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

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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

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**Various US/EU Sources – 2002 Estimates*

Global Energy Background
New realities

- Highest energy prices in history
  - *Sustained upward trends*
  - *US rising faster than EU*
- High US energy intensity *($ Energy / $ 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

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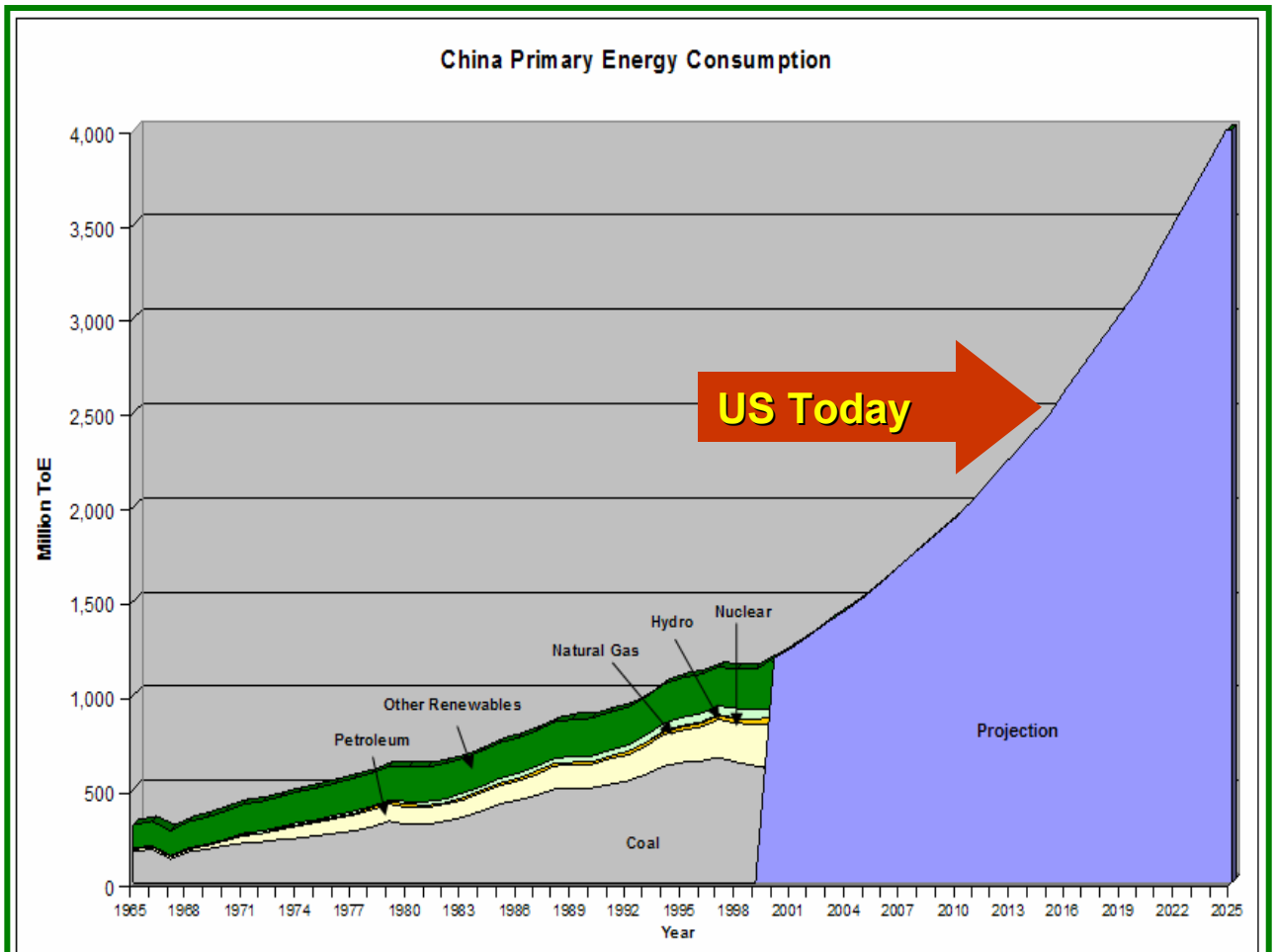
China industrializes
The new energy customer



Strategic impact on pricing?

