination management with air flow channel design
Sleep mode	Schedule power on/off function of the complete UPS, based on cycling timing and day of the week defined by the user.
Start in bypass	UPS can start in bypass mode. Configurable through LCD menu.
Self sensing fully variable speed fans	Energy efficiency and noise reduction as conditions permit
IT Earthing System compatibility	Capability to operate with earthing system using IT topology. Setting can be done through LCD menus system

BENEFITING FROM PRODUCT FEATURES IN MISSION CRITICAL APPLICATIONS

Liebert® GXT5

Key Features and Benefits

- Top-level **on-line double conversion UPS** for mission-critical applications
- Available in **5-6-8-10 kVA** ratings
- **Unity output power factor**
- **LCD multi-language color** display (gravity sensing)
- **On-line** (VFI) mode efficiency **up to 95%** at full load
- Active ECO mode efficiency **up to 98%**
- **Energy® Star 2.0 certified**
- Controllable and **programmable output sockets**
- Compact dimensions **(5U)** including batteries
- **Integrated solution** with batteries and electronics
- Parallel capability **for 10kVA**
- External battery cabinets **auto-detection**
- Operation at **full power up to 40ºC** (up to 50ºC with derating)
- Available in **rack** and **tower** configurations
- Vertiv™ **LIFE™ Services**
- Vertiv™ **Power Insight** for free download

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BENEFITING FROM PRODUCT FEATURES IN MISSION CRITICAL APPLICATIONS

Leading UPS Technology

- ⇨ High output PF=1.0
- ⇨ Wide range of power ratings (5-6-8-10kVA) to answer any possible power requirement
- ⇨ Color graphic LCD display with gravity sensing
- ⇨ Wide coverage of power ratings for maximum flexibility
- ⇨ Controllable output power sockets
- ⇨ External battery cabinets with autodetection
- ⇨ Improved battery health management
- ⇨ Remote management: update and configuration
- ⇨ Optimized thermal management and variable speed fan
- ⇨ Integrated POD and maintenance bypass (detachable)

Efficient and Green Product

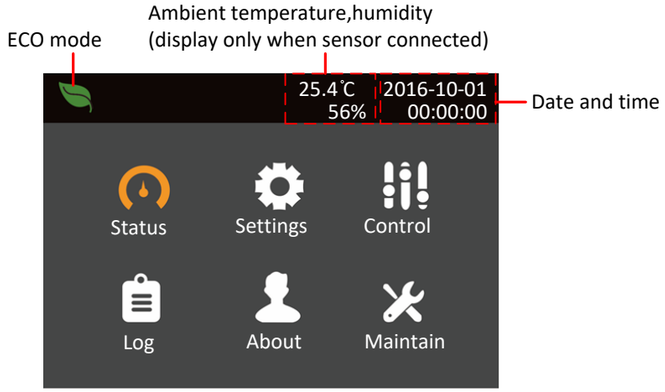
- ⇨ High efficiency up to 95% in on-line mode
- ⇨ Even higher efficiency up to 98% in Active ECO mode
- ⇨ Energy Star® 2.0 certified
- ⇨ Improved battery health management
- ⇨ Programmable output sockets for optimum battery usage
- ⇨ RoHS and REACH compliance

Solutions Wide

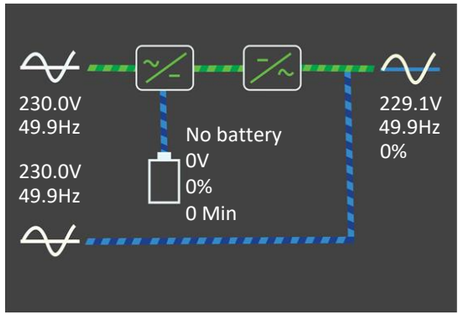
- ⇨ Integrated batteries and possibility to extend runtime with external battery cabinets
- ⇨ Easy to install, configure and operate
- ⇨ Rack / Tower design with short depth and flexible to install
- ⇨ Configurable status signals (dry-contacts)
- ⇨ Vertiv LIFE™ Services compatible
- ⇨ Extreme flexibility with parallel/redundant capability (10kVA)
- ⇨ New RDU101 SNMP/webcard with advanced features
- ⇨ Compatibility with environmental sensors
- ⇨ Terminals block integrated and configurable definition
- ⇨ DCIM compatible: Power Insight & Vertiv Intelligence (future)

