

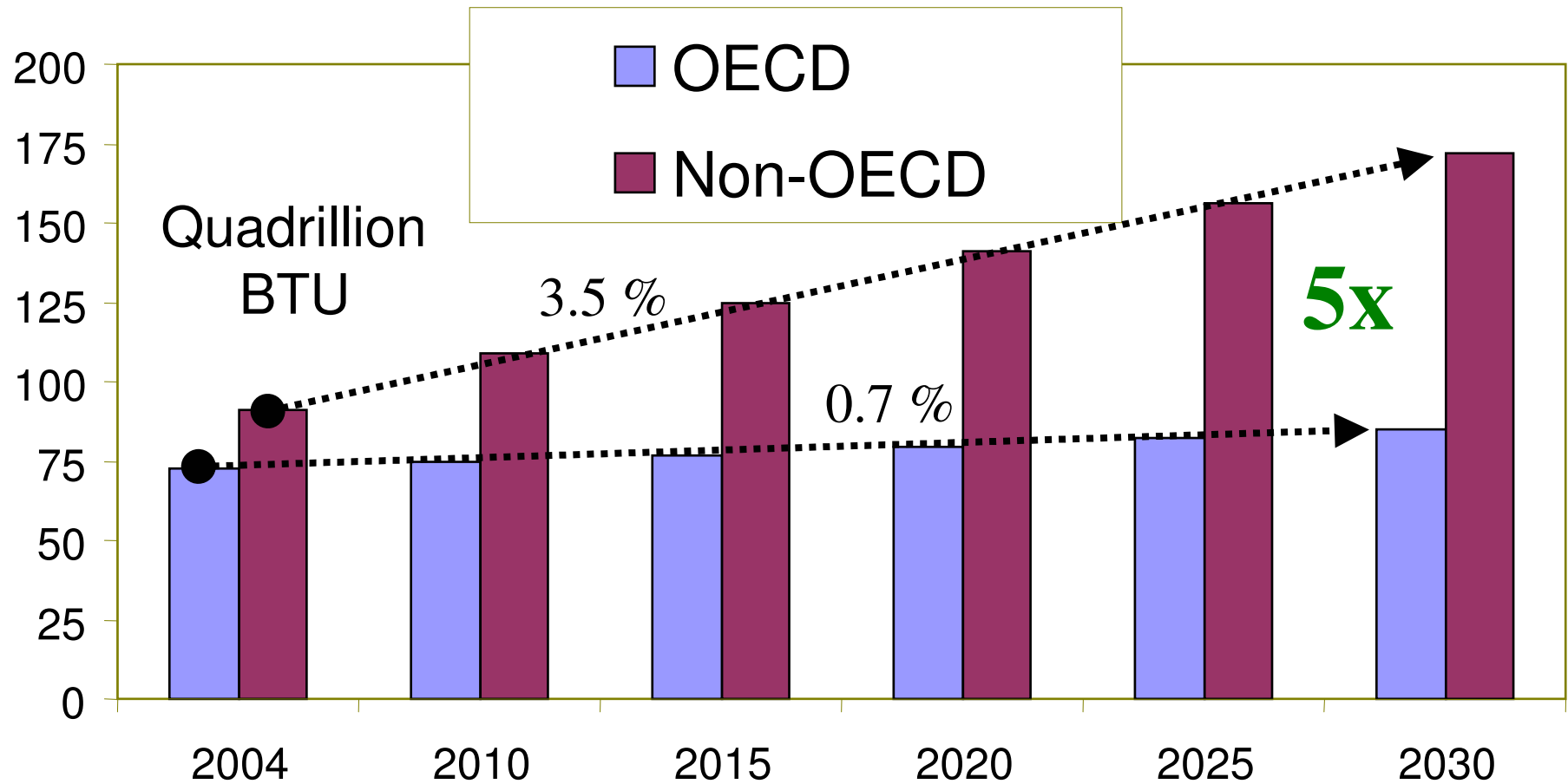
Justification & Best Practice Strategies for Energy Teams

