RICHMOND SITE

Site Background

- 90 acre campus
  - 275,000 ft^2 DSC
  - 220,000 ft^2 Paint Plant
  - 30,000 ft^2 Resin Plant
- 353 Total Employees

Site Background

- Main Plant Built in 1976; Resin in 1985; DSC in 1994
  - Topography and flow consideration
- Novel Management Style
  - No time clock, rotating shifts, team meeting rooms
  - Team input on overtime, hiring, capital and CI
  - Innovator Award Program

Richmond Sustainability Timeline

- 2006 Capital Allocated to Reduce Natural Gas
- 2007 Began to Baseline Data and Implement Projects
- 2008 DOE Assessment Awarded (Natural Gas) & Formation of Site Energy Team
- 2009 DOE SEN Program at Richmond Site
- 2010 DOE SEN Program Expands at S-W

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Gaining Leadership Buy In

Electricity				
Year	kW Drop (%)	Dem kW (%)	Cost/ kW	$ Change (%)
2006	X	X	$ 0.049	X
2007	3.1	1.4	$ 0.052	4.0
2008	13.5	9.9	$ 0.057	2.2
2009	24.9	14.1	$ 0.062	4.0

Natural Gas		
Year	MCF	$ Change (%)
2006	X	X
2007	4.5	15.1
2008	2.2	14.7
2009	11.4	24.5

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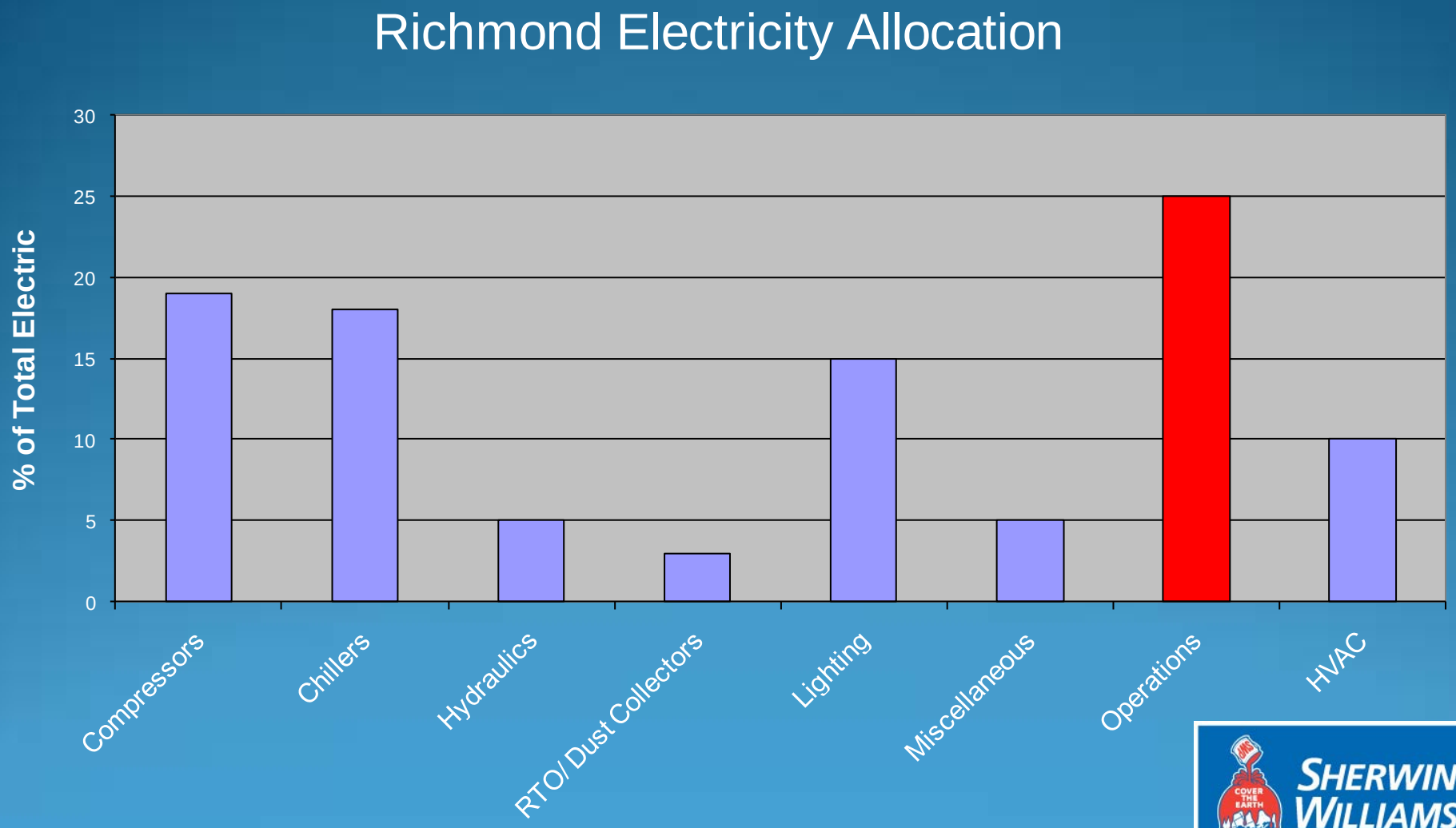
Baseline & Opportunities



