

Marc Leroux, Process Automation – Collaborative Production Management

Business value of energy management

The importance of energy management

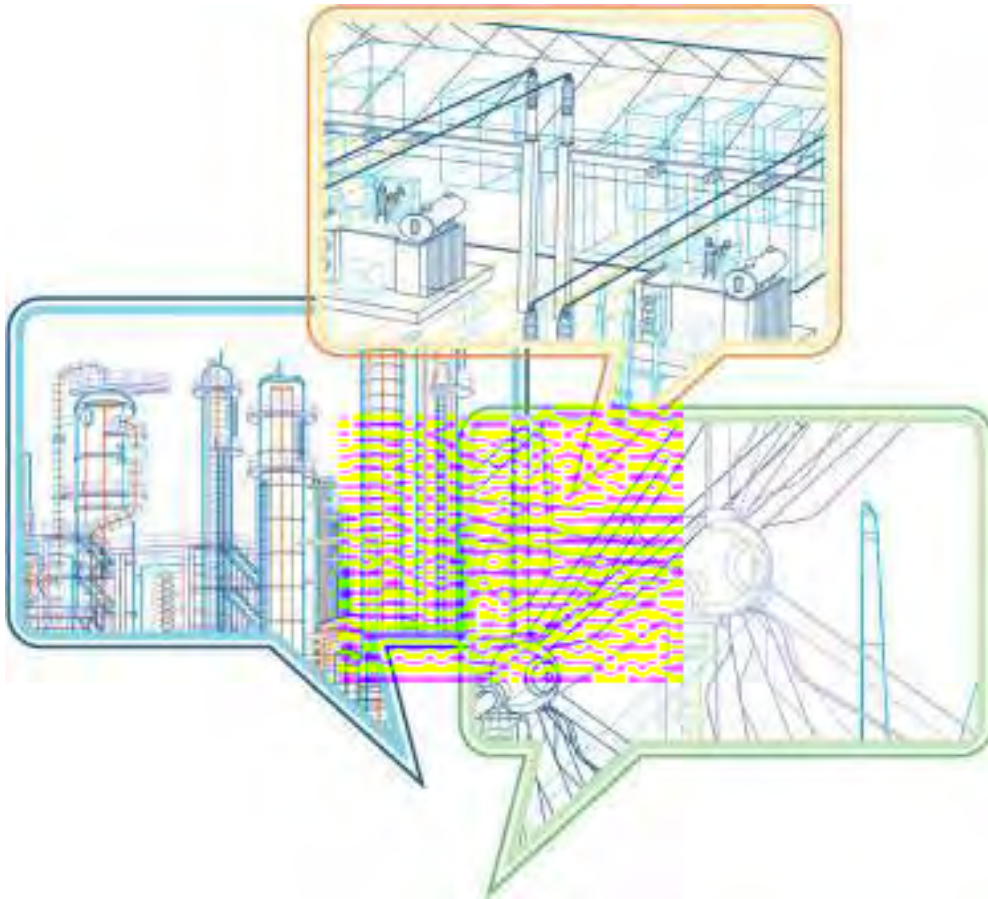
Automation & Power World 2011

April 18-21, 2011 in Orlando, Florida



Automation & Power World 2011

April 18-21, 2011 in Orlando, Florida



- Save the date for this "must attend" event!
- April 18-21, 2011
- Orlando World Center Marriott, Florida
- Over 400 hours of educational training
 - Business forum
 - Customer case studies
 - Hands-on training
 - Panel discussions
 - Technical workshops
- Earn PDHs and CEUs
- Technology & Solution Center
 - Over 70,000 sq. ft. of exhibits
- Network with your peers
- www.abb.com/a&world

ABB Automation & Power World

At-a-glance

400+

Educational workshops

Automation & Power World offers over 400 hours of educational workshops specifically designed to make engineers, maintenance and management more valuable to their companies.

70K

Technology & Solution Center

Over 1 ½ acres (70,000 ft²) of with nearly 100 tons of electrical gear and 100's of experts ready to answer any of your questions and share the future of Automation & Power Solutions.

4,000

Connect with peers

With over 4,000 of your peers in attendance, this is a powerful opportunity to network and learn from the industry. In addition, over 45 customers will be sharing their own case studies.

Educational workshops developed for all audiences

Just a few examples

Roles

Engineering

Management

Maintenance

Company types

Industrials

EPCs

Utilities

OEMs

- The coming wave of process safety system migration
- Implementing an alarm management strategy for a 100,000 I/O system - Case study
- Replacement and retrofit of large motors: Challenges and solutions
- Dynamic studies for large scale renewable energy integration at a Texas CREZ - Case study
- Secure commissioning of your process plant - Case study
- New arc flash mitigation technologies and techniques for a safer working environment
- Robotics 101
- A better approach to non-revenue water loss
- Electric vehicles: Are they real this time?
- Why is SIL more important than architecture?

Past attendees input



“I am impressed with the different parts of the program, the workshops and also the exhibit set-up... there is a lot of information to pick up.”

Duane Souers, Georgia Pacific

“It’s a great opportunity to get a lot of exposure to people and products in one week.”

Pardeep Gill, Alcoa

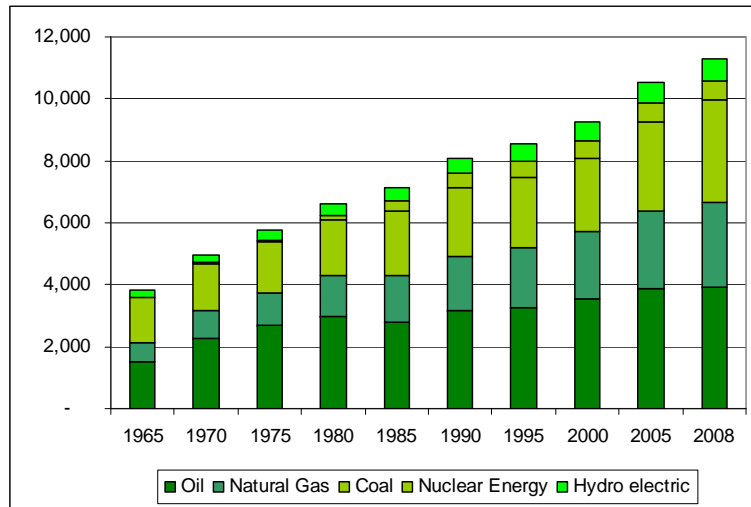


“It is well worth the time given the opportunities to: learn from industry experts, network with peers in the same industry, learn about emerging technologies, and build excellent supplier relationships.”

Sanjin Osmancevic, National Grid

Marc Leroux, Process Automation – Collaborative Production Management

Why is Energy Management essential?