BENEFITING FROM PRODUCT FEATURES IN MISSION CRITICAL APPLICATIONS – LCD DISPLAY

Main UPS Status information

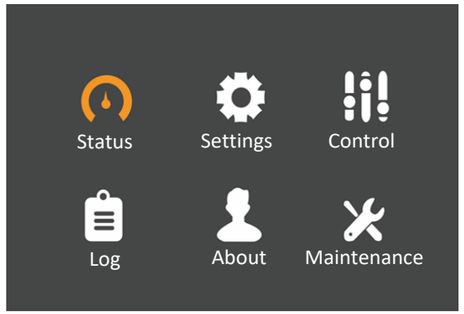


Graphical interface

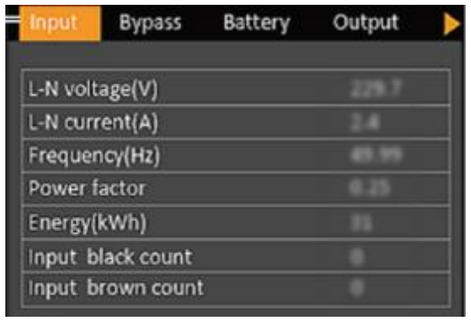


Self-rotating LCD (gravity sensing)

Easy to interface and configure



Complete UPS Information



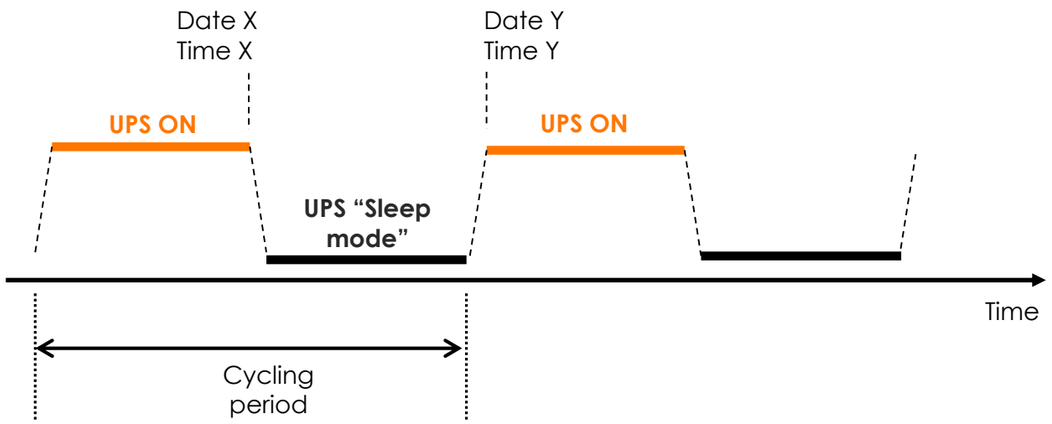
1. Menu keys (up / down / esc / Enter)
On screen configuration and menu navigation
2. Display
Gravity sensor automatically adjusts screen orientation for installation method
3-4.Status LED indicators
Normal mode or alarm visual indications
5. Power Button
Simple On/Off control

BENEFITING FROM PRODUCT FEATURES IN MISSION CRITICAL APPLICATIONS – SLEEP MODE

Liebert® GXT5 includes a "sleep mode" function:

- Schedule power on/off function by the user through LCD menu
- The user can define:
  - Time for power on
  - Time for power off
  - Cycling (day of the week / how many times)
- Setup through LCD: Settings menu ⇨ System menu

