

ABB Automation & Power World: April 18-21, 2011

WCS-120-1 (WE-102-1) Energy management system

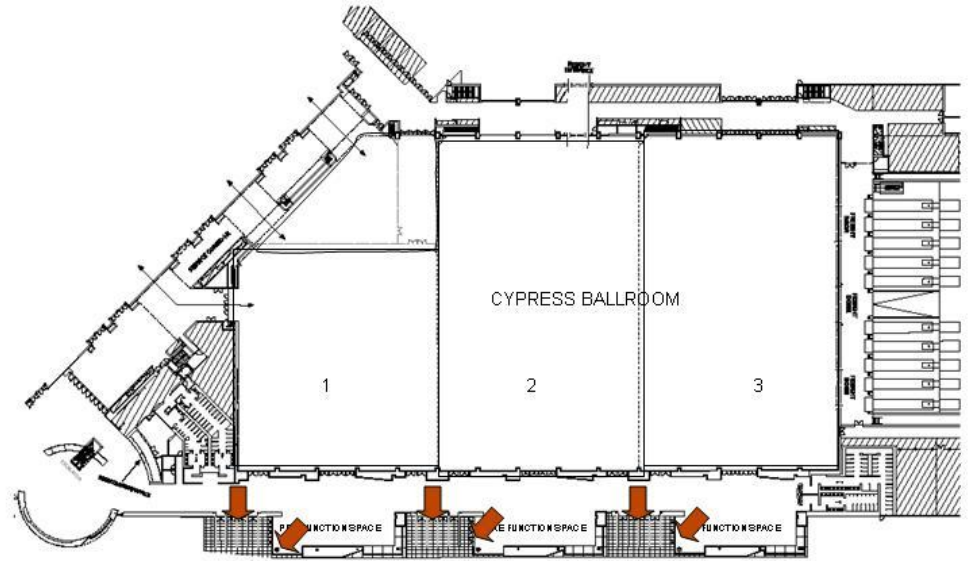
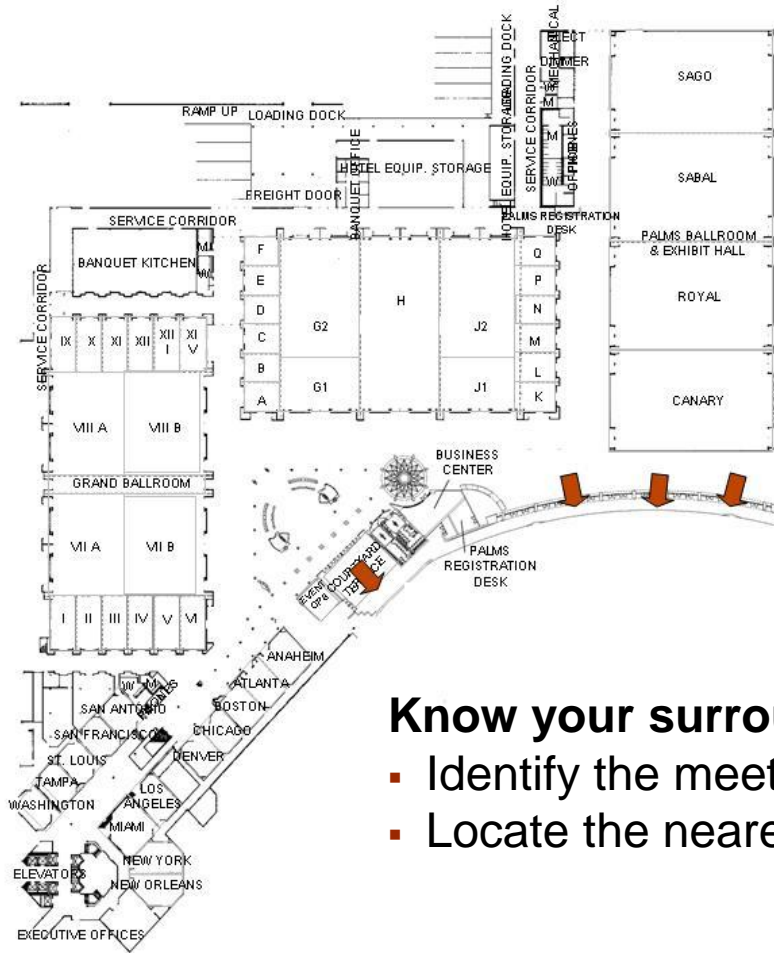
Your safety is important to us

Please be aware of these emergency procedures

- In the event of an emergency please dial ext. 55555 from any house phone. Do not dial 9-1-1.
- In the event of an alarm, please proceed carefully to the nearest exit. Emergency exits are clearly marked throughout the hotel and convention center.
- Use the stairwells to evacuate the building and do not attempt to use the elevators.
- Hotel associates will be located throughout the public space to assist in directing guests toward the closest exit.
- Any guest requiring assistance during an evacuation should dial “0” from any house phone and notify the operator of their location.
- Do not re-enter the building until advised by hotel personnel or an “all clear” announcement is made.

Your safety is important to us

Convention Center exits in case of an emergency



Know your surroundings:

- Identify the meeting room your workshop is being held in
- Locate the nearest exit

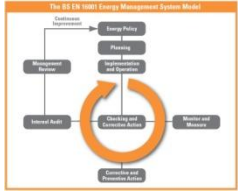
WCS-120-1 (WEE-102-1) Energy Management System

- Speaker name: Bashir Ahmad (P.Eng.)
- Speaker title: Service Engineer
- Company name: ABB Inc.
- Location: Burlington, Ontario, CANADA

Energy Management Agenda

- Introduction
- Important steps of basic energy management
- Why is energy management essential?
- What is cpmEnergy Manager?
- cpmEnergy Manager technology & product architecture
- Future trends in energy management
- References
- Summary

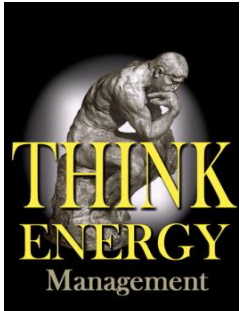
Energy Management Introduction



- What is meant by energy management?