Historical Challenges (2006 – 2008)

- Allocation of Capital
  - Capital consistently allocated for asset preservation, capacity improvements & safety
- Justification of Projects
  - Projects with huge ROIs are consistently hard to prove one by one
- Commitment of Time
  - Engineering resources typically pulled towards problems that maintain status quo

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Positive Momentum (2008 – 2009)

- Electricity Projects Impacting Budget
- DOE Assessment Identified 25% Natural Gas Reduction Opportunity
- Site Energy Team Formed
- Began to Believe Goal of Reducing Energy Consumption and Costs Annually is Possible
- SEN Program Proposed in Detroit, MI

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Richmond Wins!

- Led Initiative for SW to Join SEN Program

Changing Culture(2010)

- Allocation of Capital
  - Capital Allocated for Energy Projects
  - 40% of Open Projects Utility Related
- Justification of Projects
  - Results Are There
  - Approval of Capital No Longer An Issue
- Commitment of Time
  - High Level Engineering & Maintenance Goals Focus On Energy & Reliability

- SEN Moving Corporate Wide

Overall Site Cost Reduction

- Maintenance & Engineering Control Most Variable Costs (not related to people)
  - Standarizing Equipment Reduces Parts Costs
    - Parts Room Holds Significant Assets
- Reducing Utility Costs Reduces Contractor Costs
  - HVAC, Chillers, Hydraulics, Cooling Tower …
  - Compressed Air Moisture Issues Disappear
- Site Operations Goals “Within Reach”
  - Equipment is More Reliable

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Project Examples – No Capital

- Waste Heat
  - Compressed Air Vent
  - Boiler Room Heat
  - Vents Off Condensate Returns
  - Demo Old Equipment

