



Sustainability—It Is Just Good Business

New Orleans Regional Seminar, October 27, 2010
Jon Peterson, VP Marketing

- ❑ Core competencies
 - ❑ Focus
 - ❑ Understanding proper technology to leverage
 - ❑ HP-> DEC -> Microsoft/Intel
 - ❑ Standards such as TCP/IP
 - ❑ Commitment to our customers
 - ❑ Customer Support!
- ❑ OSIsoft's energy and resource efficiency efforts
 - ❑ Enterprise Agreement Program
 - ❑ Significant move to remote installs—on site is rare today
 - ❑ Less shipment of products—download are preferred by many customers
 - ❑ Electronic books
- ❑ OSIsoft is a key enabler of sustainability initiatives

“A sustainable United States will have a growing economy that provides equitable opportunities for satisfying livelihoods and a safe, healthy, high quality of life for current and future generations. Our nation will protect its environment, its natural resource base, and the functions and viability of natural systems on which all life depends.”

Sustainable America: A New Consensus (Washington: President’s Council on Sustainable Development, 1996), p. iv.

(<http://clinton2.nara.gov/PCSD/>)

(<http://clinton2.nara.gov/PCSD/Overview/index.html>)

The United Nations’ “World Commission on Environment and Development” definition of *sustainable development*: “...meet the needs of the present without compromising the ability of future generations to meet their own needs.”

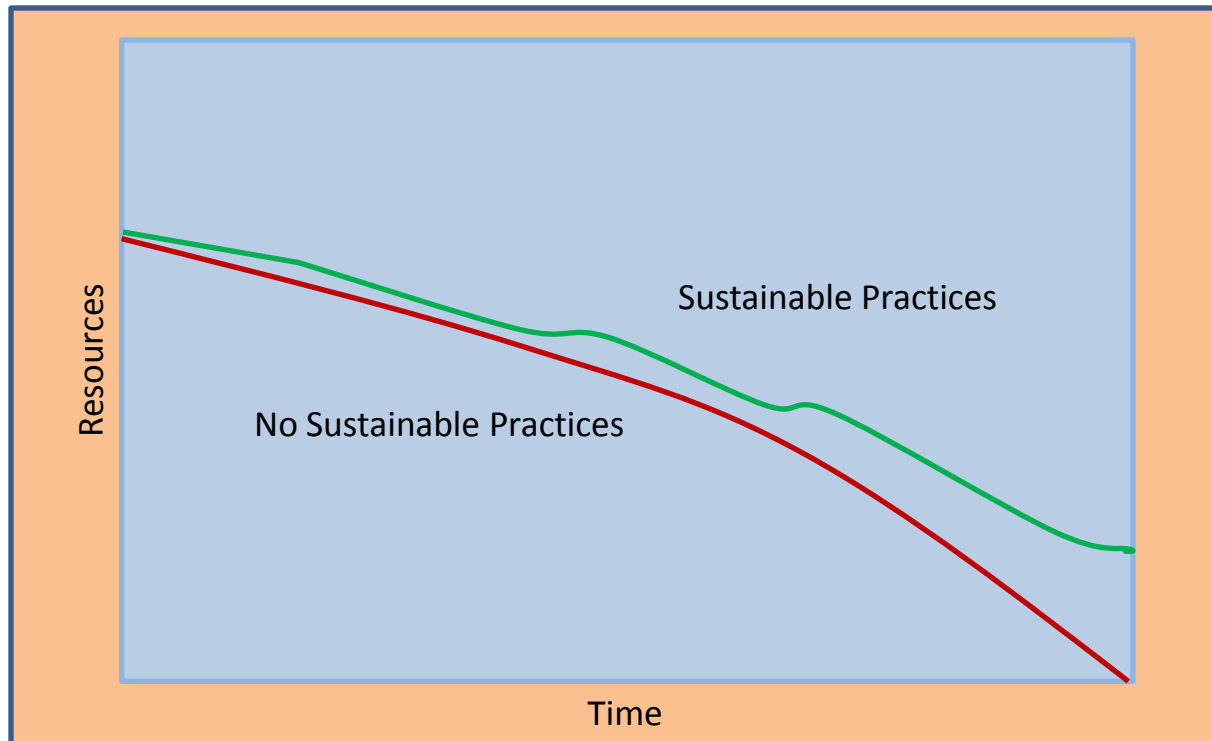
Our Common Future (aka Brundtland Report) (Oxford: Oxford University Press, 1987), p. 43.


(23 years old, still heavily referenced in UN documents)

What is Sustainability?