Sources:
BP Statist
EIA Intern
Projection based on IMF 5% GDP Growth Rate

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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
- CO_2 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

CO_2 reduction increasingly in policy

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Greenhouse gas levels over last 160,000 yrs*

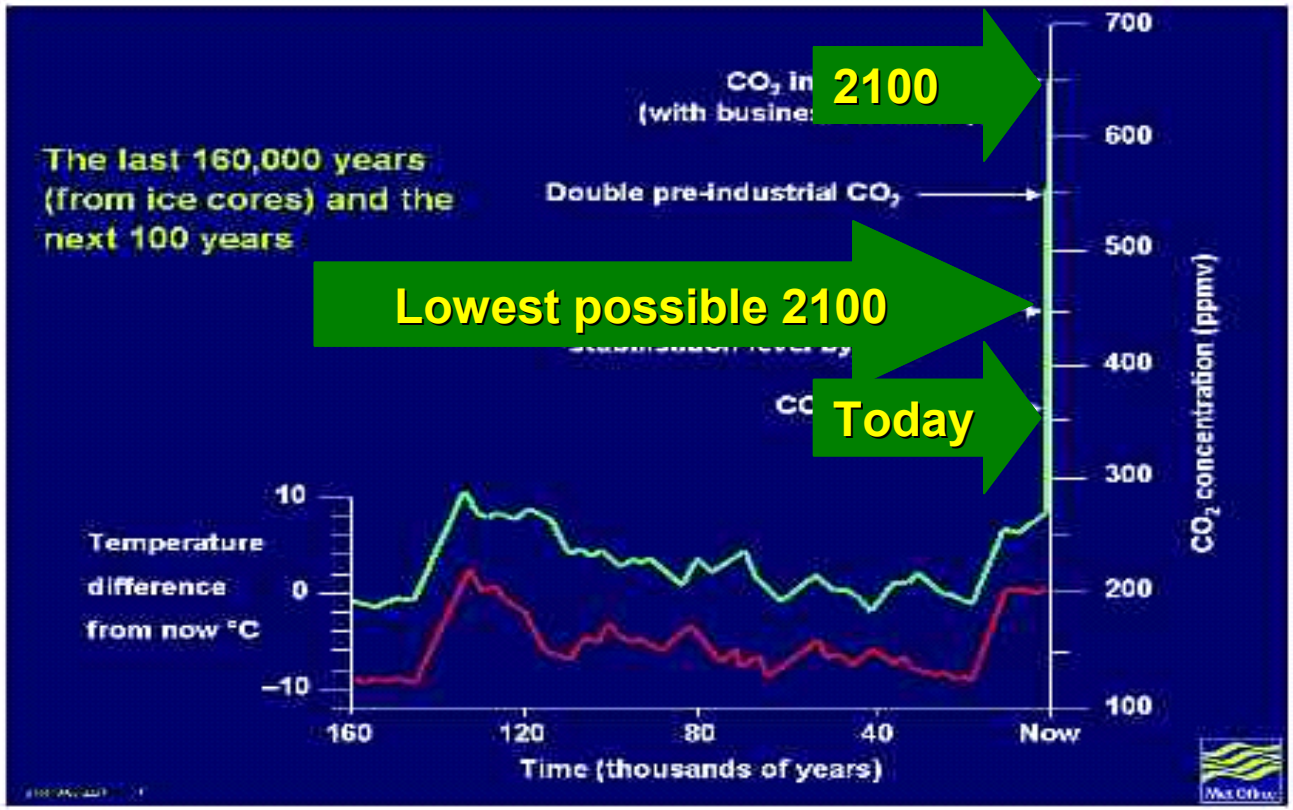

Figure 5. Atmospheric temperature and carbon dioxide concentration as measured from the Vostok ice core from Antarctica. On the right of the diagram are shown projections of carbon dioxide concentration for the 21st century. The temperature measured by the ice core is an average for the polar region. Changes of global average temperature are about half of those in the polar average.

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* John Houghton – UK Met Office et al

Increased shareholder scrutiny*

Swiss Re

Linking Climate Change to corporate governance

Friends of the Earth GREENPEACE

California Public Employees' Retirement System

- 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

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*Courtesy of Swiss Re

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

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*Source: Pointcarbon.com

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

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**Strategic Energy Management-The State of the Debate– The Conference Board 2004*

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!