Lake States TAPPI
Energy Forum
May 14, 2008

Tim Dantoin
Industrial Energy Advisor
Focus on Energy

Energy in Perspective

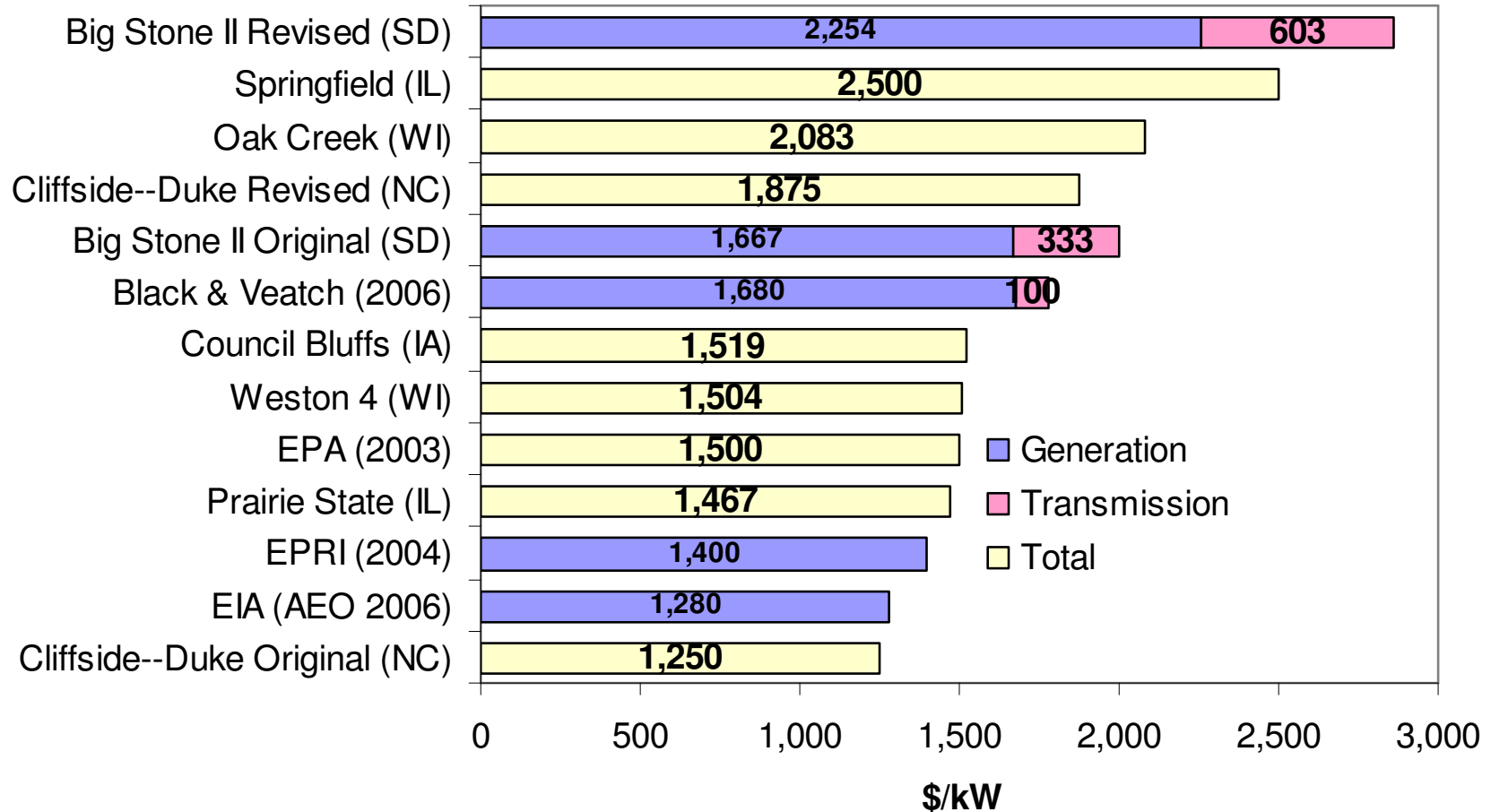
Projected Worldwide Consumption



Source: EIA International Energy Outlook 2007

Cost of New Coal Power Plants

New pulverized coal capital costs



Source: American Council for Energy Efficient Economy (ACEEE)



5 Years in Iraq
Reuters five years of Iraq war coverage in video, pictures and more
[Bearing Witness >](#)

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Leading Wall Street Banks Establish The Carbon Principles

Mon Feb 4, 2008 8:30am EST

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Guidelines to strengthen environmental and economic risk management in the financing and construction of electricity generation
NEW YORK--(Business Wire)--

Three of the world's leading financial institutions today announced the formation of The Carbon Principles, climate change guidelines for advisors and lenders to power companies in the United States. These Principles are the result of a nine-month intensive effort to create an approach to evaluating and addressing carbon risks in the financing of electric power projects. The need for these Principles is driven by the risks faced by the power industry as utilities, independent producers, regulators, lenders and investors deal with the uncertainties around regional and national climate change policy.

EDITOR'S CHOICE



“...an approach to evaluating and addressing carbon risks in the financing of electric power projects.”

Government Suspends Lending for Coal Plants

Risks Cited To Economy, Environment

By Steven Mufson

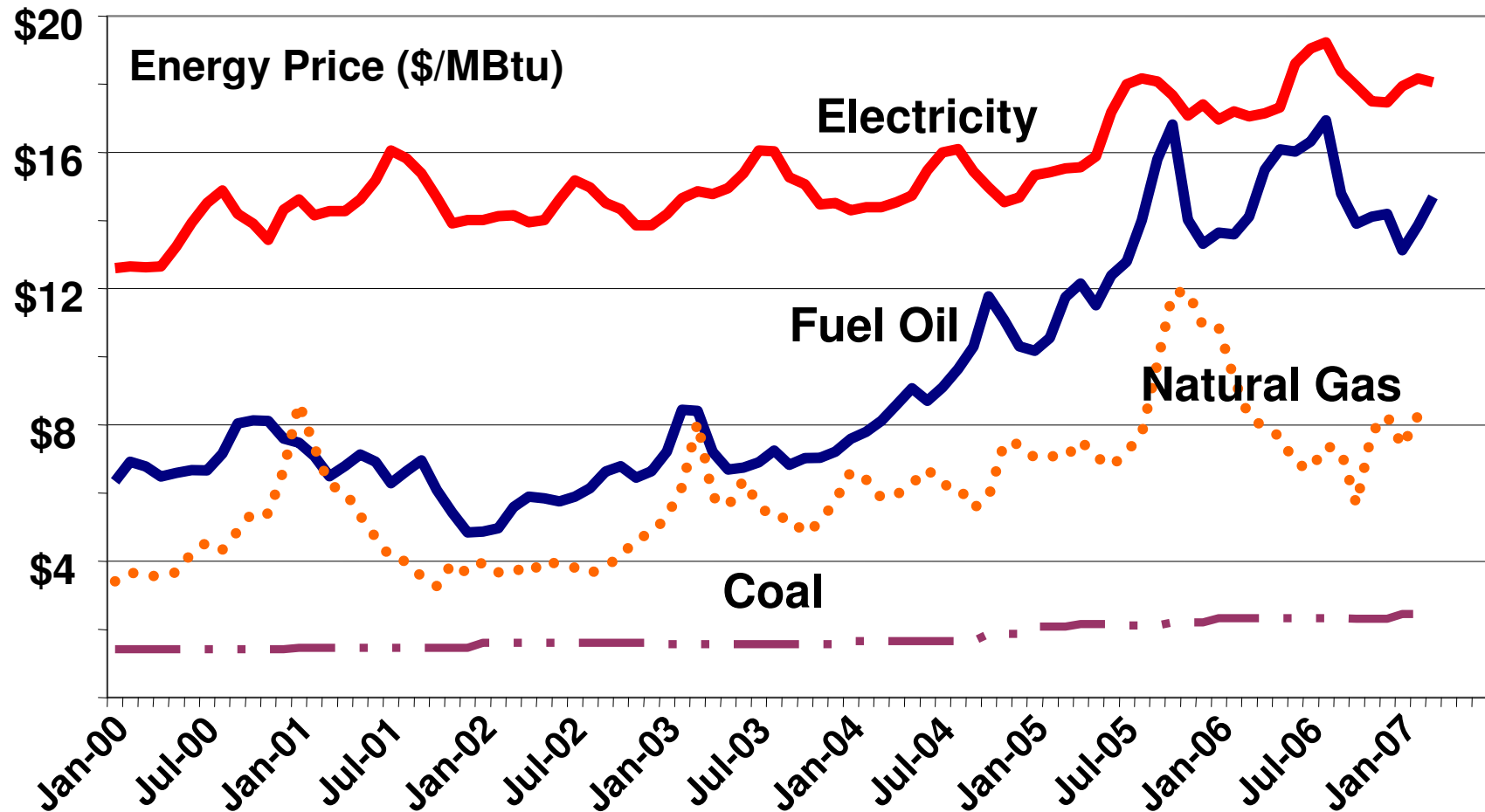
Washington Post Staff Writer

Thursday, March 13, 2008; D01

The [Agriculture Department](#) has suspended a low-interest lending program for rural electric cooperatives seeking federal assistance to build new coal-fired power plants, the department's [Rural Utilities Service](#) said in a letter to a congressional committee.

“The agency also conceded yesterday that it had not considered potential costs that could result from climate-change legislation...”