- ❑ Meet current needs
- ❑ Growing Economy
- ❑ Without compromising the future

- ❑ Sustainability cannot exist without a strong, efficient industrial base





POWER & UTILITIES

Utilities supply the electrical energy and water infrastructure society cannot function without




OIL & GAS

Oil and Gas supply the energy source for many uses
Very important in transportation



CHEMICALS & PETROCHEMICALS

Strong light-weight polymers and fibers required for efficient transportation, renewable generation and many other structures



PHARMACEUTICALS, FOOD & LIFE SCIENCES

Extremely important for quality of life
Natural resources saved through disease prevention and cure



MATERIALS, MINES, METALS & METALLURGY

Fundamental to the modern infrastructure. Mechanical structures, electrical conductors, catalysts.



PULP & PAPER

True renewable resource. Very important to packaging and communication.



DATACENTERS, IT & TELECOM

Data and transactions for the information driven economy

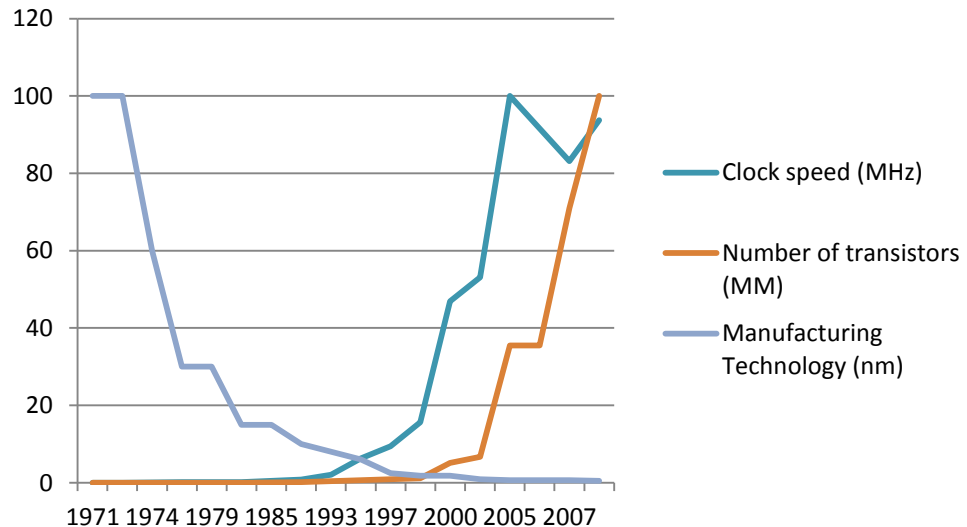
❑ Moore's law:

“In 1965, Intel co-founder Gordon Moore predicted that the number of transistors on a chip would double about every two years. Since then, Moore's Law has fueled a technology revolution as Intel has exponentially increased the number of transistors integrated into its processors for greater performance and energy efficiency.”

❑ More of a challenge that Intel lives by than a law.

- ❑ $F = ma$ is a law of nature
- ❑ Moore's law is based on sustained human innovation

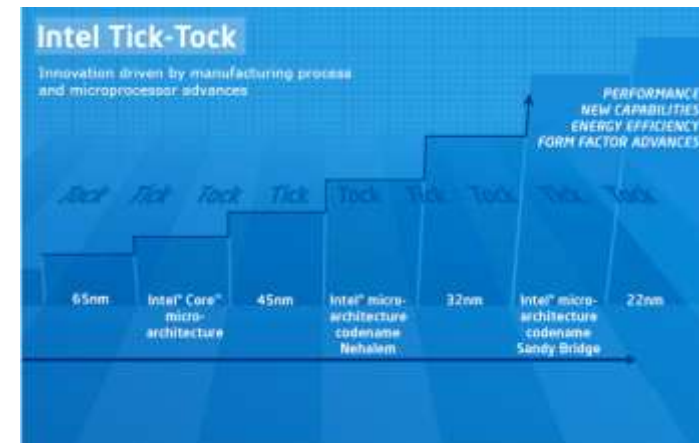
❑ Trends of Intel process or technology



- ❑ Created a set of business and technology processes
<http://www.intel.com/technology/tick-tock/index.htm>
- ❑ Chip technology is governed by two main factors:
 - ❑ Chip fabrication technology
 - ❑ Chip architecture
- ❑ Two year cadence
 - ❑ Tick: on even years deliver new silicon process technology
 - ❑ Tock: on odd years deliver entirely new processor microarchitecture

"Intel has successfully implemented a product development strategy that has truly transformed the industry and created a **sustainable** competitive advantage"