World energy consumption (Metric Tonne)
by fuel type

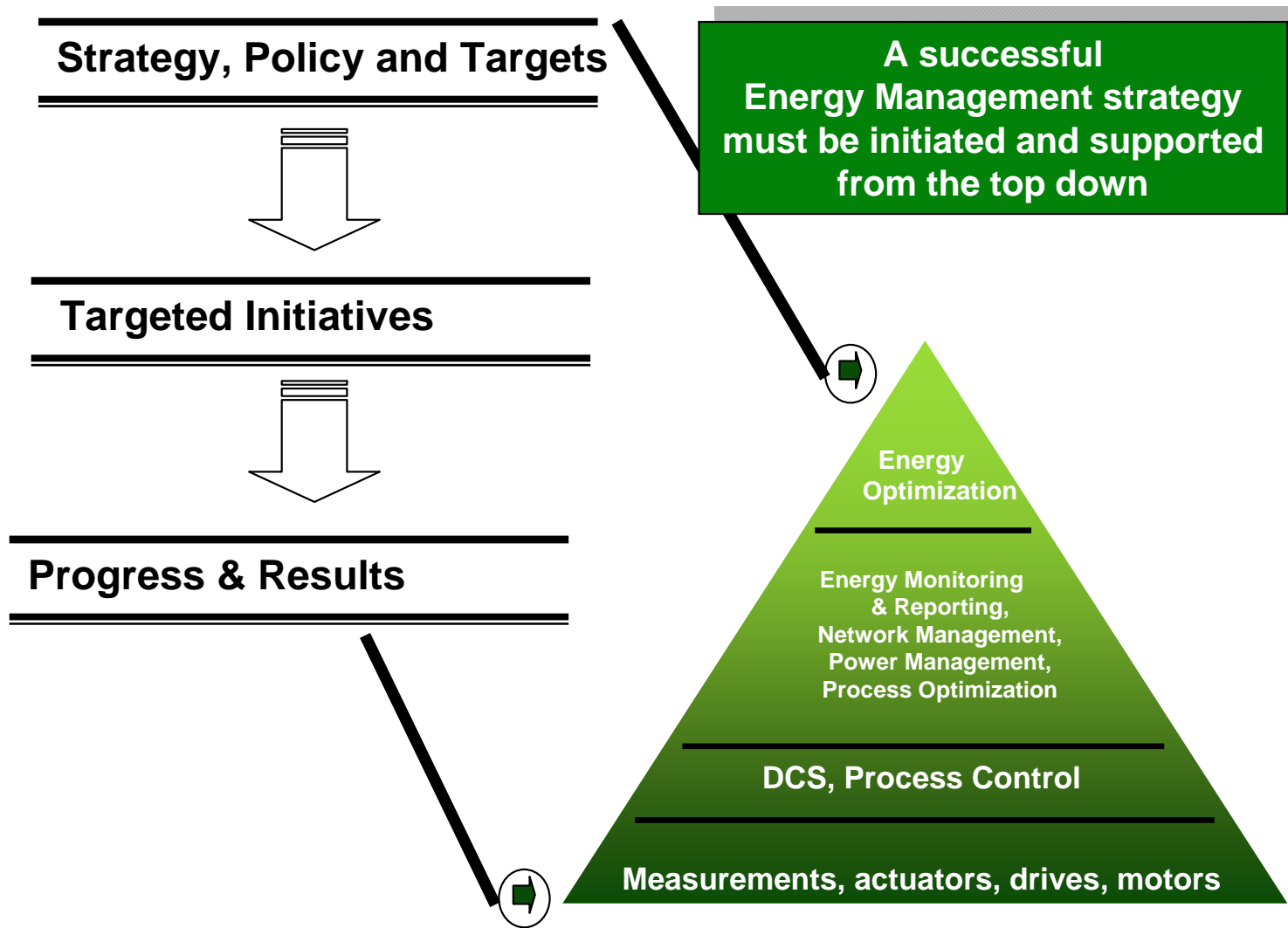
Source: BP - Statistical Review of World
Energy 2009

- Focus in sustainable manufacturing
- Energy is a major production cost item in many process industries⁽¹⁾
 - In the pulp & paper industry it is approximately 10% of production cost
 - In cement industry 30%-40%
 - In steel industry up to 50%
- Experience shows that
 - Energy savings up from 10% to 25% can be reached ⁽²⁾

(1) Based on geographical area

(2) Source: ARC Best Practices for Energy Management report, Jan. 2009

Implementation of Energy Management Strategy



How to Get Savings in Energy Costs

Reduce

Cost of consumed energy \$ / MWh

$$\frac{\text{Average Unit Price}}{\text{Energy consumption}}$$

Price Optimization

Decrease

Specific Energy Consumption
MWh / Units

$$\frac{\text{Total Energy Consumed}}{\text{Production output}}$$

Usage Optimization

Increase

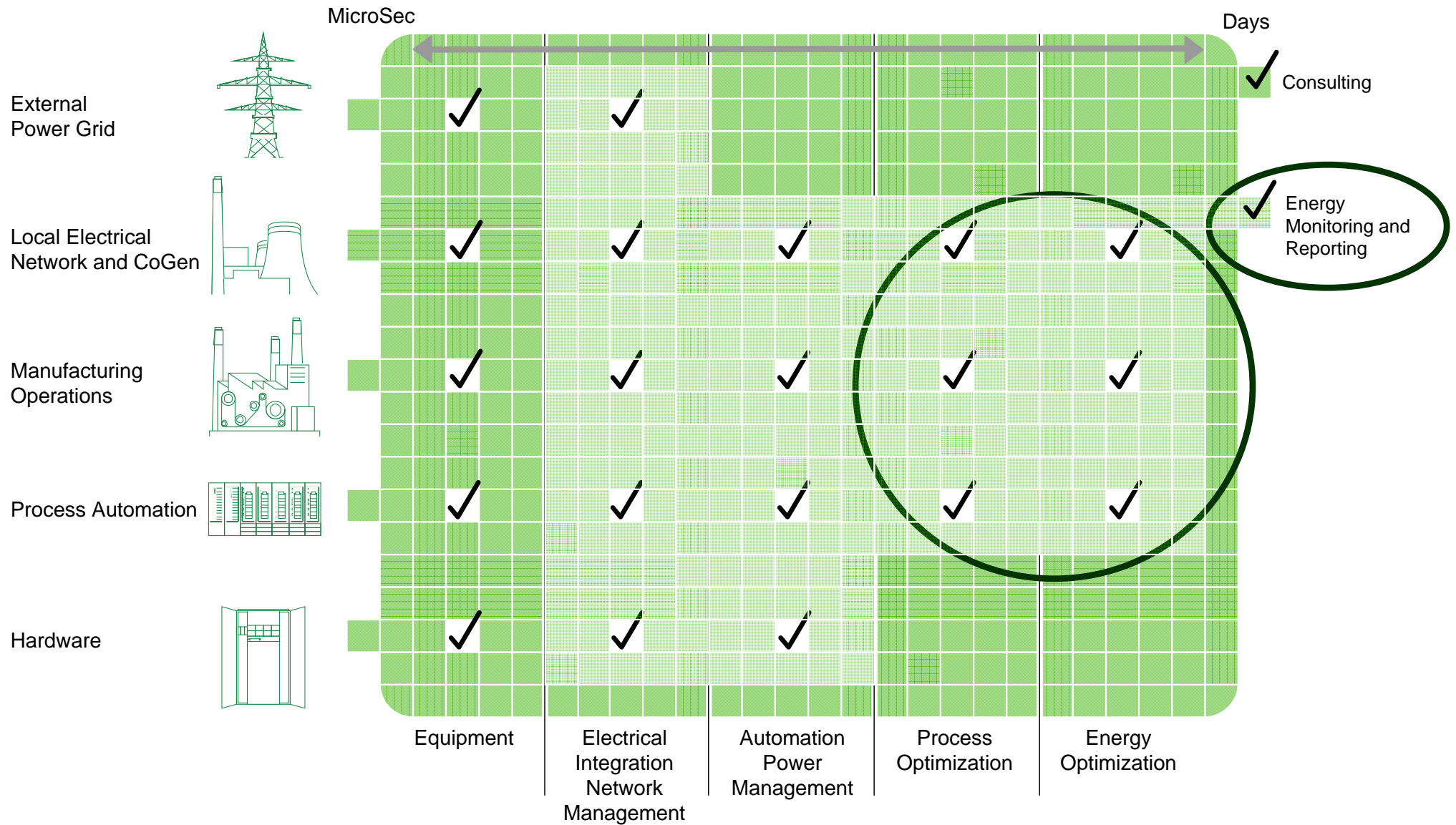
Energy Cost Effectiveness
(eE) Units / e\$

