

Managing Energy Productivity

“A Competitive Prerequisite”

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*Cutting the High Cost of Energy
2005 ACEEE Summer Study on Energy Efficiency in Industry
July 19-22, West Point, New York*

Cost of Energy in Global economy



Approximately 8% of Global GDP

Large energy productivity differences

Region	Population	GDP	Energy Total	Energy / Capita	Energy / GDP
USA	100	100	100	100	100
Canada	11	7	13	117	174
EU-15	128	94	64	50	65
Germany	28	22	14	51	70

■ Energy price gap closing

Opportunity for best practice sharing

Global Energy Background

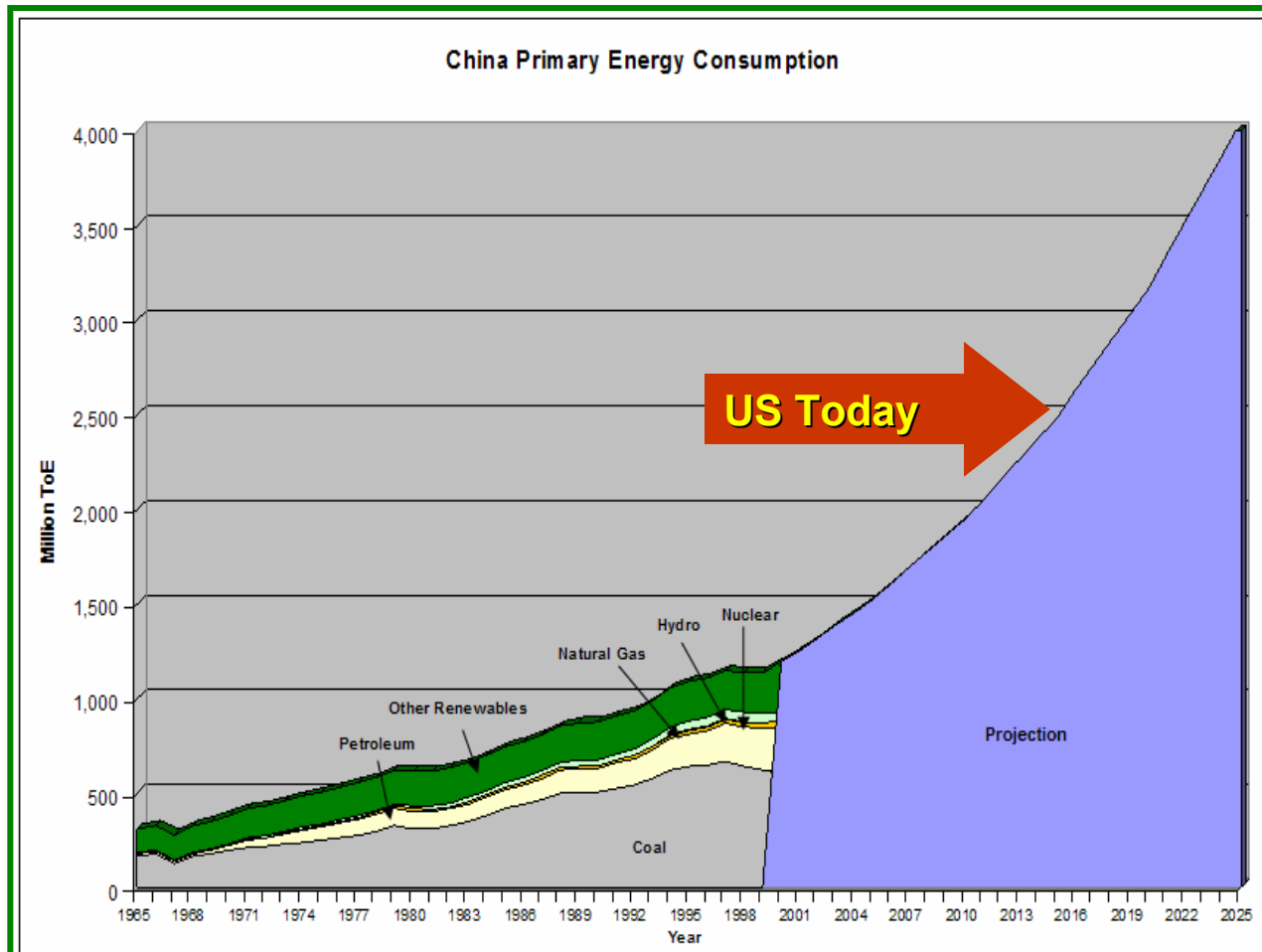
New realities

- Highest energy prices in history
 - *Sustained upward trends*
 - *US rising faster than EU*