Diane Bryant, VP/CIO, Intel Corporation



Source: <http://www.intel.com/technology/tick-tock/index.htm>

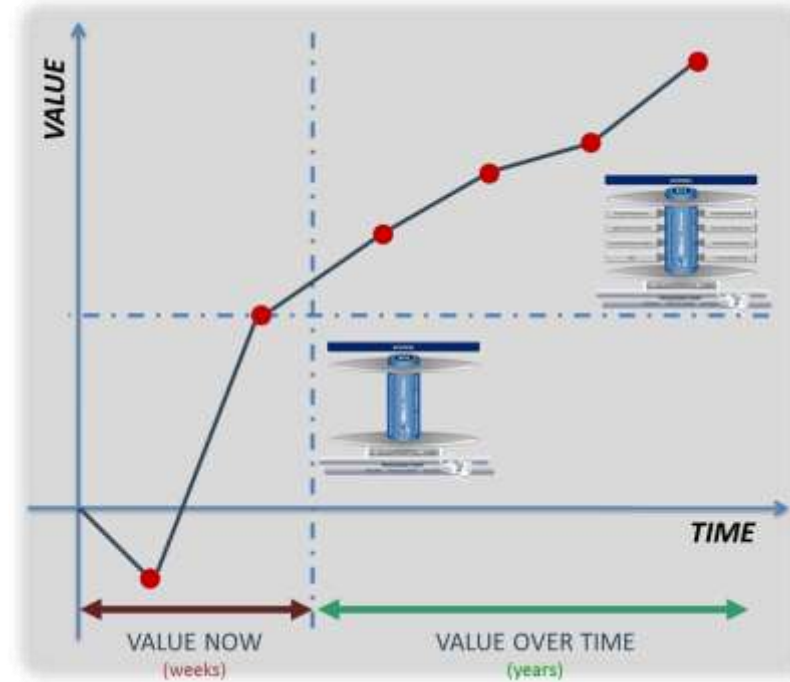
- ❑ eBay is a transaction intensive business
- ❑ Data centers are key
- ❑ Data centers are limited by:
 - ❑ Available electrical power
 - ❑ Power to run the computers and networks
 - ❑ Power to remove the waste heat
- ❑ Running out of capacity often means building a new data center
- ❑ eBay manages capacity by proactively replacing computers after 18-24 months
 - ❑ Moore's law brings more compute capacity for about the same power requirements
 - ❑ Most cost effective way to grow, sustain their business



- ❑ Definition: “meet the current without sacrificing the future”
 - ❑ The future starts tomorrow and continues...
- ❑ Sustainability is not a project
- ❑ Must be in the DNA of any organization that wants to sustain
- ❑ As demonstrated in previous examples strong companies already have the required genes to sustain
 - ❑ Manage external disruptions
 - ❑ Natural
 - ❑ Economic
 - ❑ Political
 - ❑ Technology
 - ❑ Innovate
 - ❑ Continuously improve

- ❑ Context is internal:
 - ❑ Energy efficiency
 - ❑ Resource efficiency
 - ❑ Capital efficiency, avoidance or delay
 - ❑ Employee well being
- ❑ Context is external:
 - ❑ Environmentally responsible
 - ❑ Socially responsible
 - ❑ Society well being
 - ❑ Trust

- ❑ Four core phases:
 - ❑ Measure
 - ❑ Analyze
 - ❑ Improve
 - ❑ Control
- ❑ What to measure and control?
 - ❑ Disruptions force change
 - ❑ Infrastructure is only approach that can deal with change




“By far, the greatest benefit to IP was Environmental Monitoring, and this requirement wasn’t even on the radar screen when we justified the Enterprise roll-out. This came up very immediately after the deployment, and we were able to quickly respond to this operational challenge because we had a common infrastructure to integrate with. We had disguised many disparate systems under a common real-time layer, so our programs had enterprise applicability.”

International Paper Company

- ❑ Fuel and purchased power are significant cost at Kodak Park (Rochester, NY, USA)
 - ❑ Engaged everyone in conservation efforts
 - ❑ PI System: 100K tags, 150 PI WebParts users, 250+ SAP iView pages, 30 interfaces
 - ❑ Now correlate production volume to energy
- ❑ “There was no ‘Big Bang.’” Rather, there were 1,000 little bangs
 - ❑ Established a culture of continuous process improvement
 - ❑ Everyone can see the data via browser


http://videostar.osisoft.com/uc2010/Sustainable_Seminar/video/SSS_UC2010_Opening_Kodak_Breeze.wmv






KODAK OPERATING SYSTEM

Make Lean a Way of Life



Click on a puzzle piece to learn more about a KOS topic.

