Observations of Energy Use, Climate Change and Potential Consequences and Strategies for Data Centers

October 30, 2007

Andrew Fanara

USEPA

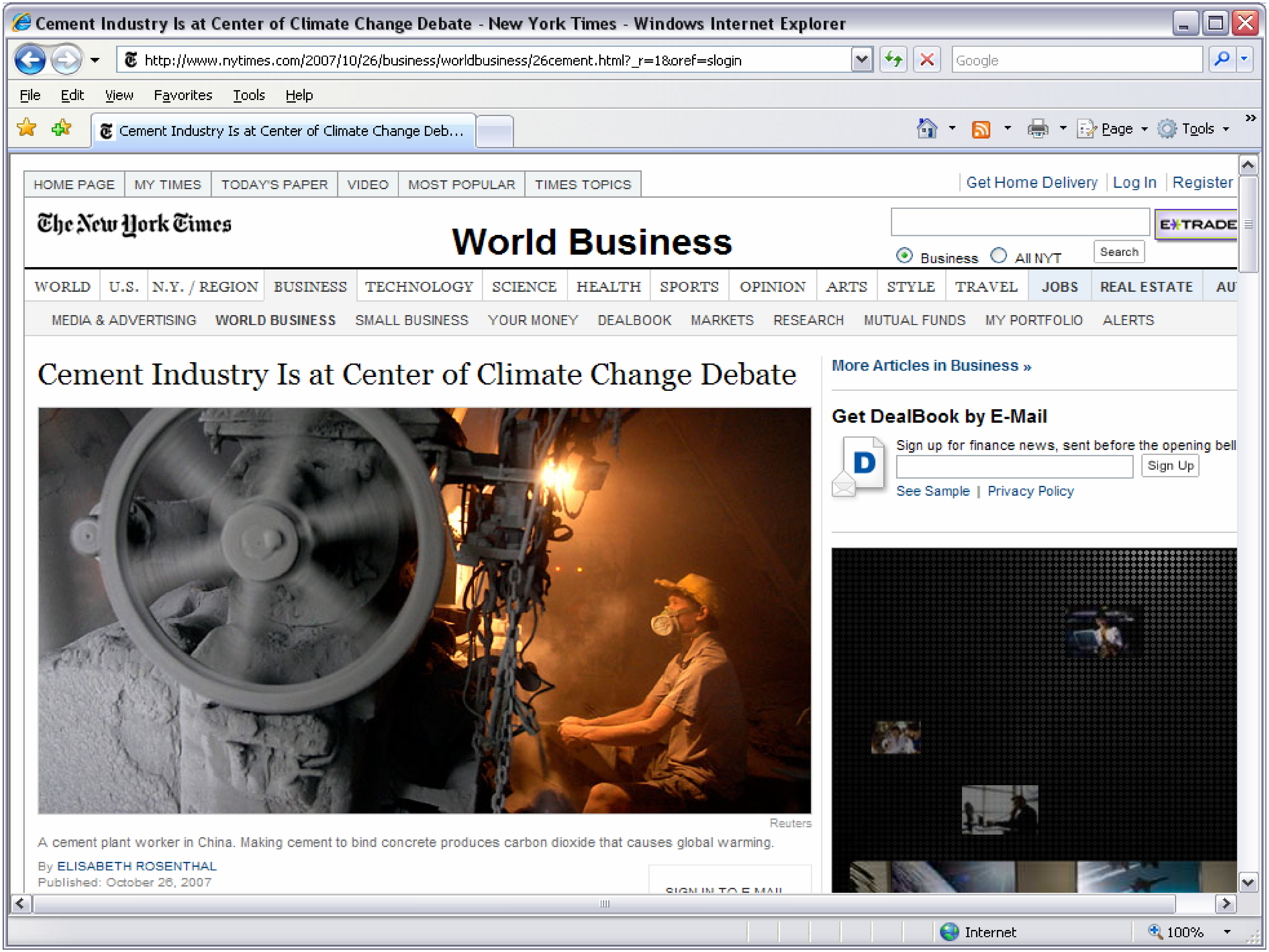
Climate Protection Partnership Division

ENERGY STAR Program

Tonights Topics

- A few recent observations on energy supply and demand and some things to keep in mind on climate change (CC)
- Brief summary of the report to the Congress on energy efficiency opportunities in the data center
- Review of the goals for the Wednesday ENERGY STAR meetings

  ❖ Main goal -- to get the discussion going tonight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Cement Industry Is at Center of Climate Change Debate

Reuters

A cement plant worker in China. Making cement to bind concrete produces carbon dioxide that causes global warming.