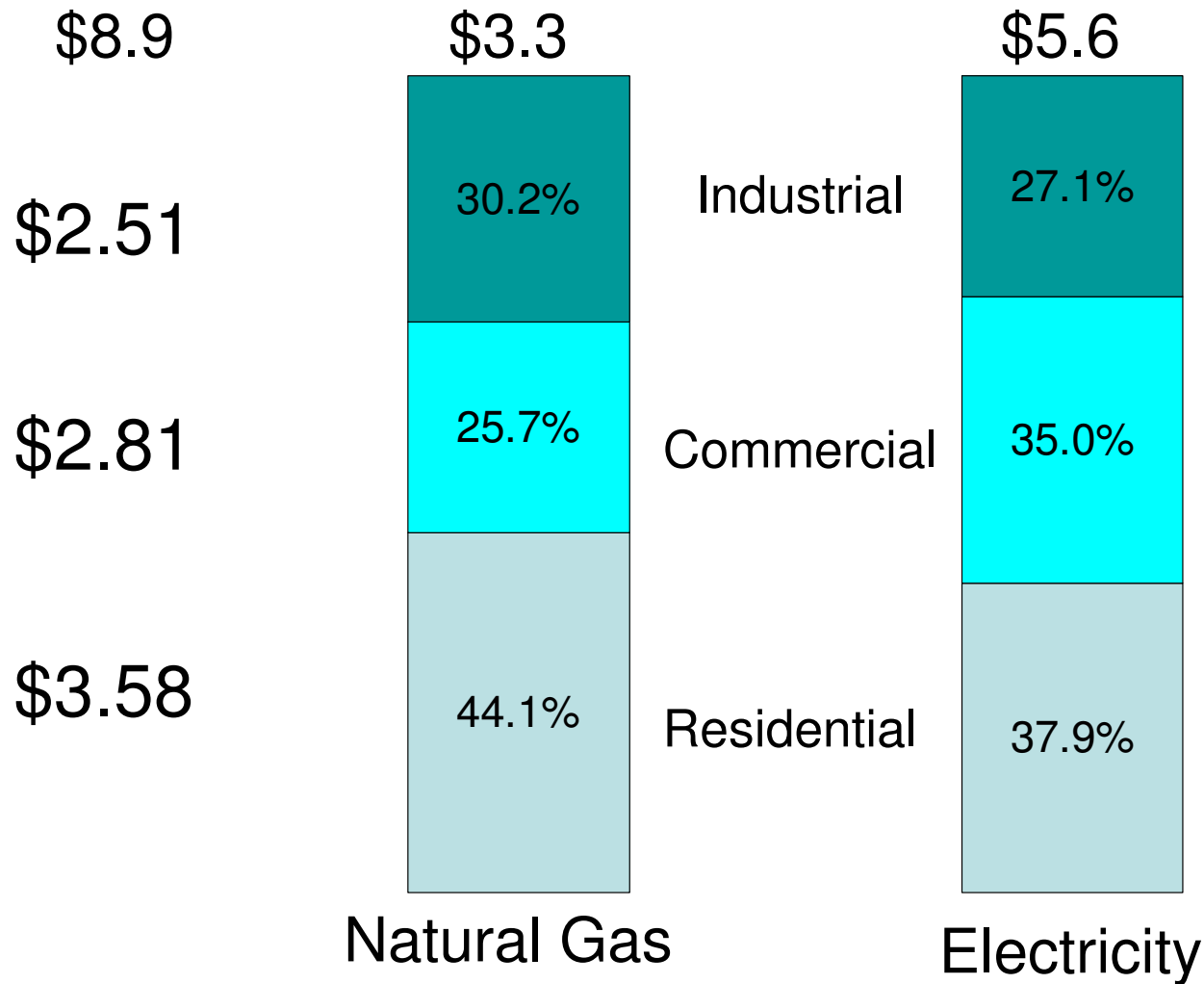
Energy Prices & Volatility



Source: ACEEE from EIA 2007

Wisconsin Energy Expenditure

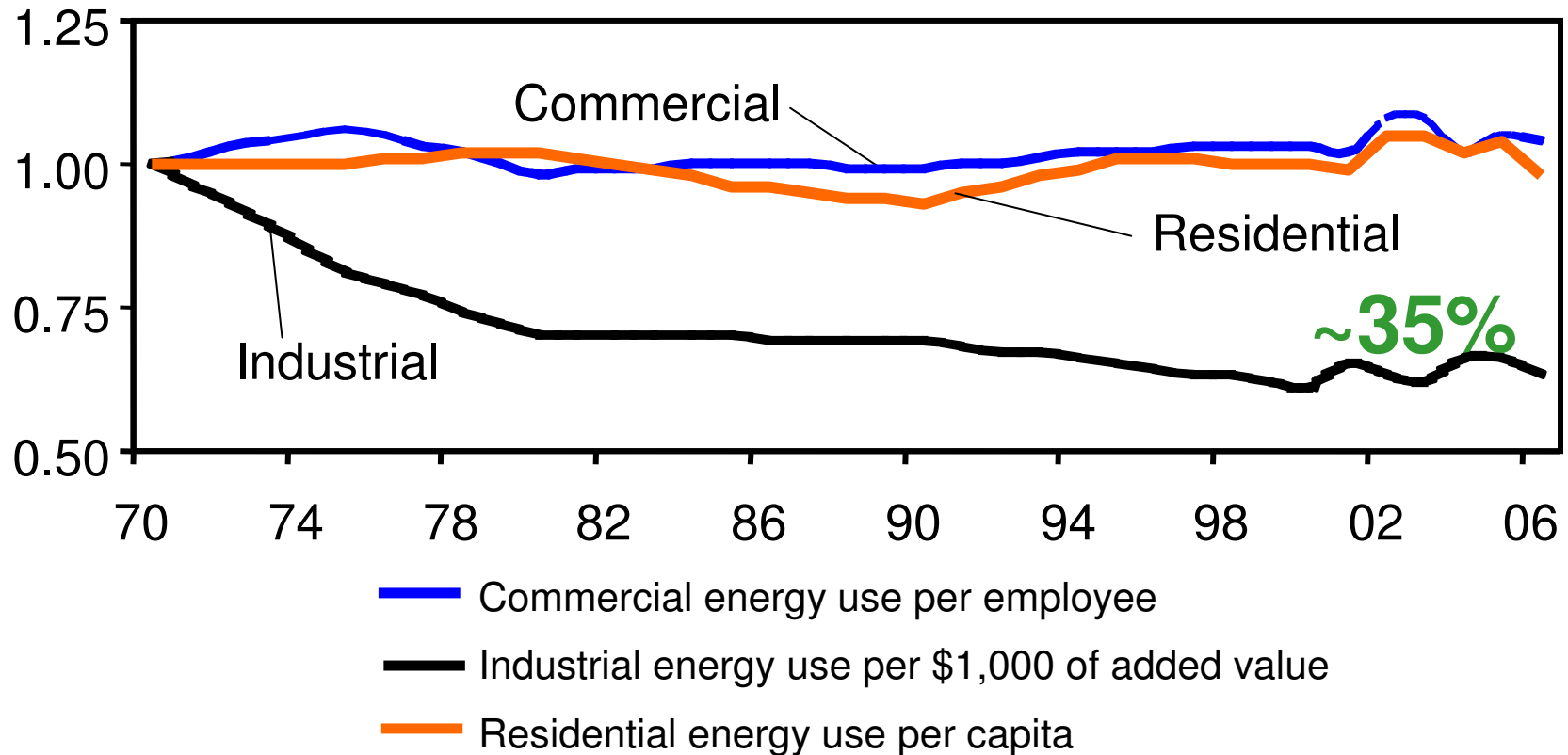
\$ billions (2006)