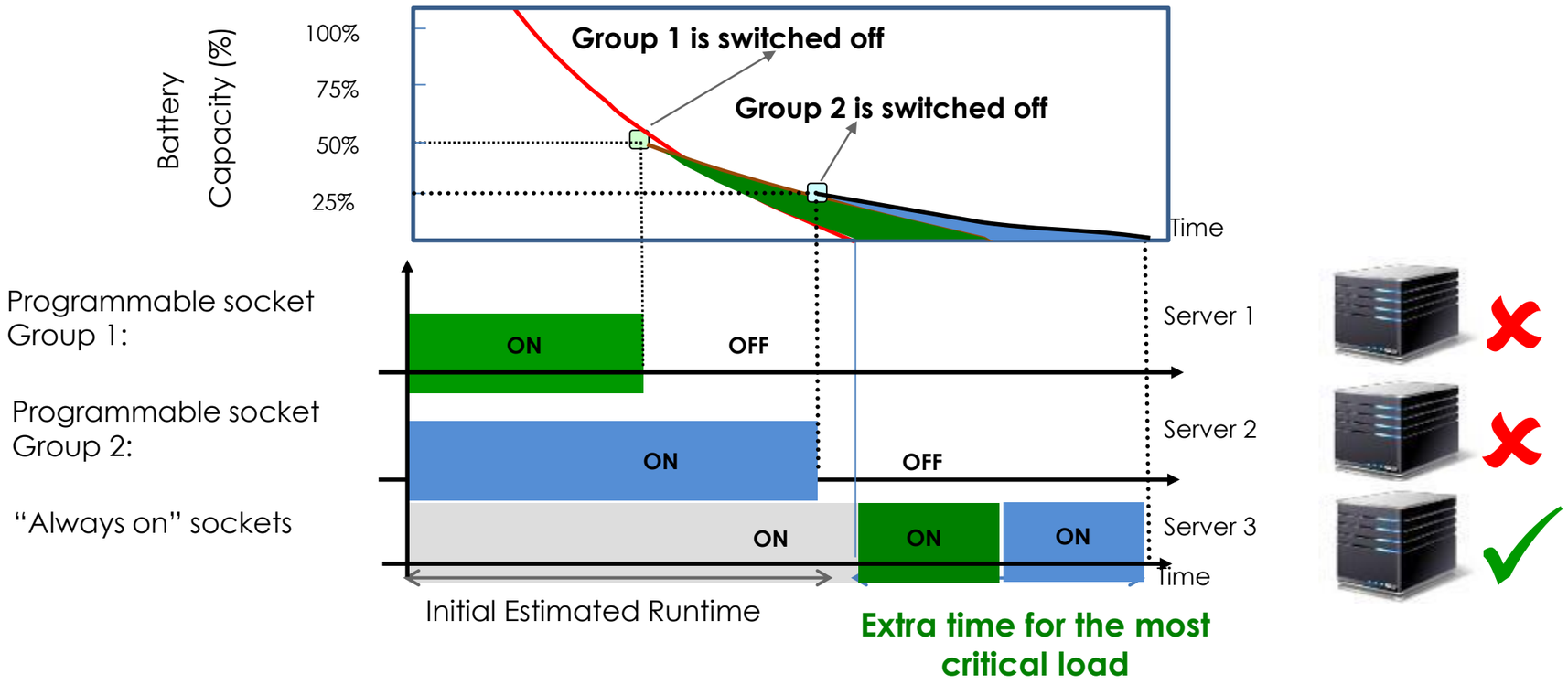
In this mode, UPS inverter and bypass are turned off, while rectifier and charger continues working (keep batteries recharger).



BENEFITING FROM PRODUCT FEATURES IN MISSION CRITICAL APPLICATIONS – PROGRAMMABLE SOCKETS

Advantages:

- ✓ **Battery energy is reserved for most critical loads (extra runtime)**
- ✓ **If less critical loads are disconnected, less battery cycling occurs Available in Liebert® GXT4™ Micro**