- High US energy intensity ($\$ \text{ Energy} / \$ \text{ GDP}$)
 - *Nearly twice European Union*
- Dependence on imports
 - *US - Oil (65%) and natural gas (1.5%)- rising fast*
 - *EU – more than 50% of all energy - stabilising*
- Radically different climate change policies
 - *How to value carbon reduction investments?*
 - *EU, US, Canada – all on different policy paths...*
- China and India major new energy customers
 - *Directly and indirectly*
- Primary fuel extraction costs rising fast

Fundamental difference from past

China industrializes

The new energy customer



Sources:
BP Statist
EIA Intern

Projection based on IMF 5% GDP Growth Rate

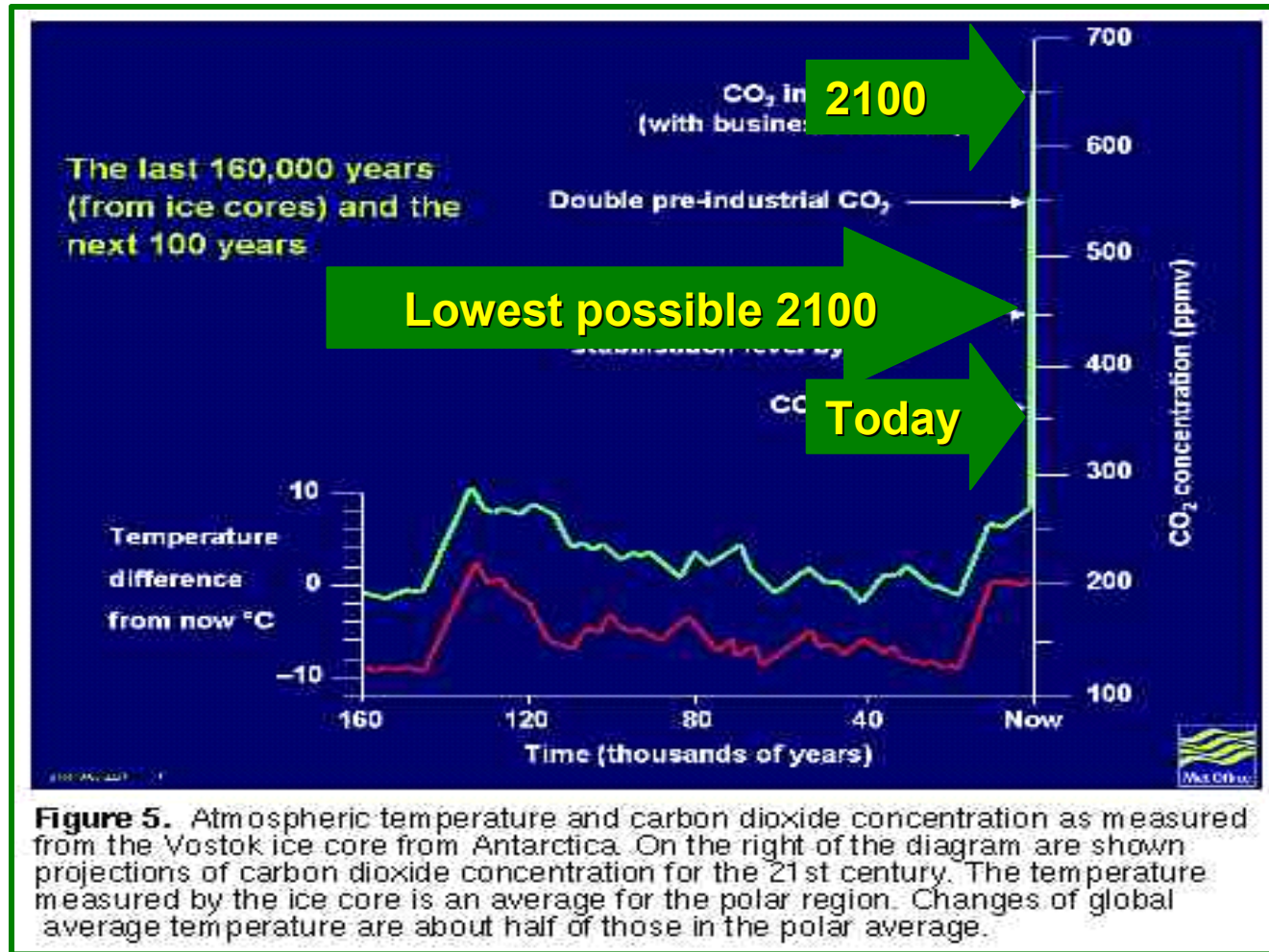
Strategic impact on pricing?