“The judicious and effective use of energy to maximize profits (minimize costs) and enhance competitive positions”

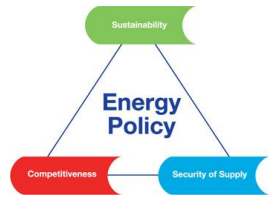
Reference (Cape Hart, Turner and Kennedy, Guide to Energy Management Fairmont press inc. 1997)



- Another definition:

“The strategy of adjusting and optimizing energy, using systems and procedures so as to reduce energy requirements per unit of output while holding constant or reducing total costs of producing the output from these systems”

Energy Management Introduction



- Energy management enables:
 - Companies to achieve its policy commitments, take action as needed to improve its energy performance
 - Demonstrate the conformity of the system to the requirements of the International Standard (e.g. ISO 50001)
 - ISO 50001 is being developed by ISO project committee ISO/PC 242
 - 42 ISO member countries are participating in its development, with another 10 as observers



Energy Management

Important steps of basic energy management

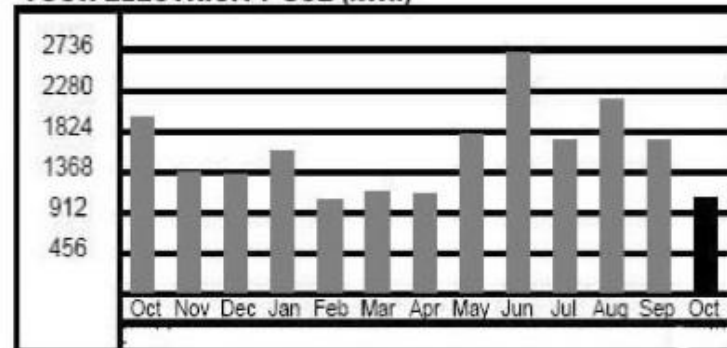
- 1st - Know how you are billed
- How much energy you use
- The most electricity you draw at one time during the billing period
- Whether or not you have an interval meter
- Other charges

Current Electricity Charge	\$88.42
Current Natural Gas Charge	\$19.23
Total Current Energy Charge	\$107.65

City Services	\$1.30
State & Local Sales Taxes	\$0.10

Total Account Balance	\$109.05
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YOUR ELECTRICITY USE (kWh)



ACCOUNT COMPARISON SUMMARY

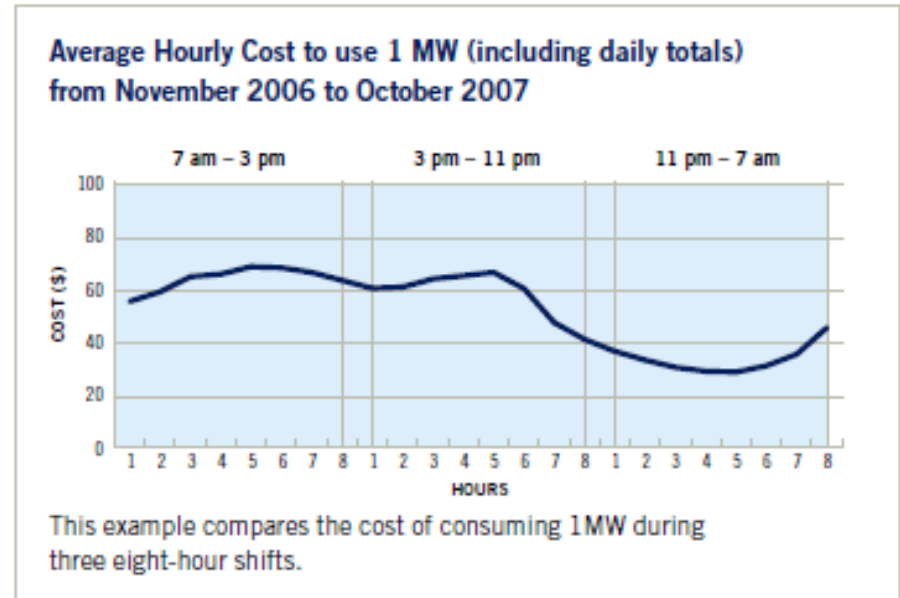
E L E C T R I C		Current Month	Previous Month	Last Year
	Days on Bill	29	32	30
	kWh Used	1,083	1,733	1,990
	Avg. kWh/Day	37.3	54.2	66.3
	Cost per Day	\$3.05	\$5.25	\$4.84



Energy Management

Important steps of basic energy management

- 2nd - Take control of you energy use
- Do a top-to-bottom analysis of how your operation uses energy
- Understand how much energy is used by machinery and facilities
- Energy efficiency initiative
- Go for some easy, early wins to help build momentum



Energy Management

Important steps of basic energy management



- 3rd Find the right technology
- The challenge is to find the right technology
- A proven and well established solution, being used by many customers, minimize the risk
- Understand payback periods; and how technology upgrades will contribute to your bottom line



Energy Management

Important steps of basic energy management



- 4th Use incentives to your advantage
- Department of Energy
- Natural Resources Canada
- Local distribution company or the Independent Electricity System Operator
 - Dispatch-able load
 - Day-ahead market
 - Etc.

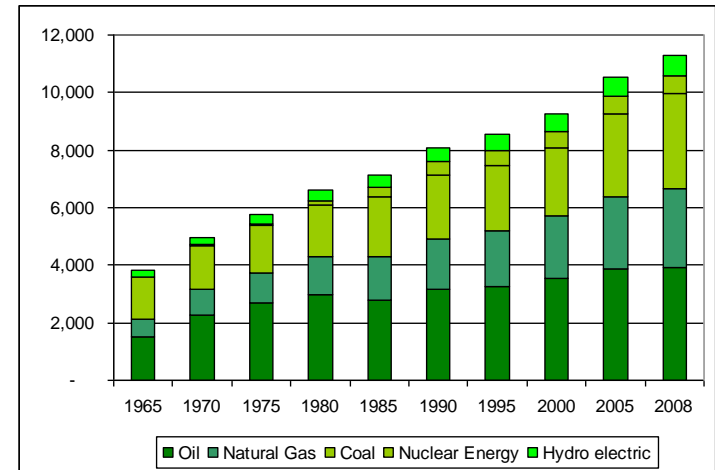


Energy Management

Why is energy management essential?