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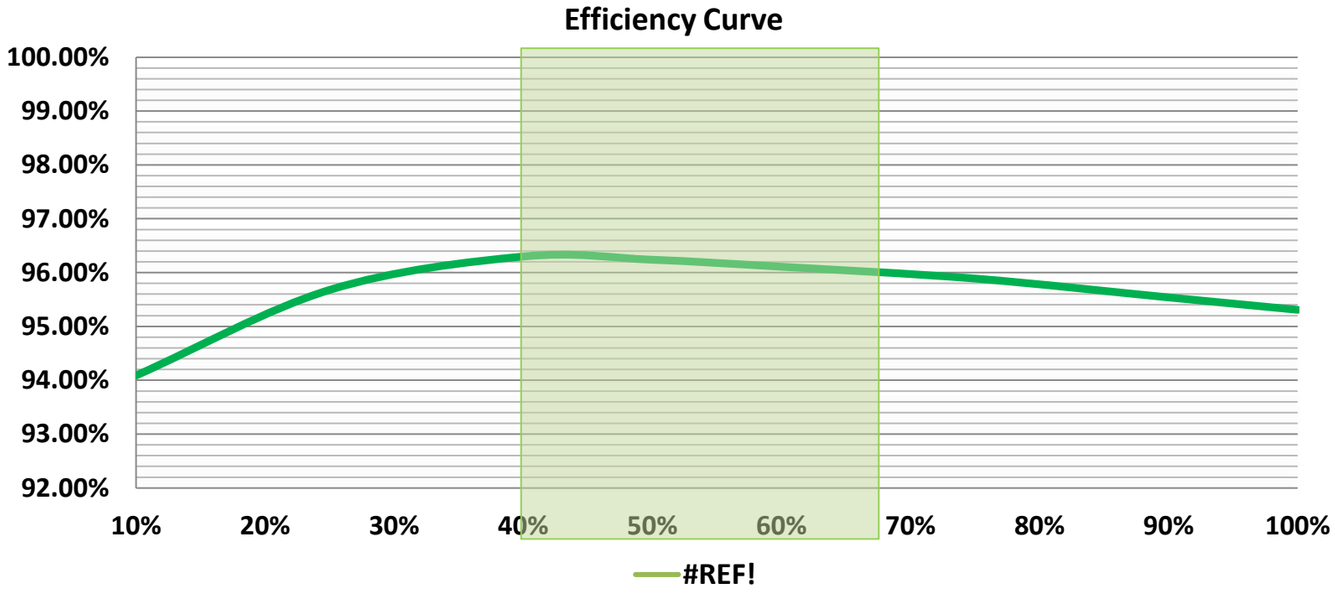
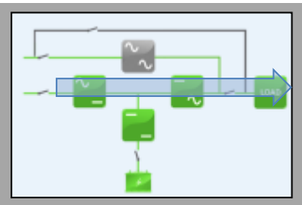
EFFICIENCY CURVE



VFI mode

> 96.3%



> 99%

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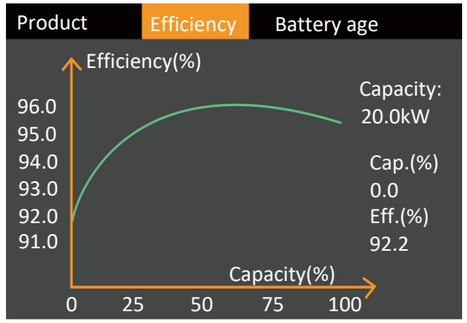
- Improvements in **UPS efficiency** **means a real advantage** for the user in terms of heat dissipation and energy cost

$$\varepsilon = \frac{Pout}{Pin}$$

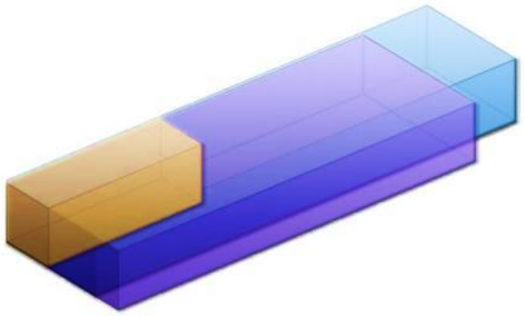
Efficiency & Financial Cost Comparison @10kW (Energy price = 0.1 €/ kWh, operation at full load) * w/o considering a coefficient for air conditioning		
AC/AC Efficiency	**Power Losses & Heat Dissipation**	**Energy cost by wasted energy**
98%	204 W	179 €/year
95%	526 W	460 €/year
92%	870 W	762 €/year
90%	1110 W	990 €/year



Key advantages:

- Reduced energy consumption
- Thermal stress in UPS is also reduced (less failures)
- Less heat dissipation, inside rack cabinet or room (PUE)
- Additional energy and cost savings due to this heat dissipation

