



Energy Management in Dow Chemical

26 May 2010, Beijing
Ningke Peng





About Dow

A diversified chemical company, harnessing the power of science and technology to improve living daily

- ✍ **founded in Midland, Michigan in 1897**
- ✍ **annual sales of \$58 billion**
- ✍ **52,000 employees**
 - **3,900+ in China and growing daily**
- ✍ **supplies more than 5,000 products**
- ✍ **serve customers in 160 countries**
- ✍ **a company committed to sustainability**
- ✍ **24 sites and offices in China**

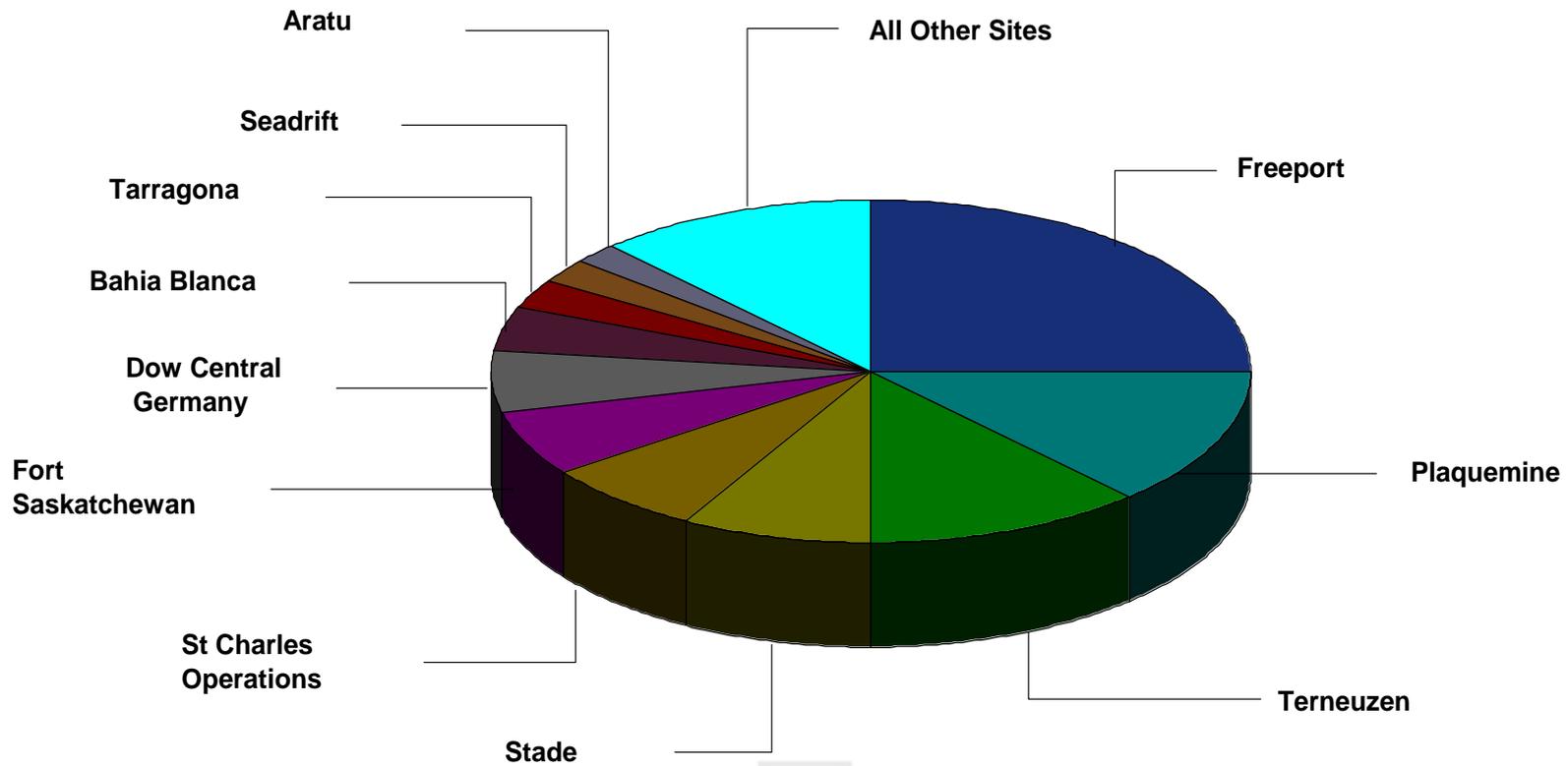




Dow's Energy Use

Dow is among the largest Industrial Energy Consumers

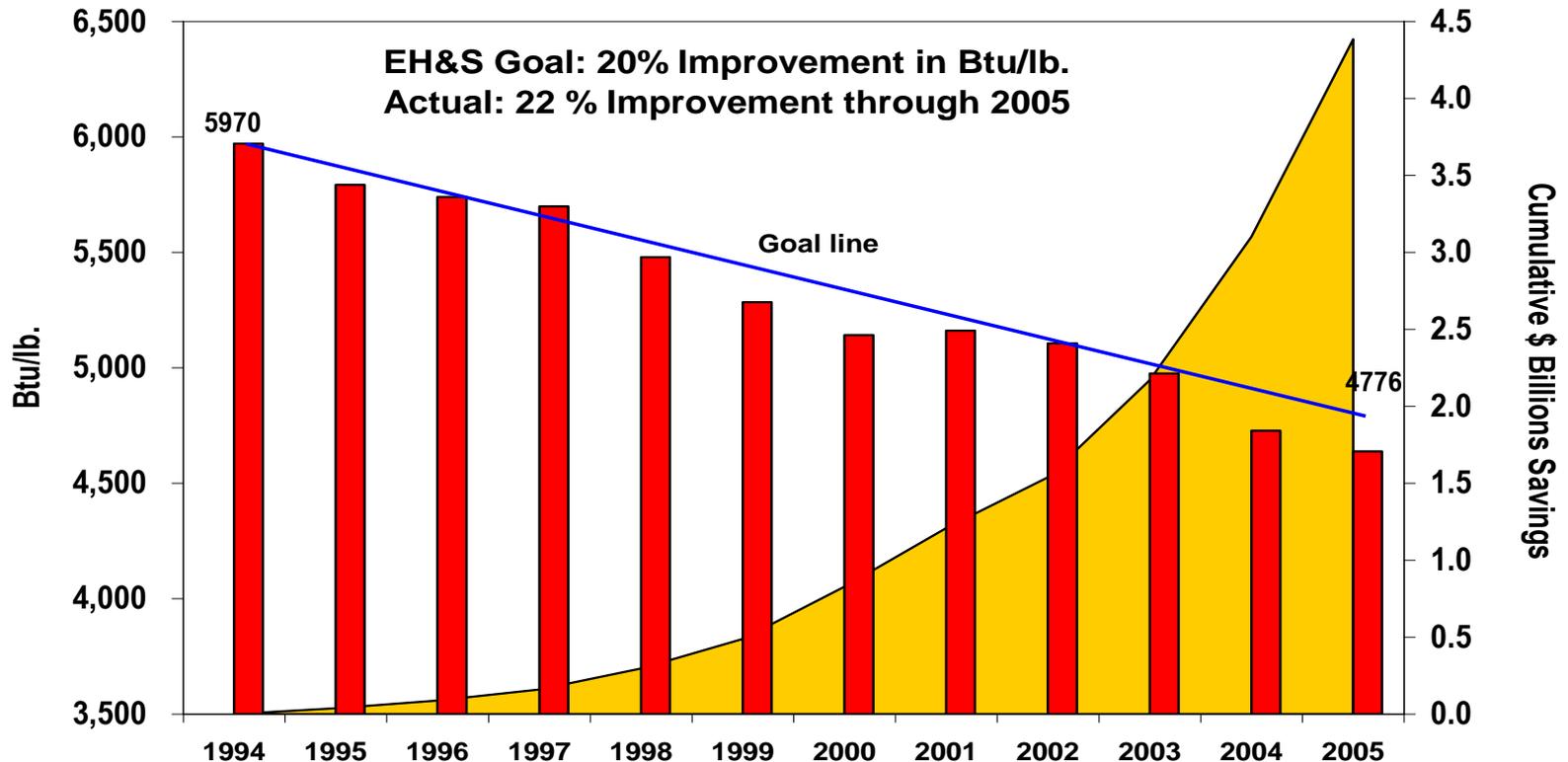
- Annual Energy Consumption Globally \approx 600 Trillion Btu's (22 million tons of coal equivalent)
- The Cost of Energy in 2009 Approached US \$2.5 Billion Globally (\sim 17 billion RMB)