- Energy is a major production cost item in many process industries
 - Pulp & paper industry approximately 10% of production cost
 - Cement industry 30%-40%
 - Steel industry even 50%
- Focus in sustainable manufacturing,
- Reduce energy consumption, and greenhouse gas emissions



World energy consumption (Metric Tonne) by fuel type
Source: BP - Statistical Review of World Energy 2009

Energy Management

Why is energy management essential?

- Common elements
 - Heavy energy users
 - Fixed or variable energy contracts
 - Penalties for consumption peaks
 - Varying flexibility in process operation
 - Key Performance Indicator (KPI) include improvement in overall process efficiency and energy consumption



Mineral Industry



Pulp & Paper



Oil & Gas



Chemical Industry



Cement

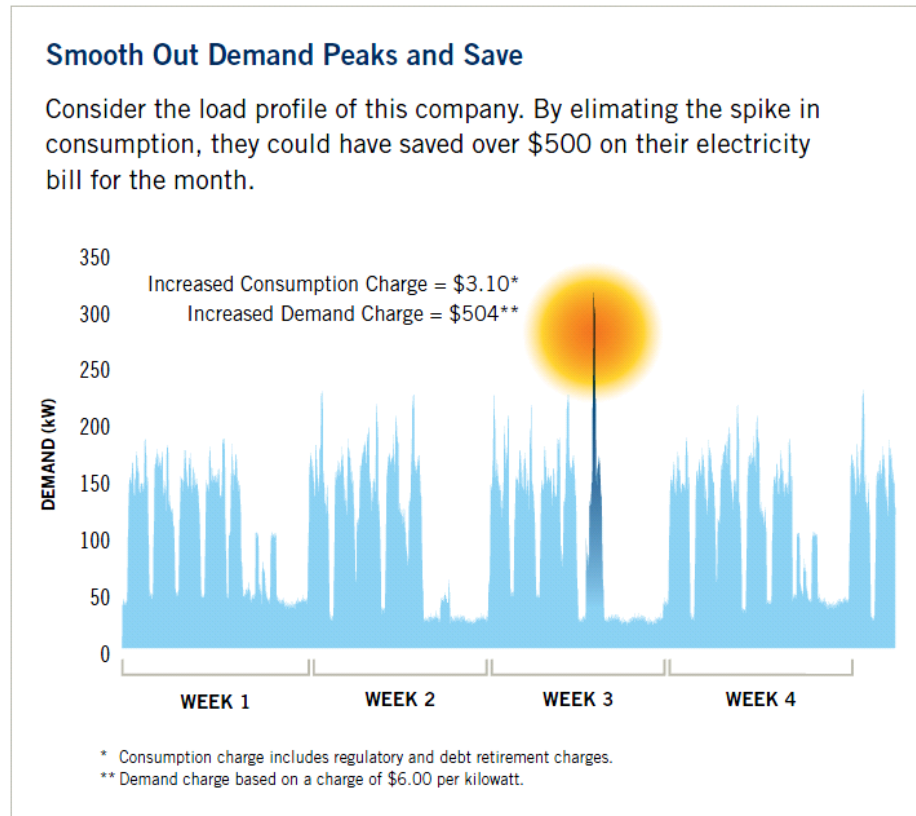


Steel

Energy Management

Why is energy management essential?

- Considerable energy savings are possible by studying the consumption profile and taking some basic common sense actions

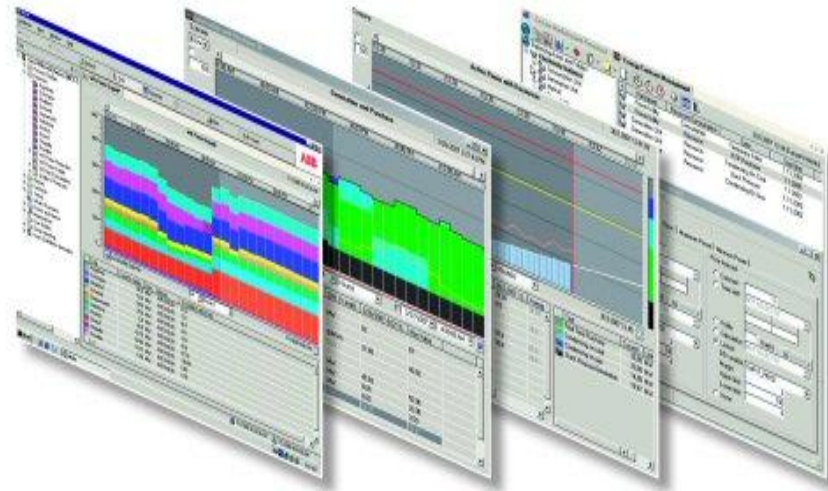


Energy Management

Why is energy management essential?

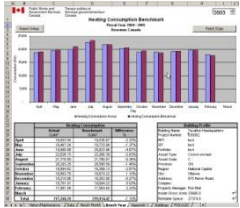


- A dedicated energy management system
 - Keeps track of the overall energy consumption in the real time format
 - Facilitates targeting the energy saving opportunities – can save significant amount of energy.

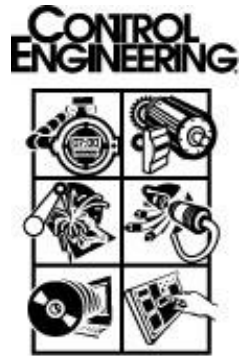


cpmPlus Energy Manager

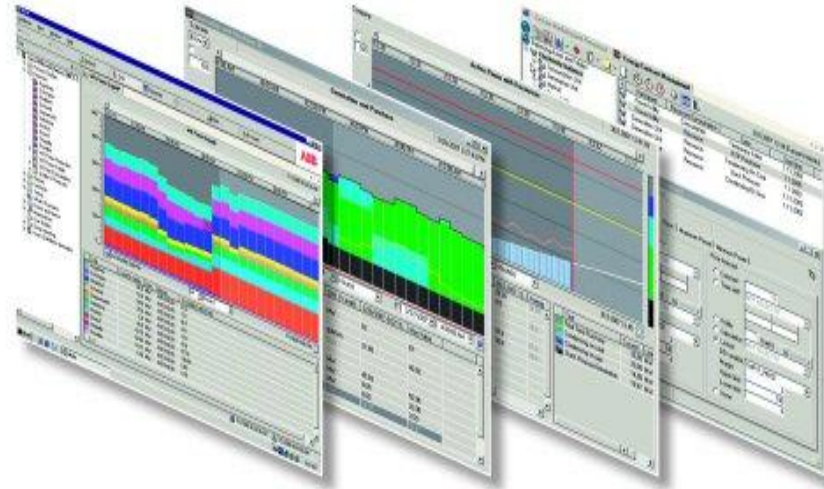
What is cpmPlus Energy Manager?