By ELISABETH ROSENTHAL
Published: October 26, 2007

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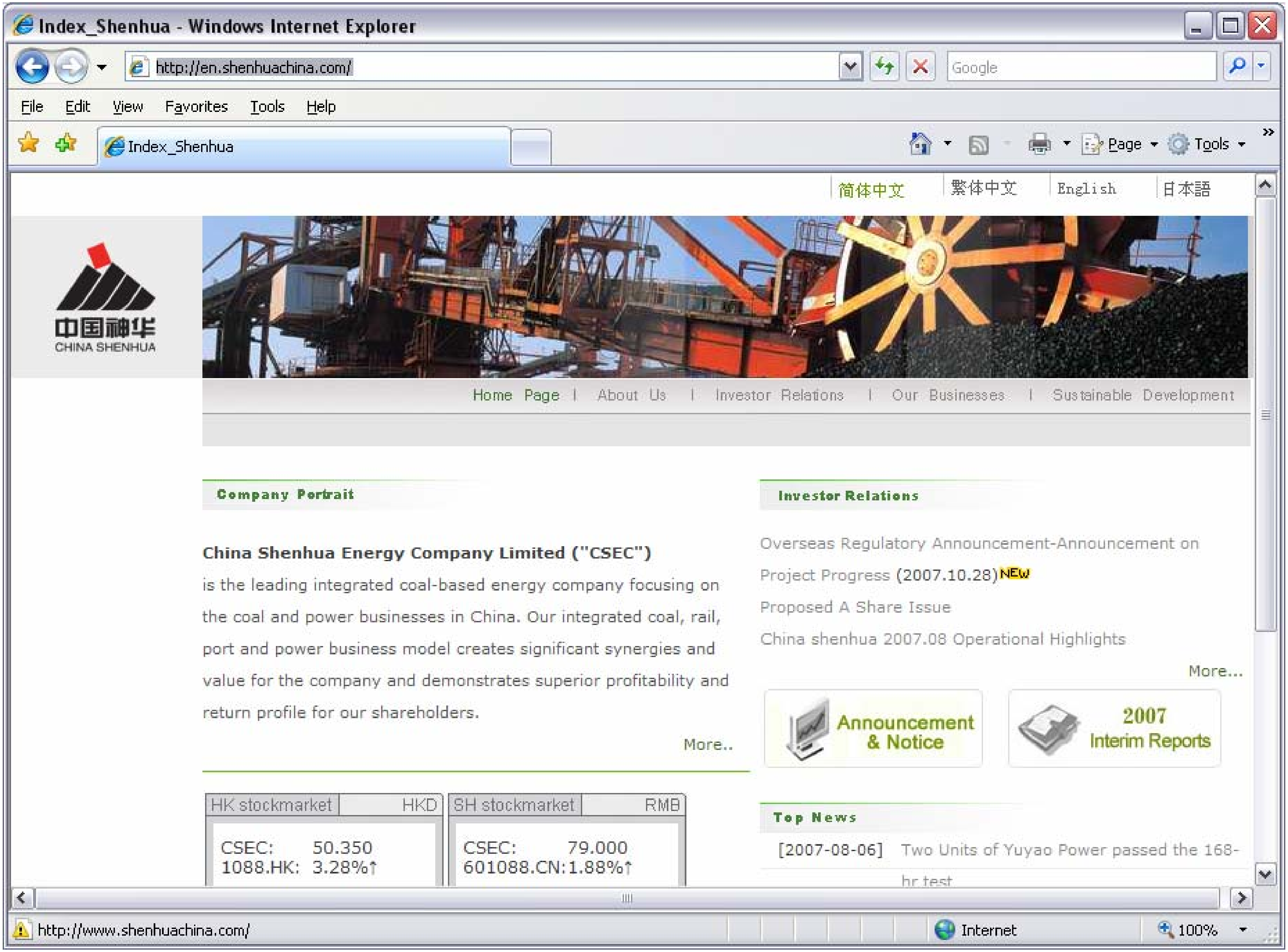
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More..

