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TERAWATT intelligent Demand Response Technology

TERAWATT IDR - Intelligent Demand Response Technology

A proven electricity cost-saving solution with guaranteed results

Prepared for:

BOSTON GREEN TOURISM

January 15, 2015

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EU Power Management Systems

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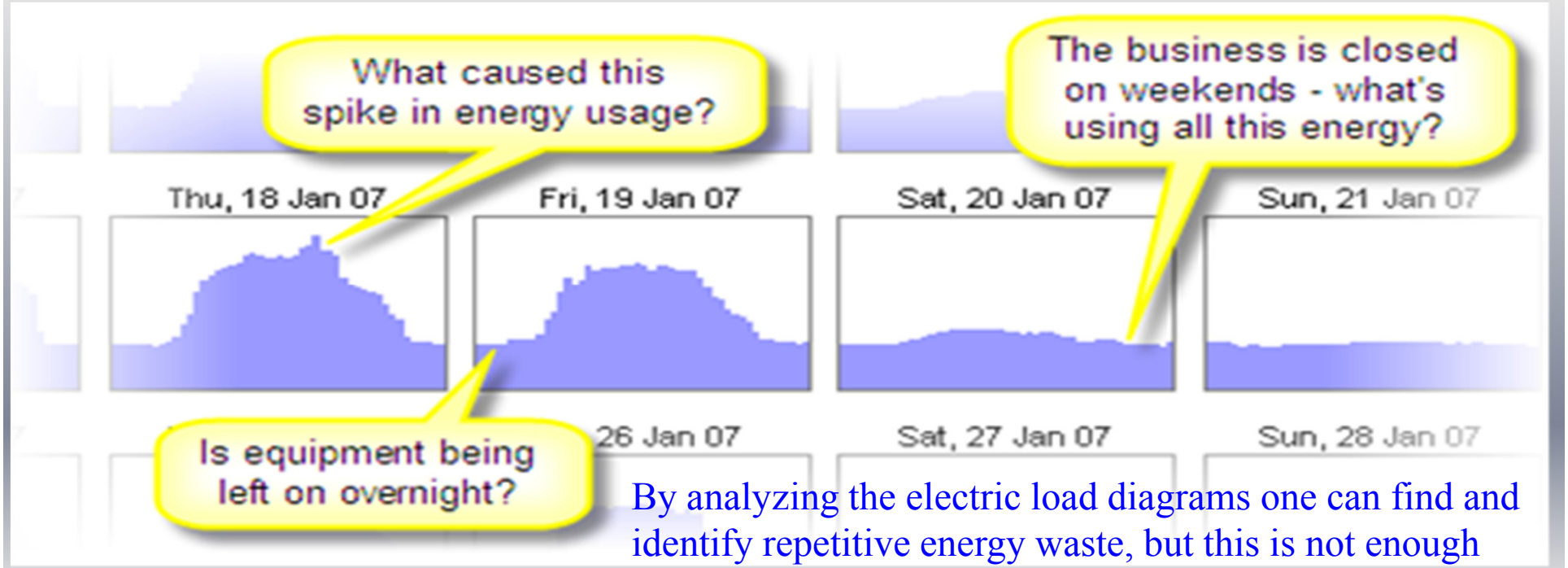
Agenda

- Electricity rates overview
- Why Terawatt IDR
- Technology architecture
- Case study
- Bullet points -essential key facts

Electricity rates overview

U.S. growing energy rates determine a more dynamic approach to reduce energy costs and rationalize the use of power while increasing the GOP

Hotels can slash their electricity bills, both **kWh** charges (consumption) and **kW** demand charges by using Terawatt Power Optimization Technology.



By analyzing the electric load diagrams one can find and identify repetitive energy waste, but this is not enough

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Electricity rates overview

Terawatt Power Optimization Technology is popular in Europe and gaining ground fast in the U.S. now being used both by commercial infrastructures (i.e. Hotels, Hospitals, etc.) and by Industrial facilities (i.e. Manufacturing Plants).

What is Power Optimization?

It is a technology that monitors real-time the power demand of Hotel's several equipment running simultaneously (i.e.: chillers, motors, dishwashers, walking-coolers, stoves, air-handlers) and optimize them according with their inherent technical characteristics adjusting their performance without affecting either comfort or equipment reliability. As result a lower peak demand (kW) and a lower consumption (kWh) every 30 minutes (utility integration period) on a daily continuous power optimization.

This Technology is considered for incentives namely by Duke Energy's Smart Saver Program and Georgia Power Southern Company Energy Efficiency Program.

DUKE ENERGY. | Smart $aver® GEORGIA POWER A SOUTHERN COMPANY

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While Commercial operations invest in reducing consumption (kWh) using Energy Efficient Solutions and reach important values is cost-savings, Industrial facilities also invest in **Load Management Solutions** reaching important values in load reduction.