- Collaborative Production Management: The application of collaborative manufacturing principles applied to the management of manufacturing processes
- For both Regulated & De-regulated energy markets
- cpmPlus Energy Manager is winner of the 2010 Control Engineering “Engineers Choice” Award for best software package in the Energy Dashboard category



2010
ENGINEERS'
CHOICE
AWARDS

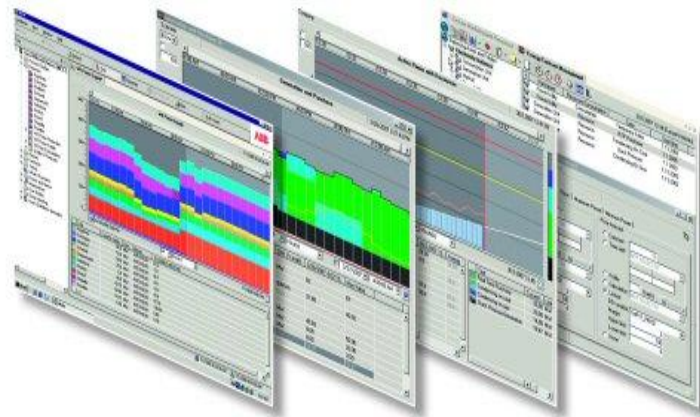


cpmPlus Energy Manager

What is cpmPlus Energy Manager?



- Saving Potential with cpmEnergy Manager
 - 2% to 5% cost savings possible with smart load planning, optimized energy procuring, and continuous energy efficiency monitoring
 - In small sites, with no previous energy monitoring in place, 10%-15% savings can be achieved per year simply by making energy usage visible for users and plant management

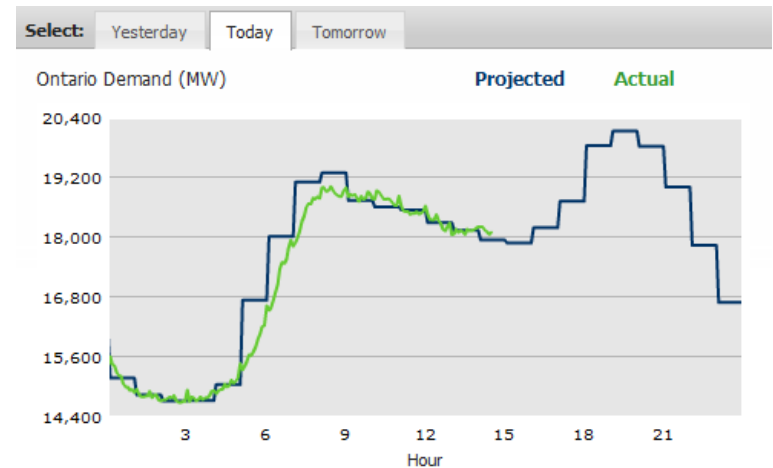


Energy Management

What is cpmPlus Energy Manager?

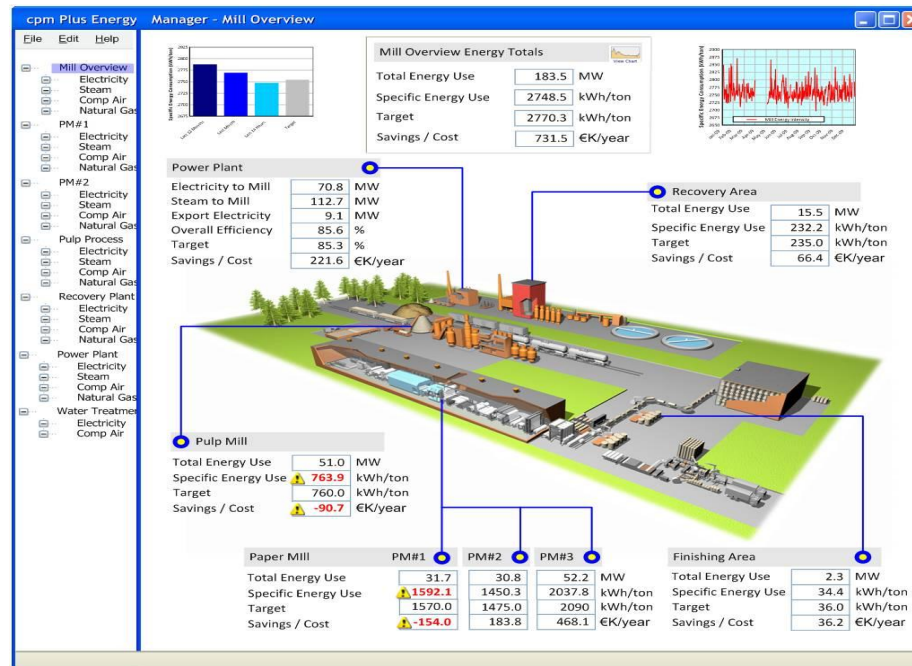


- Energy Manager is a scalable comprehensive software toolset which provides several functions.
- These functions can be broken into three main types:
 - Energy
 - Monitoring & targeting
 - Planning
 - Optimizing