Global Warming

- Growing evidence since mid-80's that human activity is affecting climate
- Man-made emissions appeared to be creating a "Greenhouse Effect"
- Burning coal, oil, and gas generates most important greenhouse gas – carbon-dioxide (CO₂)
- Dialog to curb GHG Emissions started in Rio in 1992 at UN sponsored conference
- CO₂ levels highest level since 400,000 years
- Temperature rise between 1.5 and 6 deg C forecast by end of century
- WMO revises assessment – climate changes could be abrupt not gradual

CO₂ reduction increasingly in policy

Greenhouse gas levels over last 160,000 yrs*



Increased shareholder scrutiny*

Swiss Re



Linking Climate Change to corporate governance



Friends of the Earth

GREENPEACE



California
Public Employees'
Retirement System

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■ Climate as a corporate board risk management issue

- Preparation for the impacts of climate change?
- Reporting - "material events and uncertainties"; Sarbanes-Oxley
- Carbon Disclosure Project (institutional investors representing ca. USD \$9 trillion in assets) In 2003:
 - 80% Global 500 CEOs acknowledge risk; 35-40% acting
- **2003 shareholder resolutions (25+ in recent season)**
 - 32% at Chevron, 22% at Exxon, 27% at AEP etc.
 - For 2004 >25 planned, energy, utilities, automotive and *new the insurance industry*

■ Implications for D&O insurance

- Non-action potentially affects shareholder value
- Swiss Re policy (upon policy renewal):
 1. Check response of company to CDP;
 2. If inadequate/non-responsive – send questionnaire
- Goals: Client Education and evaluation of underwriting exposure

Climate Change Mitigation

Regulatory update

- Most countries have plans to reduce GHG's
- Kyoto Protocol in 1999 agreed to GHG limits
- February 2005 Treaty in force
- Carbon trading has started
 - *Lots of 50,000 MT ~ € 20 per metric ton*
 - *Chicago Climate Exchange established to form a voluntary regime for USA – Carbon trading at about \$1.00 / MT US voluntary reductions to reduce intensity by 18%*
- China/India/US have voluntary & regulatory measures
- Phase 2 targets in negotiation

Major impacts on energy policy & cost

Senior US Management Perceptions*

- 12% “Energy is a strategic business issue”
- 37% “Energy is a purely operational issue”
- 50% “Energy is a predominantly operational issue”

- Only 17% have a single Energy Executive
 - *Most report in operations or EH&S*
- 40% report “in some way” on energy
 - *Usually incidentally and non-numerically*
- 30% claim to have an energy policy
 - *Most as part of environmental statements*
- Few have coherent climate change strategy