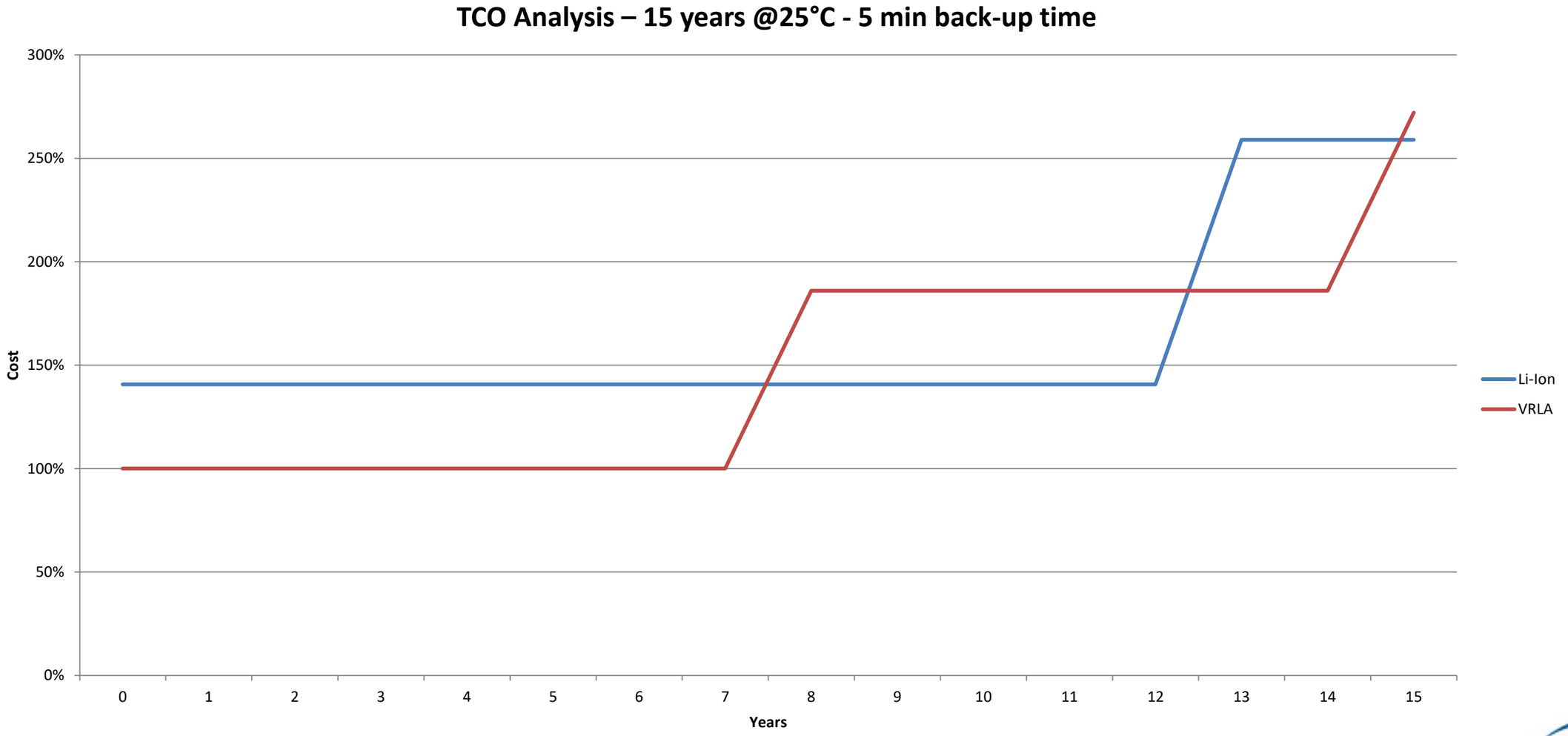
EFFICIENCY CURVE



< 5 minutes

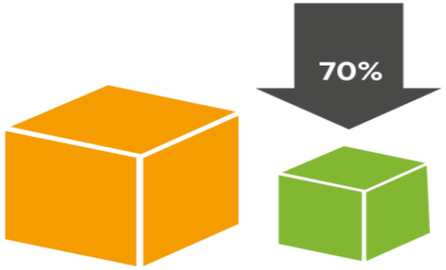
	High power system	Lower dimensions and weight	Short runtimes	High temperatures
VRLA	✓			
Lithium Ion	✓	✓	✓	✓