- About This Website
- What's New
- Success Stories
- Reference Material
- KOS University
- KOS Contacts
- iPDP
- ISO 9001-2000
- Feedback

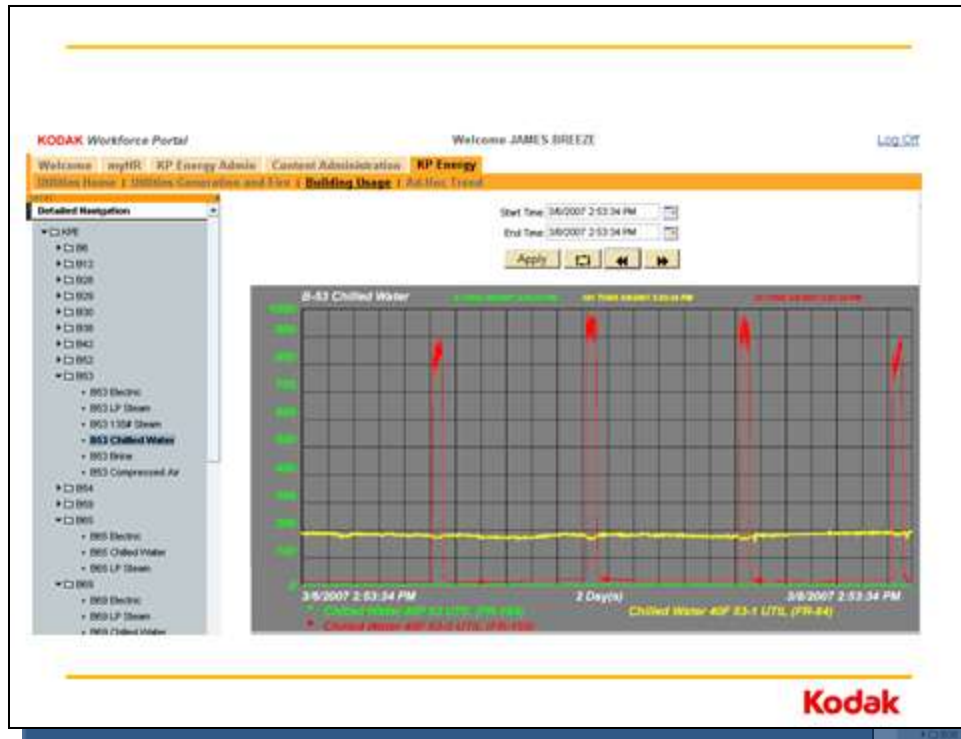


Tools do not work if applied one at a time, must be a philosophy that sustains multiple initiatives.

Kodak

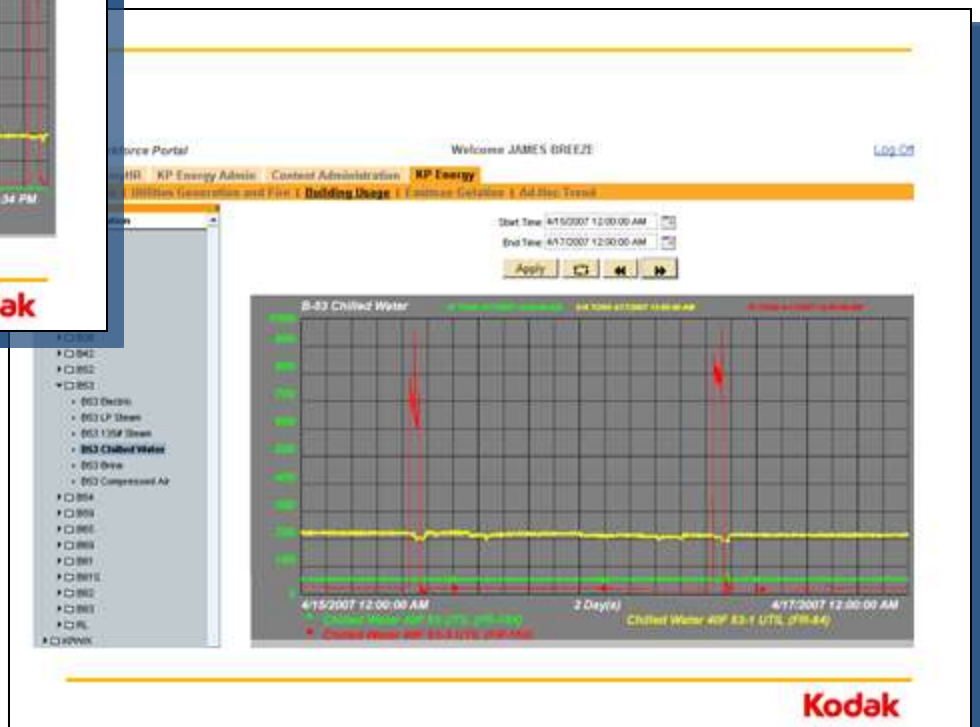
Energy Kaizen: 3-5 days, 6-8 people, action rather than analysis

Energy Gemba: shorter focused Kaizen; observe abnormality take immediate action



Carbon recovery regeneration

- Load on steam and chilled water system
- Awareness allowed optimization and move to off peak times



- ❑ Reduced utility costs with improved

Kodak

“

Summary of Results

Generation side findings

- Plant loading optimization
- Boilerfan optimization
- Exhaust head improvements
- Better management of self generation vs. purchased power