Opportunity to gain competitive edge

Energy use in North America

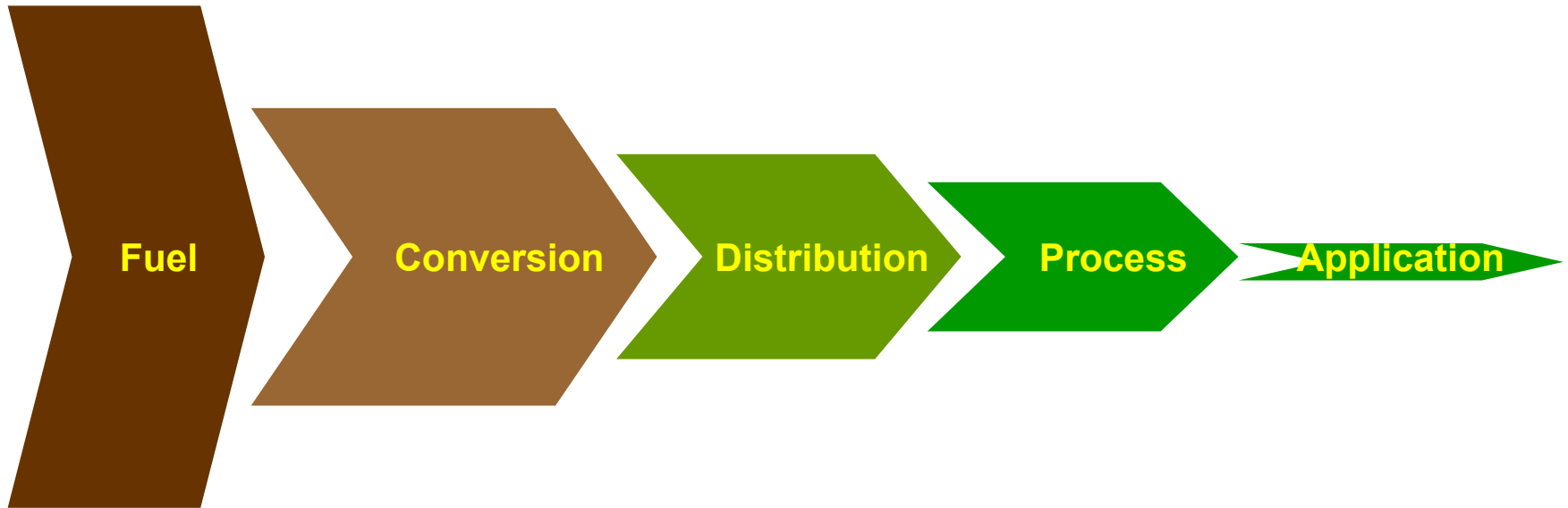
30 % of Global Demand

- Industry 35% *(1.2 to 1)**
- Homes & Buildings 40% *(2.5 to 1)*
- Transportation 25% *(1.4 to 1)*
- Most energy lost in range of inefficiencies
 - *Generation, transmission distribution of electricity*
 - *Vast heat losses in electricity chain*
 - *Inefficient industrial processes, buildings, vehicles...*
- Only 5% to 15% used productively
- Can we think differently and do better?
- Supply through efficiency is less than one third the cost of supply from new reserves

We pay for a 100 and get 10!

History drove us to the current structure

From Fuel to Application



- Systems evolved from fuel to final application
- Rigid market structure and ownership
- Perversely reinforced by well-meaning incentives
- Overwhelms efficiency and new-technology options
- High-cost / high-asset / low return approach

It's time to rethink

Can we reverse the thinking?

From Application to Fuel



- Questions become
 - *“How much energy do I need for the application?”*
 - *“What is the optimum investments in fuel, conversion and distribution mix to supply it?”*
- Result will be:
 - *Optimised manufacturing process*
 - *Fuel efficient supply processes*
 - *New management models*
 - *Reduced GHG and other emissions*
 - *Friendly to efficiency, renewable and new technology*
- Enhance competitiveness:
 - *Operating costs*
 - *Environmental improvement and credits*
 - *Energy supply security*

Different questions – different solutions

Owens Corning's Experience

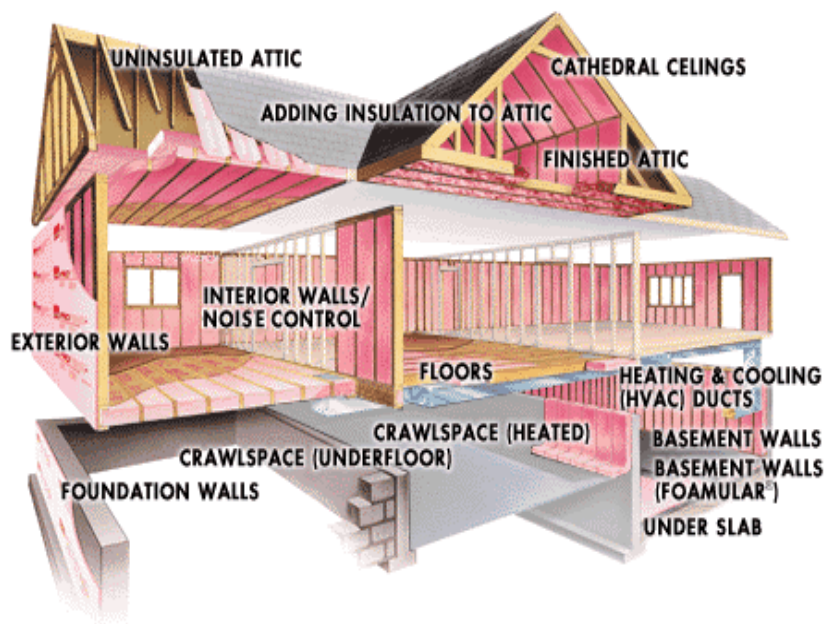
1999 to 2003 to.....