Source: Wisconsin Office of Energy Independence

Energy Efficiency in Wisconsin

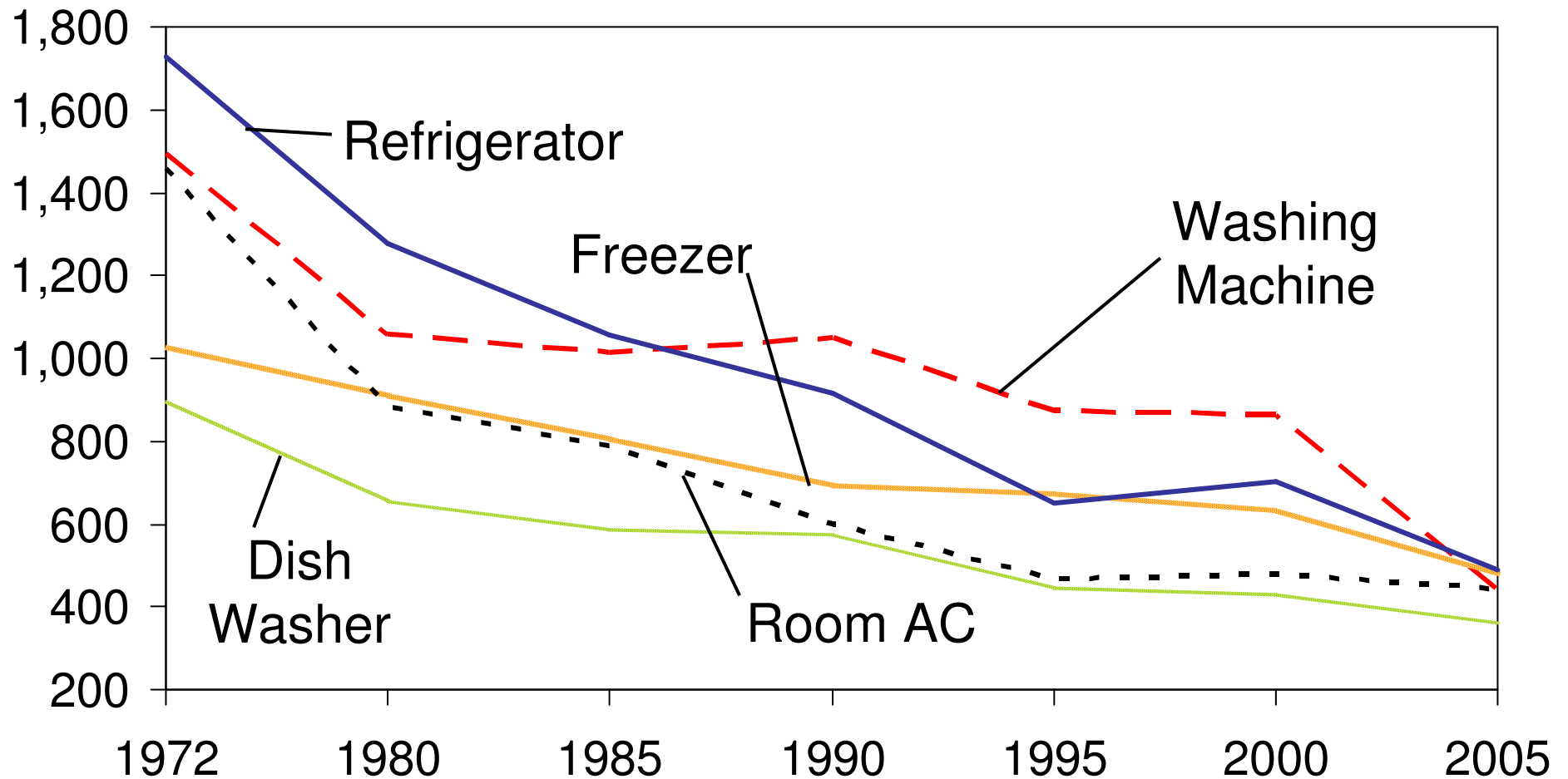
Index: 1970 = 1.0



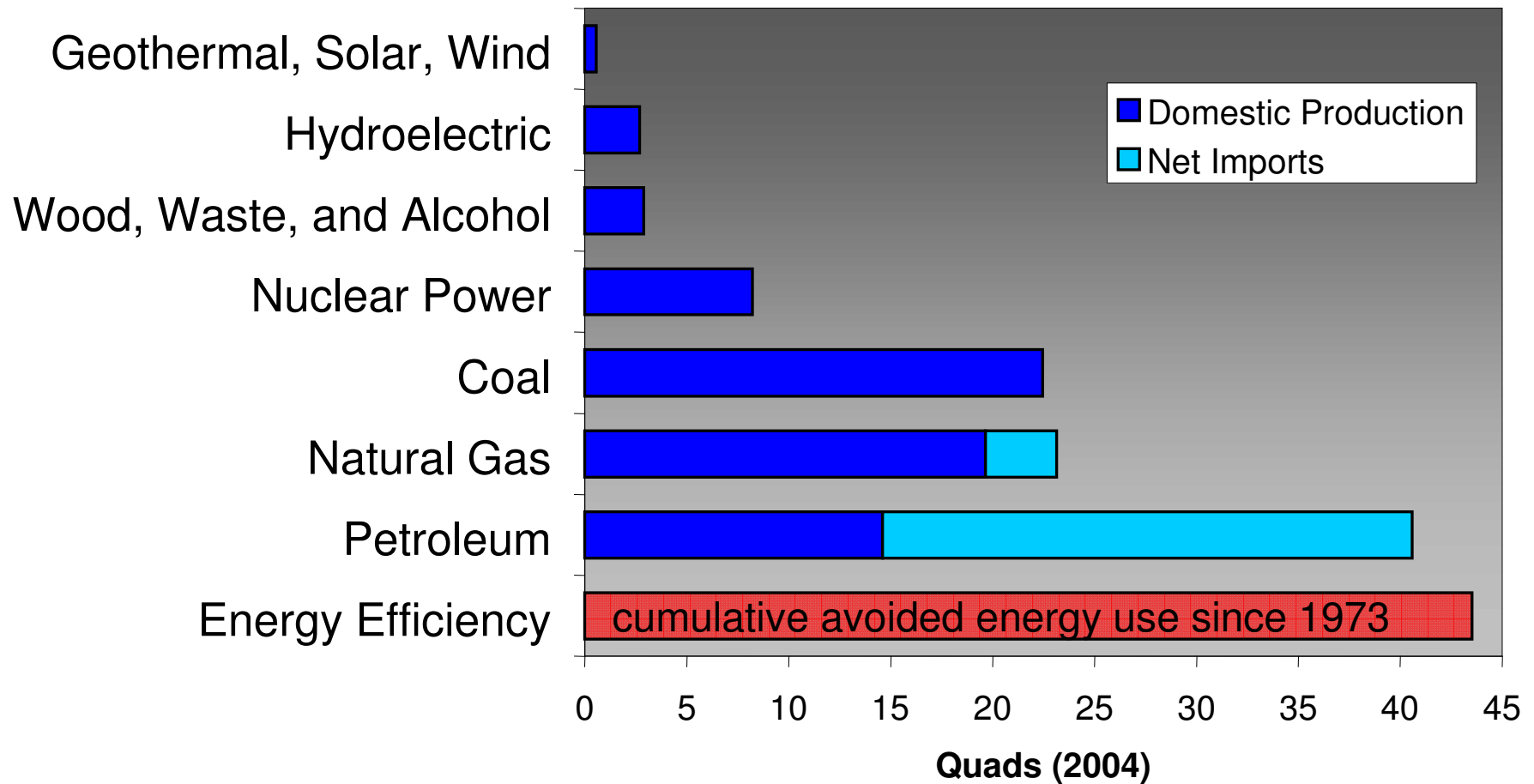
Source: Wisconsin Office of Energy Independence