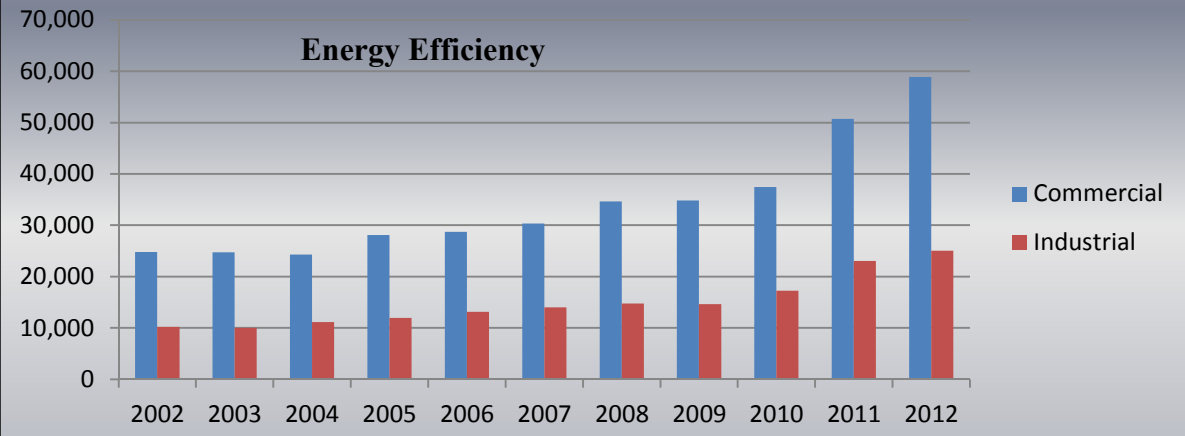
Source: U.S. Energy Administration Information

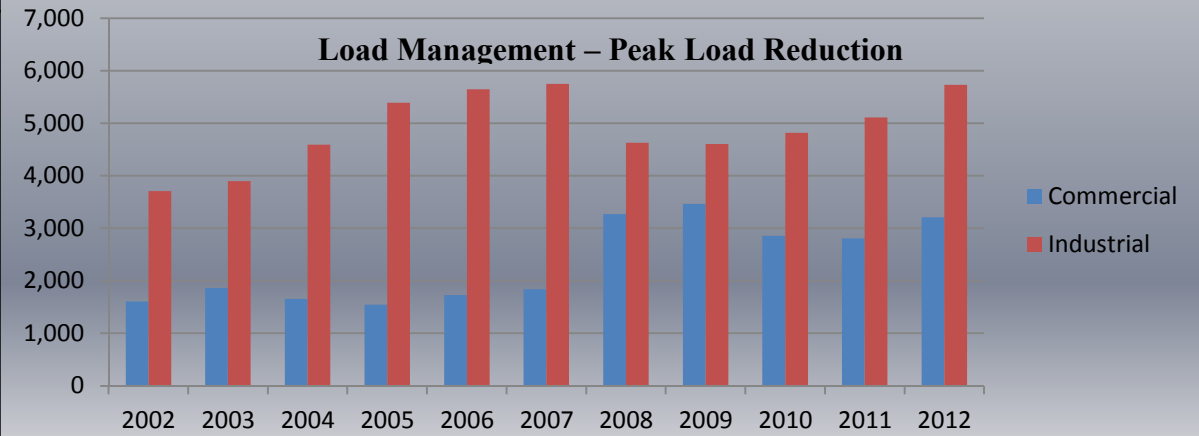
Energy Efficiency - Energy Savings (Thousand MWh)

	Commercial	Industrial
2002	24,803	10,242
2003	24,758	10,031
2004	24,290	11,137
2005	28,073	11,986
2006	28,720	13,155
2007	30,359	14,038
2008	34,634	14,766
2009	34,831	14,610
2010	37,416	17,259
2011	50,732	23,061
2012	58,894	25,023

Load Management - Actual Peak Load Reduction (MW)

	Commercial	Industrial
2002	1,606	3,708
2003	1,864	3,899
2004	1,652	4,588
2005	1,544	5,388
2006	1,730	5,643
2007	1,837	5,749
2008	3,270	4,625
2009	3,464	4,606
2010	2,854	4,819
2011	2,808	5,108
2012	3,208	5,732





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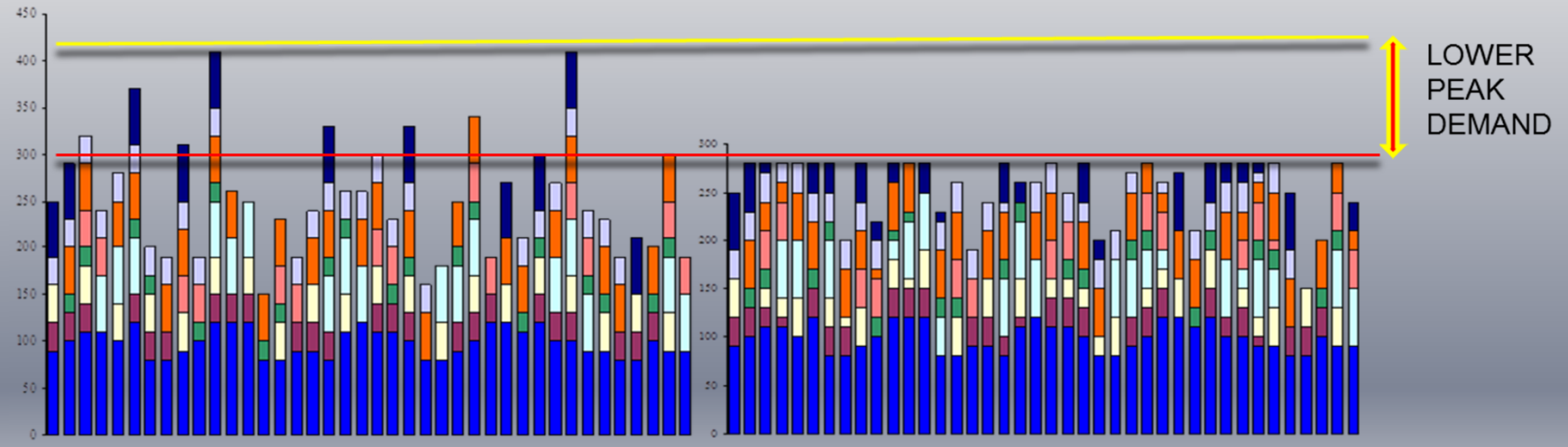
Why Terawatt IDR