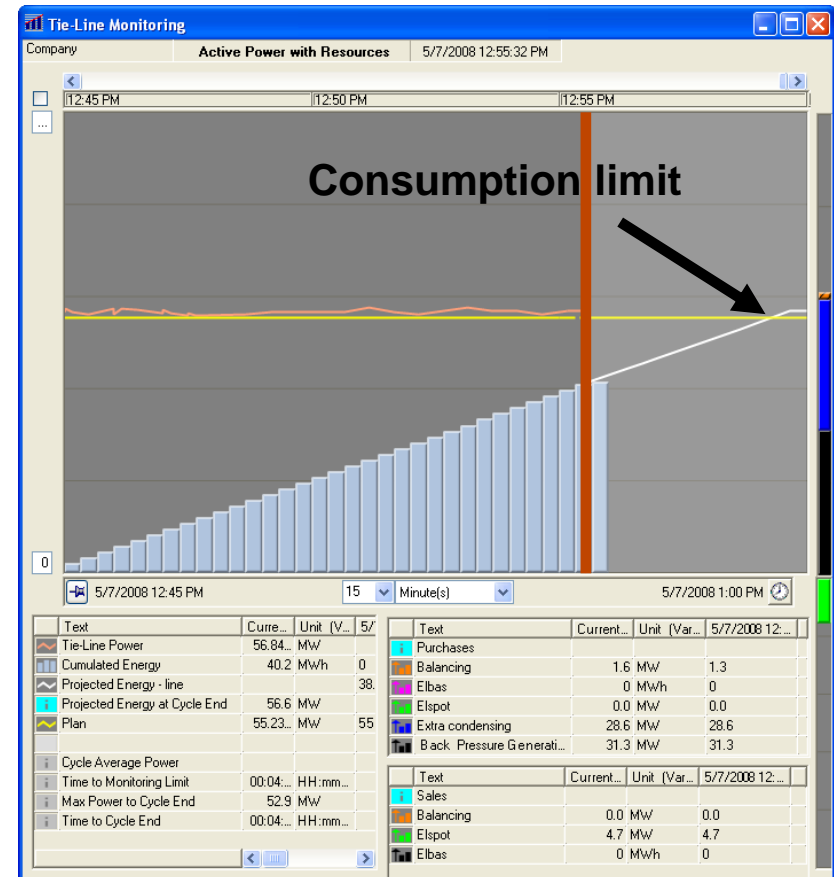
cpmPlus Energy Manager Energy Monitoring & Targeting

- Measurement of the energy consumption of equipment and processes is the basis for efficiency improvement
- Energy manager calculates energy efficiencies and provides easy to use visual tools for monitoring and targeting



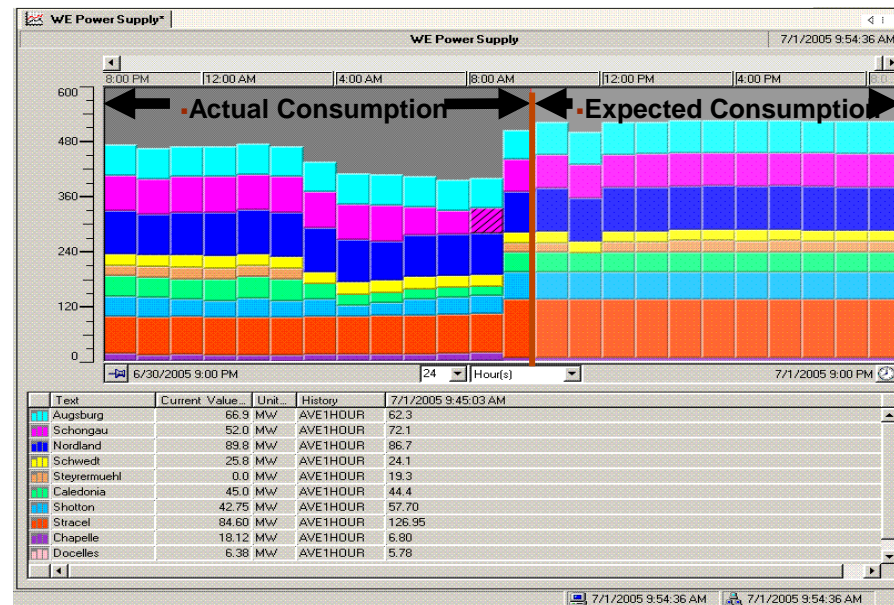
cpmPlus Energy Manager Energy Monitoring & Targeting

- Energy monitoring and reporting functions analyze the use of energy and utilities
- Contract Information
- Various energy reports explaining the consumption and cost of utilities per hour/day/month/year, by individual and aggregated users
- Consumption and cost of utilities per end product unit (specific energy consumption)