Overseas Regulatory Announcement-Announcement on Project Progress (2007.10.28) NEW

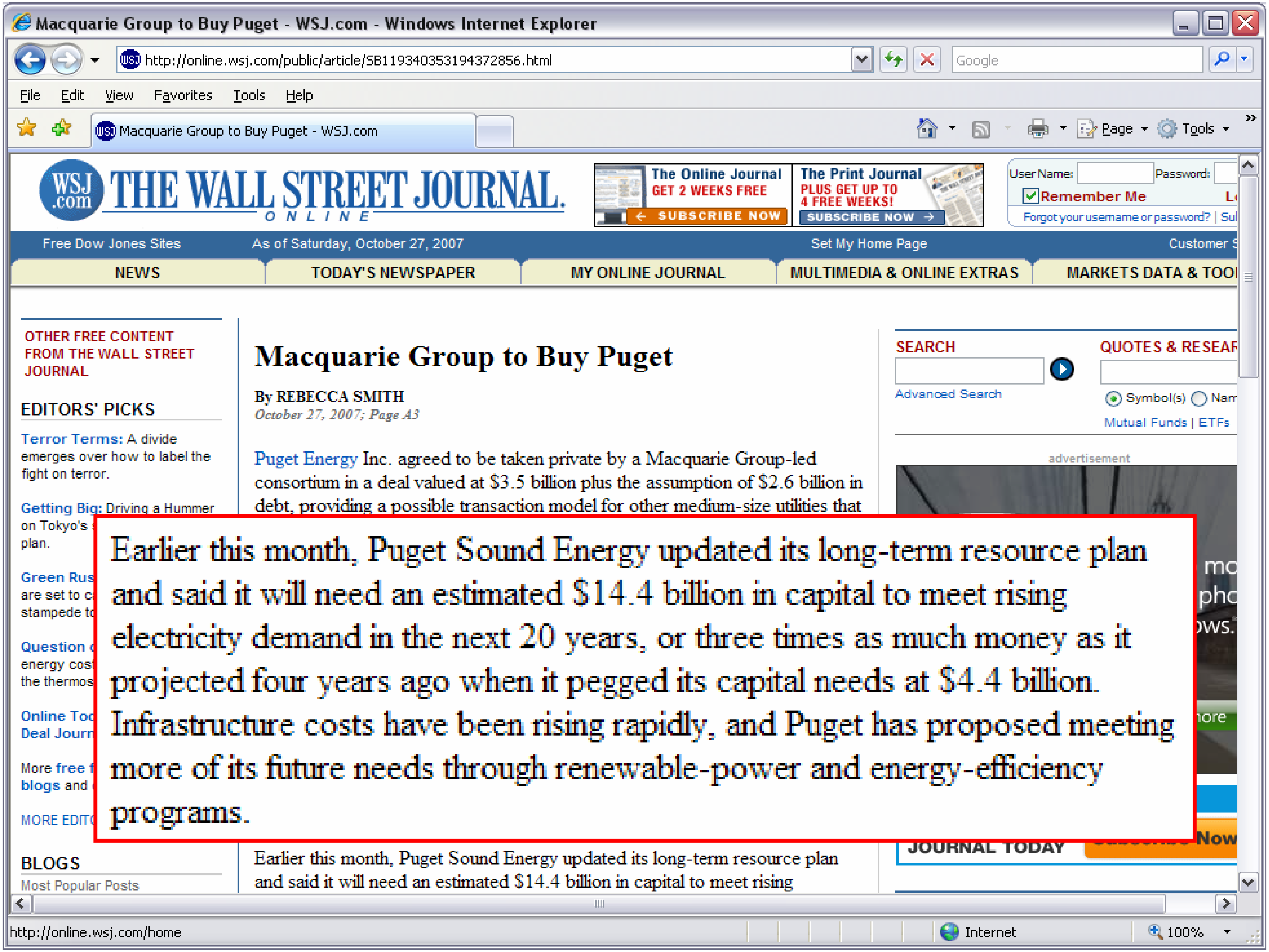
Proposed A Share Issue

China shenhua 2007.08 Operational Highlights

HK stockmarket	HKD
CSEC: 1088.HK:	50.350 3.28%↑

SH stockmarket	RMB
CSEC: 601088.CN:	79.000 1.88%↑

[2007-08-06] Two Units of Yuyao Power passed the 168-hr test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Terror Terms: A divide emerges over how to label the fight on terror.