Here is the problem: Facilities use more energy than they need to, regardless of type of business
Here is the solution: Optimizing the equipment with a rational, energy conservation technology that can generate savings without affecting either client's comfort or equipment dependability.

Terawatt Technology is positioned with the purpose of automatically reduce load demand (kW) and active power (kWh) on facilities through an intelligent optimization of simultaneity on power demand, thus achieving a lower electric load profile, reducing consumption 24/7 while monitoring Hotel's carbon footprint.



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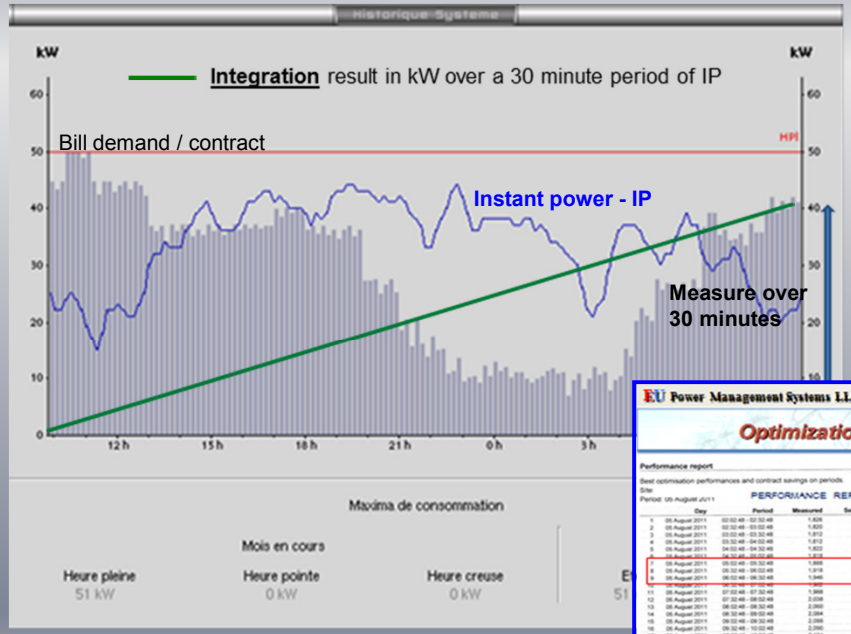
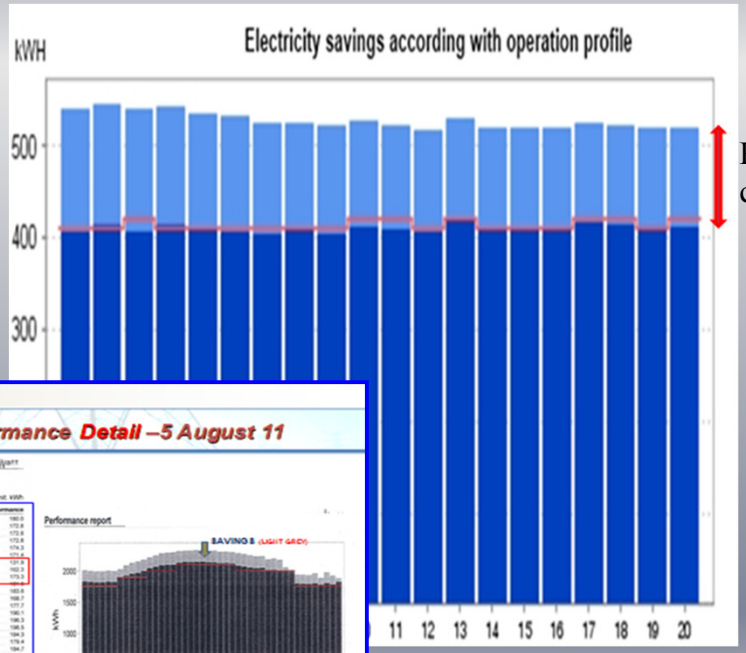
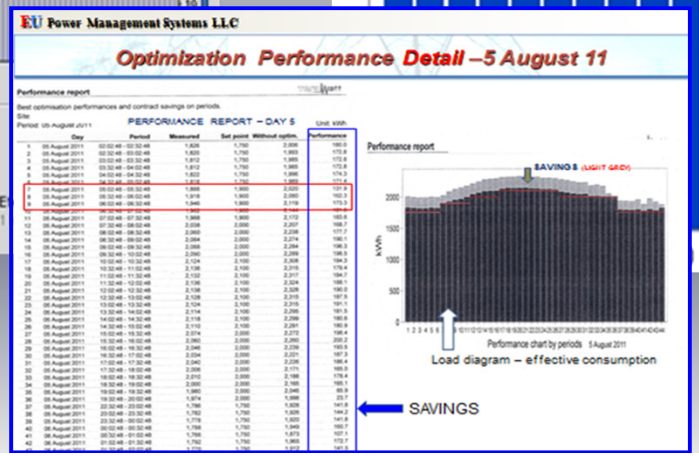
The proprietary algorithm of Terawatt IDR generate real-time projections of power demand (utilities 30'' integration time) producing instant optimization events according to a tailor-made load profile.