Energy Consumption by Appliance

kWh per Year



Efficiency as a Resource



Source: Alliance to Save Energy

Room To Improve

- Survey of 1,250 Executives & Senior Managers
- Energy on average accounted for 9% of business costs
- 79% believe prices will increase in next 12 months
- 42% did not know their gas or electric expenditures
- 60% expect to use capital or operating \$\$ on EE
- 61% expect to see no reduction in energy spend
- 60% say they pay more attention than 5-years ago
- 18% say they allow longer payback than 5-years ago

Focus on Energy

Mission

Improve energy efficiency in Wisconsin by supporting customer energy efficiency projects that...

...[otherwise would not get completed](#)

Focus on Energy

Available Assistance

Technical Assessments

- Facility-wide
- Site-specific
- Project-level

Training & Education

- Building Operators Cert.
- Systems (e.g. lighting or pools)
- Energy Management

Financial Incentives

- Prescriptive Incentives
- Custom Incentives
- Study Grants
- Service Grants
- New Construction
- Renewable

Energy Efficiency ~~Typical Approach~~ Management

Typical Approach

- Understand Energy Uses
 - Generate EE Ideas
 - Quantify Opportunities
 - Select Projects
 - Provide Justification
 - Gain Approval
 - Implement Projects to Save \$\$
- Communication
- Planning
- Goals
- Awareness
- Support
- Performance Tracking
- A purely technical focus goes only so far
-

Energy Management

Practical Approach

...in Theory

...in Practice

- Management Commitment... ...Management Concern
 - Energy Champion... ...Another “Hat” for Someone
 - Energy Policy... ...Nice Words – No Teeth
 - Energy Team... ...Another &*#@ Meeting !!
- Measure & Monitor... ...No Payback on Sub-Meters
- Report & Communicate... ...Monthly Actual vs. Budget
- Set Energy Savings Goal... ...Based on What ?
 - Implement Projects... ...No Support

Energy Management

Characteristics of Effective Programs

- Strong leadership & resource allocation
- Corporate culture that recognizes value of EE
- Sub-metering & internal energy cost allocation
- Energy assessment of all capital projects
- “On the fly” production adjustments for EE

Source: Kamen, James A. 2002. “Energy Management Practices Provide Manufacturing Advantage”. *Energy User News*.



Practical Energy Management©

- A continual improvement strategy for energy management
- Turnkey package of calc sheets, forms & strategies for use by energy teams
- Integrates energy into existing business practices
- Compatible with Six-Sigma, TS 16949, ISO 14001 and Lean Manufacturing

Practical Energy Management

8 Sections

- Management Plan
- Facility Profile
- Energy Use Profile
- Best Practices
- Project Prioritization
- Project Management
- Key Indicators
- Continual Improvement

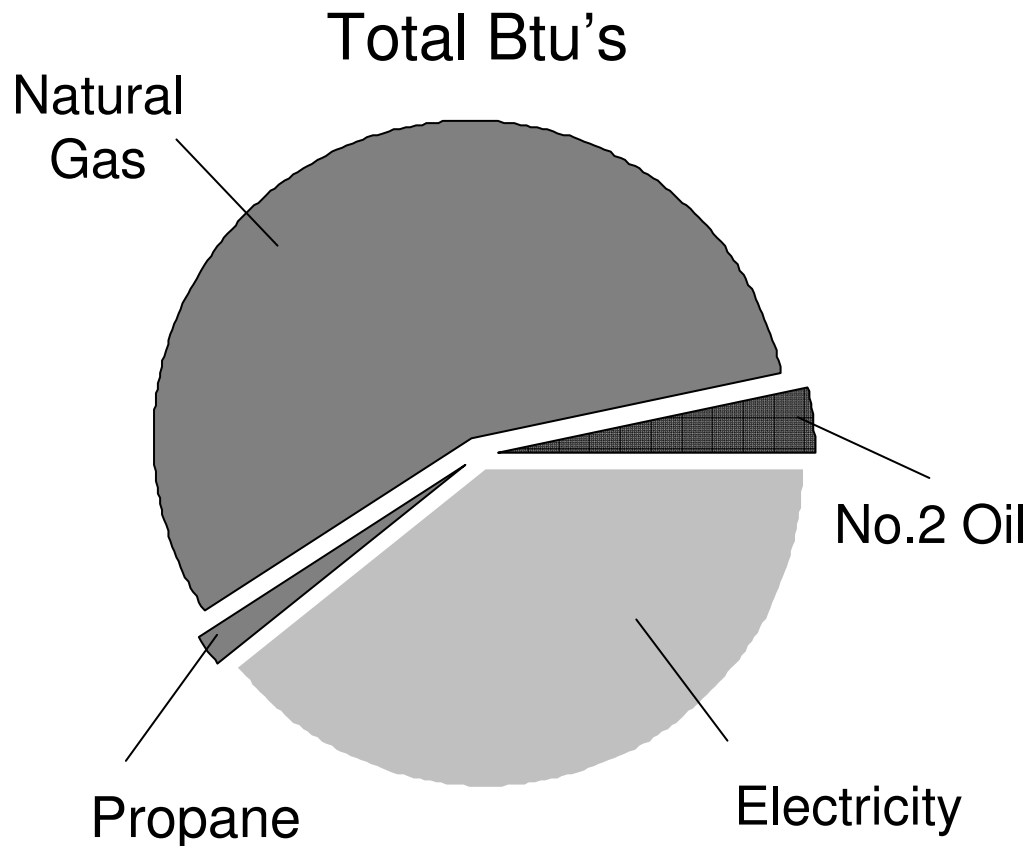
Practical Energy Management

8 Sections

- **Management Plan**
An organized approach to continually improving your energy management program
- **Project Prioritization**
A systematic method for tracking and ranking individual projects and summarizing overall energy savings and environmental impacts