The Energy Information System (EIS) has been an essential tool to help us reach our Goal of:

“One Powerhouse for Eastman Business Park”

(10:41:53 March 28, 2007)

- Collectively the “annual” savings rate in 2007 was \$27 Million
- Today the “annual” savings has grown to more than \$30 Million
- The cumulative savings is now in excess of \$100 Million
(>50% Savings From Ongoing Operations)

Kodak

ized water

- ❑ Kaizen and Gemba applied to water conservation

Kodak



Water Reduction Results

- 2009 Kodak Water Reduction was 16.5%
- 1,087,000,000 Gallons (or 1,087,000 K Gallons) saved in 2009
- 1st Quarter of 2010 – an additional savings of 450 Million gallons from the 2008 Baseline
- Roughly 1.5 Billion Gallons saved in the last 15 Months
- This is enough water to fill approximately 250 average backyard swimming pools each and every day !!!
- \$0.00 In Capital Spent
- These Water Savings are calculated for only the last 15 months and are totally independent of the site's energy reductions

sts

Kodak

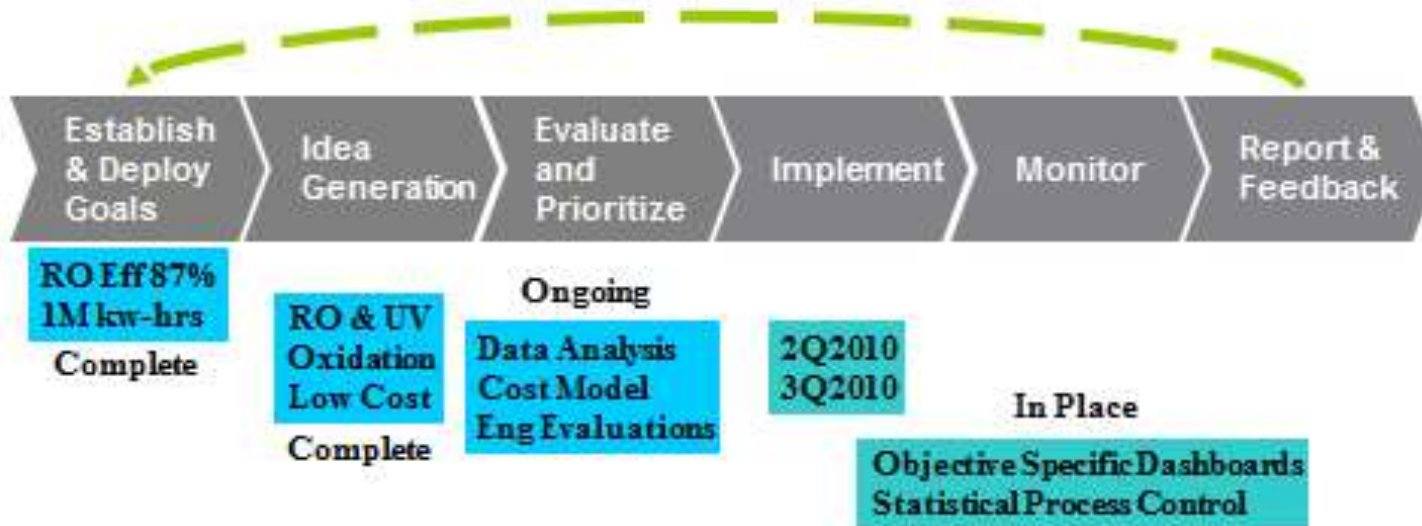
- ❑ IBM Burlington (Vermont, USA) is a large semiconductor manufacturing site
 - ❑ consumes 3.2 million gallons per day of water and 446 million kilowatt hrs of electricity annually
 - ❑ 3.5 million square feet of manufacturing space
- ❑ Challenge
 - ❑ Reduce water consumption to reduce cost
 - ❑ Less water means less energy, chemicals, maintenance and labor
 - ❑ Will also minimize environmental impacts
 - ❑ Leverage data acquisition, storage and visualization tools to monitor water usage and improve efficiency



- ❑ Approach
 - ❑ Used the PI System to collect/store data from sensors, IT network and servers
 - ❑ Statistical process control techniques used to continually analyze operational data
 - ❑ Identifies process improvements that reduce water consumption, electrical consumption, and cooling load
- ❑ Results
 - ❑ IBM achieved over \$3.6M in annual savings
 - ❑ Reduced water usage 27% while increasing manufacturing capability 30% in last 10 years
- ❑ Case study available on OSIsoft website:
<http://osisoft.fullviewmedia.com/uc2010/12-IBM.html>