Macquarie Group to Buy Puget

By REBECCA SMITH

October 27, 2007; Page A3

Puget Energy Inc. agreed to be taken private by a Macquarie Group-led consortium in a deal valued at $3.5 billion plus the assumption of $2.6 billion in debt, providing a possible transaction model for other medium-size utilities that

Earlier this month, Puget Sound Energy updated its long-term resource plan and said it will need an estimated $14.4 billion in capital to meet rising electricity demand in the next 20 years, or three times as much money as it projected four years ago when it pegged its capital needs at $4.4 billion. Infrastructure costs have been rising rapidly, and Puget has proposed meeting more of its future needs through renewable-power and energy-efficiency programs.

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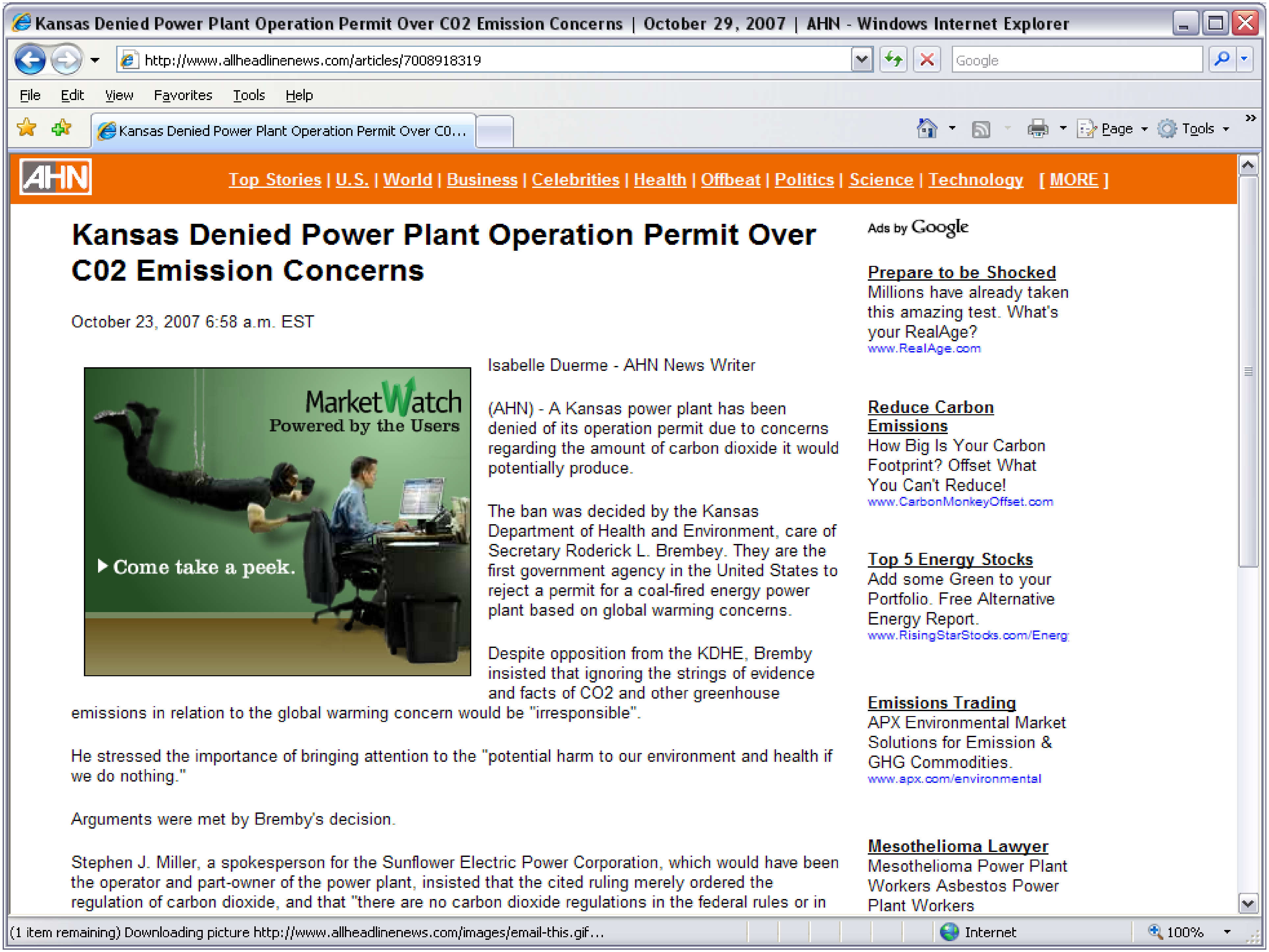
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Kansas Denied Power Plant Operation Permit Over C02 Emission Concerns