This technology provide constant performance-tracking reporting cross-checked with utilities records while identifying energy-savings opportunities through the analysis of facilities' load-shape profile and wasted energy activities.







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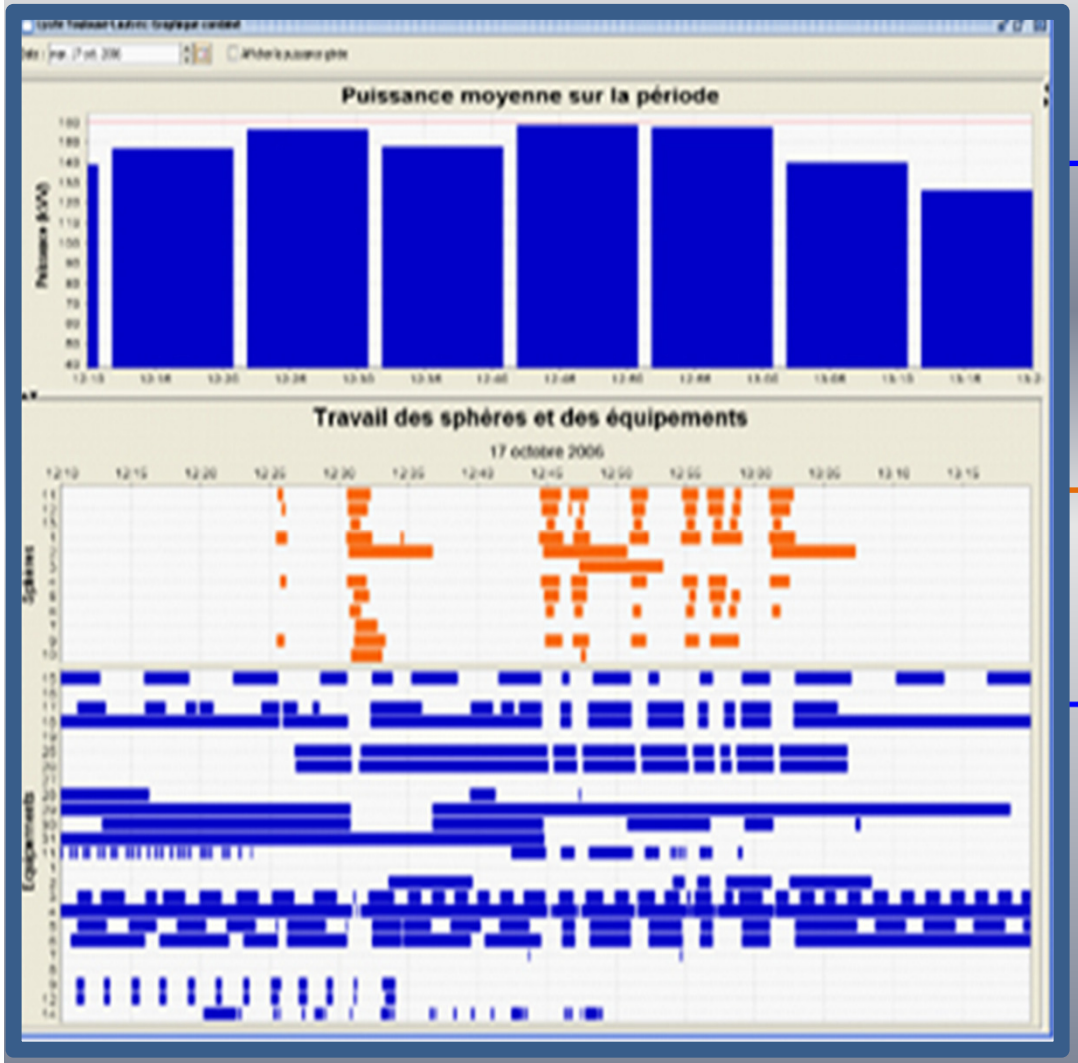
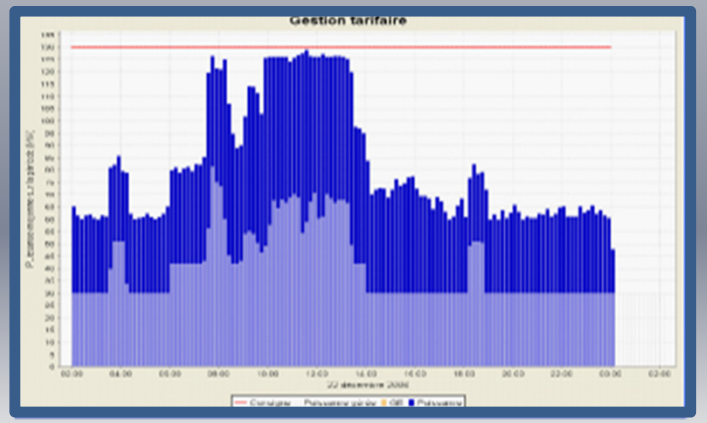