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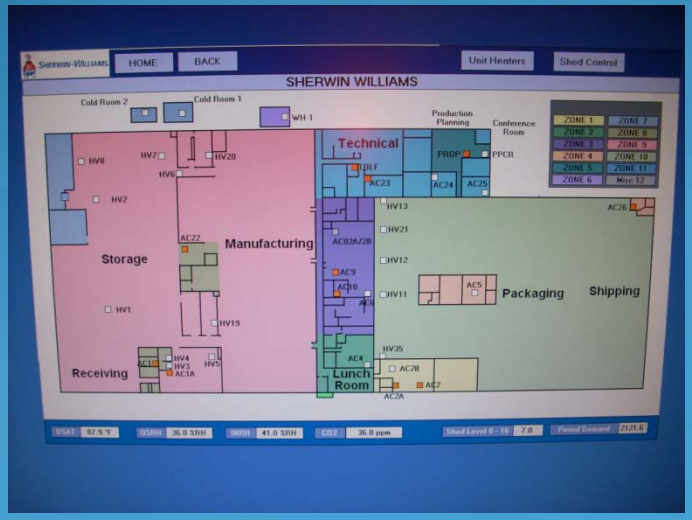
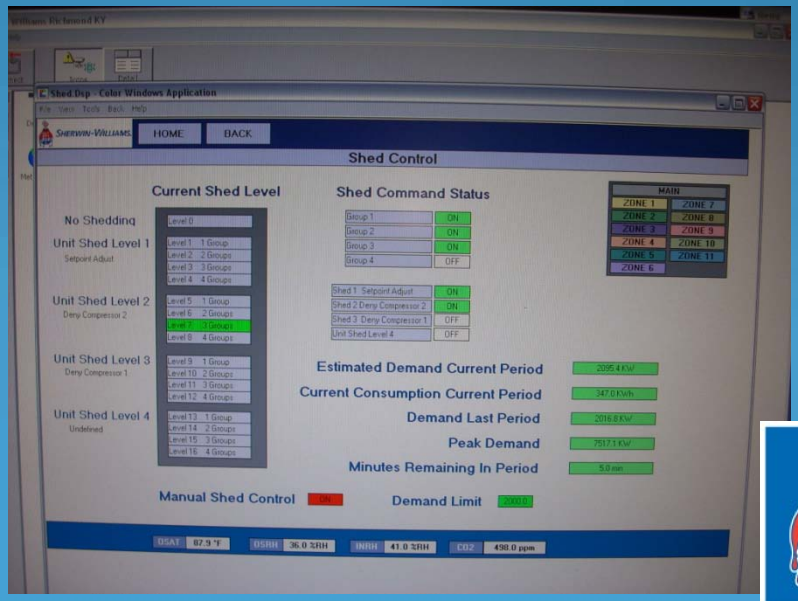
Project Examples – Lean

- Lean Opportunities
  - Showcase Success Stories
  - Improved Work Atmosphere
  - Employee Engagement
  - Financial Awards

Project Examples – Capital

- Energy and Reliability
  - Eliminate Vendor Visits
  - Justify HVAC Unit Replacement
  - Basic Troubleshooting Simplicity





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Fast Forward

- Utility Usage and Costs Will Drop in 2010
- Energy Team Currently has 75 Open Projects
- Continuing to Leverage Energy and Reliability Projects
  - Chiller Compressor Upgrade
  - Flir Thermal Imaging Purchase
- Currently Using SEN Program For Best Practice Meetings (Nissan, 3M)
- Actively Playing Role in SW Globalization of SEN

Fast Forward

Electricity				
Year	kW Drop (%)	Dem kW (%)	Cost/ kW	$ Change (%)
2006	X	X	$ 0.049	X
2007	3.1	1.4	$ 0.052	4.0
2008	13.5	9.9	$ 0.057	2.2
2009	24.9	14.1	$ 0.062	4.0
2010	30.4	16.6	$ 0.067	4.0

Natural Gas		
Year	MCF	$ Change (%)
2006	X	X
2007	4.5	15.1
2008	2.2	14.7
2009	11.4	24.5
2010	15.9	46.6

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ITP Webinar Sept. 2, 2010

Alcoa can’t wait for tomorrow

2010 Company overview

Alcoa at a glance

- Founded in 1888
- 200+ locations
- 31 countries
- $18.4 billion revenue in 2009
- 59,000 employees
- 10 times safer workplace than US average
- Award-winning sustainability leadership
- 120 years of patents, including the original aluminum process

Number of Employees (2009)	
U.S.	23,000
Other Americas	19,000
Europe	10,000
Pacific	7,000
	59,000

Aluminum – the miracle metal

- Aluminum makes cars and trucks more fuel efficient.
  A pound of aluminum in a vehicle can eliminate 20 pounds of greenhouse gas in its lifetime.
- It makes electronic gadgets “cooler” and more recyclable.
- It makes air and space travel possible.
  All the structural alloys used in modern aircraft were developed by Alcoa.
- It is one of history’s most popular, most recyclable beverage containers.
  More than one trillion cans have been recycled in America since Alcoa pioneered the industry in 1972.
- It makes buildings more beautiful and energy efficient.