October 23, 2007 6:58 a.m. EST

MarketWatch
Powered by the Users
▸ Come take a peek.

Isabelle Duerme - AHN News Writer

(AHN) - A Kansas power plant has been denied of its operation permit due to concerns regarding the amount of carbon dioxide it would potentially produce.

The ban was decided by the Kansas Department of Health and Environment, care of Secretary Roderick L. Brembey. They are the first government agency in the United States to reject a permit for a coal-fired energy power plant based on global warming concerns.

Despite opposition from the KDHE, Brembey insisted that ignoring the strings of evidence and facts of CO2 and other greenhouse emissions in relation to the global warming concern would be "irresponsible".

He stressed the importance of bringing attention to the "potential harm to our environment and health if we do nothing."

Arguments were met by Bremby's decision.

Stephen J. Miller, a spokesperson for the Sunflower Electric Power Corporation, which would have been the operator and part-owner of the power plant, insisted that the cited ruling merely ordered the regulation of carbon dioxide, and that "there are no carbon dioxide regulations in the federal rules or in

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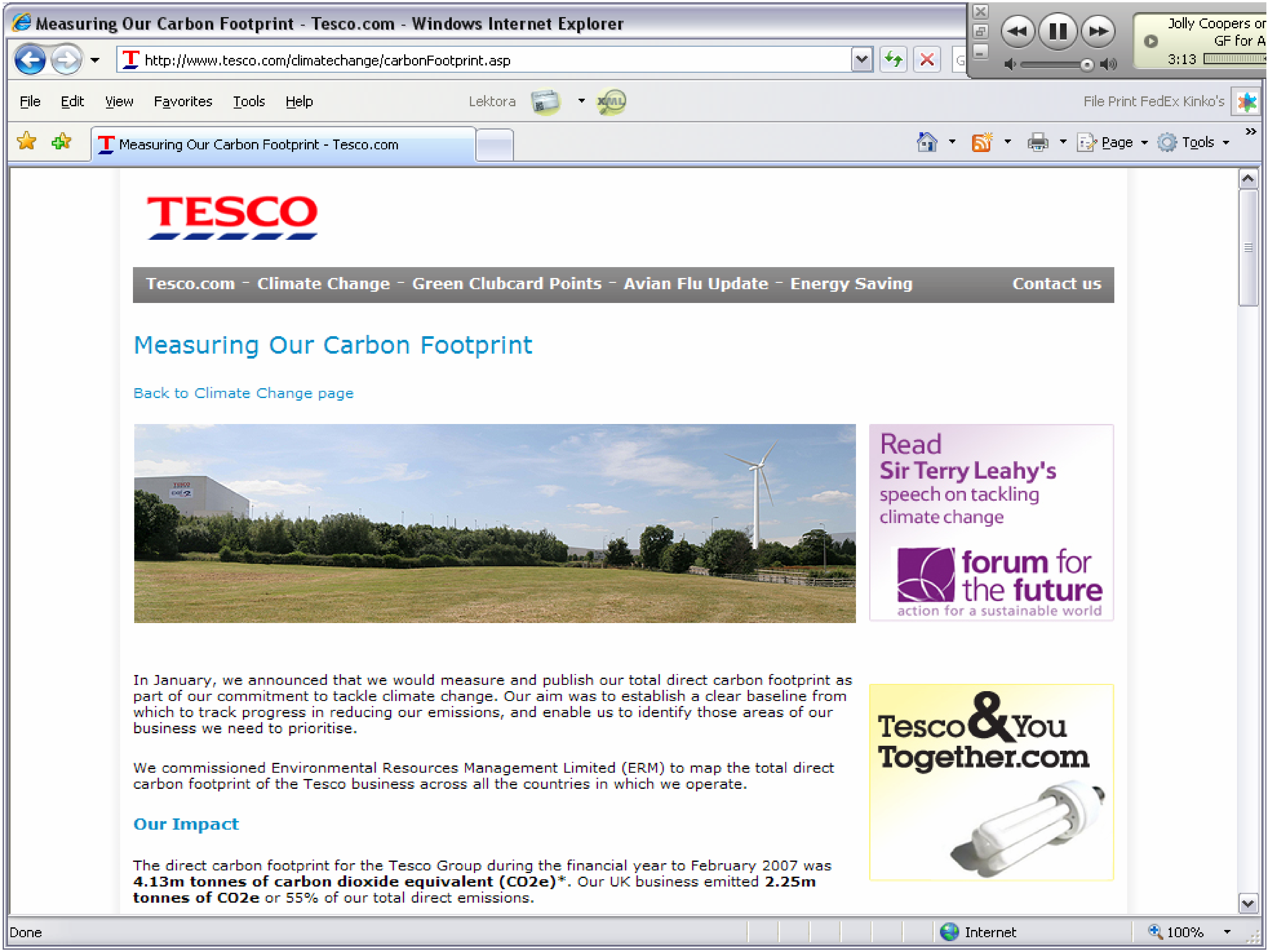
Energy Reduction in Tokyo