$$\frac{\text{Production Units}}{\text{Unit Energy Cost \$}}$$

Energy Efficiency / Energy Cost

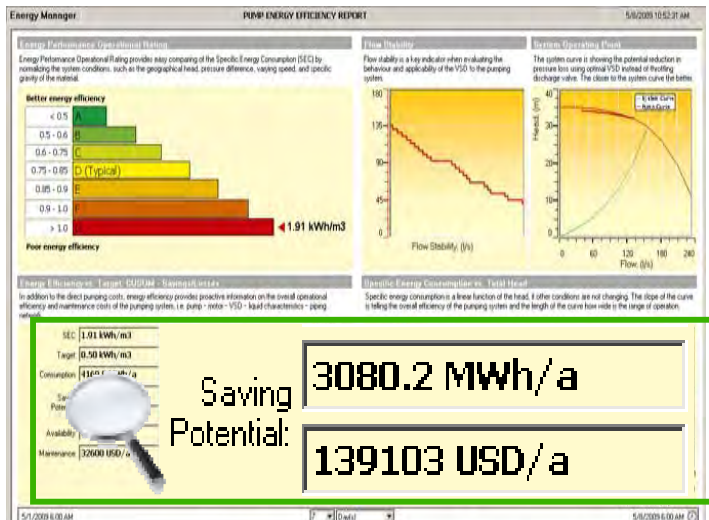
eE is a KPI = Units per energy dollar

ABB Offering for Energy Management



Use Case 1

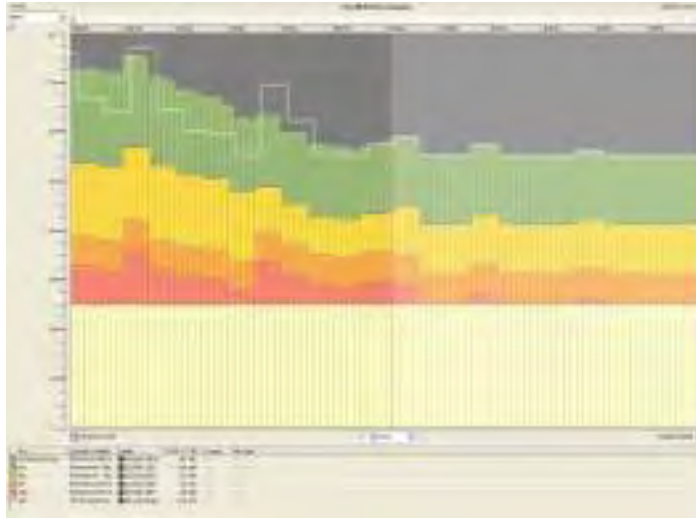
Energy Efficiency Monitoring



- User configurable visual tools for monitoring, targeting and analyzing
- At a glance view of relevant KPI's
- Clear indication of savings potential and lost opportunity
- Drill down to details
- The basis for savings is making energy usage and savings potential visible in real-time

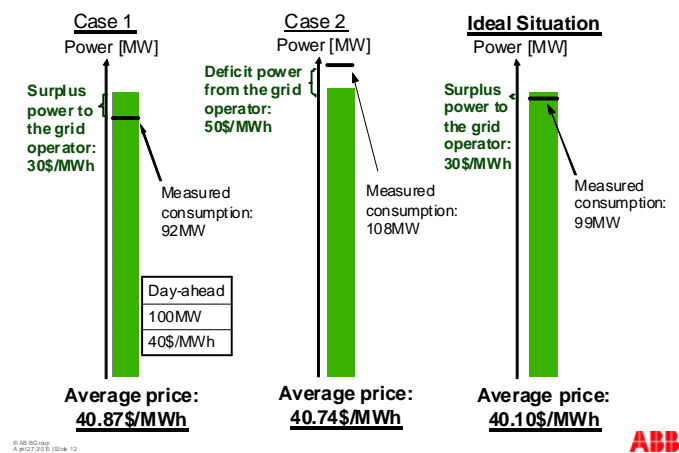
Use Case 2

Minimizing Energy Purchase Costs



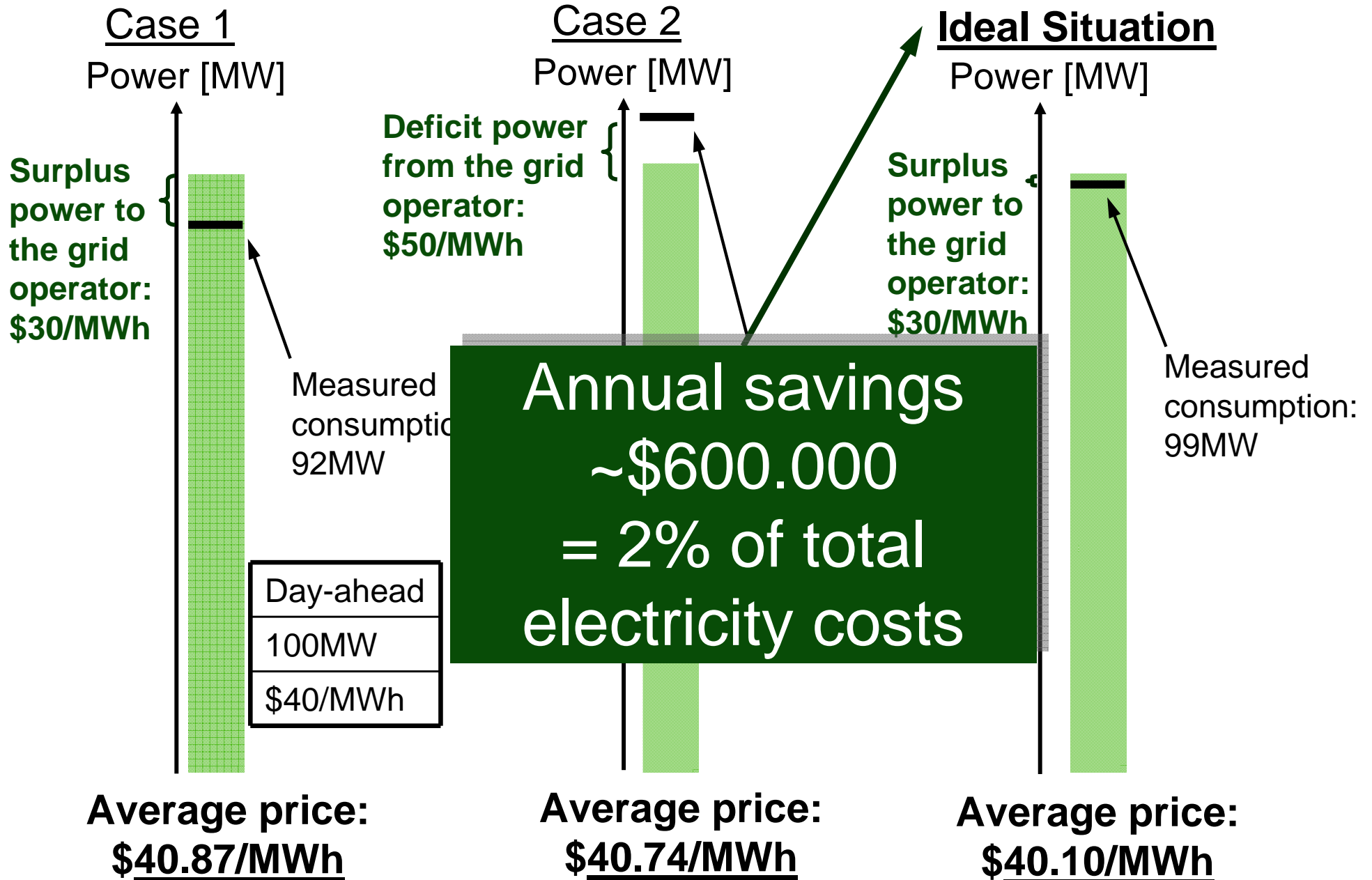
- The key is to be able to accurately predict energy consumption based on real time data
- Accurate energy plans reduce demand charges and lower penalties
- Improvement of 10% in electricity plan accuracy results in 1% savings in electricity costs
- Annual savings in example ~\$600.000
2% of total electricity costs

Example: Benefits of Accurate Planning & Monitoring



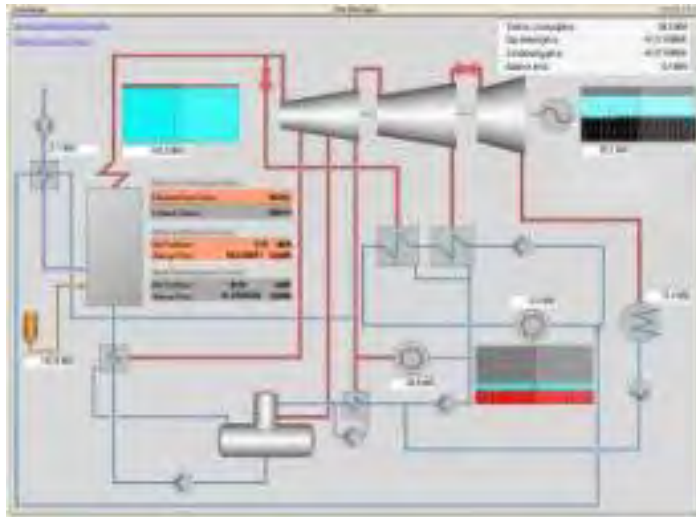
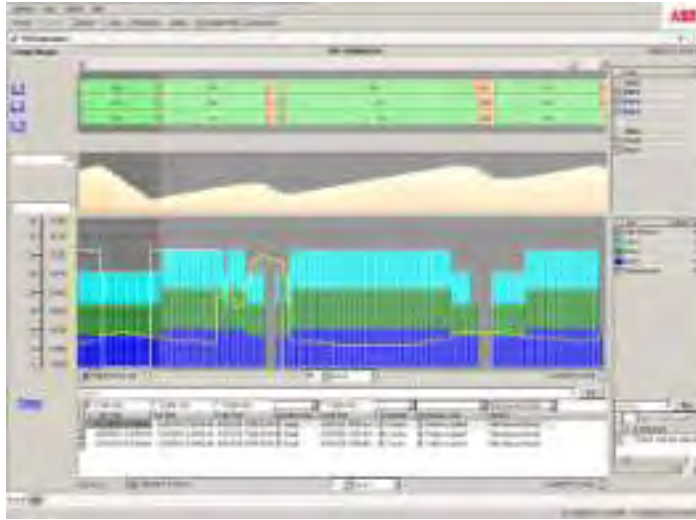
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Example: Benefits of Accurate Planning & Monitoring