Normal power demand in a facility using Terawatt IDR

Power Optimization events on selected loads

Normal operation of equipment / power use



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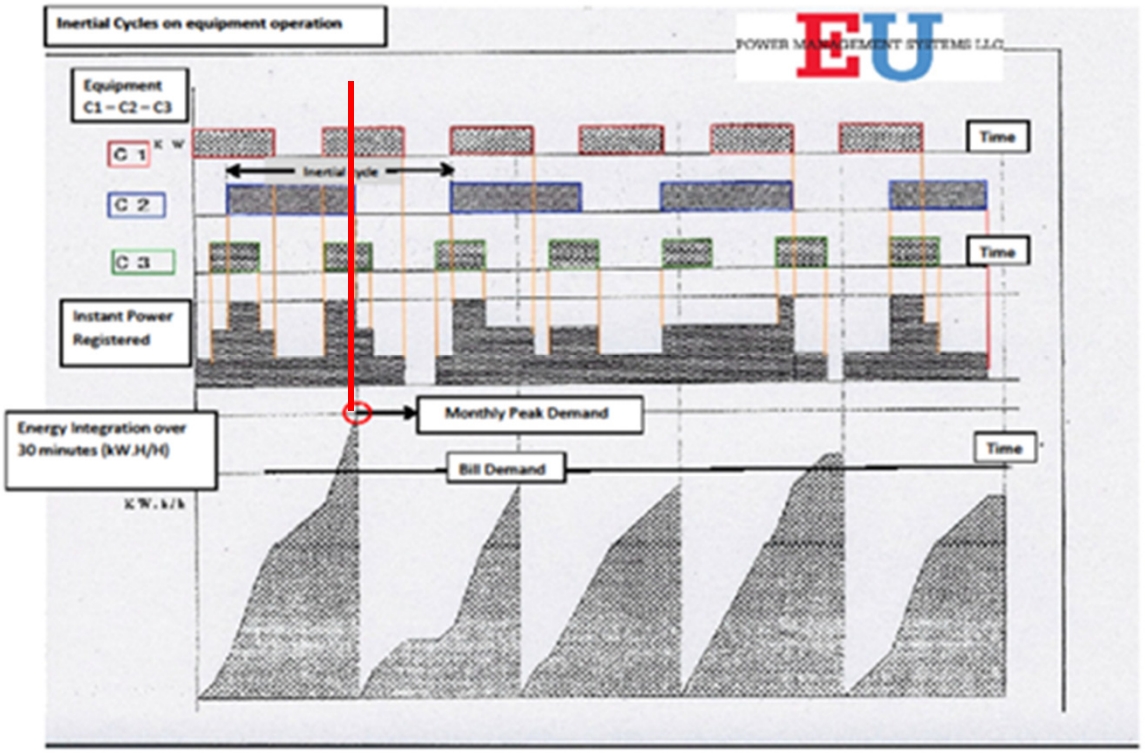
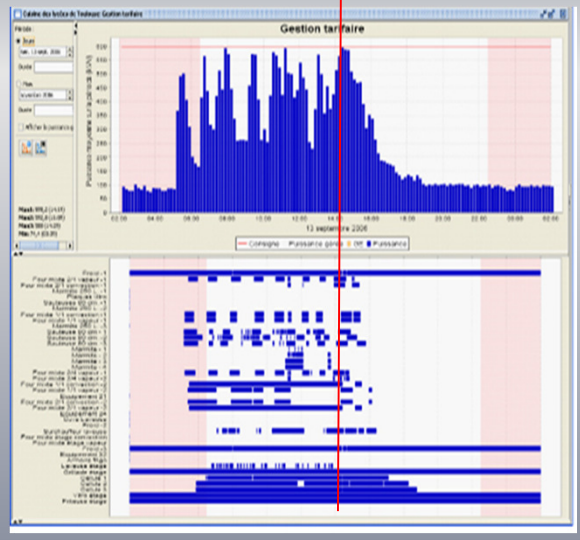
Notion of Simultaneity on Demand



Simultaneity on Demand

It's when two or more events occur at the same time, in a frame of reference



It refers to the idea that the consumption of power may occur simultaneously for multiple equipment (C1, C2, C3…) in the same period generating a peak demand that can create overload in contractual power supply or in a emergency generator