Key to Success: Consistent Process

Ultra Pure Water 2010 Objectives



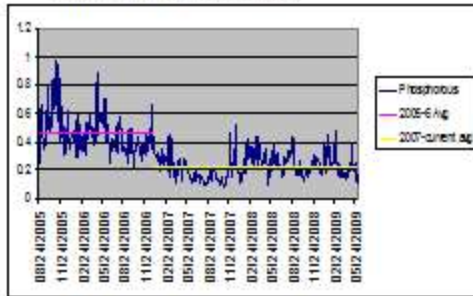
Use Structured Problem Solving Techniques for the more challenging ideas

Center of Excellence for Enterprise Operations SMART Waste Water Results

Burlington Waste Water Management Goals

- **Quality:** Meet or exceed regulatory requirements
- **Reliability:** Zero manufacturing down time
- **Cost:** \$450K/year reduction in annual cost

Phosphorus Discharge



Units mg/l
NPDES limit 1.2 mg/l

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NPDES Discharges



Phosphorus: - 48%
Fluoride: - 44%
TDS: - 54%

Waste Water Sludge



Disposal Cost: - \$45K/yr
Generation: - 600K lbs/yr

Water & Waste Water Chemical Usage



Annual Costs: - \$401K/yr
Reduction: - 2,162K lbs/yr

Manufacturing Capability



Up 30% since 2000
(excluding 2005)

Smart Water Project

Phosphorous discharge well below compliance

Center of Excellence for Enterprise Operations SMART Water Results

Burlington Water Management Goals

- Quality:** 6 Sigma conformance to Specification
No impact to product yields
- Reliability:** Zero manufacturing down time
- Cost:** \$3.6M/year reduction in annual cost

Water Usage



Rates: + 66% since 2000
Usage: - 29% since 2000
Purchases: - \$742K/yr

Water Treatment Costs



Annual Costs: - \$598K/yr

Water Related Energy Costs



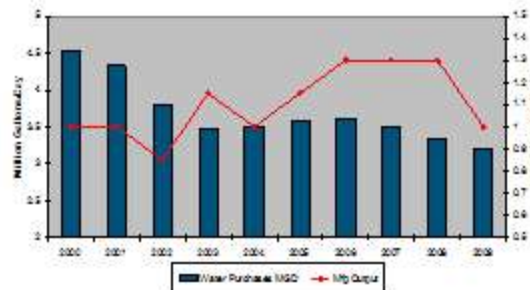
Annual Costs: - \$2,278K/yr

Manufacturing Capability



Up 30% since 2000
(excluding 2005)

Water Use and Manufacturing Output



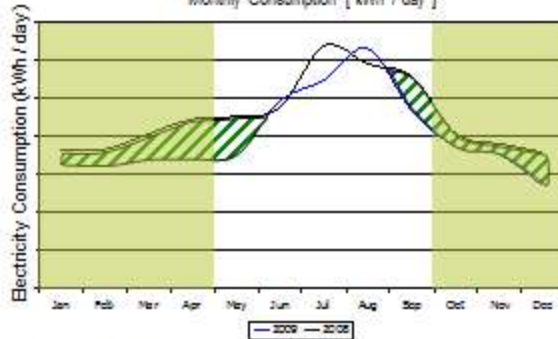
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B963 / B971 Central Utility Plant Reporting Results

Reporting Results:

- Energy Savings: 4,800,000 kWh
- Money Savings: \$390,000
- Annual Energy Savings equal to 650 homes electricity consumption [Vermont]

2008 vs. 2009 Central Utility Plant Electricity Curve
Monthly Consumption [kWh / day]



Results Exceeded Expectations

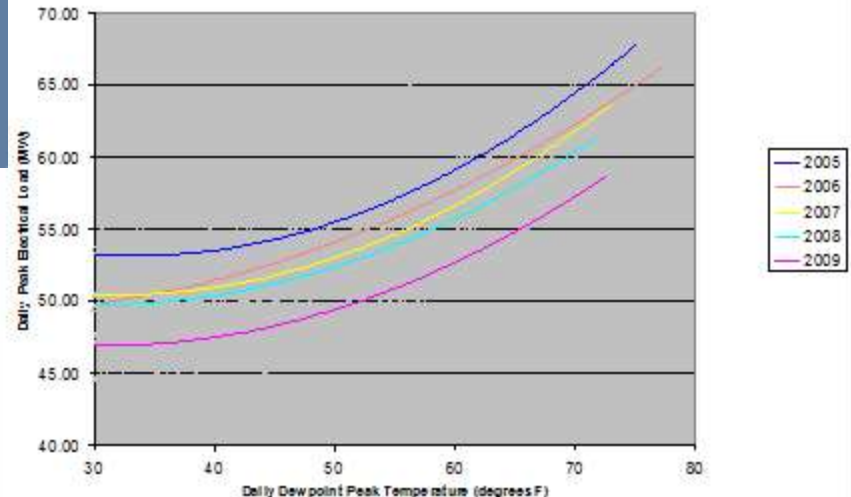
- Central Utility Plant personnel clearly recognized and understood goals
- Energy Savings exceeded Goal by \$40,000
- Winter Free-Cooling Utilization exceeded expectations by 60 days