Use Case 3

Optimizing Electricity Procurement and Consumption



- Optimize procurement and generation based on consumption plans
- Use off-peak hours if intermediate storage capacity is available
- Minimizes startup and operating costs
- Compare different scenarios, and adjust the plan
- Provides decision support for users or automatically sends set points to Advanced Process Control or DCS
- 2 to 5% cost savings are possible with optimization

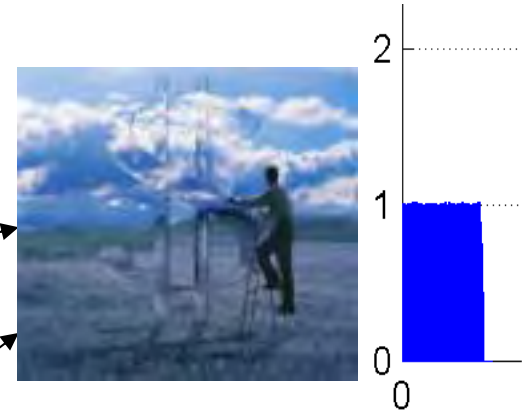
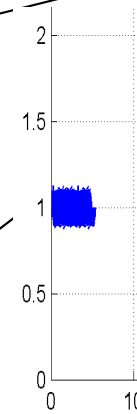
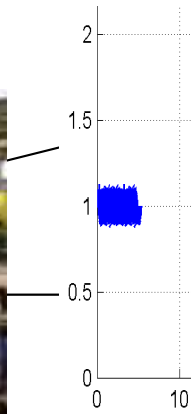
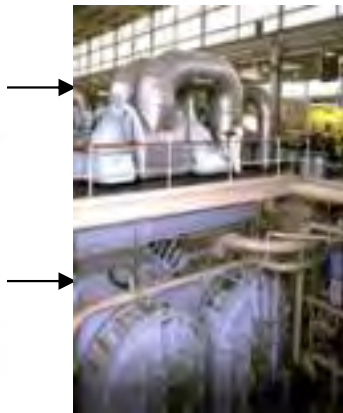
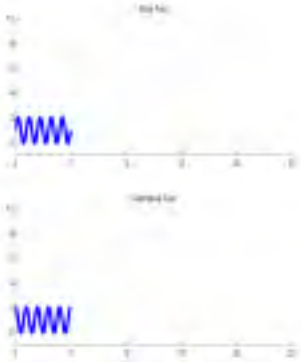
Use Case 3

Industrial Steam example

Main Fuel

Steam

Profits



Alternative Fuel

Steam

Electricity

Customer Case 1

Pulp & Paper Corporate Energy Management

- 10 Mill Systems using cpmPlus Energy Manager
 - Measurement interfaces
 - Energy load planning, monitoring and reporting
- Central System using cpmPlus Energy Manager
 - Energy optimization
 - Energy market interfaces
 - Energy monitoring, reporting and invoicing
- Total electricity bill \$700 M
- Own energy production 80 %
- Total annual savings
 - Savings in electricity price \$14 M
 - Savings in electricity consumption 35 M\$
 - CO2 reduction 175,000 tons

Customer Case 2

Steel Mill Energy Management

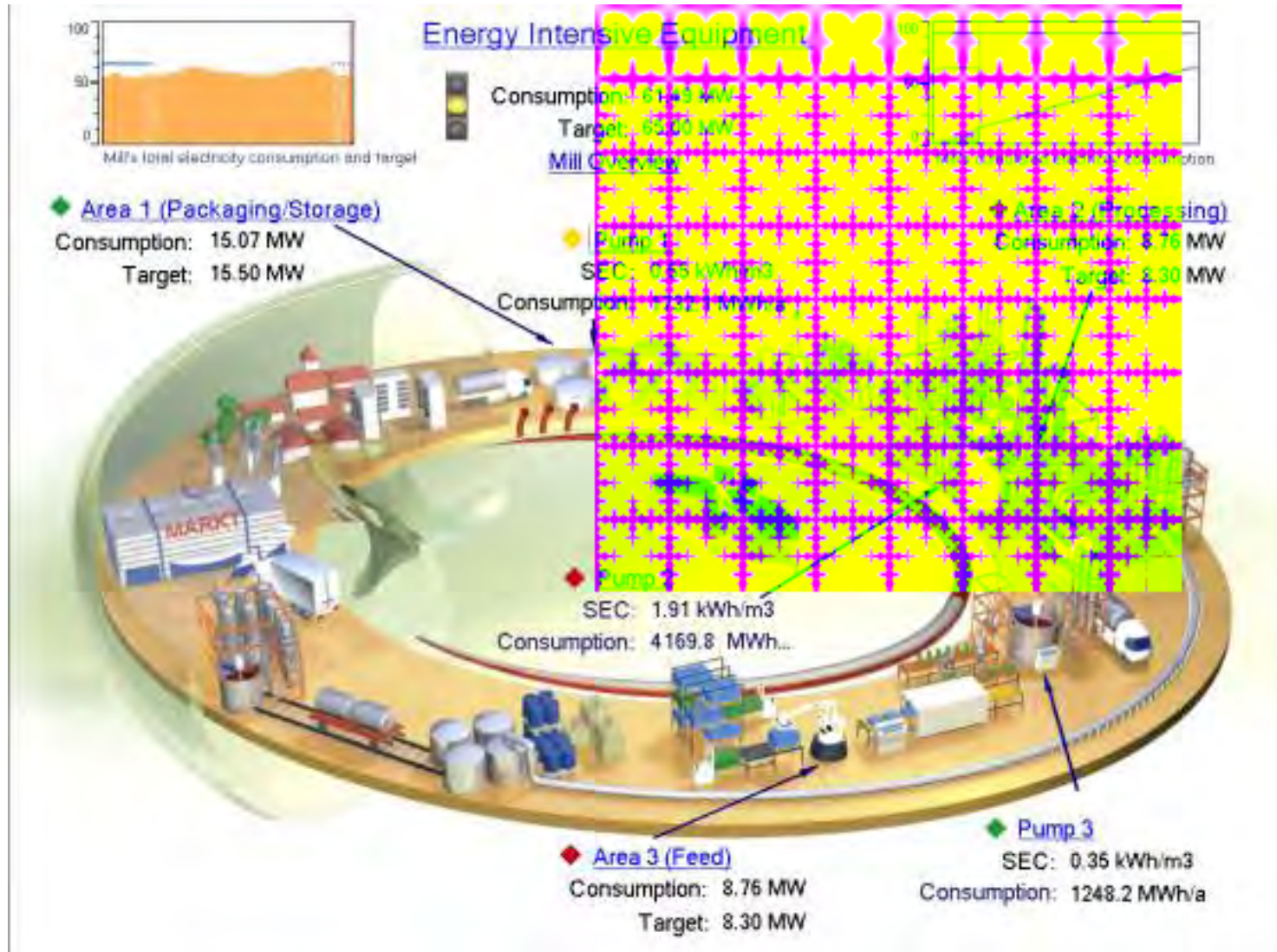
- Steel mill with the following processes
 - Blast furnaces, Coking plant, Sintering plant, Lime kiln, Power plant, Boilers, District heating, Steel foundry, Ladle furnace, Oxygen plant, Rolling mills
- Mill System using cpmPlus Energy Manager
 - Measurement interfaces
 - Load planning, energy optimization
 - Energy monitoring and reporting
- Total electricity bill \$40 M
- Own energy production 60 %
- Total annual savings
 - Savings in electricity price \$1 M
 - Savings in electricity consumption 2 M\$
 - CO2 reduction 10,000 tons