An Energy Star Industries Partner

Owens Corning in a Nutshell

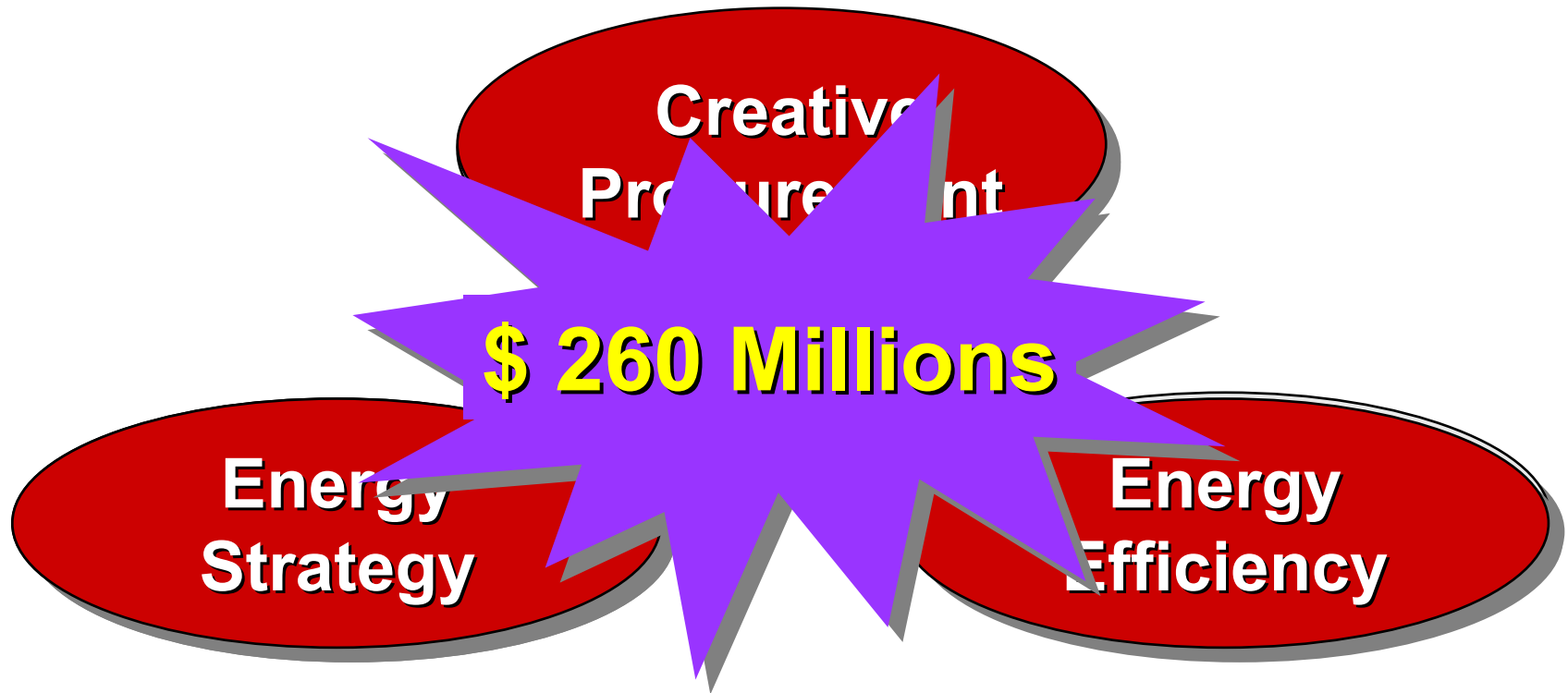
Help others save energy...



- \$5Bn sales
- 19,000 employees
- Worldwide operations
- Building Materials supplier
 - *Insulation*
 - *Roofing and siding*
- Composite Systems supplier
 - *Fibreglass reinforcements*
 - *Composite solutions for cars*
- Products reduce energy use
 - *Insulation, vehicle weight...*
- Energy intensive processes
 - *\$260Million in 1999*
 - *5% of sales*
 - *~ 80% of profits*

How well did we do in our own shop?