Dow's Energy Performance

Energy Intensity Performance



\$ 4.3 Billion **Cumulative Savings (B\$)** **Total Actual Energy**
(~33 billion RMB)



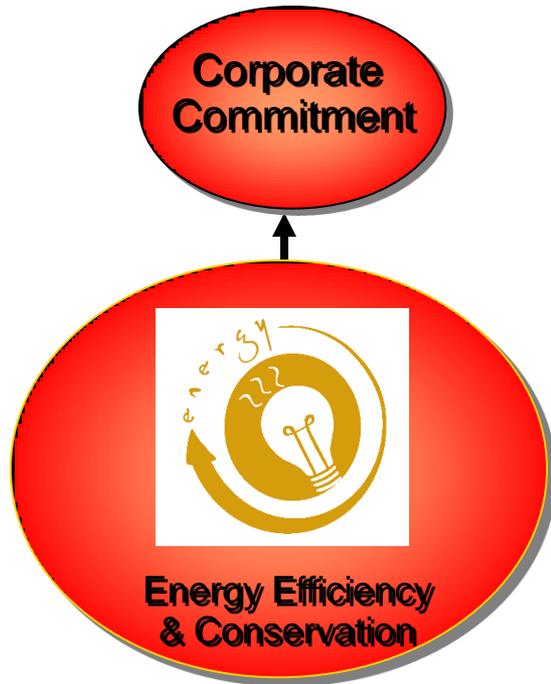


Driving Energy Efficiency at Dow

Key Elements for an Effective Energy Efficiency & Conservation Management Program



Driving Energy Efficiency at Dow



Corporate Commitment:

Provides the Overall Commitment to EE&C

Establishes Energy Efficiency & Conservation as a Corporate Objective

Defines Company Values to Stakeholders

 Dow Corporate Environmental Advisory Council

Establishes Expectations for Leaders



Enhanced Public Reporting



The Dow Global Public Report 2003



Sustainability

Public Commitment:

In 1995 Dow Committed:

- To Reduce Energy Intensity
- By 20% by the year 2005
- From Base Year 1994

The Dow Public Report

www.dowpublicreport.com



Corporate Commitment to 2015 Goals

We will further reduce our global energy intensity by 25% from 2005- 2015

We will reduce our GHG emissions intensity by 2.5 % per year thru 2015

“No one in the world is more intensely aware of the need, ultimately, to reinvent our dependency on oil and natural gas than we are... We will lead the way on energy transformation because we have to. And we have taken important steps already.”

**-- Andrew Liveris
Chairman, CEO & President
The Dow Chemical Company**



Liveris Launches 2015 Sustainability Goals



Driving Energy Efficiency at Dow



Senior Leadership Support :

Sets Overall Long Range Goals

Establishes Priority

Provides Resourcing and Funding

Establishes Performance Accountabilities

Visibly Models Action

Leads Advocacy and Champions EE&C

Driving Energy Efficiency at Dow

Organizational Structure:

Implementation Leader(s)