Customer Case 3

Building Energy Monitoring and Reporting

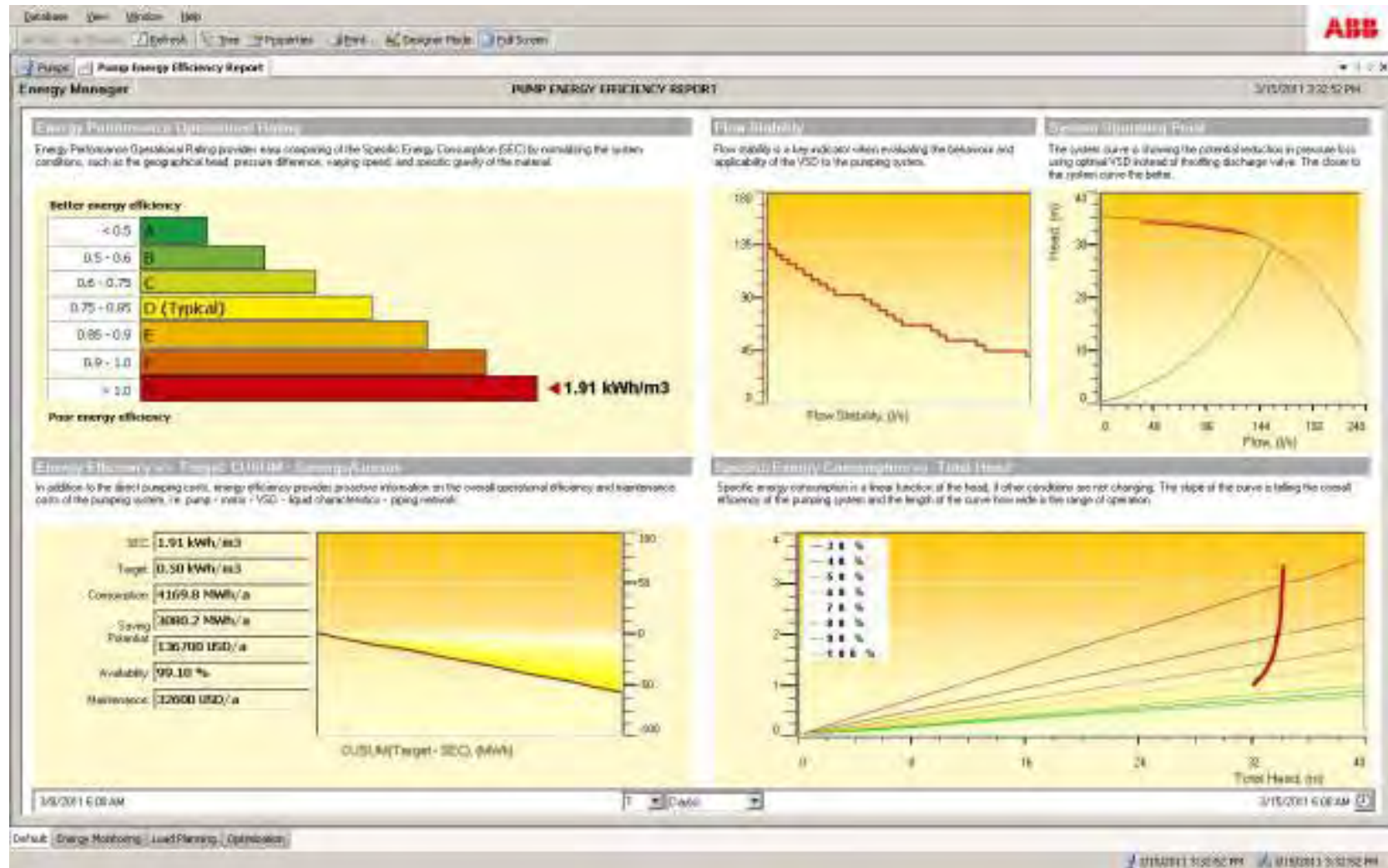
- Multi site building energy monitoring and reporting system using cpmPlus Energy Manager
 - Measurement interfaces
 - Load planning, energy monitoring and reporting
 - Energy benchmarking
 - Energy saving targets follow up
- Total electricity bill \$10 M
- Own energy production 0 %
- Total annual savings
 - Savings in electricity price \$0 k
 - Savings in electricity consumption \$400 k
 - CO2 reduction 2,000 tons