In 1999 declared a new energy game....
Framed on existing waste reduction initiative



**Energy Mission: Possible
20% Energy Cost Reduction**

First Reactions.....

- *Our energy buyers have got the best deals...*
- *Our engineering is 100% perfect....and here's the reams of data to prove it...*
- *It's been OK for 50 years ..why change?...*
- *We can't have strangers touch the process...*
- *You're in marketing....*
- *The leadership isn't serious...*
- *Someone tries this about every five years...*
- *We know what needs to be done...but the investment is always rejected...*

This too shall pass !!!

Multi-pronged approach..

- High level management sponsorship
- Global strategic energy team
- Worldwide employee engagement
 - *Local employee energy teams*
 - *Leadership criteria*
- Revitalized strategic energy procurement
 - *Consolidated global demand*
 - *Teamed with market experts*
- Created energy efficiency capital availability
 - *Energy Service partners*
 - *Created risk-adjusted approval criteria*
- Research new production strategies
- Rewards and recognition

Consistent long-term senior commitment

And have some fun!
Visualising Negawatts!



Recently in Indian plant

Packard Foundation Award “Cool Company”

A message from the David and Lucile Packard Foundation and the Energy Foundation



At IBM, Energy Efficiency Pays Big Dividends.

1527 million. That's what IBM has saved through energy efficiency in the last ten years. It's the equivalent of 58% of their entire 2000 dividend.

When you think of energy efficiency as a profit center, there's no saving whose imagination can take you.

Consider this example of what IBM accomplished in one location in just a year. The company began a comprehensive energy audit at their Boulder, Colorado site in 1998. Lighting, Windows, Elevators. And, of course, new energy-efficient servers and storage systems for their data center.

At this one location, IBM has since enjoyed more than \$1 million per year in net energy savings.

Company-wide since 1991, energy efficiency alone has enabled IBM to cut its energy bills by 25%. This has saved an estimated 8.2 billion kilowatt hours of energy, enough to power about 1.5 million homes for a year.

IBM's goal for more than 15 years has been to achieve annual savings from energy conservation equal to 4% of its energy use. The company recently added a similar goal specifically aimed at CO₂ emissions.

More profit, less pollution. Could that be your bottom line use a little something extra?

To learn more about profiting from energy efficiency, visit www.coolcompanies.org.

Energy Efficiency. It's Money in the Bank.

IN A SERIES OF CORPORATE PROFILES IN ENERGY EFFICIENCY
David and Lucile Packard Foundation, Los Altos, CA • The Energy Foundation, San Francisco, CA • 415/381-1100

A message from the David and Lucile Packard Foundation and the Energy Foundation



Energy Efficiency Insulates Owens Corning's Bottom Line.

Owens Corning makes its living selling energy savings to others. Its lightweight fiberglass helps automakers lower fuel consumption. Its famous pink insulation helps homeowners reduce their heating bills.

Since 1998, Owens Corning has also been campaigning to cut its own internal energy use. They've instituted a company-wide energy productivity program, called "Mission Possible," that has become a profit center in its own right.

The goal is to reduce energy costs by 20 percent within five years – and they're almost halfway there.

The company has invested more than \$25 million in energy reduction capital projects, which will further reduce energy consumption by 38 million per year.

Owens Corning has still faced large increases in energy prices, but it has been able to offset them in part through these reductions in energy consumption.

There are also incentives for employees to find savings. With no capital investment, simple ideas like reducing water consumption and turning off unused industrial ovens have led to \$2.5 million in annual savings. To top it off, energy savings will reduce Owens Corning's greenhouse gas emissions to the levels contained in the Kyoto protocol to reduce global warming.

More profit, less pollution. In these volatile economic times, could that be your company use a little insulation?

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3M Sticks With Energy Efficiency, Saves \$200M.



- ✓ REDUCED ELECTRICAL DEMAND — SAVED \$800,000
- ✓ UPGRADED LIGHTING SYSTEM — SAVED \$4.3 MILLION
- TOTAL YEAR 2000 SAVINGS — \$16 MILLION!

The company that invented Post-it Notes has an important reminder for all of corporate America: energy efficiency pays.

Energy efficiency has been a profit center for 3M since 1975, yielding more than \$200 million in net savings...\$16 million in 2000 alone.