VRLA VS LI-ION TECHNOLOGIES / TCO ANALYSIS

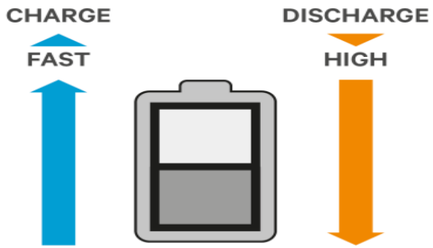


Note: Maintenance cost , BMS cost for VRLA and Space occupation cost excluded

MAIN ADVANTAGES OF LI-ION BATTERIES



Μικρότερες Διαστάσεις



Ταχεία Επαναφόρτιση (0.3C-3.3C)
Υψηλό Ρεύμα Εκφόρτισης

Long life – 15 Έτη διάρκεια ζωής

- **Υψηλή πυκνότητα Ισχύος→** Μικρότερες διαστάσεις / εξοικονόμηση χώρου
- **Μεγάλη διάρκεια ζωής→** Εξοικονόμηση κόστους αντικατάστασης
- **Μεγάλο εύρος θερμοκρασίας λειτουργίας→** Εξοικονόμηση λειτουργικού κόστους (ψύξης)
- **Υψηλό ρεύμα φόρτισης →** Γρήγορη επαναφόρτιση
- **Αργός ρυθμός αυτοεκφόρτισης→** Μεγάλο διάστημα shelf life

Σημαντική βελτίωση στην απαίτηση χώρου και βάρους έναντι VRLA λύσεων

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MAIN ADVANTAGES OF LI-ION BATTERIES

Χαρακτηριστικά	VRLA	Li-Ion
Αναμενόμενη διάρκεια ζωής	Μέση	Μεγάλη (x 2 έως 3 φορές)
Μειωση διάρκειας ζωής στους 30°C	>50%	<20%
Πυκνότητα ισχύος	Μέση	Μεγάλη
Επαναφόρτιση	Μέτρια	Γρήγορη
Απαίτηση Ψύξης	Μέτρια	Χαμηλή
Απαίτηση χώρου (400kVA, 5 λεπτά)	Μεγάλη	Μικρή (-70%)
Βάρος	Μεγάλο	Μικρό (-70%)
Σύστημα Παρακολούθησης	Προαιρετικό	Περιλαμβάνεται
Κόστος κτήσης	Μέτριο	Μεγάλο (x 2 έως 3 φορές)

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WHY ARE THESE DIFFERENTIATORS IMPORTANT IN THE APPLICATIONS?

Feature	Why is it important?	Reference/example applications
Unity power factor (PF=1.0)	More active power and **more loads can be connected**. A lower rating UPS and cheaper UPS can be proposed	More devices can be powered in **high density server racks** with the same UPS and VA rating, in small computing rooms and closets
High efficiency (95%) and Active ECO mode (98%)	A higher efficiency means an **optimized energy management** and **lower heat dissipation**, thus providing energy and cost savings. It also helps to reduce	Small computing rooms and servers **Telecom equipment**
Energy Star® approval	It means a testing by a external agency that **guarantees efficiency** as well as a surpassing several efficiency levels	Small computing rooms and servers **Telecom equipment**
Short depth (630 mm) **and height** (5Us)	A more compact UPS that will use less floor space, and leaves **more space available for data equipment** in a rack. They can also fit in shorter racks (cheaper)	**Retail stores** for power protection of point of sales terminals and networking
Integrated POD and maintenance bypass	Protection devices are included, thus reducing installation costs. And maintenance bypass **help in UPS servicing**, thus **increasing critical load availability**	Mission critical servers in **banking** for continuous operation
Controllable power sockets	Help to **prioritize loads** connected to the UPS and optimize runtime, and help to reboot loads connected	Remote locations in **transportation** that may require different levels of runtime to optimize batteries
Integrated solution with batteries and electronics	A single part number that **integrates everything** required to order and easy to install	**Branch offices** requiring an easy to install and configure solution
Integrated dry-contacts & configurable	Configurable UPS status signals to **report externally the main UPS conditions**, that otherwise will require an optional dry-contacts card	**Industry applications** not requiring a more advanced SNMP/Web monitoring solution
Color graphical **LCD** in multiple languages	**User friendly interface** to know UPS status and configuration	**Branch offices** that require user friendly interface

MID POWER UPS MAIN APPLICATIONS

Vertical	Applications	Key features
IT	• Critical servers • Networking equipment • Data storage	• Unity power factor for more loads • Compact and integrated solution • Integrated solution
Finance & Banking	• Branch offices • CCTV and data protection • ATMs	• High efficiency up to 98% in ECO • Integrated maintenance bypass & POD • Flexible Rack / Tower design
Telecom	• 4G-5G Mobile stations • SDN and NFV • Control rooms	• Unity power factor for more loads • Short depth and compact UPS • Integrated solution
Industry	• Manufacturing sites • Control equipment and PLCs • Data and networking equipment	• High efficiency up to 98% in ECO • Configurable dry-contacts • Controllable sockets • Parallel / redundant capability