Operational Impact: Plant Overview display



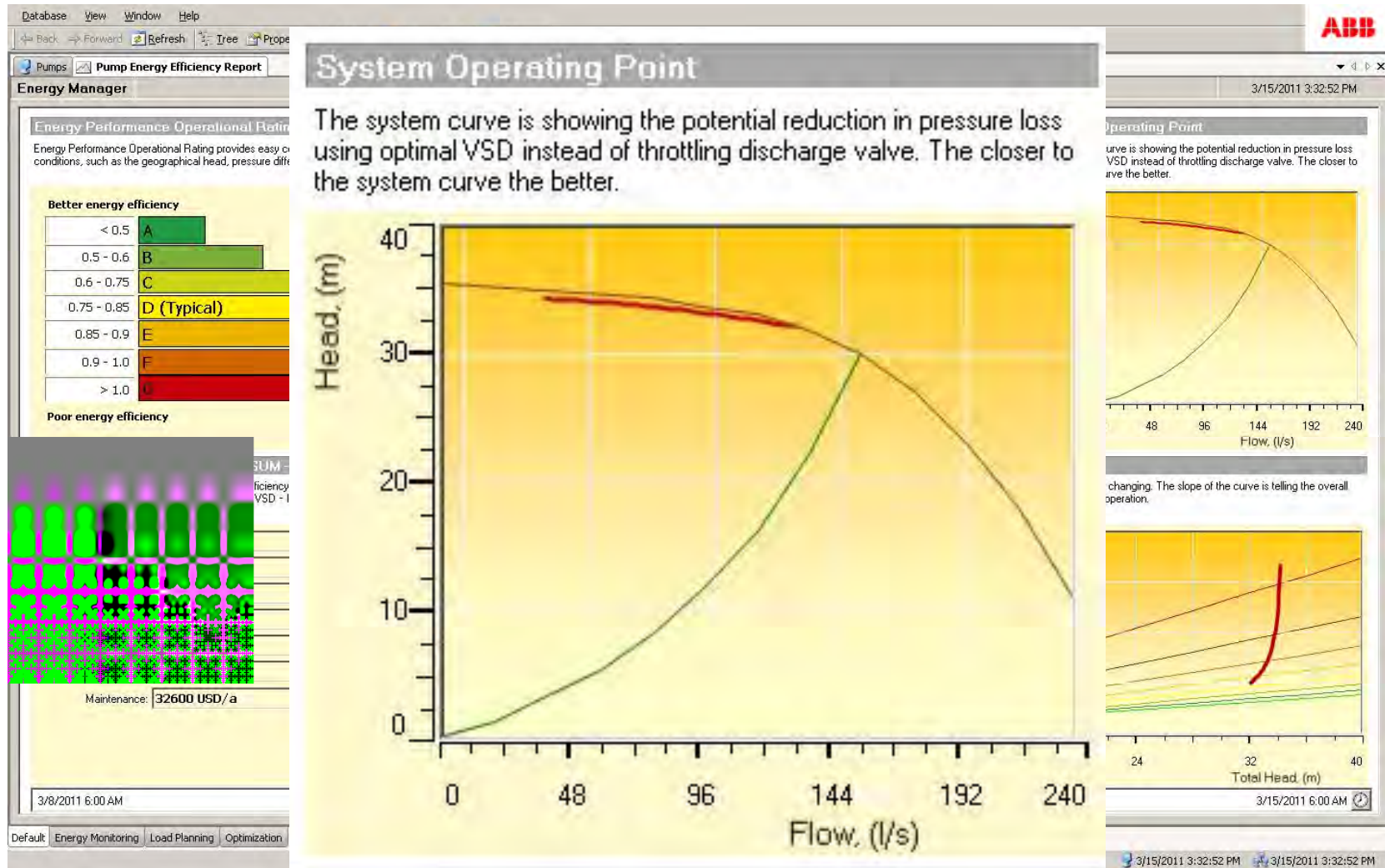
Equipment Efficiency

Understanding the priority of actions



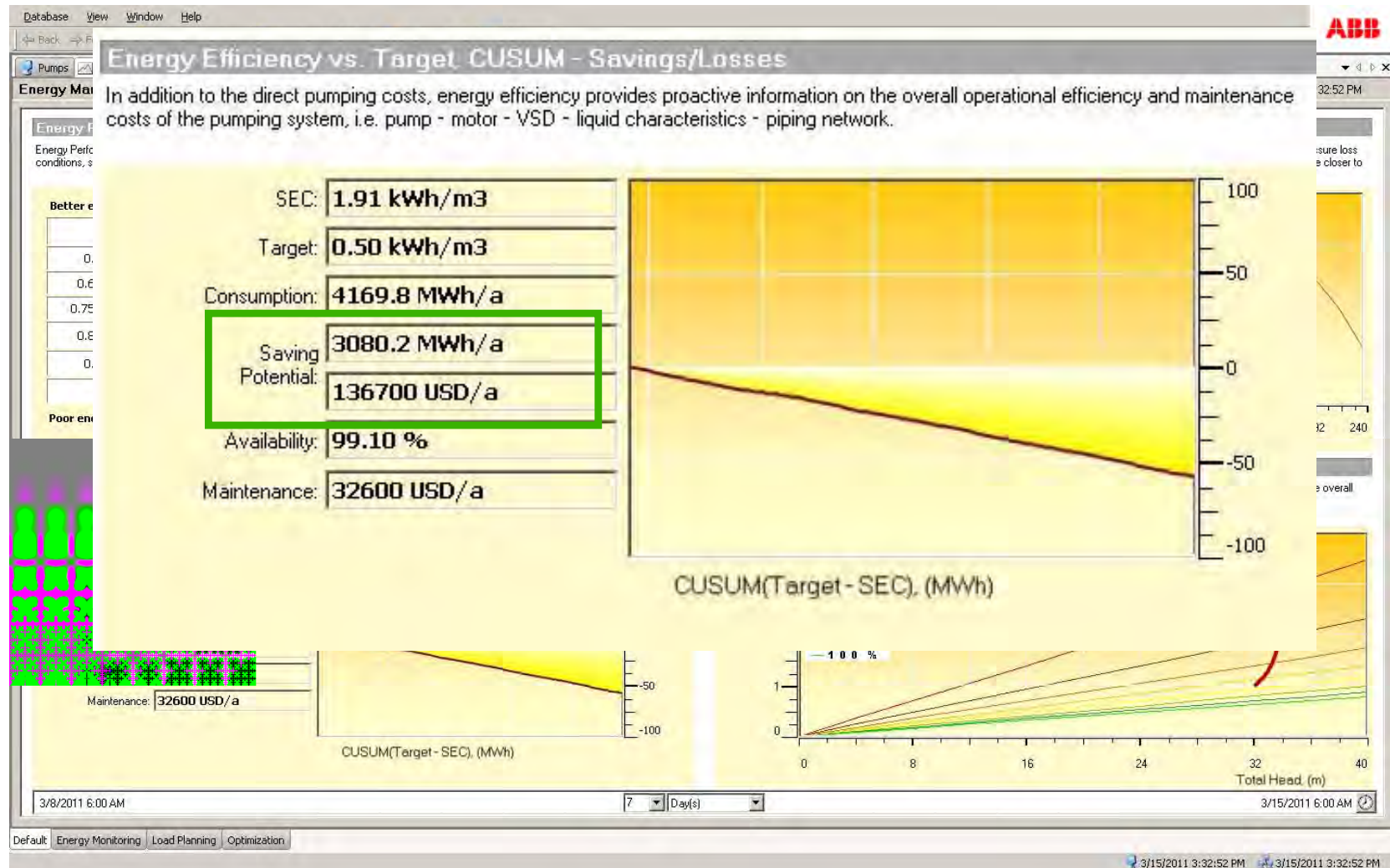
Equipment Efficiency

Understanding the priority of actions



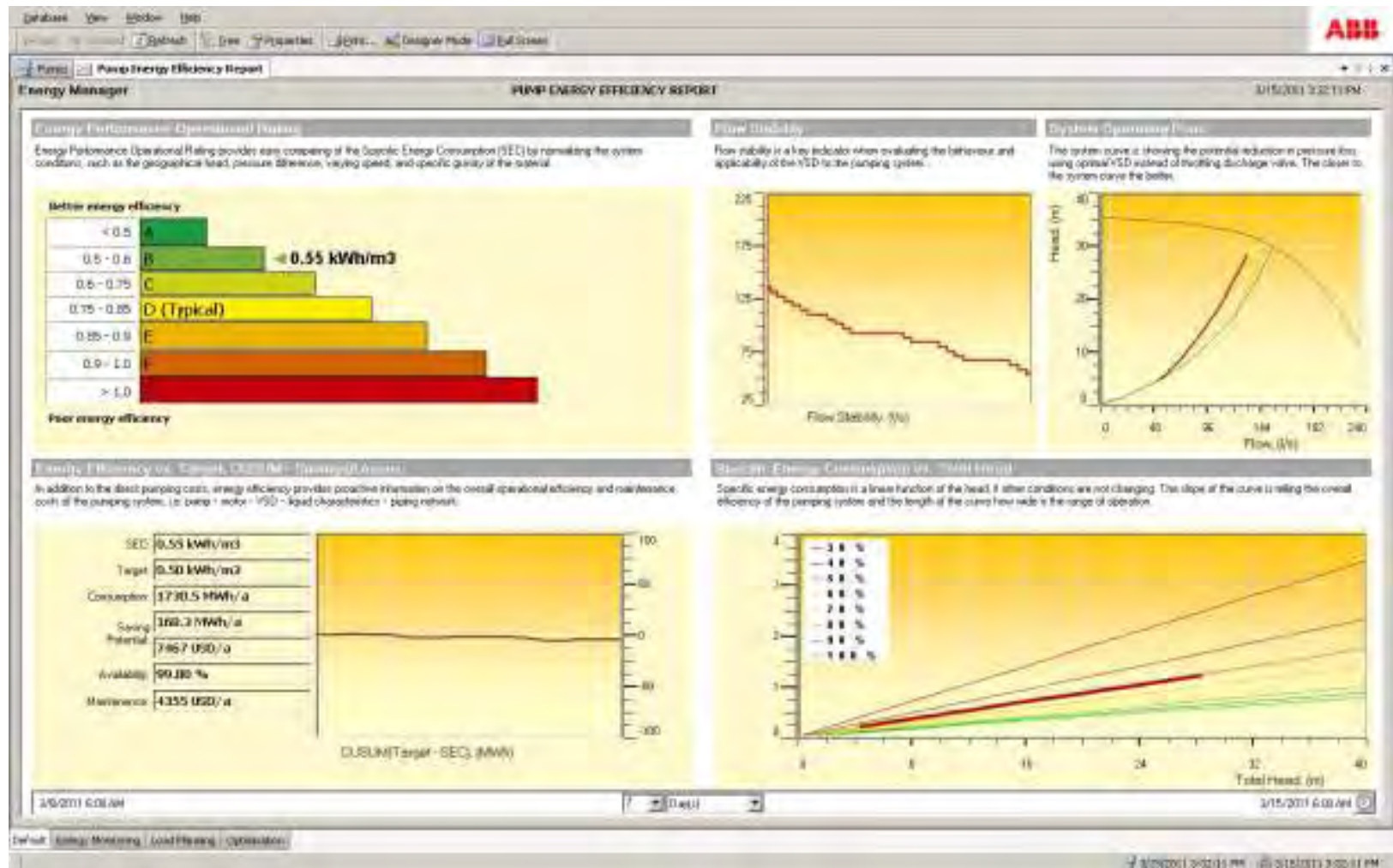
Equipment Efficiency

Understanding the priority of actions



Equipment Efficiency

Making the right business decision



Equipment Efficiency

Making the right business decision

Database View Window Help
 Back Forward Refresh Tree

Pumps Pump Energy Efficiency Report

Energy Manager

Energy Performance Operational

Energy Performance Operational Rating provides information on the system's performance under various conditions, such as the geographical head, pressure, and flow rate.

Better energy efficiency

< 0.5	A
0.5 - 0.6	B
0.6 - 0.75	C
0.75 - 0.85	D (Typical)
0.85 - 0.9	E
0.9 - 1.0	F
> 1.0	G

Poor energy efficiency

Energy Efficiency vs. Target, CU

In addition to the direct pumping costs, energy efficiency is a key factor in the overall costs of the pumping system, i.e. pump + motor + VSD.

