

Sustainability—It Is Just Good Business

Bernard Morneau
President, OSIsoft

Empowering Business in Real Time

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OSIsoft Overview

❑ Corporate - Founded 1980, Private

- ❑ Dr. J. P. Kennedy, Founder and CEO

❑ Employees - 700

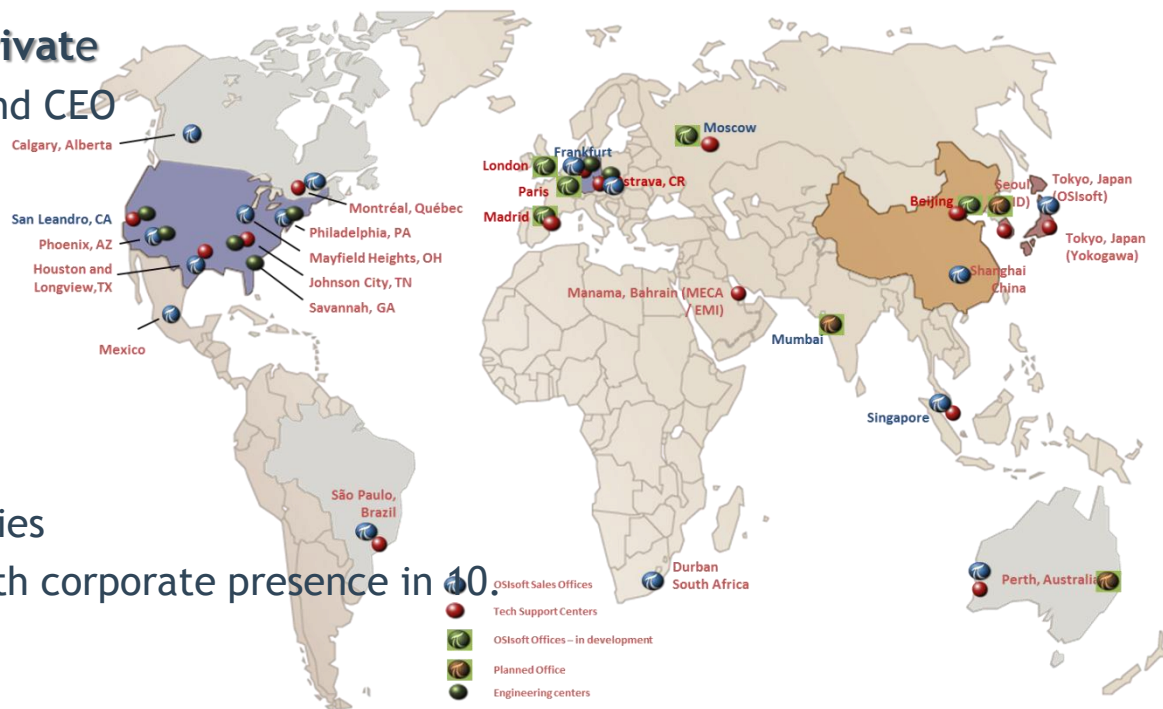
- ❑ Engineering - 215
- ❑ Customer. Support - 210
- ❑ Sales and Marketing - 175
- ❑ Operations - 100

❑ Geography

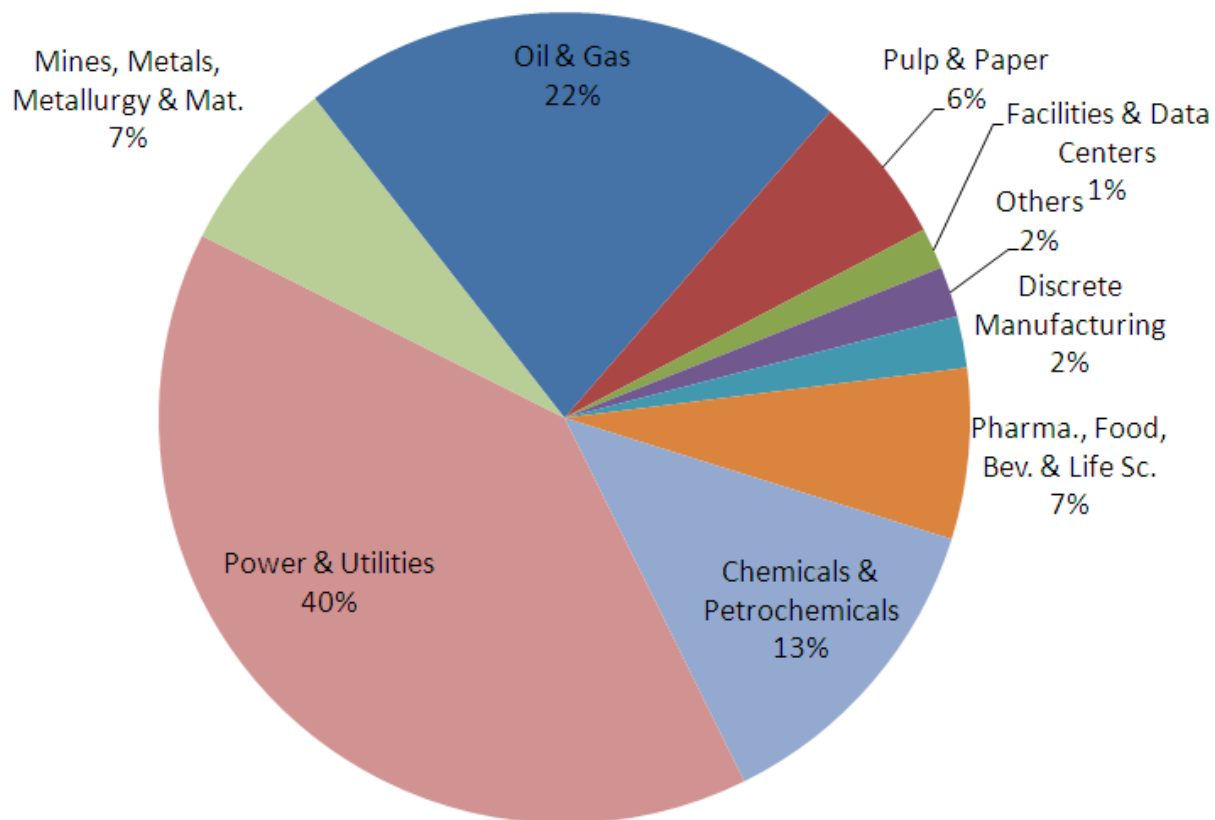
- ❑ Doing business in 110 countries
- ❑ 23 offices in 13 countries with corporate presence in 40.