Facility Profile

Energy in Business Context

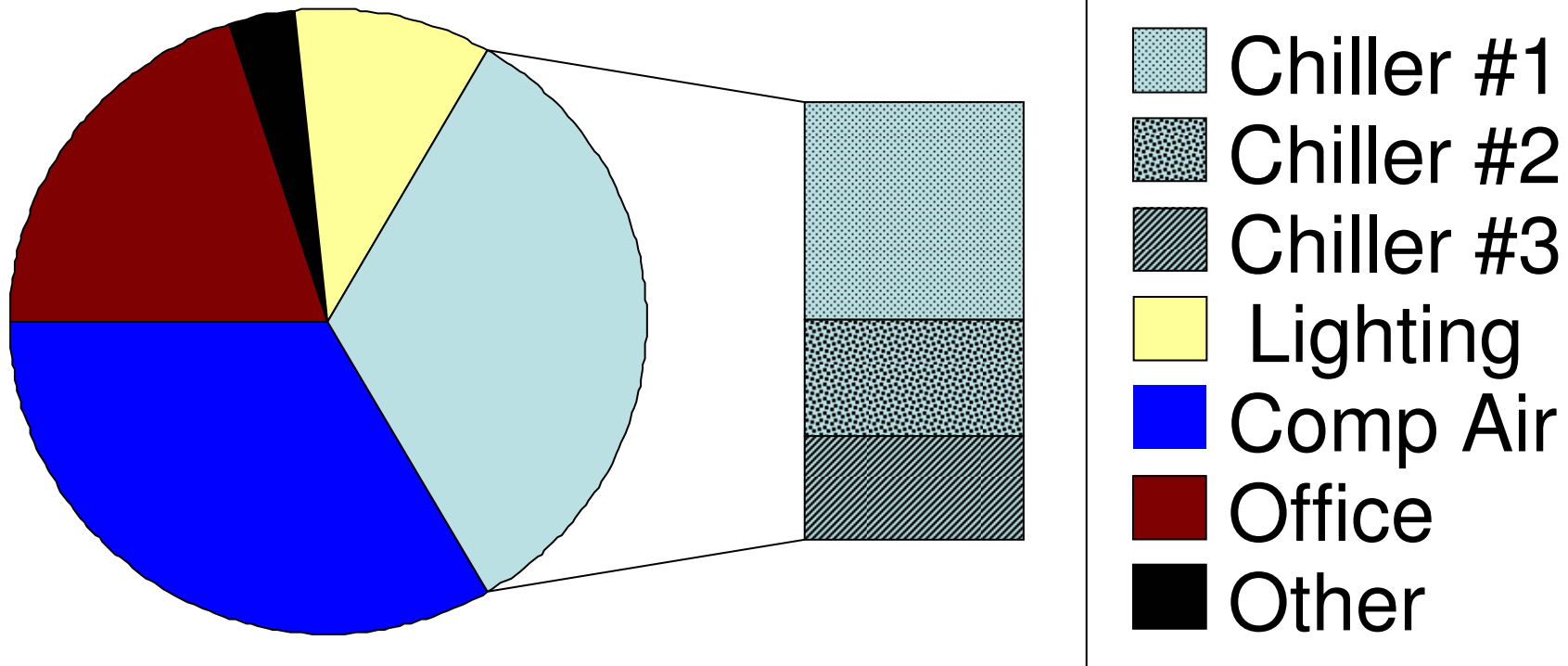


| Key Performance Indicators | 2006 (Annualized) |
|--|----------------------|
| Lbs Resin | 408,858 |
| Electric \$ p Lbs Resin | \$2.76 |
| Electric MMBtu p Lbs Resin | 0.180 |
| Gas \$ p Lbs Resin | \$2.53 |
| Gas MMBtu p Lbs Resin | 0.339 |
| Tot Energy \$ p Lbs Resin | \$5.29 |
| Water \$ p Lbs Resin | \$0.52 |
| Business Indicators | 2006 (Annualized) |
| Total Energy Cost | \$2,164,782 |
| Operating Costs | \$15,000,000 |
| Energy as % Oper. Costs | 14.43% |
| Total Facility Costs | \$33,500,000 |
| Energy as % TF Costs | 6.46% |
| Annual Profits | \$3,450,000 |
| Energy as % of Profits | 62.75% |
| % Increase in Profits with 5% Reduction in Energy Costs | 3.14% |