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Free Cooling Project

Leverage cold ambient temperatures of Vermont

Average Peak Electrical Loads at IBM VT 2005-09



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- ❑ Faced recent hardships
 - ❑ Price collapse
 - ❑ Demand destruction
 - ❑ Credit crunch
- ❑ Extremely important part of sustainability value chain
 - ❑ Supplier of light-weight, strong materials

“Throughout 2009, our industry and company experienced the most challenging economic environment that many of us can recall. Faced with a triple threat—aluminum prices crashing, broad demand destruction within our customer base, and a credit crunch that crippled our ability to initiate growth—we quickly executed our Cash Sustainability Program to strengthen our balance sheet, restore liquidity, and make Alcoa free-cash-flow neutral by the end of 2009.”

“I see an amazing future for Alcoa. Strong, lightweight, energy-saving and infinitely recyclable, our miracle metal will continue to contribute to the sustainable life and health of our planet and its people.”

Klaus Kleinfeld, Chairman & CEO

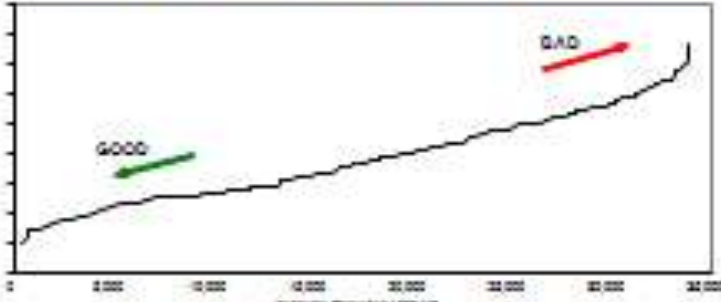
- ❑ Aggressive, transparent Sustainability Program
- ❑ Some key concepts
 - ❑ Life cycle assessment
 - ❑ Product design
 - ❑ Economic value of products
- ❑ Industrial Demand Response
 - ❑ Provide reliability to the grid
 - ❑ Reduce energy costs



- ❑ Commodity business
- ❑ Competitive advantage comes from production efficiency

Aluminum Smelting Economics

Energy is 30-40% of Aluminum Production Costs....

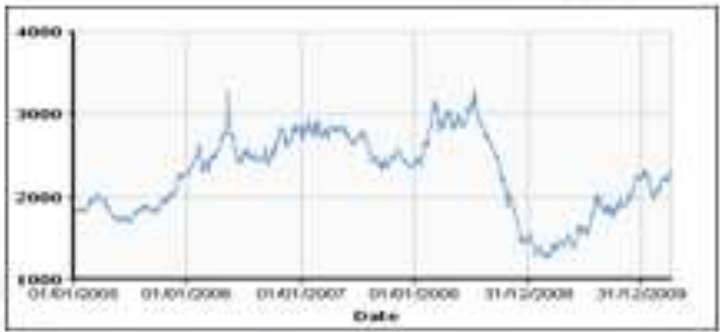


Worldwide Smelter Cash Production Costs

**Warrick Operations is
Alcoa's Largest Operating U.S. Smelter**

- 330,000 MT capacity/year


**Competition in a
Worldwide Commodities
Market....**



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- ❑ 780 MW Generation
- ❑ FERC License—participate in markets as a generator

Warrick Power Plant



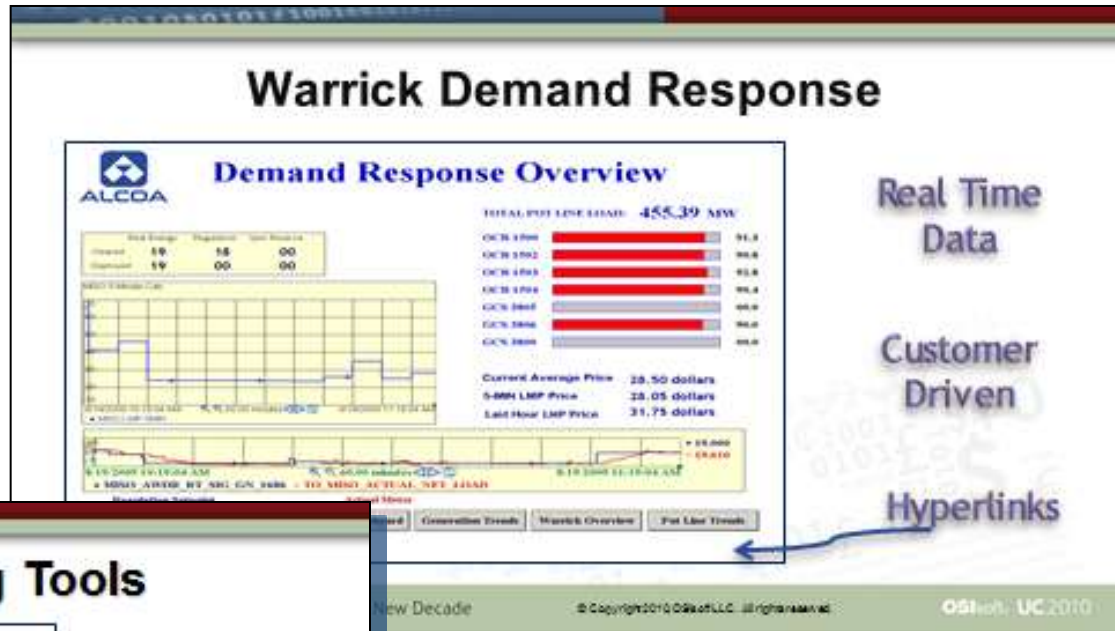
Generation Assets:

- 780 MW's Coal Generation
- (4) B&W Wall-Fired Boilers
- Vintage 1960's
- 2.8 mm tons coal/annual
- Illinois basin with Low NOx burners/SCR
- FGD Scrubbers

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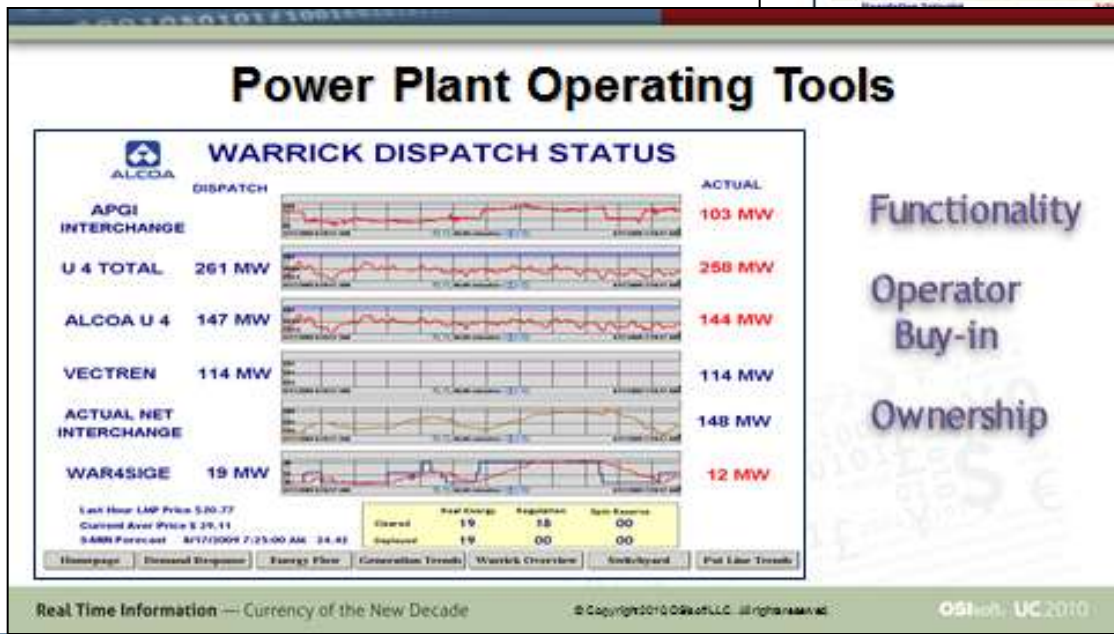
- ❑ MISO (Grid operator)
 - ❑ Reliability
 - ❑ Generation capacity
 - ❑ Congestion mitigation
- ❑ Alcoa
 - ❑ Sell power
 - ❑ Purchase



Real Time Data

Customer Driven

Hyperlinks



Functionality

Operator Buy-in

Ownership

- ❑ They studied the performance of sustainability-focused companies during financial crisis of 2008/2009
 - ❑ Some continued to focus on long-term health vs. just short term survival
 - ❑ Difficult to have this discipline
- ❑ Results
 - ❑ Stock market performance was 15% higher for these companies vs. their peers

“Create value for shareholders and society”

- ❑ Sustainability is about your company's long term survival
 - ❑ Not just carbon, Green House Gas (GHG) or other “green” initiatives
- ❑ Corporate initiative
 - ❑ engage in a culture of continuous improvement
 - ❑ improve compliance, public perception, and profitability
- ❑ Increase profits
 - ❑ Manage economic, social and environmental risks and opportunities
- ❑ Gain and Sustain the Trust of the general public
- ❑ Sustainability needs your company to sustain, to thrive
- ❑ This is just good business



Thank you

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