How do they do it? Each 3M facility has an energy "champion" overseeing a team from manufacturing, maintenance and service engineering. Their goal is to minimize energy input per unit of product.

Upgraded lighting? \$4.3 million in annual cost savings – and elimination of 343 million pounds of carbon dioxide emissions.

More efficient server systems? Upgrading 1,000 of them at corporate headquarters in St. Paul, Minnesota, yielded \$800,000 in annual cost savings.

And eliminated another 15 million pounds of CO₂. 3M is even buying more than a million kilowatt-hours of renewable energy each year for its Austin, Texas manufacturing site.

More profit, less pollution. In these uncertain economic times, should that be your bottom line use a little yellow note?

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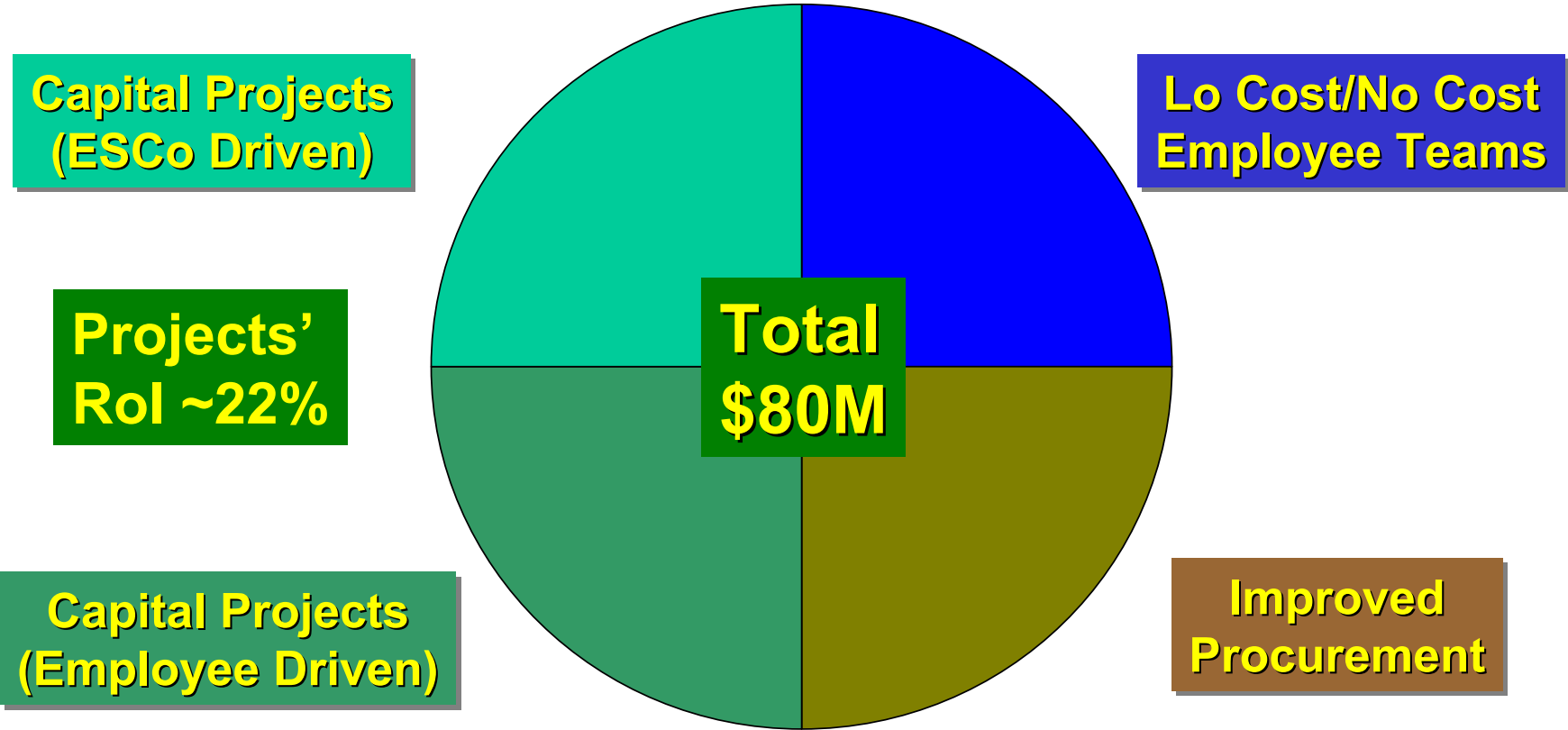
Declared energy to be manageable cost

2003 Results

- Annual energy cost from \$260M to \$220M
- Total capital invested < \$20M
- Substantial emissions reductions
- Vastly improved employee energy awareness
- Increased production 18%
- Absorbed 10% energy price increases
- Energy productivity gain of \$80M
- Peer reviewed by BP and Ontario Hydro
- ***Energy productivity champion plants also had highest quality, waste, safety....***

\$80M Productivity...way more to go!