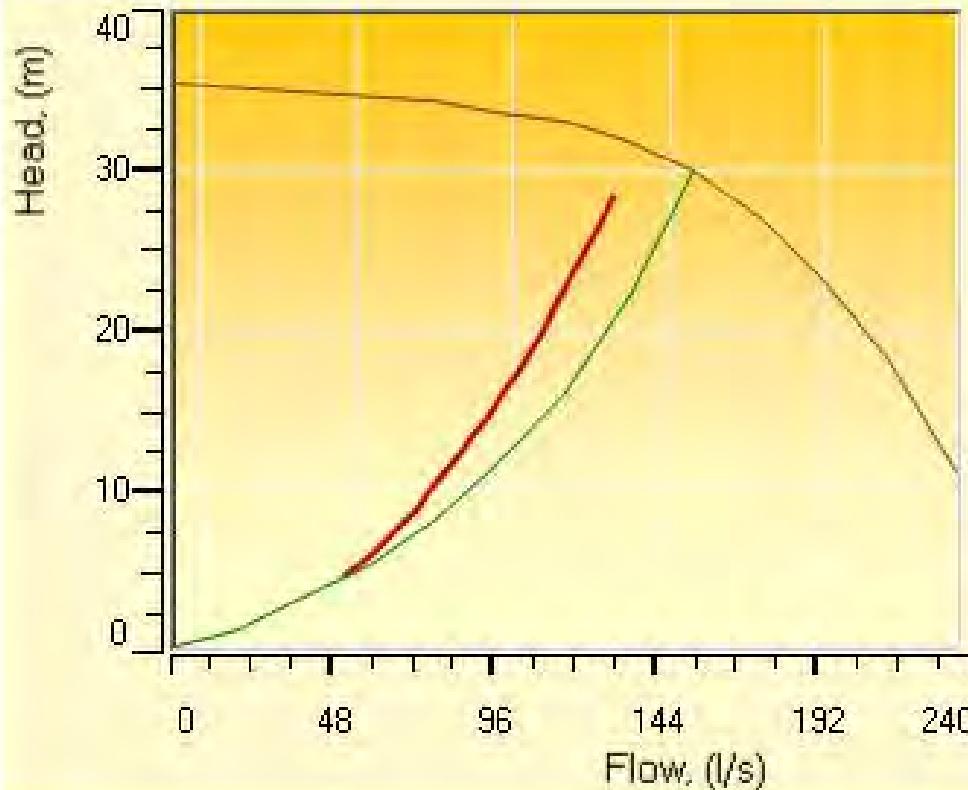
SEC:	0.55 kWh/m ³
Target:	0.50 kWh/m ³
Consumption:	1730.5 MWh/a
Saving Potential:	168.3 MWh/a
	7467 USD/a
Availability:	99.80 %
Maintenance:	4355 USD/a

3/8/2011 6:00 AM

Default Energy Monitoring Load Planning Optim

System Operating Point

The system curve is showing the potential reduction in pressure loss using optimal VSD instead of throttling discharge valve. The closer to the system curve the better.



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3/15/2011 3:32:11 PM

System Operating Point

showing the potential reduction in pressure loss instead of throttling discharge valve. The closer to the system curve the better.

Flow (l/s)

48 96 144 192 240

ing. The slope of the curve is telling the overall system performance.

Total Head (m)

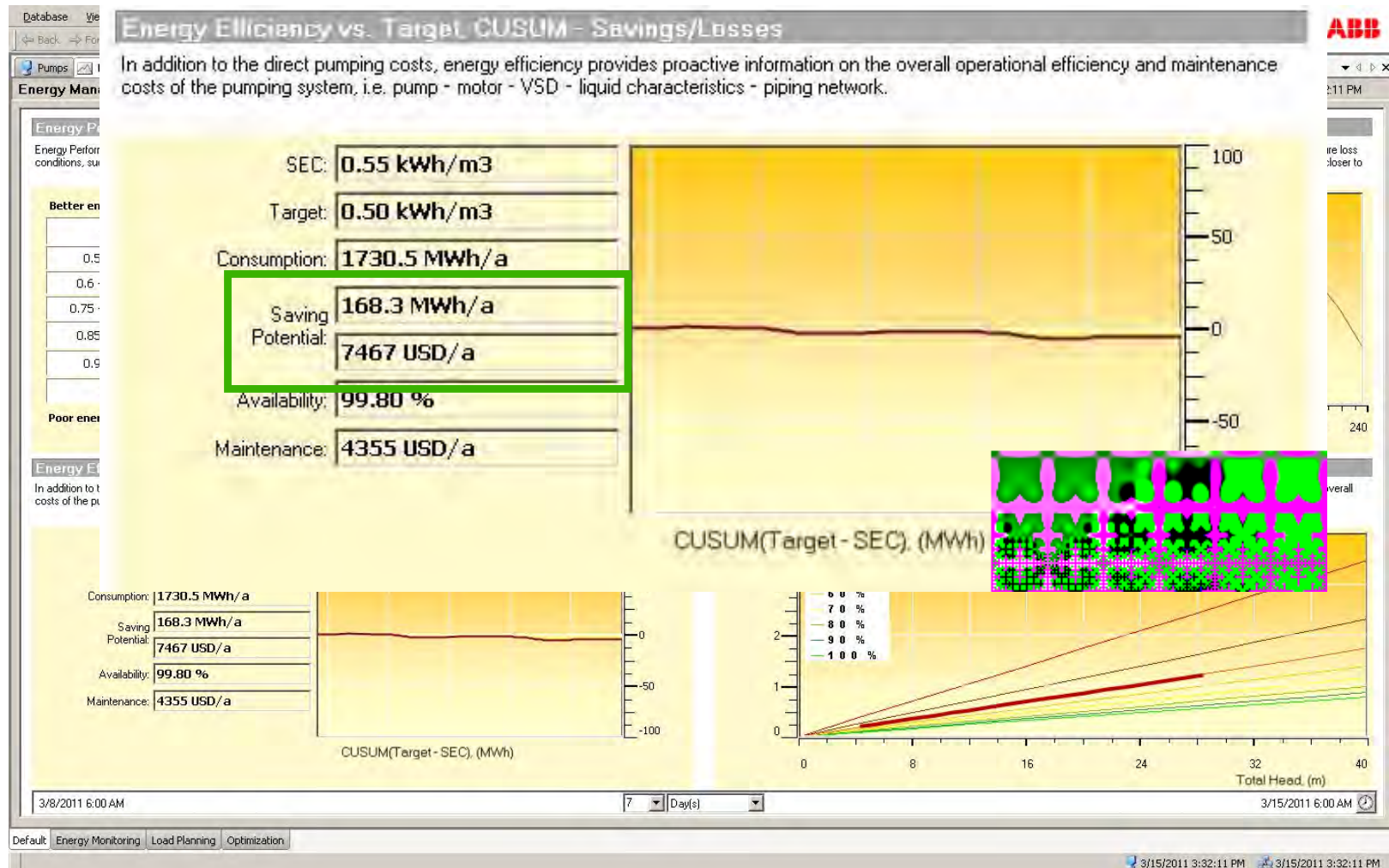
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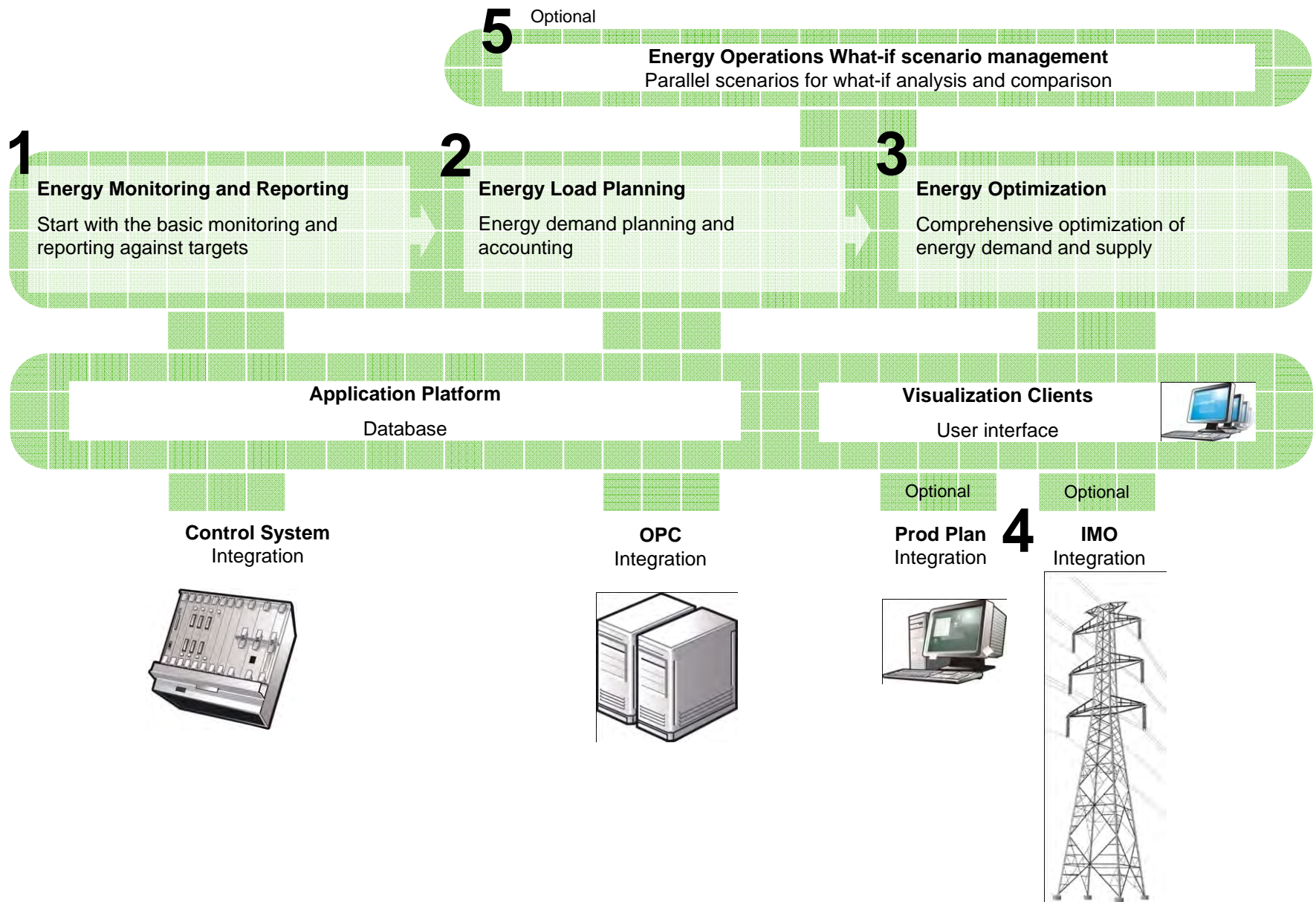
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Equipment Efficiency