❑ Installed Base

- ❑ 2 800 + Active Customers
- ❑ 10 000 + Active System licenses (excluding OEM)
- ❑ 32 000 + I/F licenses (connection, node, server, site)
- ❑ 250 000 + clients licenses (individual, concurrent, enterprise)
- ❑ 250 000 000 + Data Streams
- ❑ Monitor 500 PI Servers, 1 500 Host computers & 8 000 interfaces



Invoices by Industry (%)



Diverse Customer Base Across Industries



- ❑ 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
 - ❑ Significant move to remote installs—on site is rare today
 - ❑ Less shipment of products—download are preferred by many customers
 - ❑ Electronic books

PI System - Overview



Connect



Manage



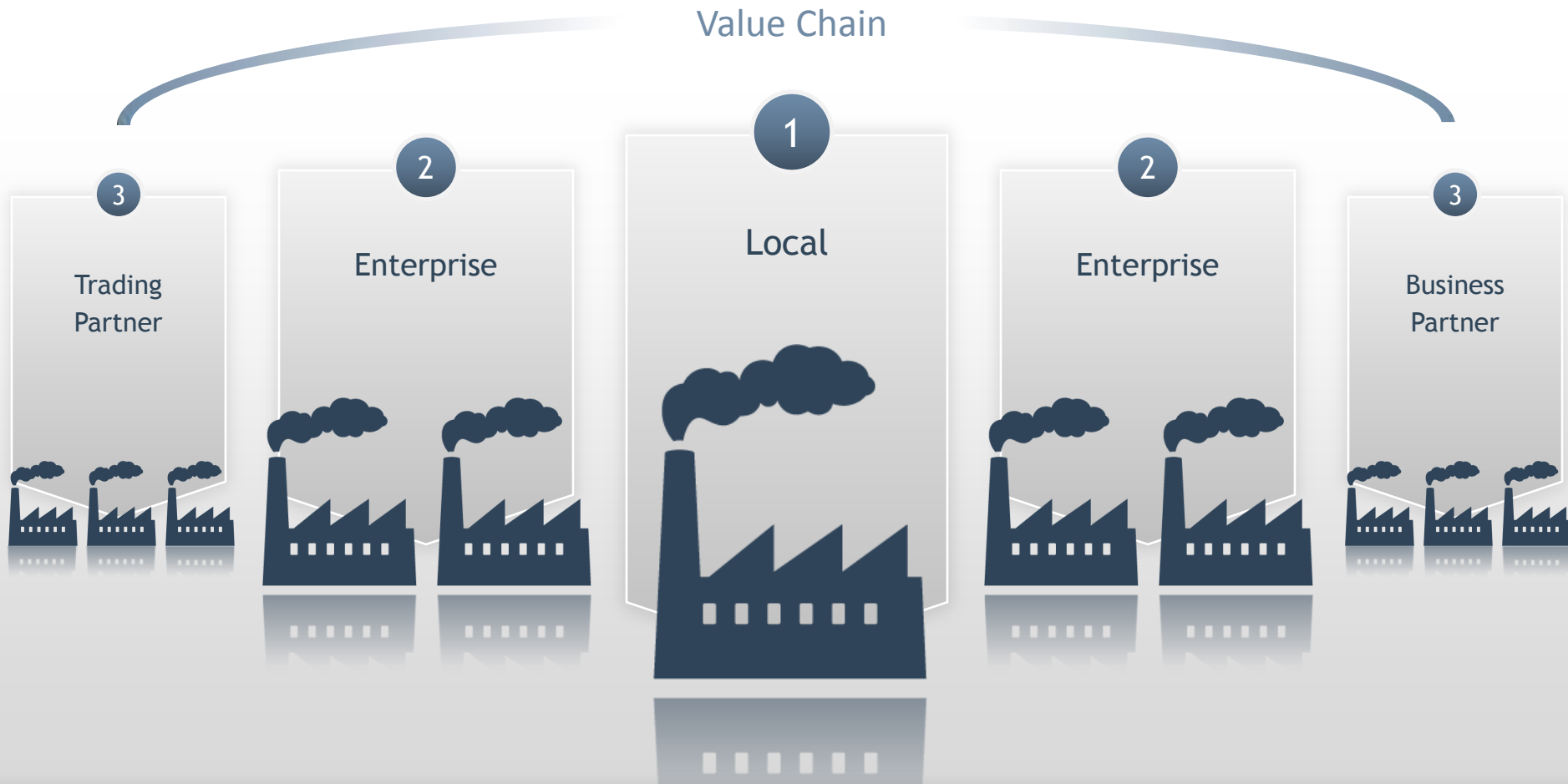
Analyze



Present

The OSIsoft PI System is the highly scalable and secure real-time and event infrastructure that connects people with the right operational and manufacturing information at the right time to analyze, collaborate, and act.

Our Value Proposition



OSIsoft makes real-time data visible locally, across the enterprise, and throughout the value chain.



The Smart Grid

GRIDWEEK

Investing in our Energy Future

Secretary Steven Chu
U.S. Department of Energy
Washington, D.C.
September 21, 2009

85% of our carbon emissions reductions will come from Energy Efficiency!