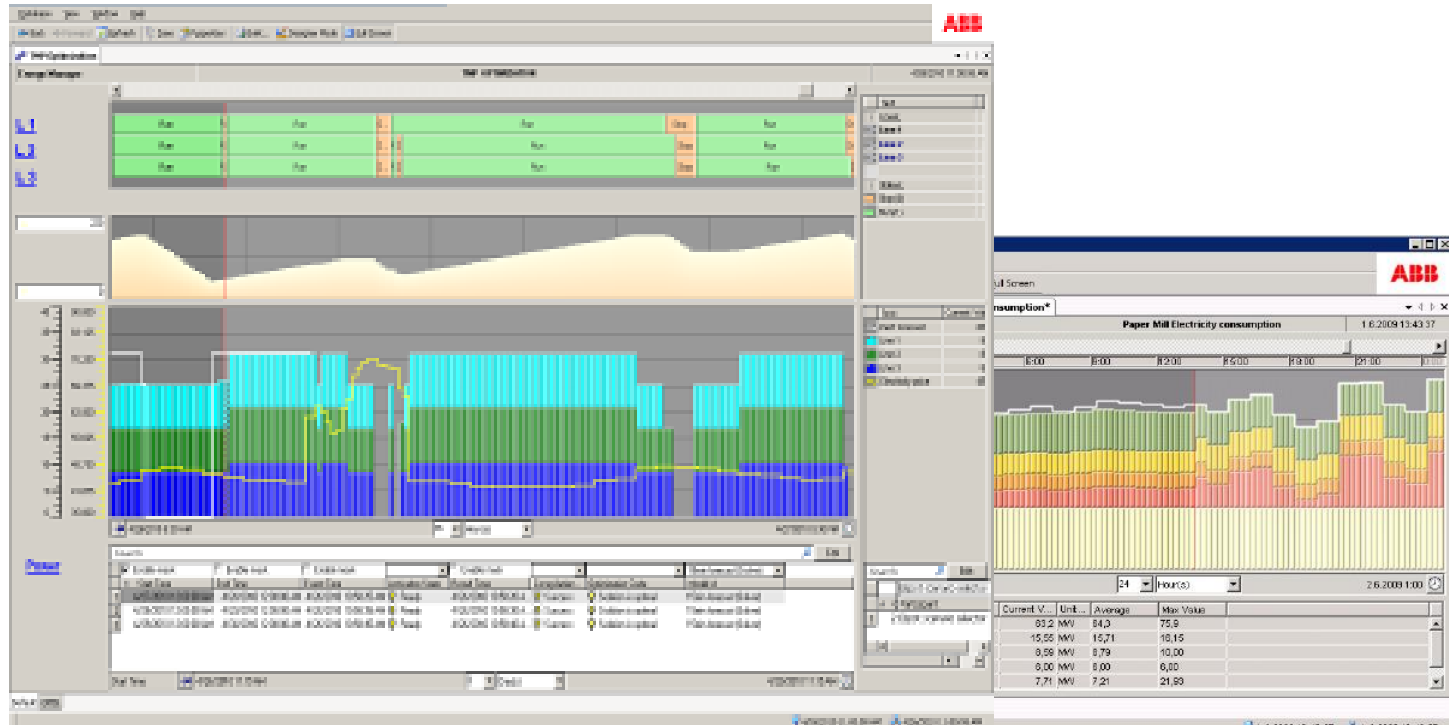
cpmPlus Energy Manager Energy Planning

- Accurate load schedules are the cornerstone of energy management
- Knowing the expected load helps negotiate utility contracts and actively participate in the day ahead market



cpmPlus Energy Manager Energy Planning

- The energy planning function can handle up to five separate utilities for each consumer, e.g. electric power, steam, natural gas, water, and oil.



cpmPlus Energy Manager

Energy Optimizing

- Energy supply optimization is applicable in a situation of multiple energy supply optimization
- Load schedules can be optimized to exploit energy price variation
- Cost and limitations on the use of each energy source are different

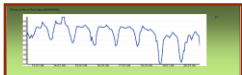


cpmPlus Energy Manager

Additional functions



- Data reconciliation
- Energy purchase and sales management
- What-if-Analysis to support decision making through simulation



- Energy analysis tool set for
 - Benchmarking, load profiling, base load analysis, energy data normalization, rate modeling, *etc.*
- Separate calculation and reporting tool set

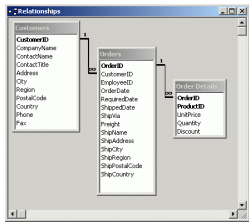


cpmPlus Energy Manager Benefits

- Purchase or produce energy at the lowest market price
- Optimize the use of alternative energy resources
- Improve energy efficiency and reduce energy costs
- Improve energy cost consciousness

2 to 5% cost savings possible with smart energy procurement and energy efficiency monitoring with Energy manager Tools!

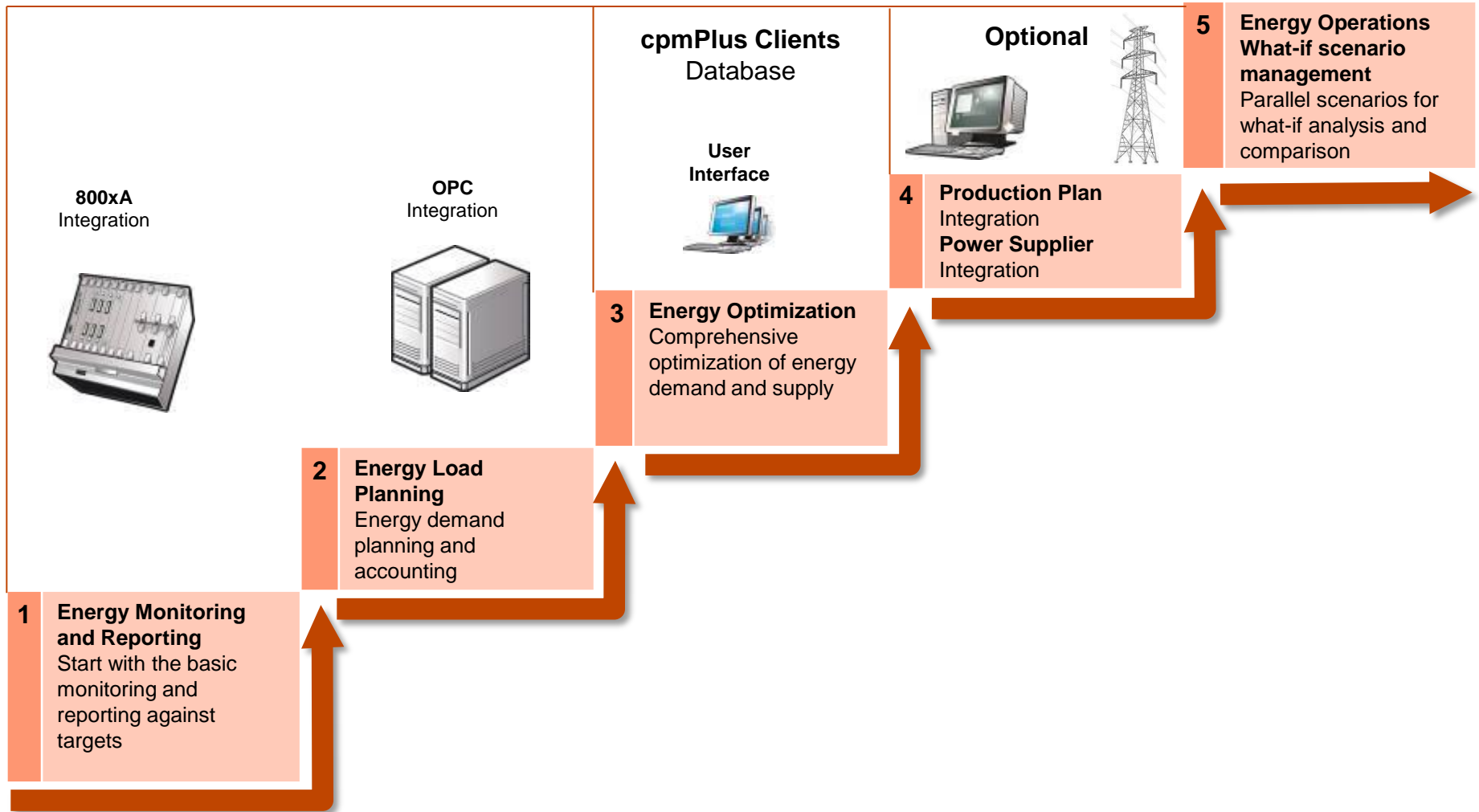
cpmPlus Energy Manager Technology & Product Architecture