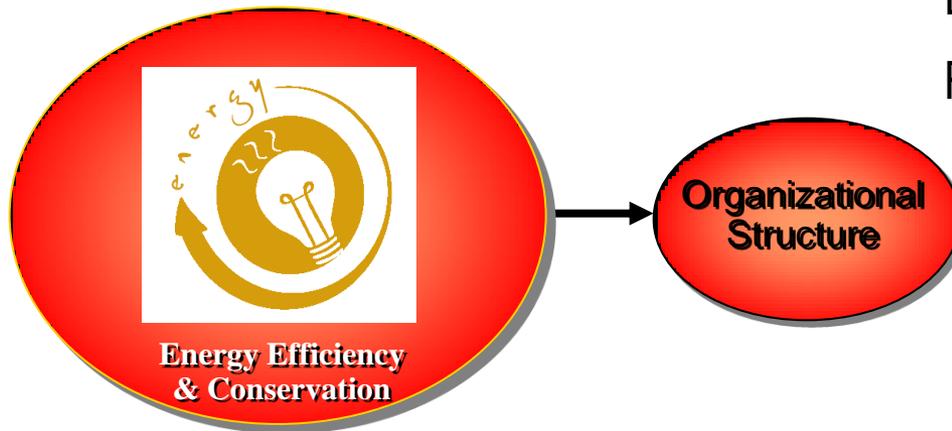
Implementation Teams

Energy Teams Networks

Roles & Responsibilities

Implementation:

- Develops Management Systems
- Establishes Implementation Model
- Develops Specific Plans to Achieve Goals
- Identify Energy Saving Opportunities
- Implement EE&C Projects
- Monitor and Report Progress
- Promotes EE&C Culture Locally
- Leverages Success





Driving Energy Efficiency at Dow

Organizational Structure:

Business Teams

Site Teams



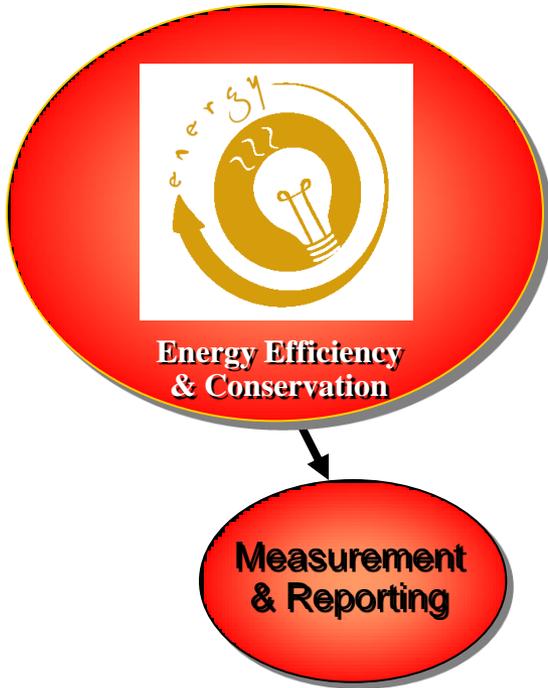
- Charter
- Leadership
- Membership
- Plans
- Roles

EE&C Global Leader	Business A EE Leader	Business B EE Leader	Business C EE Leader	Business D EE Leader	Business E EE Leader
Site 1 EE Leader	Plant A 1	Plant B 1	Plant C 1	Plant D 1	Plant E 1
Site 2 EE Leader	Plant A 2	Plant B 2	Plant C 2	Plant D 2	Plant E 2
Site 3 EE Leader	Plant A 3	Plant B 3	Plant C 3	Plant D 3	Plant E 3
Site 4 EE Leader	Plant A 4	Plant B 4	Plant C 4	Plant D 4	Plant E 4
Site 5 EE Leader	Plant A 5	Plant B 5	Plant C 5	Plant D 5	Plant E 5





Driving Energy Efficiency at Dow



Energy Measurement & Reporting Systems:

Robust Energy Accounting System

- Metering Program
- Sub-metering
- Energy Conversion to Common Btu's; Btu's/lb

Drill Down Capabilities:

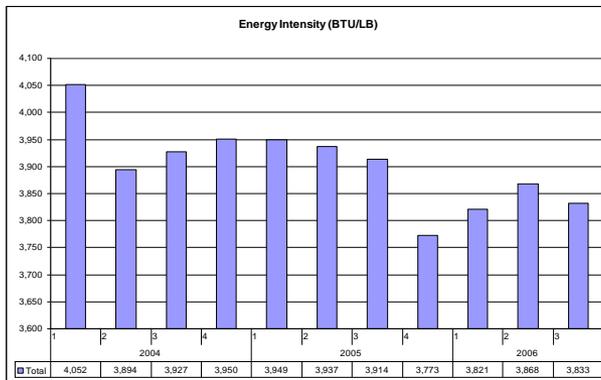
- Business / Site / Plant / Facility / Equipment

Converts Data to Useful Information

Available to all Leaders and Employees

Basis for Monitoring and Reporting Progress

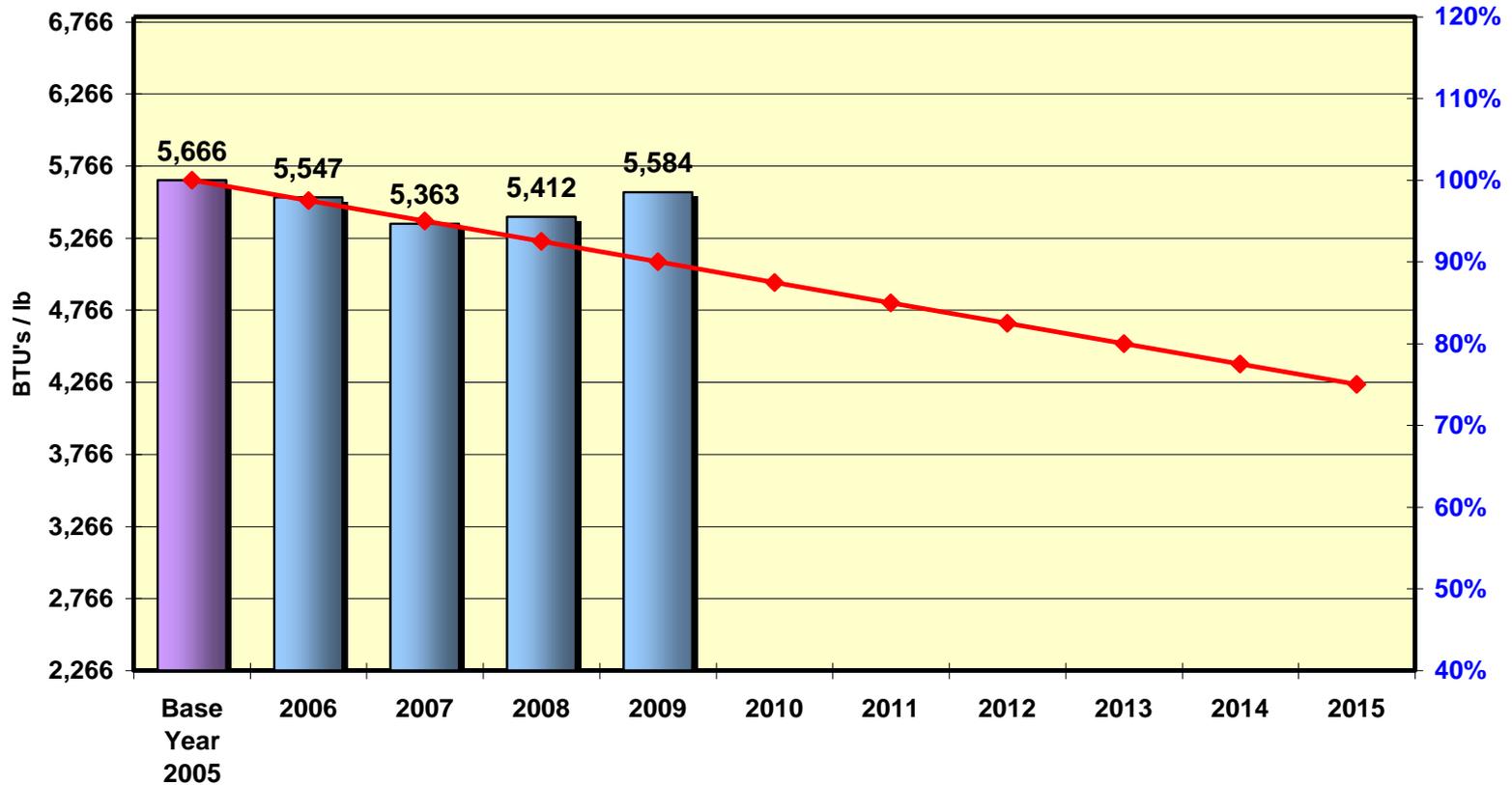
Global Asset Utilization Reporting System