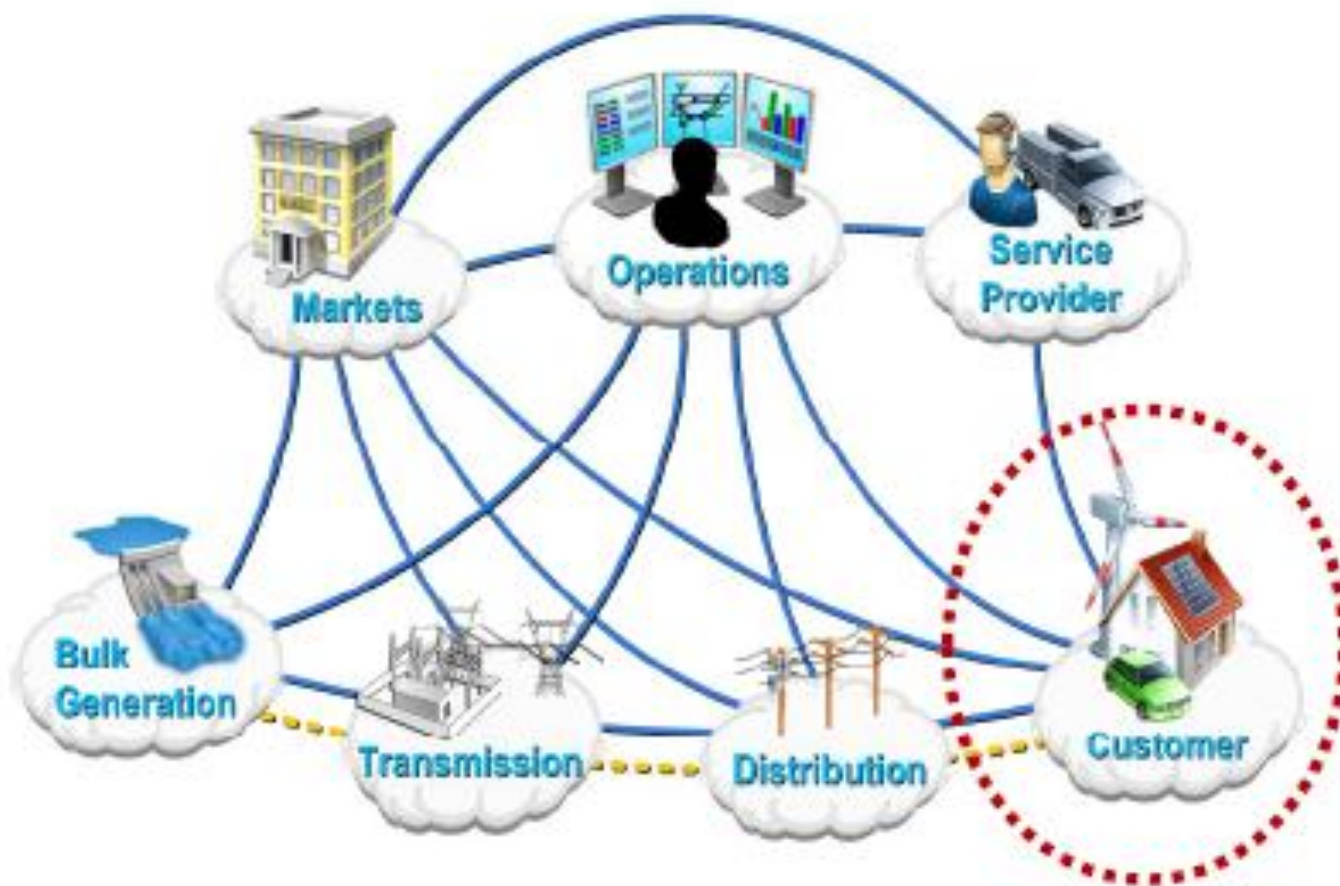
“We’ll fund a better, smarter electricity grid and train workers to build it -- a grid that will help us ship wind and solar power from one end of this country to another.”

“Think about it. The grid that powers the tools of modern life -- computers, appliances, even BlackBerrys -- looks largely the same as it did half a century ago.”

President Barack Obama

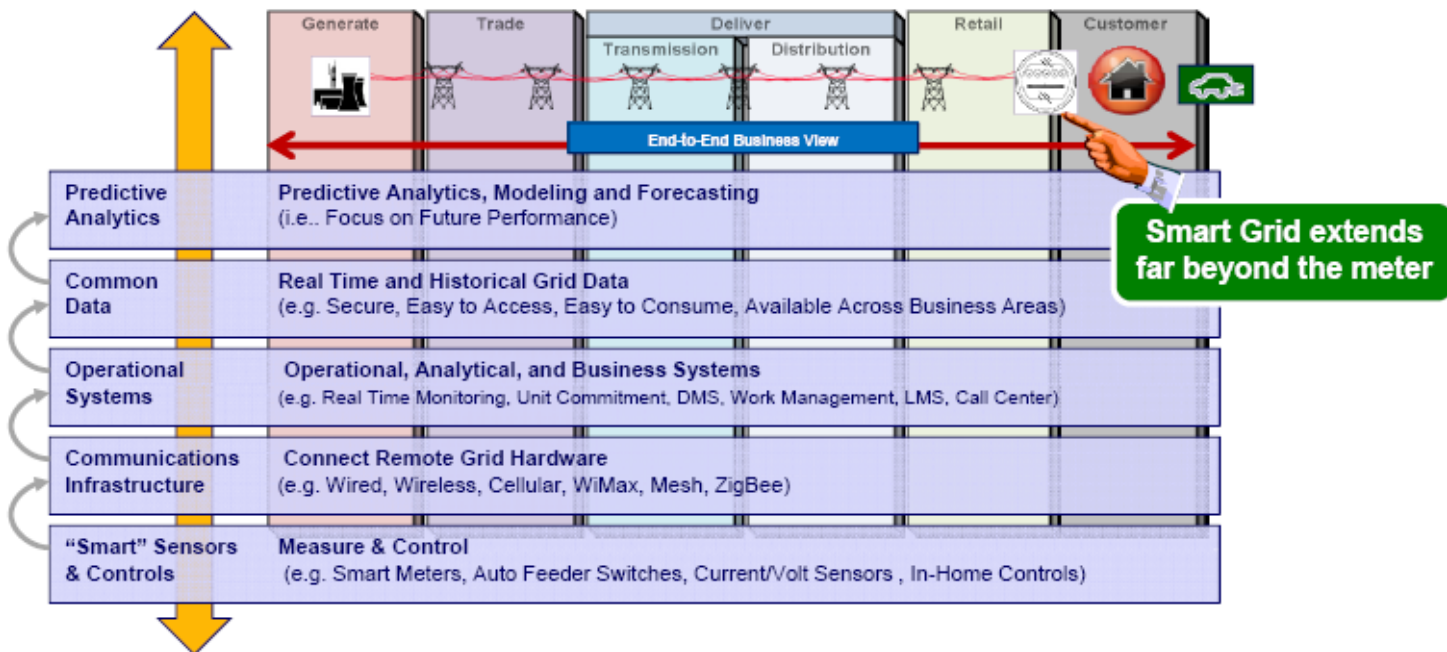
To meet the energy challenge and create a 21st century energy economy, we need a 21st century electric grid

NIST Smart Grid Conceptual Model



Smart Grid integrates electric infrastructure with advanced technology and analytics to deliver an end-to-end business view

FPL's Layered, Architectural Approach to Smart Grid



End-to-end business view of the grid enables FPL to improve grid performance, drive efficiencies and enable new customer services



The User Perspective

“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.”