- Tokyo Power and Electric is targeting 800 most energy consuming buildings in Tokyo for energy consumption reduction, 100 of which are data centers

- Data center operators are worried that new reduction targets could force them out of Tokyo and away from the companies/facilities they support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Measuring Our Carbon Footprint

Back to Climate Change page

In January, we announced that we would measure and publish our total direct carbon footprint as part of our commitment to tackle climate change. Our aim was to establish a clear baseline from which to track progress in reducing our emissions, and enable us to identify those areas of our business we need to prioritise.

We commissioned Environmental Resources Management Limited (ERM) to map the total direct carbon footprint of the Tesco business across all the countries in which we operate.

Our Impact

The direct carbon footprint for the Tesco Group during the financial year to February 2007 was **4.13m tonnes of carbon dioxide equivalent (CO2e)***. Our UK business emitted **2.25m tonnes of CO2e** or 55% of our total direct emissions.

Public Law 109-431: EPA Report

- **Purpose**: assess energy impacts on and from datacenters, identify energy efficiency opportunities, and recommend strategies to drive the market for efficiency
- **Goals**:
  - Inform Congress & other policy makers of important market trends, forecasts, opportunities
  - Identify and recommend potential short and long term efficiency opportunities and match them with the right policies
  - Identify areas for additional strategic research *outside the scope* of the report