Equipment Use Profile

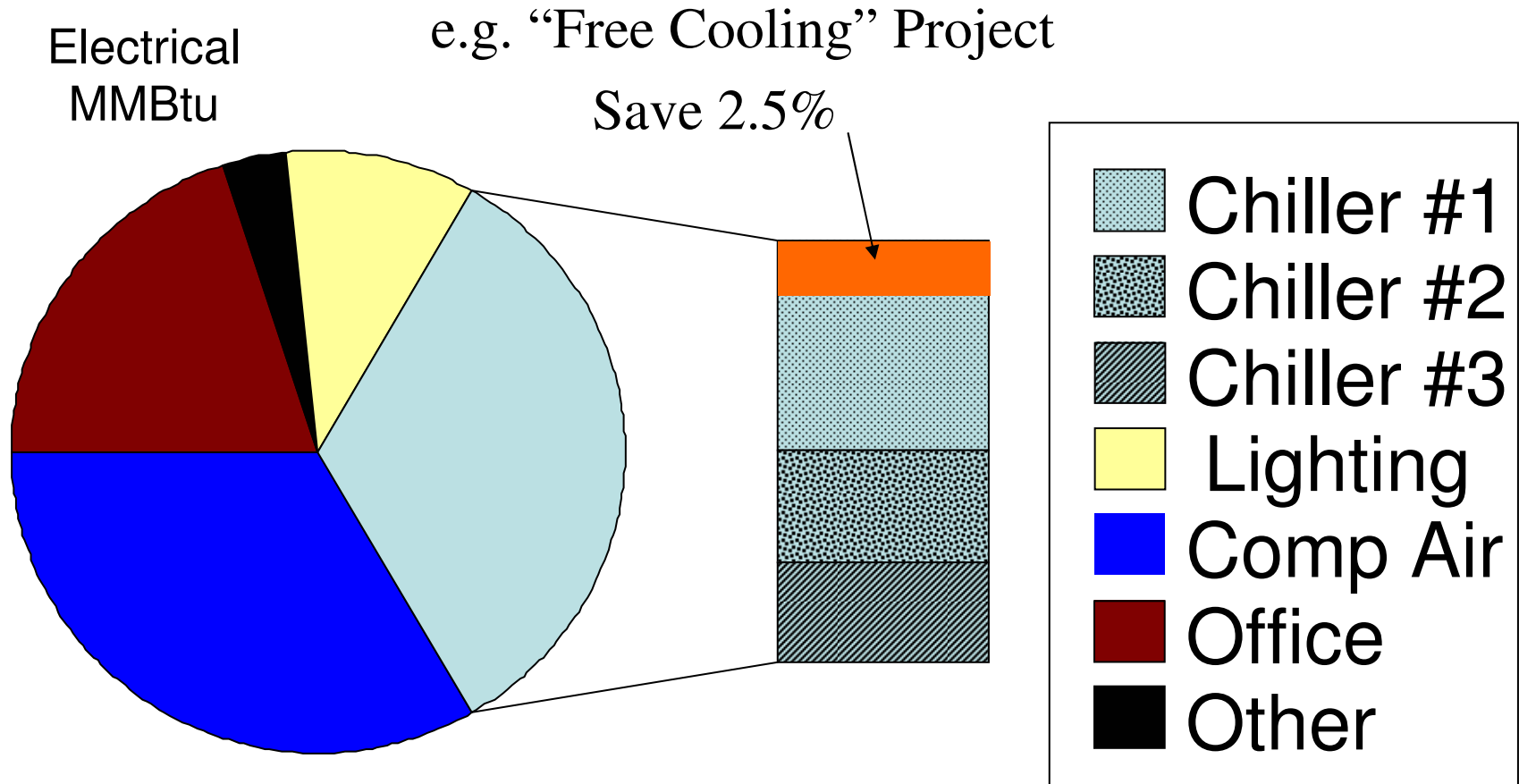
Estimating Energy Uses

Electrical
MMBtu



Best Practices

Finding Opportunity



| 1 | A | B | C | D E F G H | | | | | I | |
|----|----------------|---|--------------------|-------------------------|--------------|------------------------------|----------------|---------------|------------------|-----|
| | | | | Prioritization Criteria | | | | | | |
| 2 | Project Number | Project Description | Project Status | Simple Payback | Project Cost | Ease of Installation | Other Benefits | Priority Rank | (e.g.) | |
| 3 | | | criteria weight--> | 40% | 30% | 15% | 15% | 100% | | |
| 4 | 31 | VFD & Smaller Motor on SW Kraft Pump | In Process | 100 | 100 | Medium | Medium | 89.80 | Waiting | |
| 5 | 27 | Pulp Warehouse Lighting | In Process | 50 | 75 | High | High | 72.50 | Comp | |
| 6 | 1 | VFD on Finishing Dept Trim Blowers | Scoping | 75 | 50 | High | Medium | 69.90 | Currentl duct | |
| 7 | 38 | Air Compressor System Optimization | Scoping | 75 | 25 | Medium | Medium | 57.30 | | |
| 8 | | | | | | | | | | |
| 9 | 11 | Convert all 140 psi unit heaters to 40 psi steam. | Identified | -10 | -10 | Medium | Medium | 12.80 | Also v | |
| 10 | 15 | Economizer on #3 Boiler | Identified | -10 | -10 | Medium | Medium | 12.80 | One of | |
| 11 | | | | | | | | | | |
| 12 | 30 | Shut Down Wire Pit Pump | Done | 100 | 100 | High | Medium | -100.00 | | |
| 13 | 36 | 600 Ton Pulp Storage Tower | Done | 100 | 100 | Medium | Medium | -100.00 | | |
| 14 | | | | | | | | | | |
| 15 | 38 | <== Last Project Number Used | | | | | | | | Sav |
| 16 | | | | | | | | | | |
| 17 | "Left Side" | | | | | Priority Rank Threshold=> | 50 | ====> | Project | |

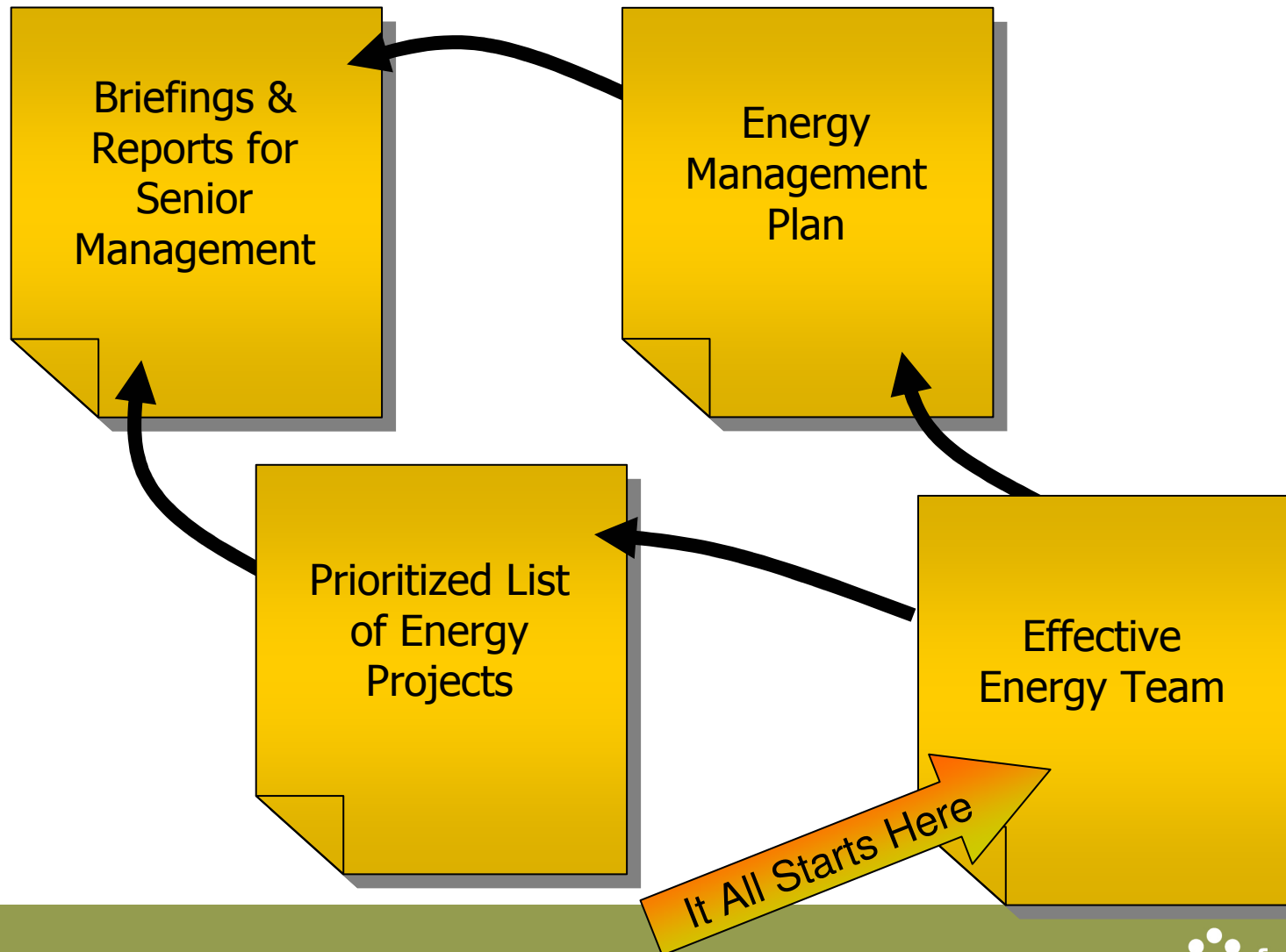
| G | | H | I | J | K | L | M | N | O |
|---|---------------|---|--|------------------------------|------------------------------|---------------------------|-----------------------------|------------------------|---|
| eria | | | Comments (e.g. other benefits or installation issues) | Project Information | | | | | |
| Other Benefits | Priority Rank | Electric Consump. Savings (kWh) | | Electric Demand Savings (kW) | Natural Gas Savings (therms) | Annual Dollars Saved (\$) | Estimated Project Cost (\$) | Simple Payback (Years) | |
| 15% | 100% | | | | | | | | |
| Medium | 89.80 | Waiting for spare equip from 600 ton tower project | 53,128 | 6.08 | 0 | \$2,550 | \$1,000 | 0.39 | |
| High | 72.50 | Company opted not to pursue federal accelerated depreciation | 125,956 | 10.79 | 0 | \$6,046 | \$19,030 | 3.15 | |
| Medium | 69.90 | Currently run at full speed in winter to keep duct work from freezing even when equipment is not operating. | 222,645 | 0.00 | 5,184 | \$15,353 | \$33,000 | 2.15 | |
| Medium | 57.30 | | 1,130,443 | 129.05 | 0 | \$54,261 | \$112,229 | 2.07 | |
| Medium | 12.80 | Also will increase electricity generation from steam turbine. | No Data | No Data | No Data | No Data | No Data | No Data | |
| Medium | 12.80 | One of the recommendations in the Boiler Optimization study | No Data | No Data | No Data | No Data | No Data | No Data | |
| Medium | -100.00 | Added per Norm | 106,256 | 12.16 | 0 | \$5,100 | \$1,000 | 0.20 | |
| Medium | -100.00 | | 136,226 | 16.22 | 0 | \$6,539 | \$8,500 | 1.30 | |
| Savings from Quantified Projects | | | 6,867,385 | 839 | 685,362 | \$998,121 | \$1,084,848 | 1.09 | |
| Savings from Completed Projects | | | 701,430 | 72.83 | 0 | \$33,669 | \$15,000 | 0.45 | |
| 50 | ====> | Project Savings Over Priority Threshold | 4,943,296 | 546.16 | 685,362 | \$877,868 | \$767,116 | 0.87 | |