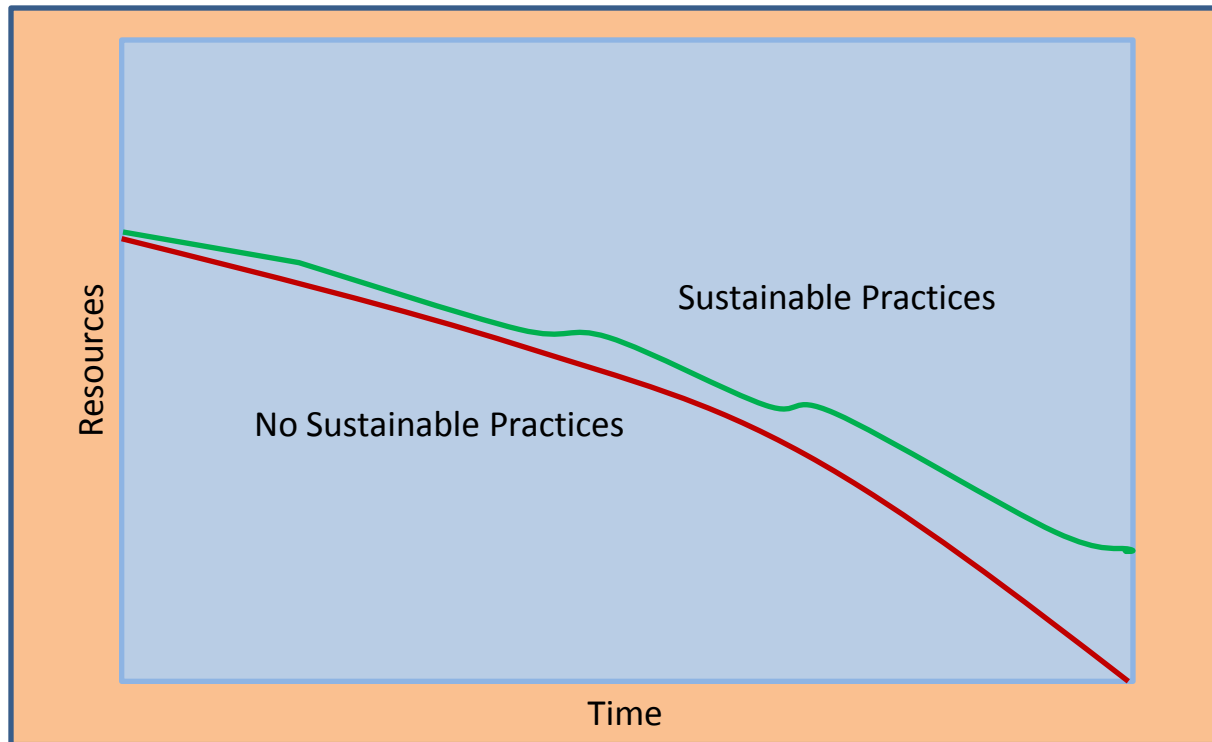
Our Common Future (aka Brundtland Report) (Oxford: Oxford University Press, 1987), p. 43.

(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



Industry Roles in Sustainability

A photograph of a large industrial cooling tower emitting a plume of white steam against a clear sky.

POWER & UTILITIES

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

A photograph of an industrial refinery or chemical plant with complex piping and storage tanks.

OIL & GAS

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

A photograph of several large, white industrial storage tanks.

CHEMICALS & PETROCHEMICALS

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

A photograph of several white, oval-shaped pills.

PHARMACEUTICALS, FOOD & LIFE SCIENCES

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

A photograph of an industrial facility with large cranes and structural elements.

MATERIALS, MINES, METALS & METALLURGY

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

A photograph of a large industrial machine, likely a paper mill component.

PULP & PAPER

True renewable resource. Very important to packaging and communication.