EPA Report to Congress

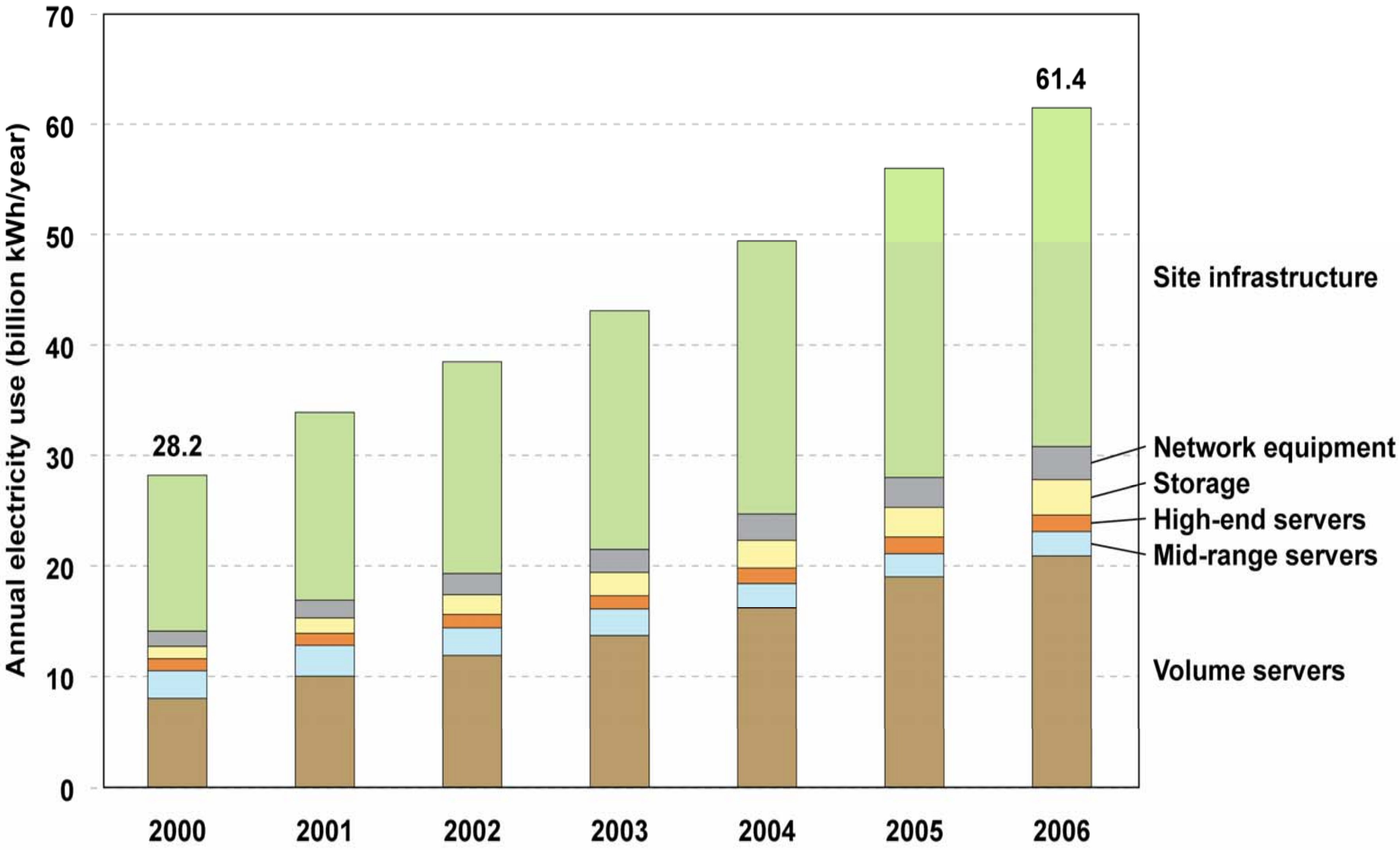
ENERGY STAR

Trends in Data Center Energy Use

- Sector consumed about 61 billion KWh in 2006
  - Equates to ~1.5% total U.S. electricity consumption and ~$4.5 billion
  - Federal sector: ~6 billion kWh and ~$450 million
- Projected to increase to 100 billion kWh in 2011
  - Equates to ~2.5% of total U.S. electricity consumption and ~$7.4 billion