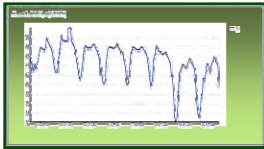
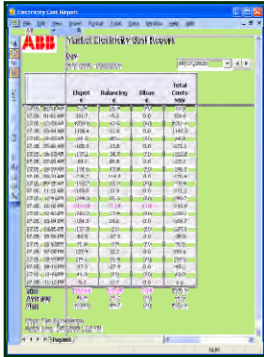
Making the right business decision



Implementating a Modular Package



Lowering costs Energy Management



- Key element in energy management program
 - Predict accurate energy demand schedules
 - Lower costs, fewer penalties
 - Manage varying energy price
 - Allocate energy consumption and production
 - Utilize several optional sources of energy
 - Use most cost effective sources/fuel types and energy purchase contracts
- Monitor efficiency
 - Establish targets, monitor energy efficiency - improve real-time decision making
- Assign costs to production centers
 - Cost accounting for company's internal energy distribution
 - Drives cost consciousness
- Reconciliation of periodic energy bill

For more information

Please visit us at Automation & Power World

- Exhibit Area
 - Collaborative Production Management – Booth 12
 - Energy Efficiency – Booth 22
- Presentations
 - Energy Efficiency Solutions track

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Workshop statistics

Over 400 hours of training

- ~45 customer presented case studies
- 87 sessions in the Technology and Solution Center
- 11 hours of panel discussions consisting of customers, industry experts and ABB executives
- Nearly 50 hours of hands on technical training

ABB Automation & Power World

Registration options

	Full Conference	Courtesy Registration
Access to ABB product developers and application experts in the 70,000 ft ² (over 1.5 acre) Technology & Solution Center		
Access to a series of complimentary and educational workshops.		
Free Lunch and Tuesday Evening Reception		
Access to over 300 additional educational workshops – Including ARC Analysts presentations		
Up to \$1,500 off a future ABB purchase*		
Complimentary ARC report valued at \$2,500!*		
Evening Events (Monday and Wednesday)		
* See www.abb.com/a&pworld for more details	Cost	Free!
	\$300 per day or \$800 for all three days.	

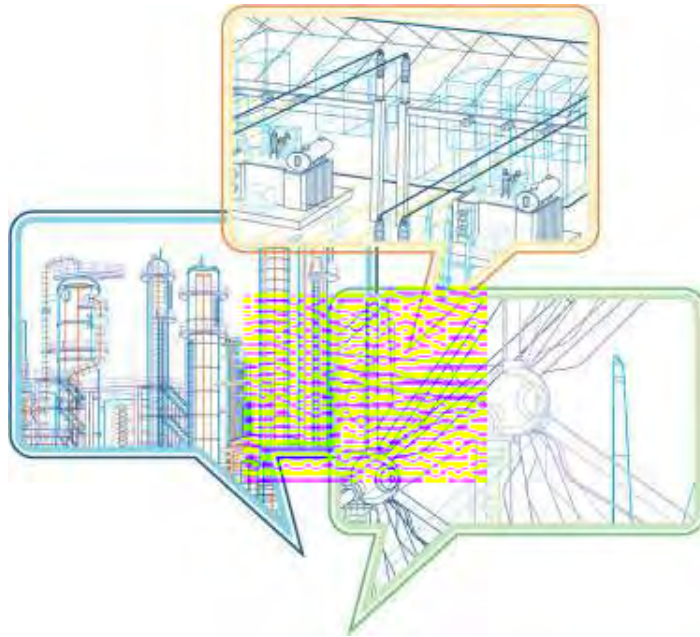
Top ten reasons to attend



- Become more valuable, choose from over 400 educational workshops and hands-on training sessions
- Connect with thousands of peers and industry experts from 40 countries
- Ask questions of, and give feedback to, ABB product developers and executive management
- Get up to date with new and emerging technologies and industry trends
- Learn how to maximize the value from your existing assets
- Discover how to improve grid reliability, energy efficiency and industrial productivity
- Apply lessons learned from over 45 customer-presented case studies
- Focus on critical non-technical issues facing your company in the business forums
- Succeed professionally by earning CEUs on select workshops and PDHs for every workshop you attend
- See the widest range of technologies from one company at one conference!

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Register today!

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Join the Automation & Power
conversation:

Stay in the loop:



Questions and Answers

Question	Answer
Do you monitor water usage and is this part of a holistic energy management policy?	Yes, this can also be measured and managed
Do your cost calculations capture the potential revenue from savings in CO2 and other greenhouse gas emissions? Is this a measurable parameter? Does your energy management metering include measurement and reductions in gas?	Yes, this can also be captured and calculated. The calculations will vary depending on geographic area
Do you have any optimization scenario from your case study and is it possible to access to them	Here are links to a number of case studies showing energy efficiency optimization: 1) Energy efficiency portal http://www.abb.com/cawp/db0003db002698/E59264EF6CE31B87C12571D8006F9669.aspx 2) cpmPlus Energy Manager http://www.abb.com/product/db0003db004001/c7bc8a5df2f16aa985257599004f1a49.aspx 3) cpmPlus Expert Optimizer http://www.abb.com/product/db0003db004001/aeb109afc47df071852576170049499e.aspx
Is it possible to do this calculation in other currency or units ?	Yes
Your examples included paper mills, steel mills - which use a lot of energy. Is there a cutoff point - annual energy cost - at which an ABB monitoring and feedback system would not be practical?	For monitoring there is really no limit. For optimization the situation would depend on a number of factors, including what energy sources might be available. We recommend having someone perform a short study, typically 1-2 days, to determine where savings could be achieved and if adding optimization might be appropriate.

**Power and productivity
for a better world™**

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