Wide and cross applications potential:
Transport, networking equipment, routers, IP telephony, mission critical servers, …

MID POWER UPS MAIN APPLICATIONS

Vertical	Applications	Key features
Edge	• Internet of Things • Smart City • Sensors and networks	• High efficiency up to 98% in ECO • Unity power factor for more loads • Compact and integrated solution
Healthcare	• Lab and testing devices • Hospitals • Data and networking equipment	• High efficiency up to 98% in ECO • Rack and tower configuration • Agency certifications
Retail	• Branch offices • POS terminals • CCTV	• Unity power factor for more loads • Battery cabinets autodetection • Integrated solution
Cloud Edge	• Distributed cloud services • Content providers • eCommerce	• High efficiency up to 98% in ECO • Configurable dry-contacts • Controllable sockets

Wide and cross applications potential:
Transport, networking equipment, routers, IP telephony, mission critical servers, …

QUALITY / PRICE / RISK?

- Middle Time Before Failure ?
- Middle Time To Repair ?
- Quality ?
- Testimonials ?
- Status - Real time – data processing ?
- €xpensive ???

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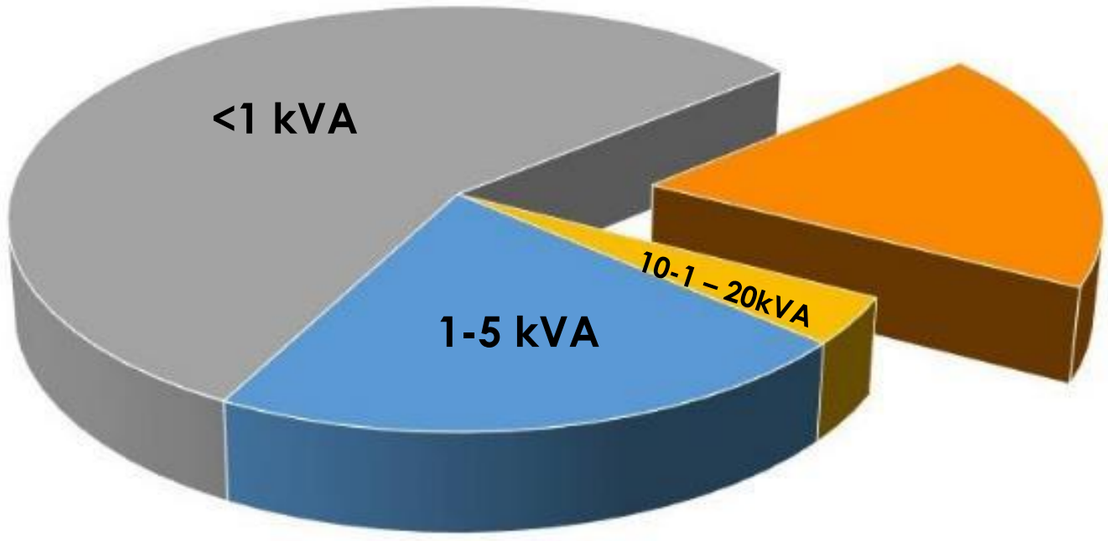
LIEBERT® GXT5 5-10 KVA – A HUGE OPPORTUNITY (MID POWER)

Single Phase UPS Market EMEA
1028M$



Source: IHS Markit Aug. 2018

5.1 – 10kVA single phase UPS market size in EMEA

Several key data:

- ✓ **Estimated market size in EMEA – CY2020**
  - ✓ **191M$ for EMEA**
  - ✓ **107M$ for Western countries**
  - ✓ **84M$ for MENA and East Europe**
- ✓ **Around 20 % of market in this segment**
- ✓ **Continuous growth (3% CAGR)**
- ✓ **Multiple vertical markets: retail, healthcare, industrial, finance, government, transport, etc.**

Will you miss this opportunity?

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with…

Real benefits….

For the environment….

for the customer…

*for…us….both…**ALL.***

THANK YOU!
ANY QUESTIONS?

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