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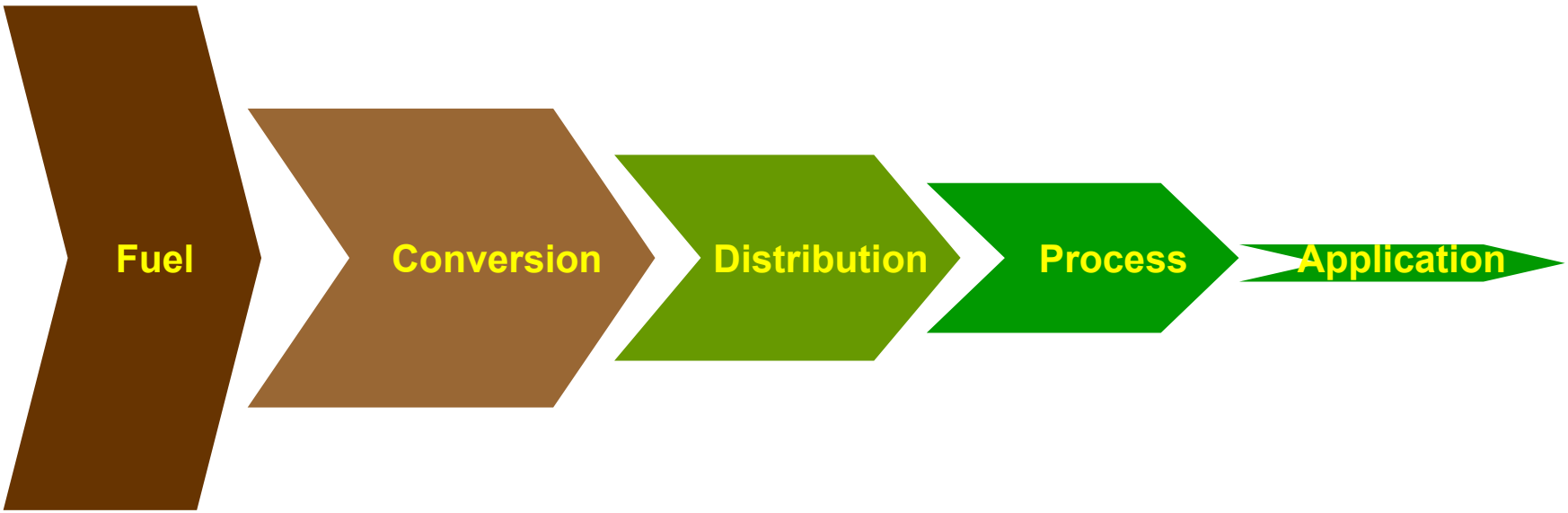
**Indicative ratio of US average to global best practice*

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

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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

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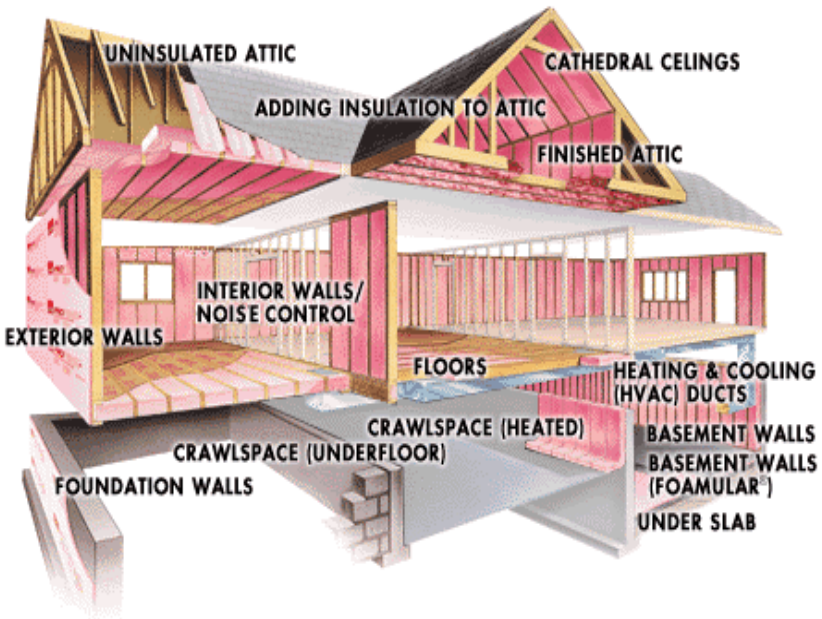
Owens Corning's Experience

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?