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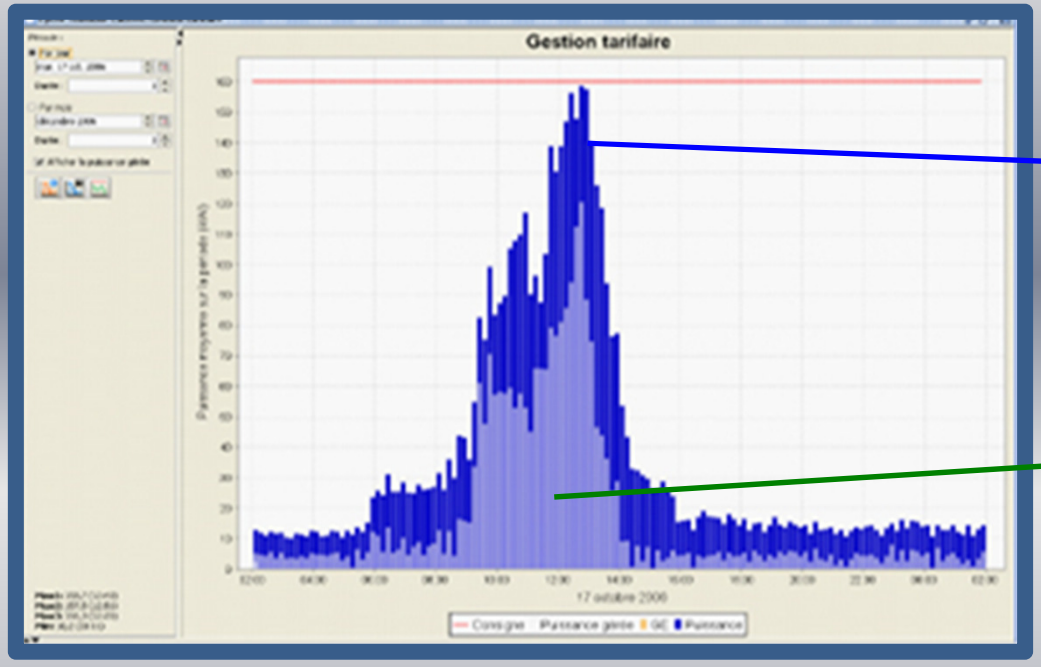

Old load shape profile without Terawatt IDR power optimization

New load shape profile adjusted to the real power needs using Terawatt IDR

The fully automated tailor-made Terawatt IDR power optimization works in real-time generating cost-savings on a 24/7 operation.

There is no downtime associated with the Terawatt IDR installation. No impact on client's comfort or on the equipment reliability. A guaranteed project with rebates from several utilities in their incentive programs.

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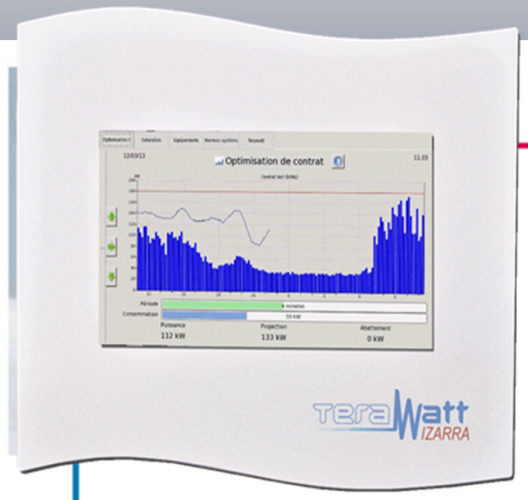
Technology Architecture



Liaison Ethernet
/ modem

Internet, Modem
or local connection

Serveur de données

Logiciels :
- Ekhi = Visualisation
- Argia = répartition

Remote monitoring system
for reporting or software updates

Full Automated
Tailored operation

BUS

Module MAC
Suivi équipements
(t x KW = KW.H)

Module MOCI
Comptage énergies

MOCI MODULE
management &
data aquisition

MAC modules
interface on
equipment

output

Connection to
external probes

Other energy readings are available for monitoring or interface with the smart grid / emergency power