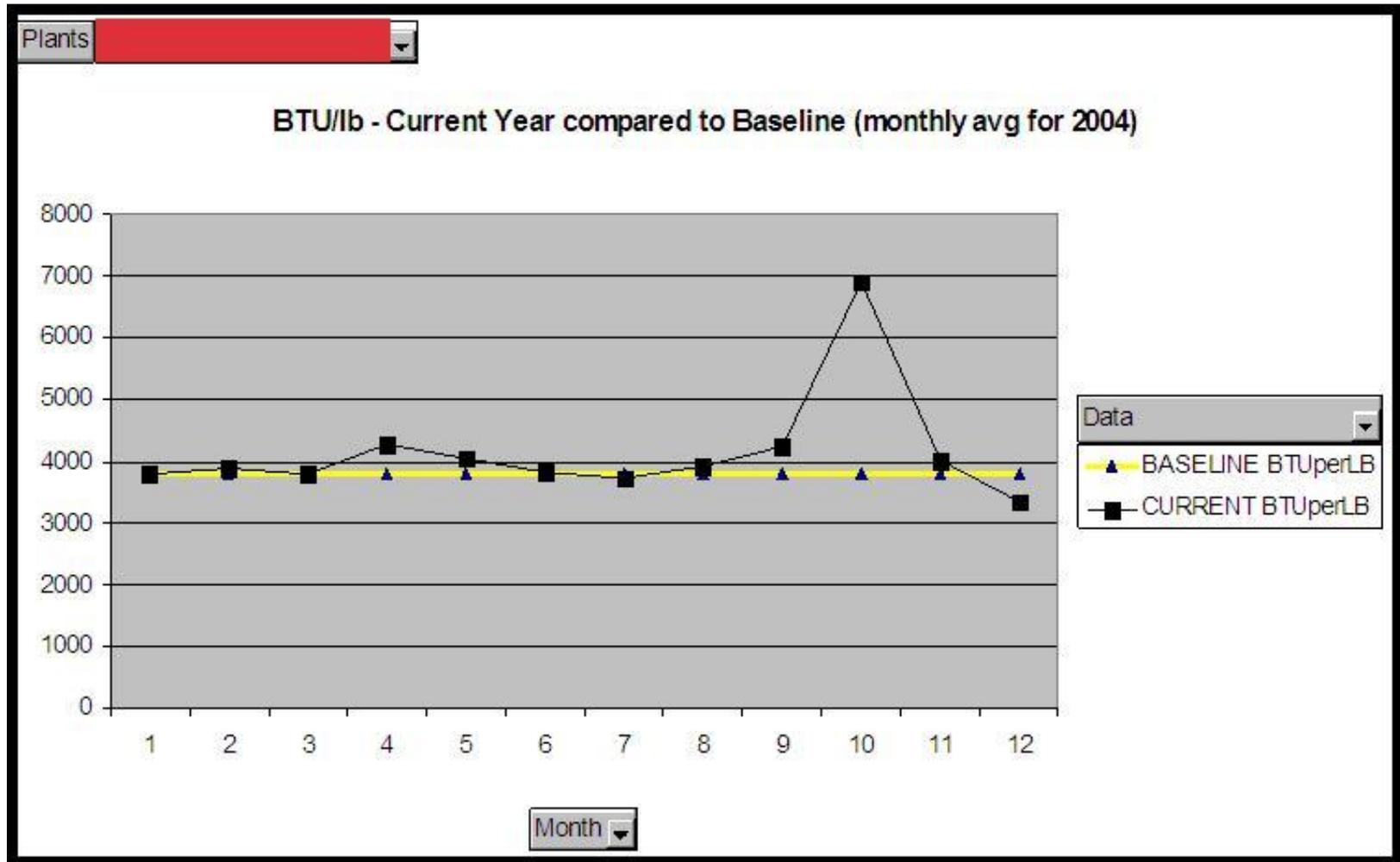
Example : Energy Intensity Reporting System