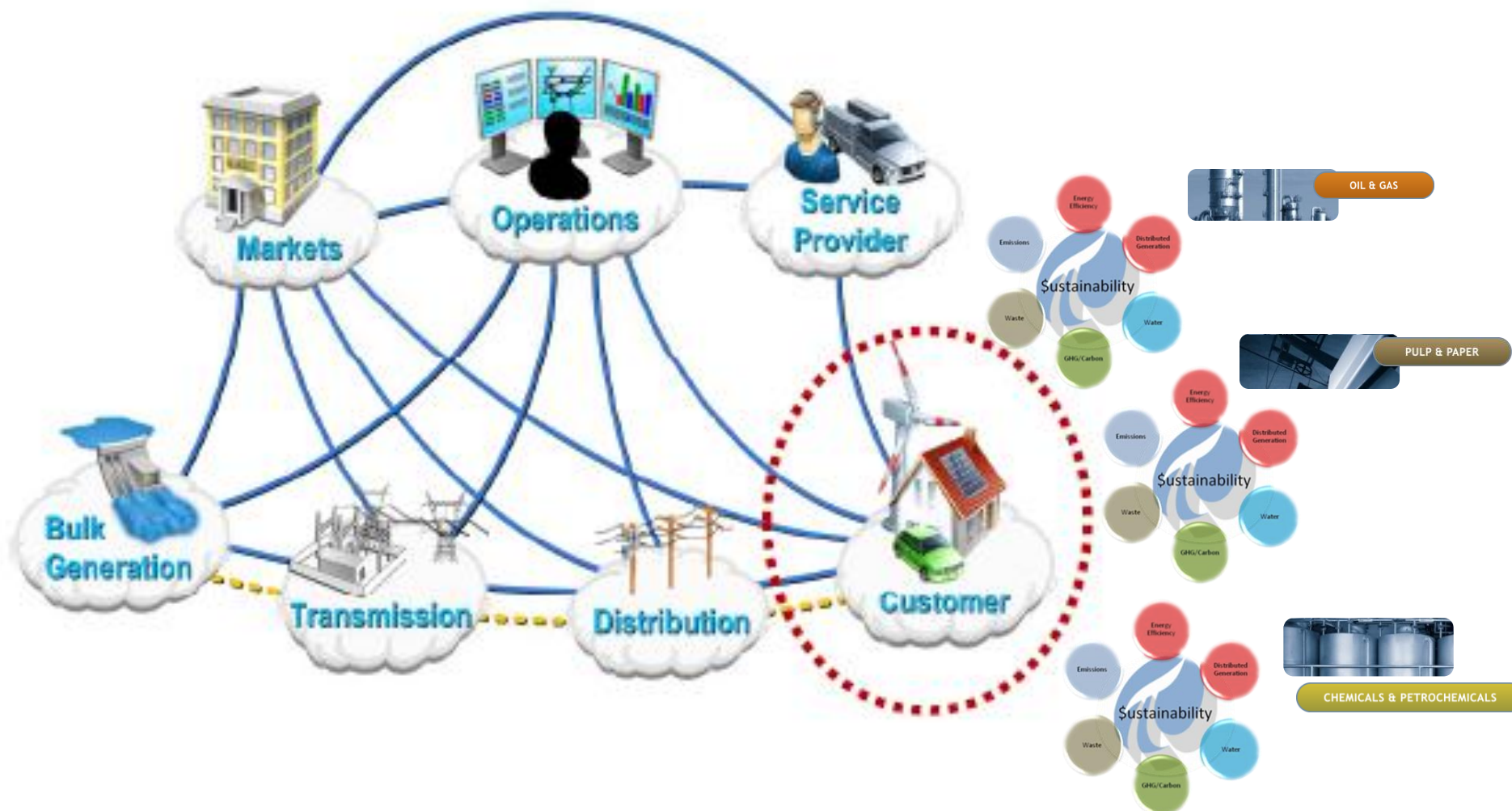
A photograph of a modern data center with rows of server racks.

DATACENTERS, IT & TELECOM

Data and transactions for the information driven economy



NIST Smart Grid Conceptual Model



❑ Fundamental strategies of innovative products and innovative management

<http://www.ge.com/company/history/index.html>

“Why Predict the future when you can create it?”

- ❑ Light bulb
- ❑ Dynamo
- ❑ Electric fan
- ❑ Commercial finance
- ❑ Resins
- ❑ X-ray tube
- ❑ Refrigeration
- ❑ Supercharger
- ❑ Radio station
- ❑ Television
- ❑ Silicones
- ❑ Jet engine
- ❑ Radar
- ❑ Medical imaging

Founded late 19th century by Thomas A. Edison

- ❑ Created a business based on research
- ❑ Diversification
- ❑ Innovative use of capital
- ❑ Decentralized management
 - “natural aggregate of many individually sound decisions will be better for the business than centrally-planned and controlled decisions”
- ❑ Six-sigma

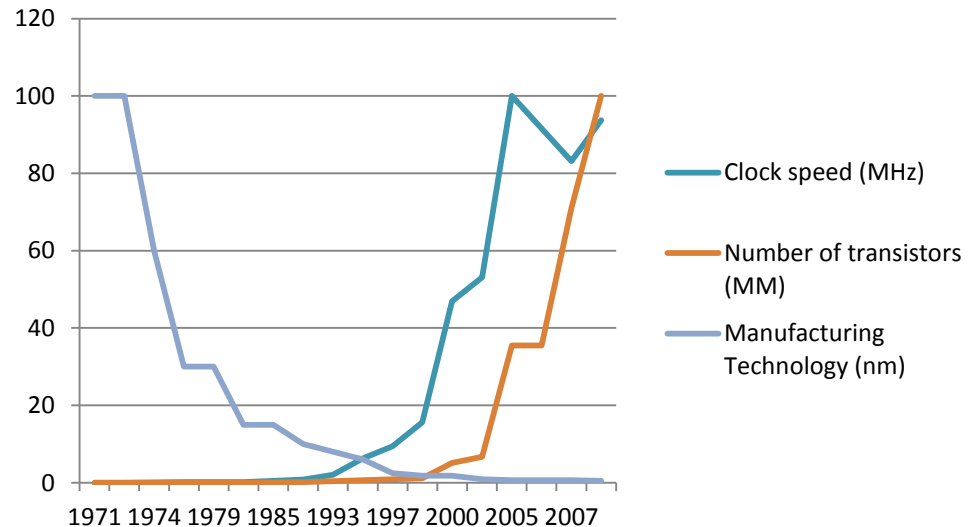
❑ Moore's law:

“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 [Personally I like this one!]
- ❑ Moore's law is based on sustained human innovation

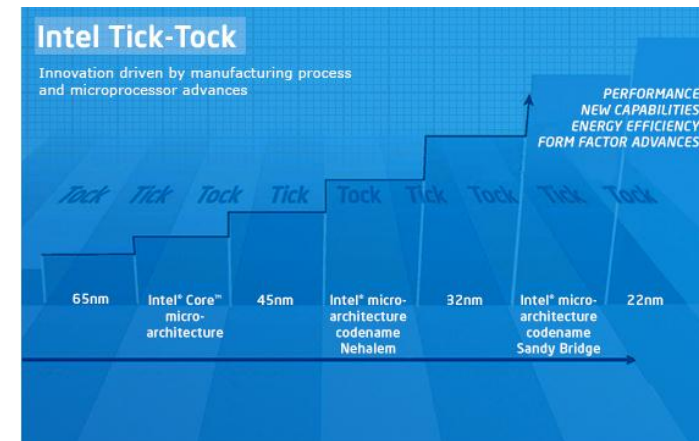
❑ Trends of Intel process or technology



- ❑ 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>

- ❑ 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



Some Case Examples:


Kodak
IBM
Alcoa



- ❑ Fuel and purchased power are significant cost at Kodak Park (Rochester, NY, USA)
 - ❑ Engaged everyone in conservation efforts
 - ❑ PI System: 100K tags, 150 WebPart 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

Kodak



Kodak

Carbon recovery regeneration

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



Kodak

- ❑ Reduced utility costs with improved

“

- ❑ S
- tl

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)



ized water



- ❑ Kaizen and Gemba applied to water conservation
- ❑ Project started 15months ago
 - ❑ Use 18 million gal/day of water
 - ❑ It's free from lake, but expensive pumping and treatment costs
- ❑ Examples
 - ❑ Synthetic chemical manufacturing
 - ❑ water should be zero on holiday - found valves failed open
 - ❑ Water down 43% from the 3 largest buildings

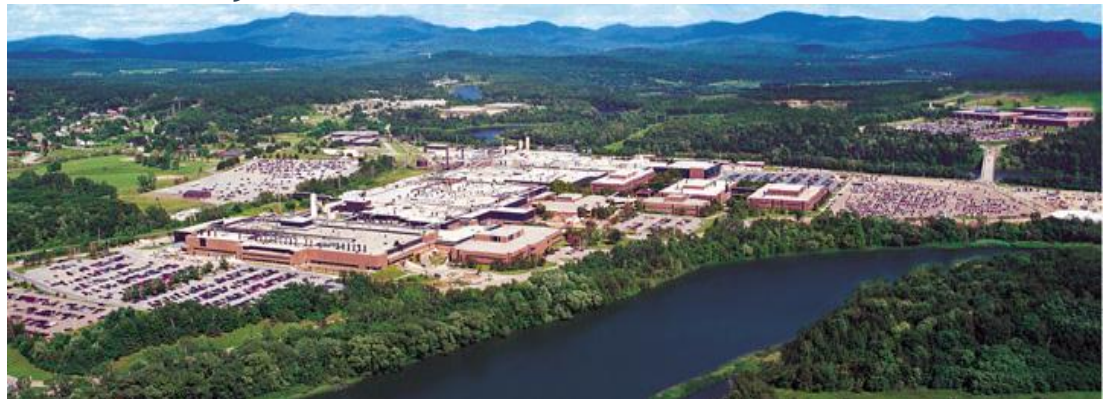


Water Reduction Results

- 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

The Kodak logo, consisting of the word "Kodak" in its signature red, bold, sans-serif typeface.

- ❑ 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

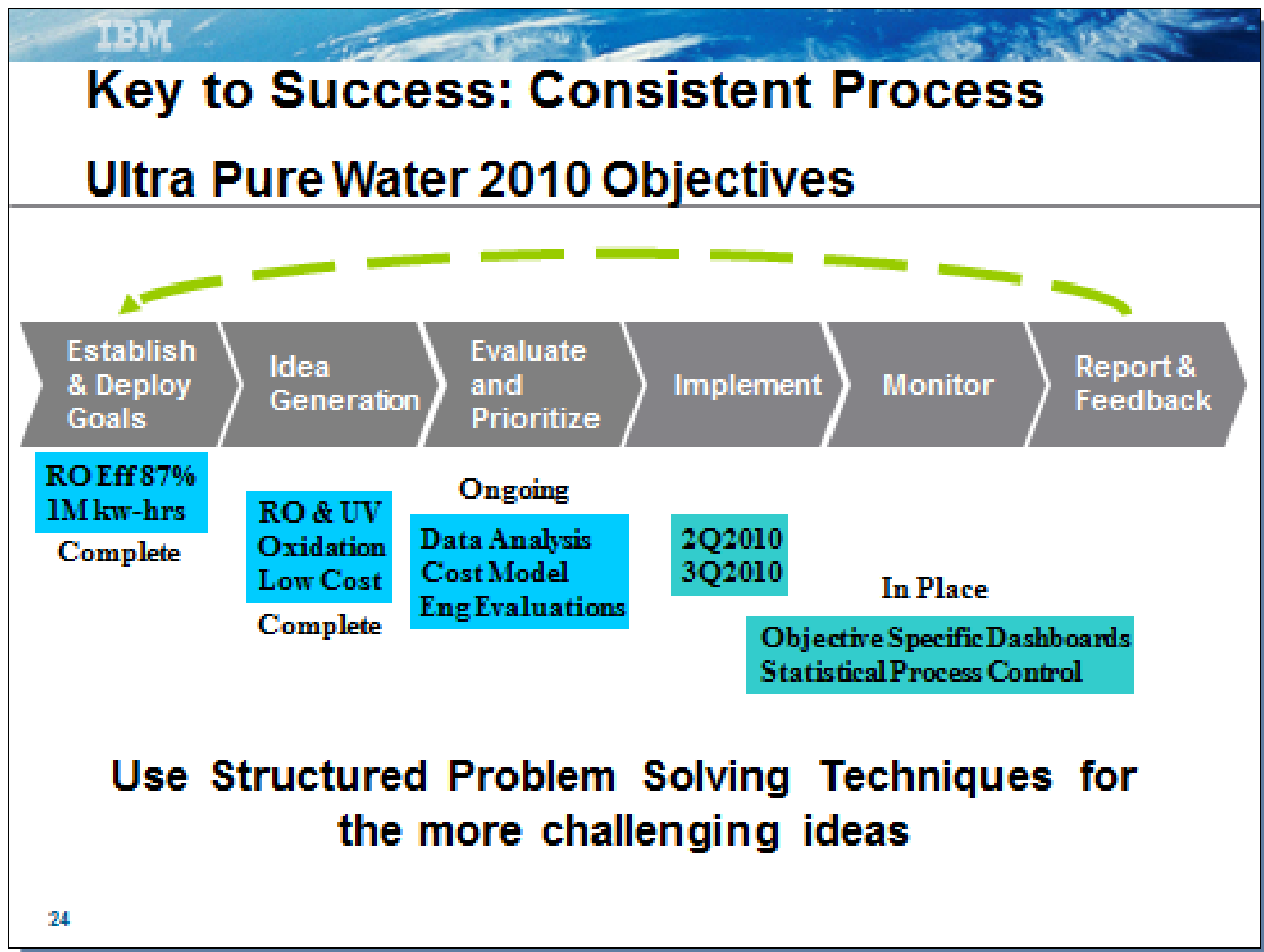
- ❑ Used the PI System to collect/store data from sensors, IT network and servers
- ❑ Statistical process control techniques used to continually analyze operational data
- ❑ Identifies process improvements that reduce water consumption, electrical consumption, and cooling load