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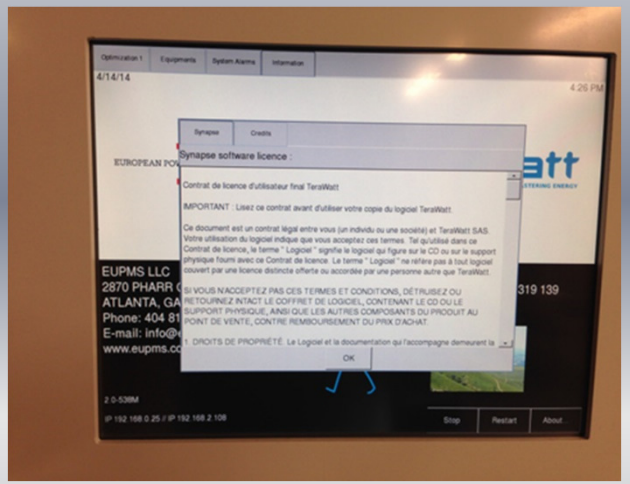
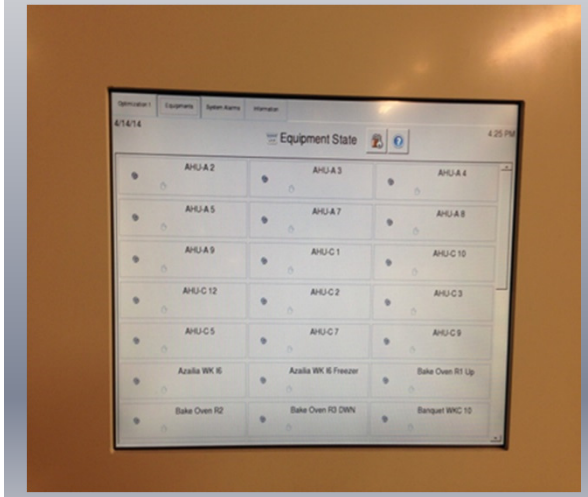
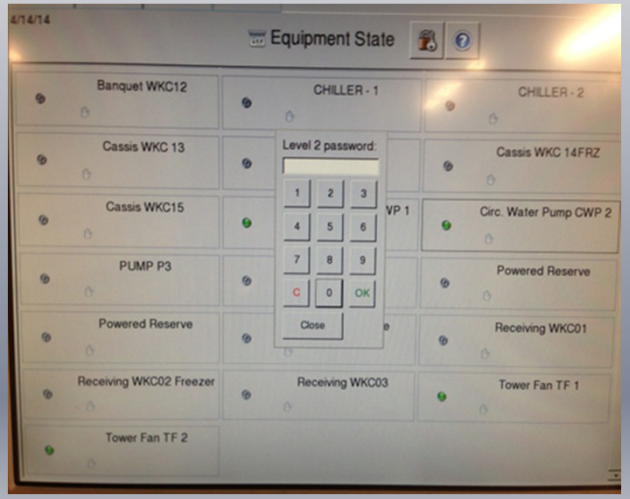
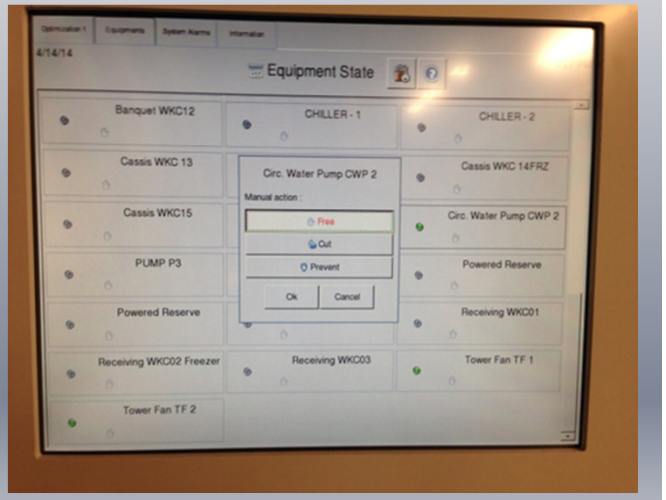


Main Touch Screen to access software certificates and main controls

Real-time screen with load profile







Selected loads monitoring and optional interface by-pass for equipment maintenance – password access

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Case study

Grand Hyatt Hotel Atlanta

439 Rooms
21 Suites
30,000 square feet of versatile function space

GRAND HYATT HOTEL ATLANTA

TERAWATT IDR POWER OPTIMIZATION RESULTS

- Annual kWh off-set: 2,262,934
- Annual CO2 tons off-set: 1,629
- Annual cost-savings: $70,000
- ROI: 1 Year
- Execution time: 3 weeks with no down-time

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Grand Hyatt Hotel selected loads
Power Optimization on equipment

Project Highlights
Annual KWH off-set 2,262,934
Annual CO2 tons off-set 1,629
Savings: $ 70,000 Annually

"The project went seamless; Paul and Edmundo were excellent to work with. It's not that often that a project goes as well as the Terawatt project went."

Wes Shirley
Director of Engineering
Grand Hyatt Atlanta in Buckhead

Total of 64 systems optimized

Variable frequency drives: i.e. motors, pumps, etc.

Chillers, Air Handlers, heat stripes, etc.

Kitchen equipment: i.e. dishwashers, stoves, walking-coolers, fryers, etc.