Source of Productivity Gains



**Capital Projects
(ESCo Driven)**

**Lo Cost/No Cost
Employee Teams**

**Projects'
RoI ~22%**

**Total
\$80M**

**Capital Projects
(Employee Driven)**

**Improved
Procurement**

Three quarters from employee teams!



The game continues..

- Ruthless pursuit of energy productivity
- “Plant-of-the Future” Pilots
 - *Raise energy productivity another 30%*
 - *Explore all options*
 - *Efficiency, renewable, cogeneration*
 - *Green incentives etc.*
- Manage Greenhouse Gas worldwide
 - *System wide spotlight on productivity*
 - *Potential new cash-flows*
- Suppliers and Customers
 - *Manage energy productivity along the value chain*
 - *Avoid cost and discounts*

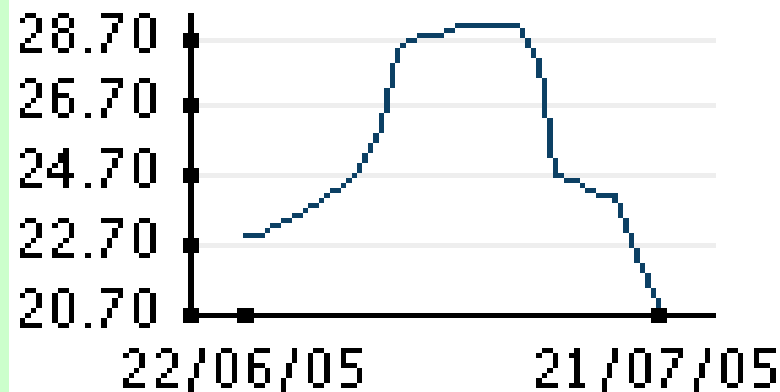
Energy Productivity is a Management Muscle

Carbon Mitigation Value Emerging

New cash flows from energy productivity?

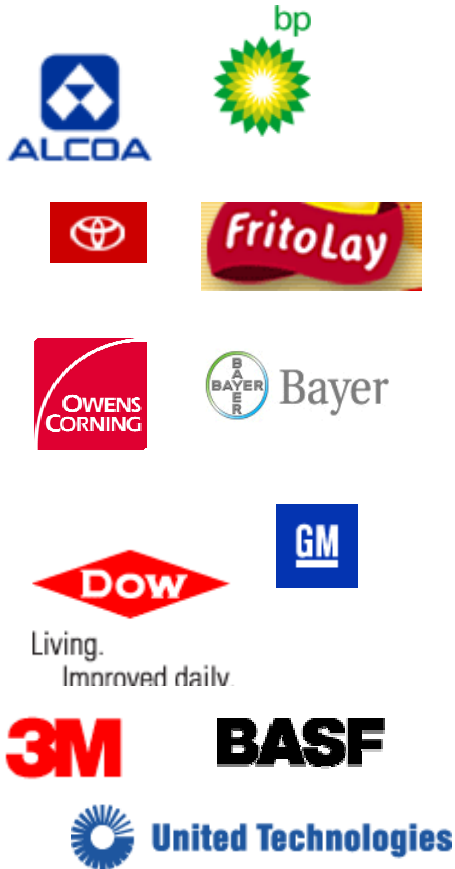
Pricing of EUA

21 July 2005
EUA 2005
(€/tCO₂)
€20.99



Approximately ~\$23 per metric ton

Energy Management Best Practices



- High level sponsorship
- Strategic business issue
- Clear energy leadership
- Integrated energy strategy
- Global climate change strategy
- Goals and accountability
- Core to competitiveness
- Common global metrics
- Measure and communicate
- Bar constantly raised
- Peer review process
- 20% -30% productivity advantage

The Story Doesn't Change

In closing

***Energy is a manageable cost...
not an act of God!***

Energy is a competitive opportunity....



Winners manage it effectively!

Thank You

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