We are the aluminum leader

- Alcoa invented the commercial aluminum smelting process in 1888
- Alcoa has the world's largest smelting capacity
- Alcoa is the leader in aluminum technology and innovation

We are #1 or #2 in more than 90% of all our businesses

- Bauxite mining
- Refining
- End and tab can sheet
- Aerospace sheet & plate
- Hard alloy extrusions – advanced
- General engineering plate
- Aerospace fastening systems
- Aerospace airfoils
- IGT airfoils
- Aluminum structural forgings
- Aluminum truck wheels
- Commercial building systems (NA)

Worldwide operations – regional strength

Innovation is our heritage

Year

1886 | 1890 | 1900 | 1920 | 1940-1950 | 1960 | 1980 | 1990 | 2000 | Today

Aluminum Beginnings

Cookware

Airplanes

Electrical Conductor

Model T Castings

Household Foil

Truck bodies & Wheels

Buildings

Marine

Easy Open Cans

Heat Exchangers

Automotive Structures

Audi A8

Ferrari Modena

Space Shuttle

Consumer Electronics

Defense

Airbus A380

Environmentally-Friendly Bus

Oil & Gas

Aluminum Bottles

Energy Efficiency Program for Alcoa

What are the Barriers ?

- Sponsorship from the highest level on management
- Sponsorship from the lowest levels of management
- An effective energy organization
- Employee awareness
- Employee involvement
- Money

Sponsorship

The Energy Spend is significant.

Alcoa spends on the order of $3 billion on Energy globally each year

- Even small improvements yield big savings – a 1% improvement equals $30M p.a.

Global Summit on Energy Efficiency (EE) in 2009

- Kicked off the identification of EE projects across all BUs
- Began coordination process to raise awareness level across Alcoa

Key elements of EE program

- Non-capital items: process practices, maintenance practices, building controls
- Small capital items: efficient lighting, auto-shutoff mechanisms
- Larger capital items: cogeneration, efficient furnaces, waste heat recovery

But…

…being ‘non-core’, Energy Efficiency (EE) capital projects often take a backseat to other projects

Organization

Rick Bowen
President, Alcoa Energy

R. Notte
Director , Global Energy Services

W. Brockway
Manager, Global Energy Efficiency

Key Responsibilities:

- Define long term strategies for energy issues.
- Establish Targets
- Reporting
- Coordination of efficiency programs with Carbon
- Identify resources

Key Responsibilities:

- Driving the rapid execution of Energy Efficiency activities across all businesses and regions
- Help businesses and locations Identify and define opportunities,
- Establish a global network facilitating the sharing of global best practices and implementing projects to deliver significant cost savings**.**
- Manage State and Federal funding programs to offset cost.

Have a Goal

Issue	New 2030 Goal (from a baseline of 2005)	New 2020 Interim Goal	Rationale
CO2 in Primary Operations	Reduce 2005 total CO2e intensity (direct & indirect) of Primary Ops by **30%** (mining/refining/smelting)	**20%**	Stay in Line with the general trajectory of emerging legislative programs
Energy Intensity in Primary operations	Reduce 2005 Primary Ops energy intensity by **15%**	**10%**	Close the gap in production phase of life cycle analysis between Aluminum and competing materials
Energy Intensity in all other Businesses	Reduce 2005 energy Intensity by **30%** for all other businesses	**20%**	Mitigate future risk of escalating energy cost in a carbon constrained world
Recycling	Achieve **a 90%** Global UBC recycling rate by 2030 in the markets we operate	Achieve a UBC recycle rate of **75%** in the US by 2015	Enhance the reputation of the can as the preferred package and eliminate the landfilling of a useable material

What We Hear from our Plants

- Opportunities are known by location and BU people?
- How can we learn what others at Alcoa are doing?
- Can we get governmental funding?
- Is there technical advice available?
- How can we get capital?
- What are other industries doing?
- Is there training available?
- Where can we go to get information?
- Do we have a standard way to ……?
- What is the best system for ….?