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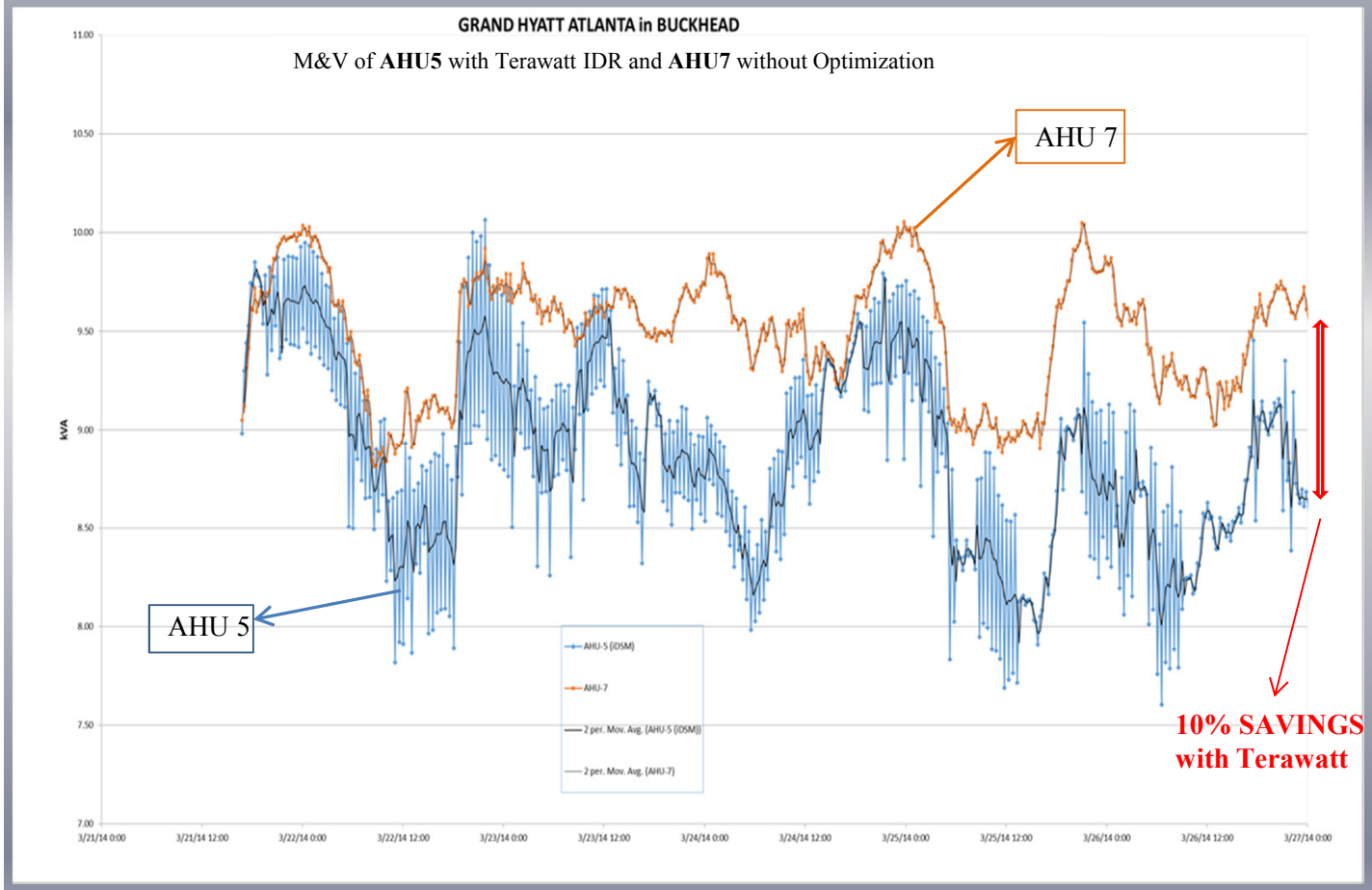
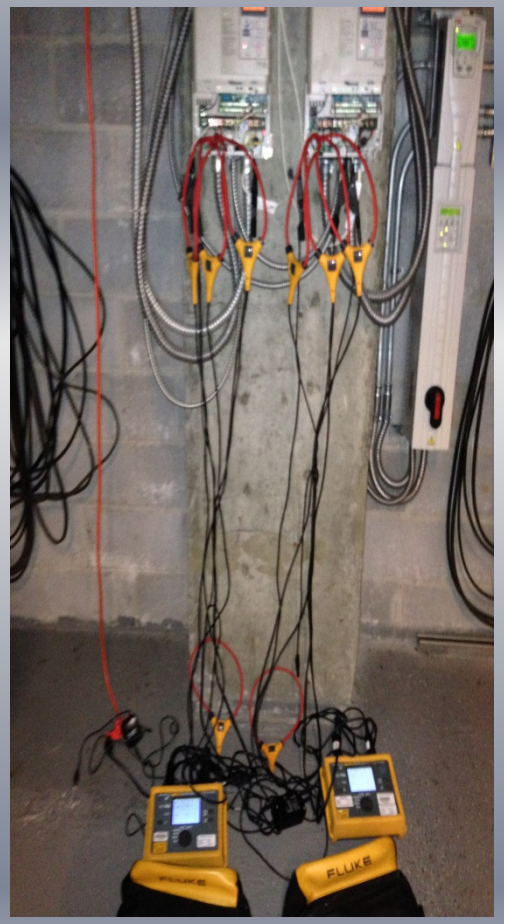
Measures and Verifications – M&V at Grand Hyatt Hotel Atlanta





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TERAWATT IDR essential key facts

- Proven technology: low investment, reduce energy costs, fast ROI, helps improve G. O. Profit
- Fully automated system working 24/7 in a tailor-made energy optimization profile
- Detailed monthly Performance-tracking Reporting with real-time hourly optimization results
- Auto-regulated for several personalized input protocols: relative humidity / temperature levels
- System remote / local access password protected interface on 15” color touch screen monitor
- Interface option with Distributed Generation platforms, EMS, Modbus and Scada protocols
- Real-time recording and monitoring of all type of fluids (i.e. temperature, water, gas, etc.)
- Smart Grid compatible with fully automated protocols
- Real-time interface on status by remote access (TCP/IP / Modem) with GSM alarm activation
- Detects and eliminate energy waste helping to meet corporate sustainability goals on emissions
- Automated ATS commutation Utility grid / Emergency - monitoring and optimization for both
- Helps provide compliance with energy regulations and to negotiate rate plans with utilities
- Enhanced public image and social responsibility through Key Performance Technology – KPT

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TERAWATT IDR - Intelligent Demand Response

A guaranteed facility upgrading solution proven to improve business environment by reducing energy costs

Some clients:

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THANK YOU

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