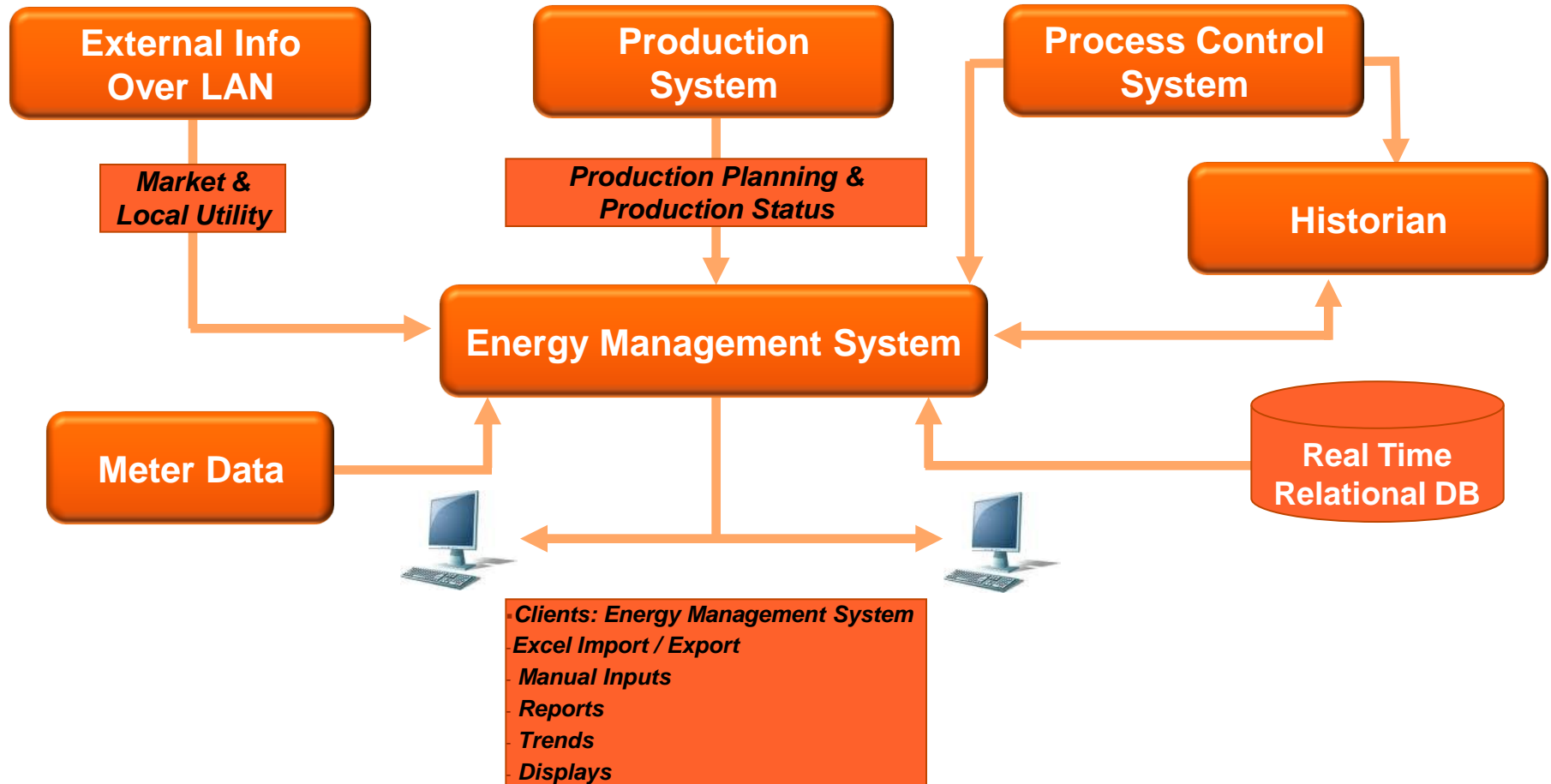
- Technology & Product Architecture
 - Microsoft .NET Technology
 - Client / Server Configuration
 - Relational Database (DB)
 - Open communication links
 - Modular Design
 - Grows from a small to a large Corporate System
 - Integration with other applications
- ... and much more