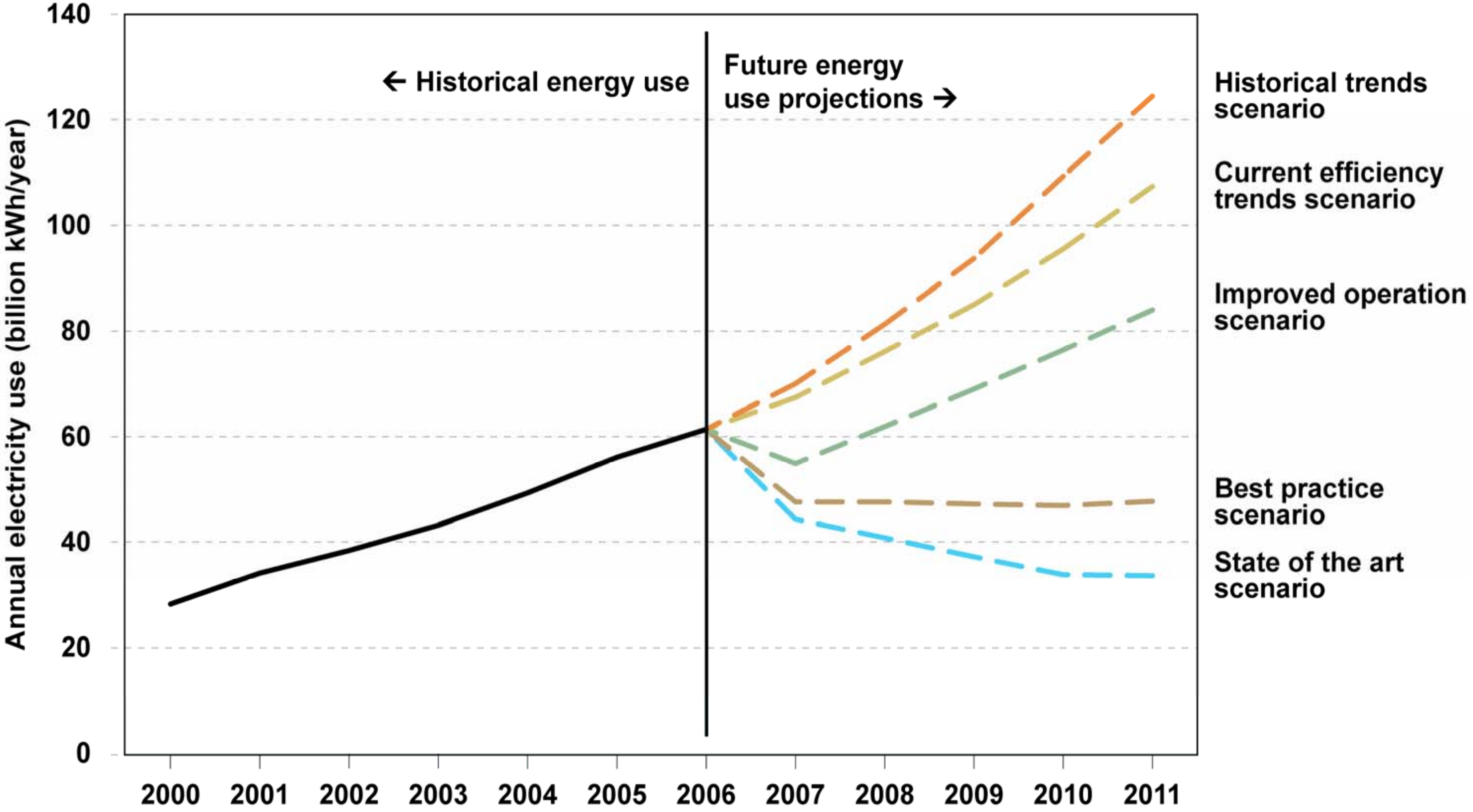
Electricity Use by End Use

2000 - 20006



Comparison of Projected Electricity Use

All Scenarios 2007 - 2011



Report Recommendations

- Standardized performance measurements for IT equipment and data centers
  - Development of benchmark/metric for data centers
  - ENERGY STAR label for servers, considering storage and network equipment
- Leadership by federal government to be a catalyst
- Encouragement of private and public organizations and the creation of incentives to pursue efficiency options
- Information on best practices
- Research and development

EPA/DOE Activities & Goals

2008 Activities

EPA

Server/storage spec

Data center focus group, look at other buildings

DOE

Pilot project, measure data center energy use

Potential Metrics

Benchmark score/watt

IT load/total load

Useful work/IT load or energy

Long Term Goals

ENERGY STAR IT Specs

ENERGY STAR building benchmark

DOE auditor certification

DOE design guide and tools

Track 1: Servers

ENERGY STAR Server Specification Working Group

- Potential Criteria to be Discussed:
  - Product Coverage and Definitions
  - Power Supply Efficiency and Power Factor
  - Standardized Performance Labeling and Reporting
  - Active Power Management
  - Networking, Benchmarking, and Other Considerations

- Discussion to be held in the Anasazi Room / 830 am

Track 2: Data Centers

ENERGY STAR Industry Focus – Development of Energy Performance Benchmarks for Data Centers

- Topics to be Discussed:
  - EPA and DOE Goals for Metrics
  - Energy Usage in Data Centers: Selecting a performance metric and opportunities for improvement
  - Implementing a Metric (i.e., defining and implementing a metric, data collection efforts, etc.)

- Discussion to be held in the Sunset Room / 830 am

Final Thoughts and Take Aways

- More attention being paid to the implications of energy supply and demand than ever before
- We are seeing the emergence of a more environmentally sensitive consumer class
- Is government leading or following public sentiment?
- Enterprise wide strategic energy management and planning a competitive must have for every organization
- Voluntary and industry schemes (and claims) to save energy will increasingly be questioned for their effectiveness -- they must be challenging and verifiable to be credible

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