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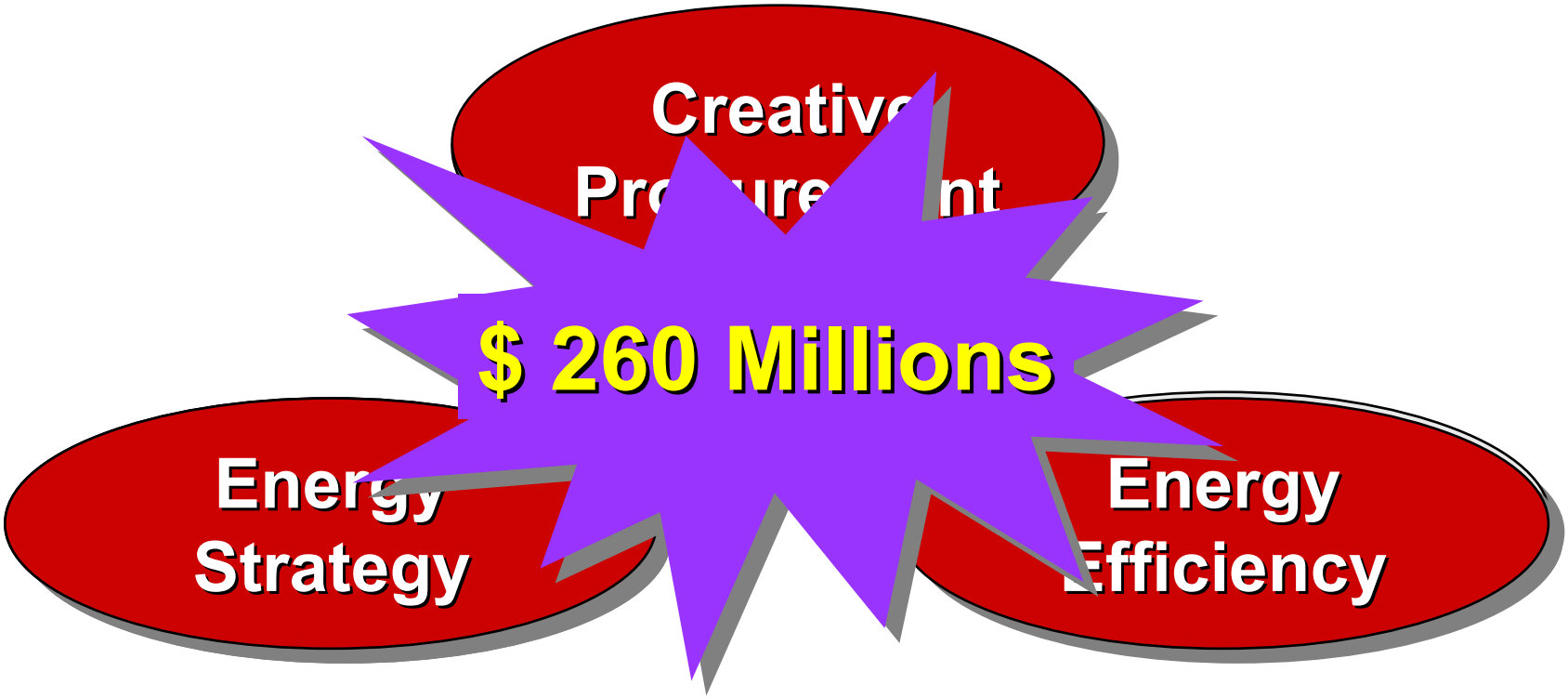
In 1999 declared a new energy game….

Framed on existing waste reduction initiative



Energy Mission: Possible
20% Energy Cost Reduction

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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 !!!

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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

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And have some fun!
Visualising Negawatts!

Recently in Indian plant

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Packard Foundation Award "Cool Company"

Declared energy to be manageable cost

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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!