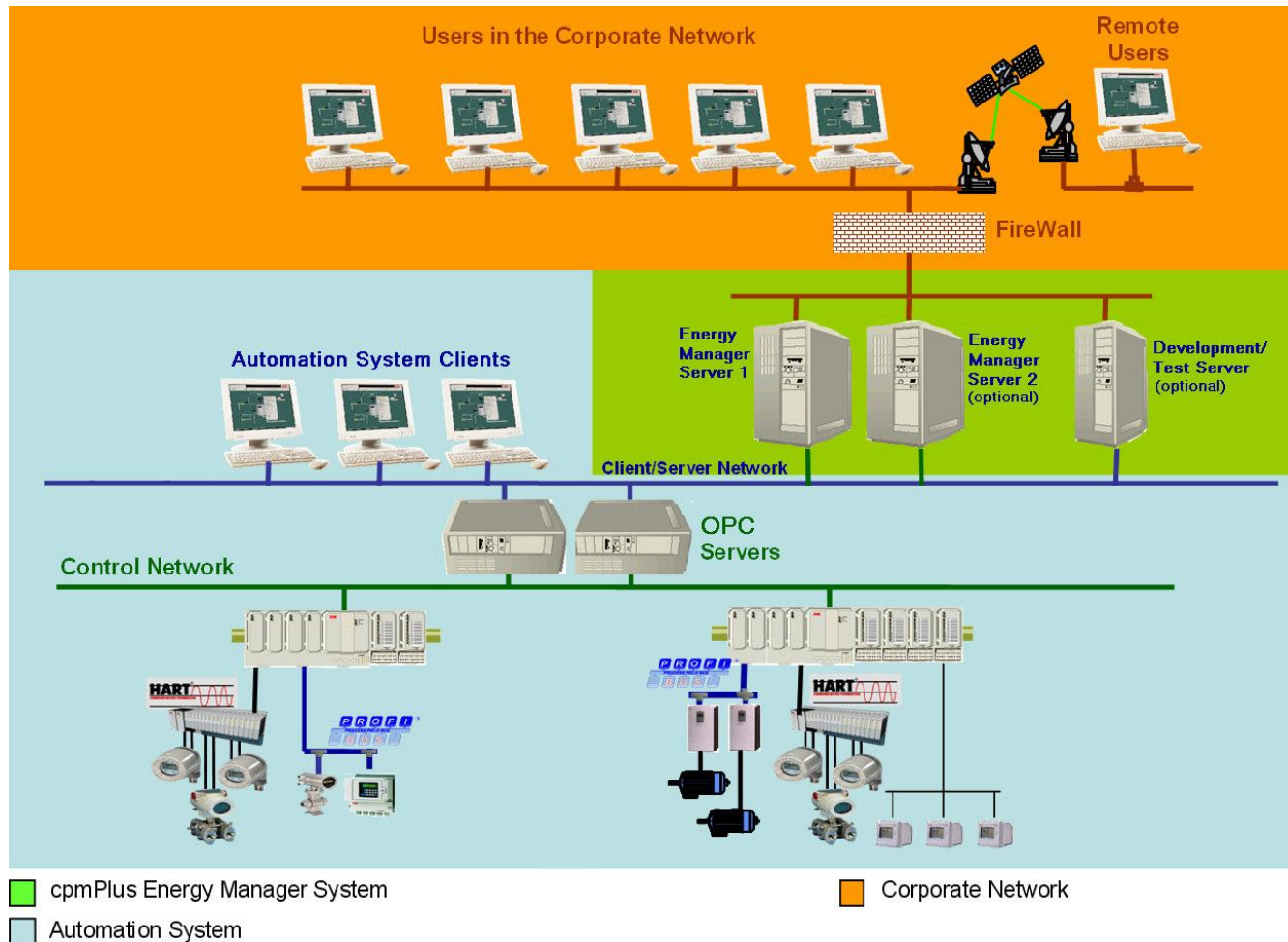
cpmPlus Energy Manager Technology & Product Architecture



cpmPlus Energy Manager Basic System Configuration



cpmPlus Energy Manager Basic System Configuration



cpmPlus Energy Manager

Future Trends



- Smart Grid

- Utilities and governments are investing money in the smart grid technology
- Application of digital technology to optimize the generation, delivery, and the consumption processes
- ‘Smart Grid’ is a combination of technologies which will make the demand response economical and more flexible.
- The energy management system will play a key role in achieving this objective.



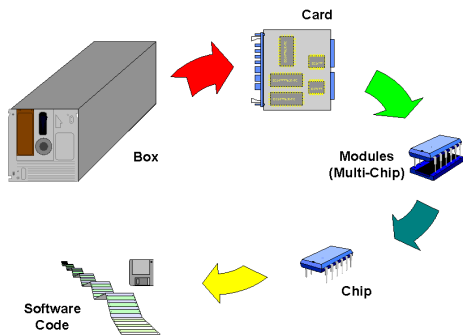
cpmPlus Energy Manager Future Trends



- Building controls
 - Building standards such as KNX are becoming more popular as the energy cost is going higher.
 - **KNX** technology – the worldwide standard for all applications in home and building control



Energy Manager is designed to evolve with technology!



cpmPlus Energy Manager

Reference sites (North America)



- Public Works Government Services of Canada (PWGSC), Ottawa, ON
- Zellstoff Celgar, BC



cpmPlus Energy Manager Reference sites (Europe)

Over 40 Energy Management Systems since 2000

- Paper: UPM Corporate wide EMS at mill and control centre levels in Finland and central Europe
- Steel: Sotel EMS for ArcelorMittal sites in Luxembourg, Belgium and France
- Power: PVO-Pool EMS for large power network balance management, settlement and invoicing



cpmPlus Energy Manager Summary

- Energy Manager Users
 - Pay lower electricity purchase price & demand charges
 - Minimum use of peak rates
 - Avoid penalties
 - Get control of their overall energy management



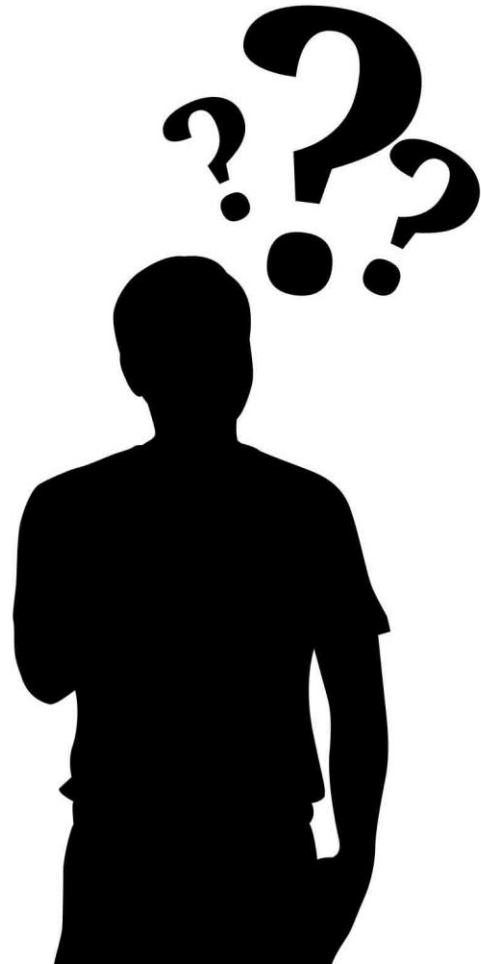
cpmPlus Energy Manager Summary

- Savings
 - Between 2 – 5% of overall energy bill
 - UPM-Kymmene: 35% decreased electricity supply cost

Ref.: ARC-INSIGHTS # 2001-047M



Questions? Energy Management System



Reminders

Automation & Power World 2011

- Please be sure to complete the workshop evaluation
- Professional Development Hours (PDHs) and Continuing Education Credits (CEUs):
 - You will receive a link via e-mail to print certificates for all the workshops you have attended during Automation & Power World 2011.
 - **BE SURE YOU HAVE YOUR BADGE SCANNED** for each workshop you attend. If you do not have your badge scanned you will not be able to obtain PDHs or CEUs.

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