De-Pyramided Energy Intensity Performance
Goal 25% Reduction by 2015





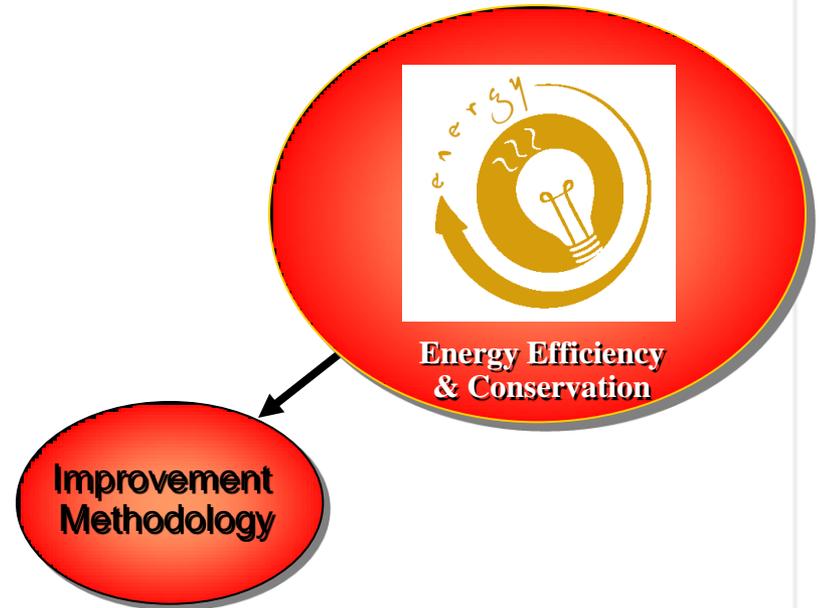
Site Tool for Individual Plants



Driving Energy Efficiency at Dow

Improvement Methodology:

- To Identify Defects –
 - Energy Waste
 - Inefficiency
 - Sub-Optimized Systems
- Enables Finding Optimum Solutions
- Corrects the Defect
- Establish a Control Plan to Sustain the Gains
- Integrated into Capital Program
- Internal and/or Externally Assisted Energy Assessments
- Long Range Listing of Opportunities / Projects
- Continuous Improvement Mindset
- Consider Six Sigma Approach