❑ 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>



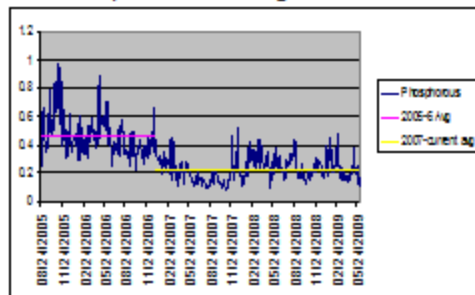
IBM

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

14

NPDES Discharges



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

Waste Water Sludge



Disposal Cost: - \$49K/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 2009)

Smart Water Project

Phosphorous discharge well below compliance

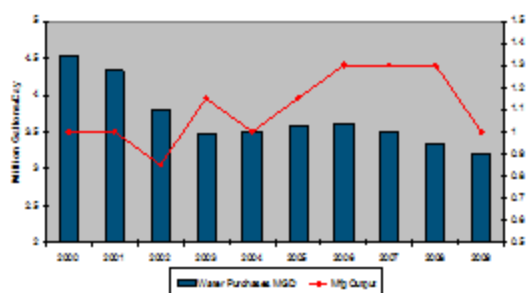
IBM

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 Use and Manufacturing Output



15

Water Usage



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

Water Treatment Costs



Annual Costs: - \$596K/yr

Water Related Energy Costs



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

Manufacturing Capability



Up 30% since 2000
(excluding 2009)

B963 / B971 Central Utility Plant Reporting Results

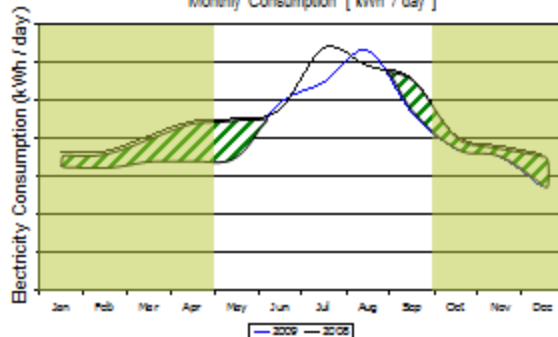
Reporting Results:

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

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

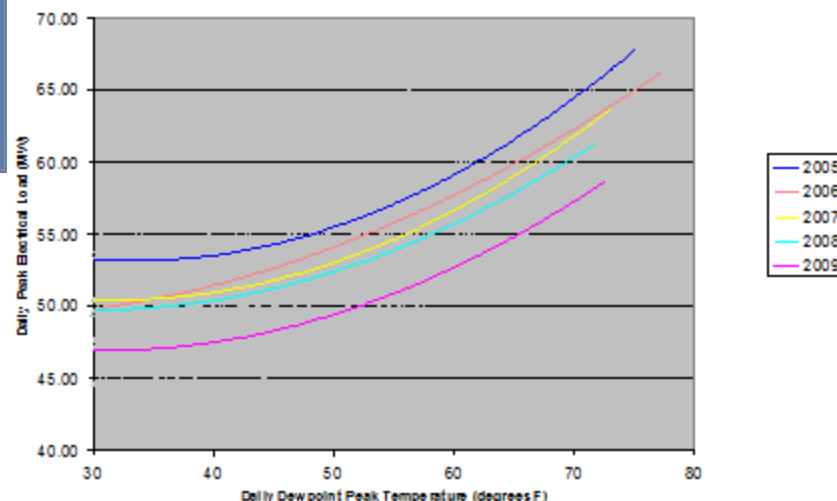
2008 vs. 2009 Central Utility Plant Electricity Curve
Monthly Consumption [kWh / day]