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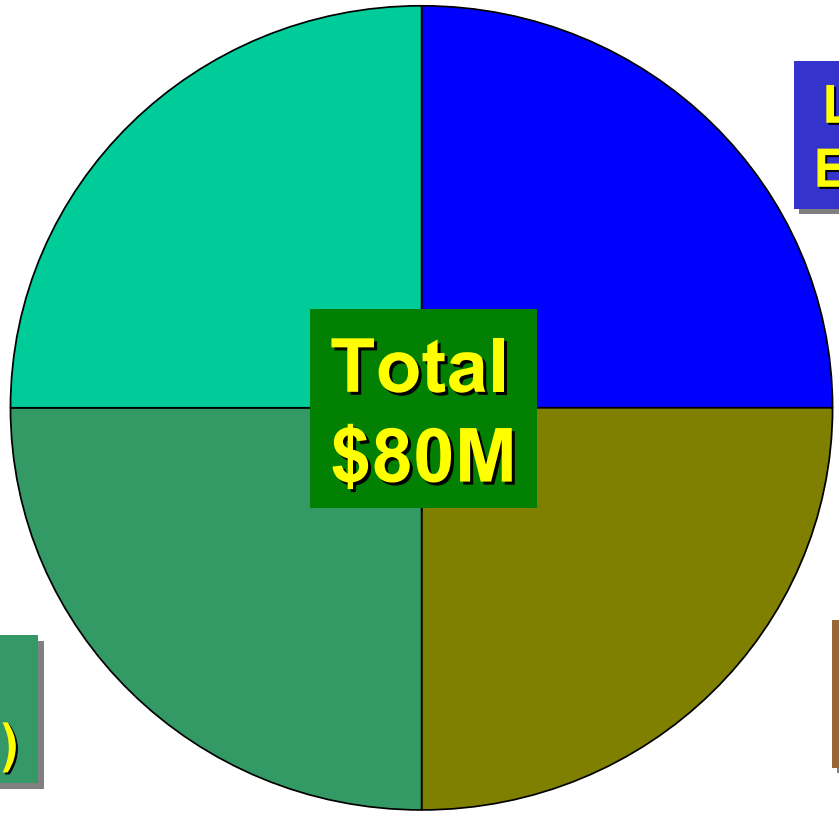
Source of Productivity Gains



Three quarters from employee teams!

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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

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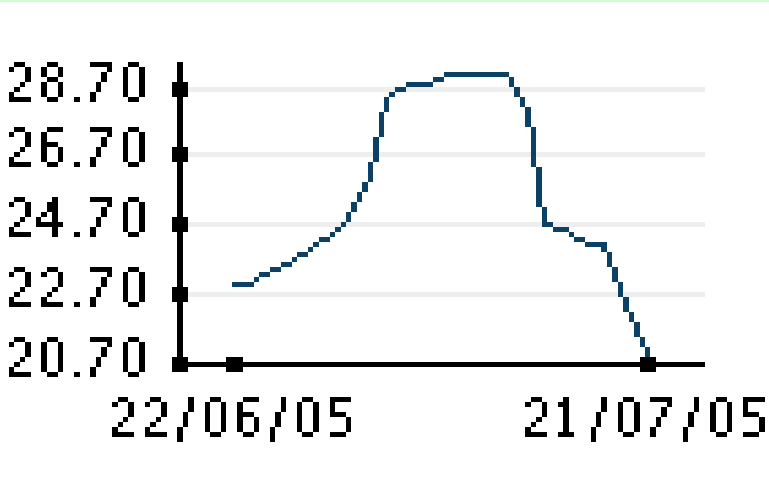
Carbon Mitigation Value Emerging
New cash flows from energy productivity?

Pricing of EUA

21 July 2005
EUA 2005
(€/tCO2)
€20.99



Approximately ~$23 per metric ton

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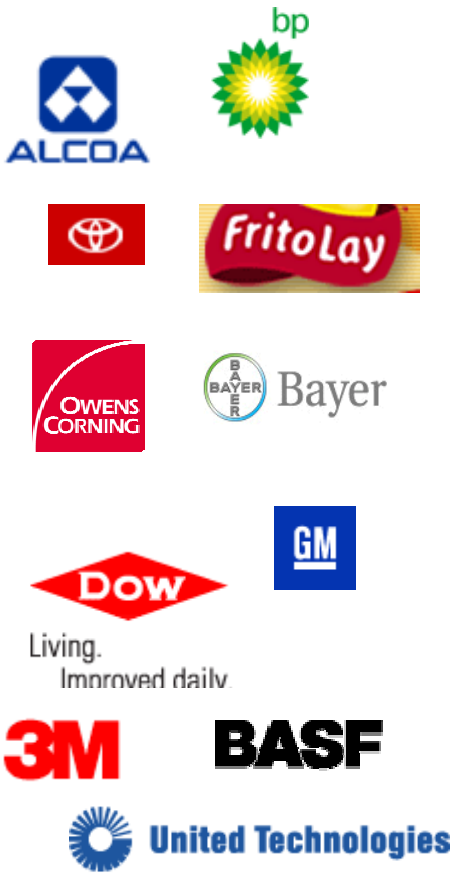
*Source: Pointcarbon.com

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

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In closing

Energy is a manageable cost…
not an act of God!

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Energy is a competitive opportunity....

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Thank You

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