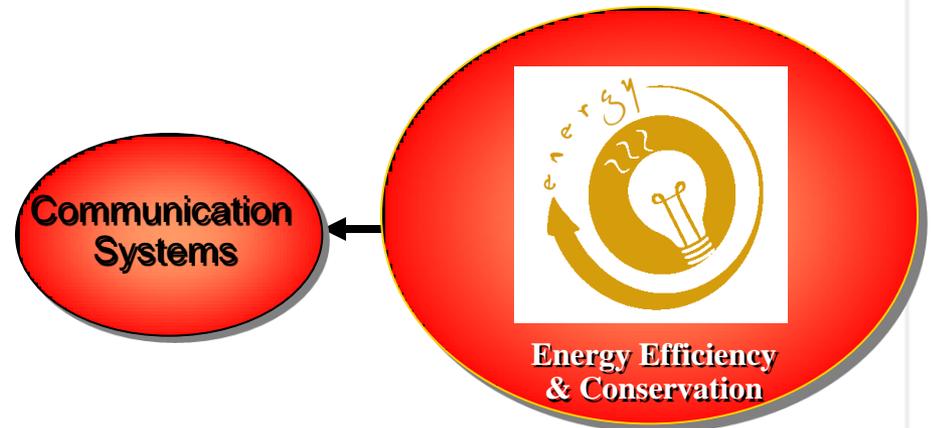


Driving Energy Efficiency at Dow

Employee Communication Systems:

System(s) That Facilitate Sharing or Communication of :

- Energy Efficiency and Conservation Goals
- Performance Reporting
- Challenges & Success Stories
- EE&C Tools and Best Practices
- Benchmark Information
- Promotes Involvement & Recognizes Successes
- Messages from Leadership Team
- System that is easy to access – Consider Web based





Driving Energy Efficiency at Dow

Goals and Compensation:

To Help Drive Accountability Throughout the Organization

Set Challenging Annual Goals

- Corporate Goals
- Business Goals
- Site Goals
- Plant Goals
- Team Goals
- Individual Goals

Link to Compensation :

- Compensation Linked to Goal Attainment & Performance





Driving Energy Efficiency at Dow

Reaching Beyond the Fence:

- Dept of Energy – “Save Energy Now”
- Energy Star’s – Industrial Energy Star Program
- Texas Industries of the Future – Programs, Texas Show Case
- Alliance to Save Energy
- ACEEE
- American Chemistry Council
- NAM, Others





Our Results

Dow Solutions - Impact to Dow

- Sustained Drive to Energy Intensity Reduction Since 1990 over 38% reduction
- Since 1994:
- Cumulative Energy Savings = Approx 1,700 Trillion Btu's
 - More than enough energy to provide power to all the residential and commercial users in California for a full year
 - Equivalent to 60 million tons of coal saved.
- Cumulative avoided GHG (CO2 equi) emissions of ~ 90 Million MT
- Cost Savings (avoided fuel) = Over \$ 9 Billion (>61 billion RMB)
- Demonstrated Long-Term Effectiveness of our Program
- Added Value to Corporate Reputation
- Positions us for even further, more ambitious Goals

Dow Solutions – Impact to the Planet

- One square foot of Styrofoam (one inch thick) will save one ton of CO2 emissions over the average lifespan of a home





Efficiency and The Triple Bottom Line

Good for Business:

Saves Money, Enhances Global Competitiveness, Preserves Jobs, Creates Prosperity for Shareholders

Good for the Environment:

Fewer GHG Emissions, Part of the Solution to Global Climate Change

Good for Society: Reduces Demand, Lowers Energy Bills, Promotes Energy Security





Thank You





Back up Slides





1995 to 2005 Results

How were the Results in Energy Efficiency Obtained?

Facility Efficiency improvement	9%
Product Mix / Merger & Acquisition Activity - not covered above	5%
Energy Power & Utility Efficiency Improvement power / steam supply	5%
Sub Total	19%
High Payback Energy Efficiency Projects	--- %
Focused Engineering/Most Effective Technology Efficient Solutions	+ %
Focused Maintenance/Operations/Energy Teams	+ %
Total	22+%

+ No precise metrics on this - based primarily on Six Sigma and energy team activities



Examples of Energy Efficiency Projects

✍ Replace aging power co-generating assets with state of the art assets – going from a 9000+ HR to 6100 HR

Finding a solution, then leveraging across the company:

- GT brush seal designs
- Variable speed drives
- Site integration optimization
- New design standards for evaluating pipe size vs pump size, insulation, etc.

✍ New technologies for producing products that help others enhance their energy efficiency

✍ Six sigma tools to optimize asset operations.

- Six sigma is a process improvement methodology using data and statistical analysis to identify, fix or improve opportunity areas

✍ Recovering by-product hydrogen and using as fuel