What we are doing – Global EE Team Established

Established a Global Energy Efficiency Team

- Drive / coordinate a comprehensive Energy Efficiency program
  - Monthly calls held
- Across all BU and regions leveraging current activities & resources
- Knowledge transfer to / from other Alcoa businesses
  - Energy webinars conducted
  - New SharePoint site established and being populated
- Rapidly share best practices in energy
  - Formal best practices under development
- Explore creative methods to accomplish energy projects

Regional / Business SPA's

		GPM	AWA	GRP	EPS
	Business	Ghislain Gaudreau	Ray Chatfield	Rick Stone	Paul Woerz
Regions	Europe		Ray Chatfield	Guyla Maar	
	Asia	NA	NA		
	Latin America	Paulo Miotto	Ray Chatfield		
	Canada	Nicolas Dalmau	NA		
	US	Ed Potter	Ray Chatfield	Rick Stone	
	Australia	?	Ray Chatfield		

What is Energy Efficiency? - Focus is on execution

5 pillars of Energy Efficiency across the enterprise:

- **Awareness:** Engage all Alcoans on the cost of energy
- **Alignment:** Consistency with current processes and resources
- **Defining Opportunities**: Execute savings through DI system
- **Sharing Best Practices:** Accelerate gains
- **Strategic Improvements:** Make meaningful changes

Results are improved sustainability:

- New discipline
- New Skill Set
- Reduced Cost
- Reduced energy intensity
- Reduced Carbon footprint.

We are the GLUE for Energy Efficiency

WE ARE NOT:

- Asset Owners
- Police
- Bank
- Manufacturing Process Experts
- Duplicative

WE ARE:

- Global Coordinators
- Structure Creators
- Linkage Drivers
- Cultural Change Agents
- Education and resource providers
- Accountable for EE Process

Our role: Get the right processes, resources and training to the right people to bring Energy Efficiency to the next level to raise ROC, reduce energy intensity and GHG footprint.

Best Practice Tracking

contribution in sharing Energy Efficiency Technology by communicating BEEPs

Best practices	Alcoa-Köfém Hungary					Amorebieta-Esp					Sabinanigo-Esp					Alicante-Esp					Fusina-It				
	Applicable		Applied			Applicable		Applied			Applicable		Applied			Applicable		Applied			Applicable		Applied		
	Yes	No	Yes	No	under application	Yes	No	Yes	No	under application	Yes	No	Yes	No	under application	Yes	No	Yes	No	under application	Yes	No	Yes	No	under application
Sub-Metering Energy Intensive Systems	☑	☐	☑	☐	☑	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☑	☐
AWA Refining Energy Project Implementation Approach	☐	☑	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☑	☐	☐	☑	☐	☐	☑	☐
Compressed Air Induction Nozzles	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☐	☑	☐
Regional EE Organization	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐
EEN and European Resources	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐
Heat Exchanger Cleaning	☐	☑	☐	☑	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐	☑	☐
New Lighting Technologies	☑	☐	☑	☐	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐
Fan Control Methodologies	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐
Furnace Combustion System Mgmt	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐
Pumping System Reliability - Predictive Maintenance	☑	☐	☑	☐	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☑	☐	☐	☑	☐	☐	☑	☐
Bonu$ BEEP Save Energy Now - 2007 Program	☐	☑	☐	☑	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☑	☐	☑	☐
Asset Ownership & Expense Allocation	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☑	☐	☐	☐	☑	☐	☑	☐

What we are doing – Add tools & Resources to the Process

Bring more tools and resources to the process

- Training, energy assessment and execution planning
- Linkage to other industries
- Government programs / resources / funding / incentives
- Subject matter experts (internal and external)
- Measurement and verification / metrics
- Roadmap for 2020/2030 EE targets

Expected Future State

- Vibrant community of energy enthusiast established and working together.
- Keep ideas coming year after year for lasting impact
- Drive a measurement culture to keep and improve gains