Free Cooling Project

Leverage cold ambient temperatures of Vermont

Average Peak Electrical Loads at IBM VT 2005-09



- ❑ 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

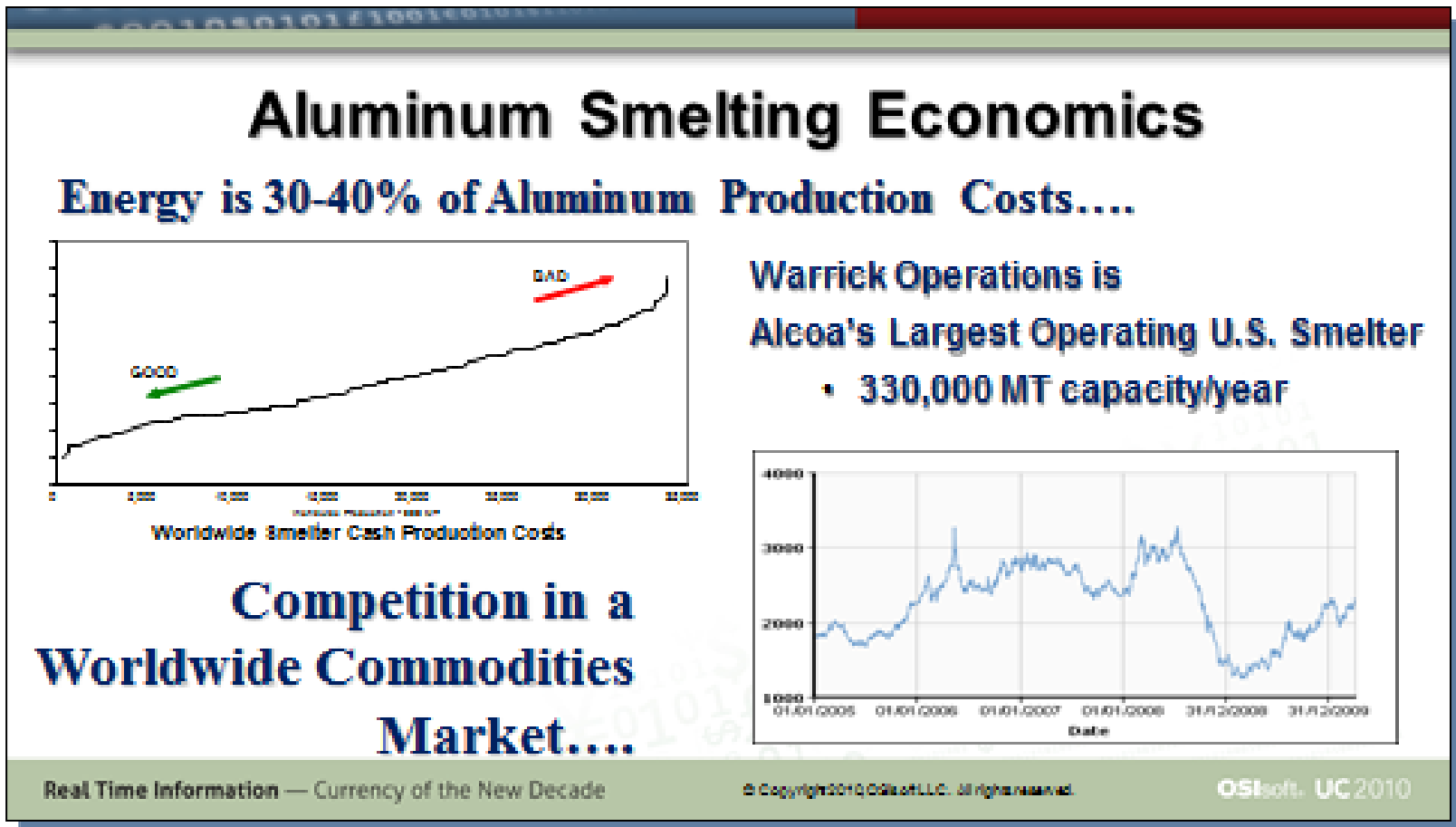
- ❑ Life cycle assessment
- ❑ Product design
- ❑ Economic value of products

- ❑ Industrial Demand Response

- ❑ Provide reliability to the grid
- ❑ Reduce energy costs



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



- ❑ 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

Midwest ISO Interface



Real Time Information — Currency of the New Decade

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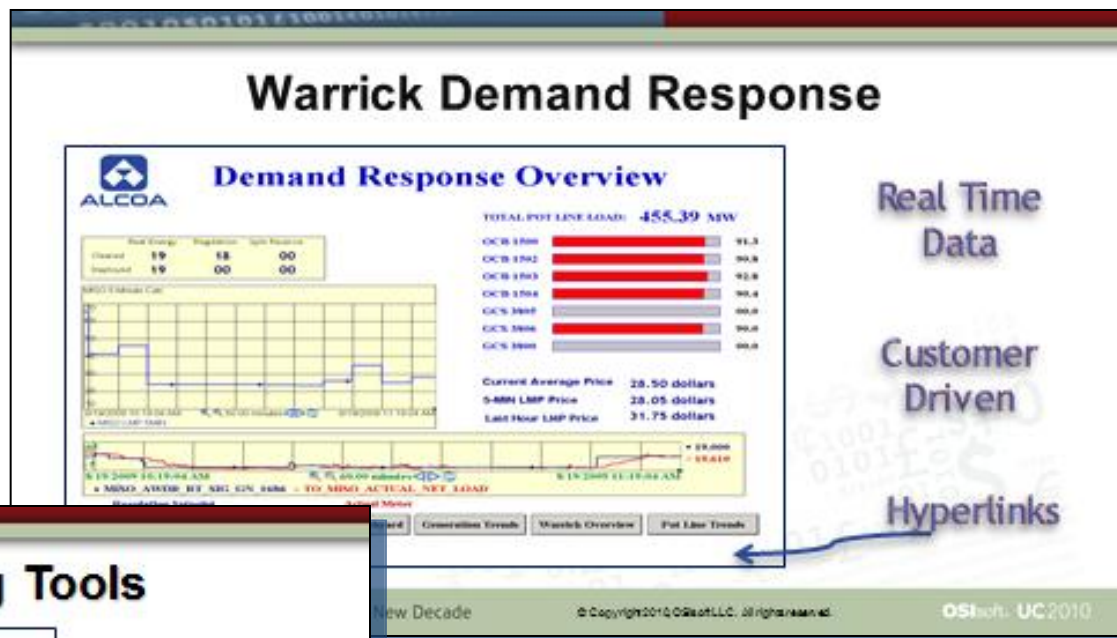
OSIsoft UC2010

New Decade

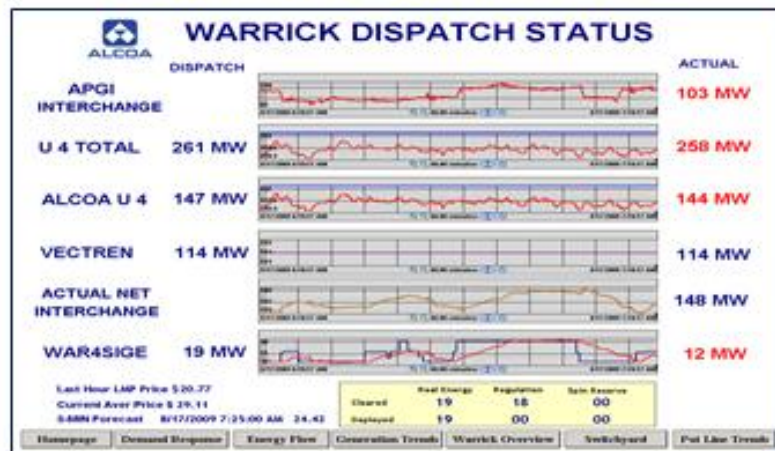
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OSIsoft UC2010

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



Power Plant Operating Tools



Functionality

Operator
Buy-in

Ownership



Some Closing Thoughts

- ❑ 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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