Right Side"


Project Prtzn

| File Edit View Insert Format Tools Data Window Help | | | | | | | | | |
|---|--|------------|------------|-----------------|------------------------------|---------|--------------|------------------|-------|
| | A | B | C | D | E | F | G | H | |
| 1 | Environmental Effects of a Implemented Project(s) | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | Input Assumptions | | | | | | | | |
| 6 | | Annual kWh | | | | Annual | | | |
| 7 | | Saved | | CO2 SUM | | Therms | | | |
| 8 | | | | 4,328,775 | total CO2 lbs avoided | Saved | | | |
| 9 | | 170,078 | | \$5.70 | per metric ton | 300,000 | | | |
| 10 | | 0 | | \$11,215 | Value of CO2 | 0 | | | |
| 11 | | 0 | | | | 0 | | | |
| 12 | Total | 170,078 | | | | 300,000 | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | Total | | | | Total Equivalent | Total |
| 16 | Equivalent Metric | Annual kWh | Conversion | Equivalent | Equivalent Metric | Annual | Conversion | Metric Saved: | Metri |
| 17 | Description: Electric | Saved (9) | Factors: | Metric Saved: | Description: Gas | Therms | Factors: Gas | Annual Gas | An |
| 18 | | | Electric | Annual Electric | | Saved | | Benefits | Pr |
| 19 | CO2 (lbs.) (1) | 170,078 | 2.4 | 408,187 | CO2 (lbs.) | 300,000 | 11.71 | 3,512,400 | |
| 20 | NOx (lbs.) | 170,078 | 0.0064 | 1,088 | Nox (lbs.) | 300,000 | 0.01 | 3,000 | |
| 21 | SO2 (lbs.) | 170,078 | 0.0108 | 1,837 | SO2 (lbs.) | 300,000 | 0.00 | 18 | |
| 22 | HG (lbs.) | 170,078 | 3.73E-08 | 0 | HG (lbs.) | 0 | 0.00 | 0 | |
| 23 | No. of Homes (2) | 170,078 | 9.960E+03 | 17 | No. of Homes | 300,000 | 973.00 | 308 | |
| 24 | Residential (\$ Saved) (3) | 170,078 | 0.0847 | 14,406 | Residential (\$ Saved) | 300,000 | 0.85 | 256,110 | |
| 25 | Business (\$ Saved) | 0 | 0.0540 | 0 | Business(\$ Saved) | 0 | 0.58 | 0 | |
| 26 | Renewable (\$ Saved) | 0 | 0.0847 | 0 | Renewable (\$ Saved) | 0 | 0.85 | 0 | |
| 27 | Tons of Coal (4) | 170,078 | 0.0005000 | 85 | Tons of Coal | 0 | 0.00 | 0 | |
| 28 | Coal Cars (5) | 170,078 | 0.0000050 | 1 | Coal Cars | 0 | 0.00 | 0 | |
| 29 | Jobs Years Created (6) | 170,078 | 4.46E-06 | 1 | Jobs Created | 300,000 | 0.00 | 0 | |
| 30 | Personal Income (\$) | 170,078 | 7.78E-02 | 13,233 | Personal Income (\$) | 300,000 | 0.00 | 0 | |
| 31 | Sales Generated (\$) | 170,078 | 3.25E-01 | 55,338 | Sales Generated (\$) | 300,000 | 0.00 | 0 | |
| 32 | CO2 (tons) | 170,078 | 1.20E-03 | 204 | CO2 (tons) | 300,000 | 0.00 | 0 | |
| 33 | Barrels of Oil (7) | 170,078 | 1.97E-03 | 334 | Barrels of Oil | 300,000 | 0.02 | 5,172 | |
| 34 | Cars | 170,078 | 1.62E-04 | 27 | Cars | 300,000 | 0.00 | 255 | |
| 35 | Stoughton (Yrs.) (8) | 170,078 | 59,448,000 | 0.00 | | | | | |
| 36 | Shawano (Yrs.) | 170,078 | 31,075,000 | 0.01 | | | | | |

Practical Energy Management



Effective Energy Teams

- Leader usually has personal convictions on enviro. & energy
- Develop clear action plans that are regularly updated
- Address both technical and management aspects of energy
- Act as opportunities arise
- Measure existing conditions & impact of change
- Engage other employees as needed
- Focus on continual improvement
- Have effective meetings 

Effective Team Meetings

- ✓ Meet frequently for no more than 1 hour
- ✓ Set and keep a fixed day and time (e.g. 2nd Tuesday)
- ✓ Maintain meeting “pace” (i.e. don’t dwell on one subject)
- ✓ Members define next project task & due date
- ✓ Spread task responsibilities (burn-out vs. buy-in)
- ✓ Rotate responsibility for new efficiency ideas
- ✓ Do NOT invite vendors to meetings
- ✓ Use laptop & projector for real-time notes & calcs
- ✓ Address continual improvement (i.e track & communicate)
- ✓ **Keep energy use in PERSPECTIVE**

Keeping Perspective



“Little” Picture
Energy Efficiency

“Big” Picture
Business Success



“Really Big” Picture
Climate Change

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