

# Telecommunications in Ten Years: Why the End of (Cheap) Fossil Fuels Will be a Key Driver

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Illinois Commerce Commission

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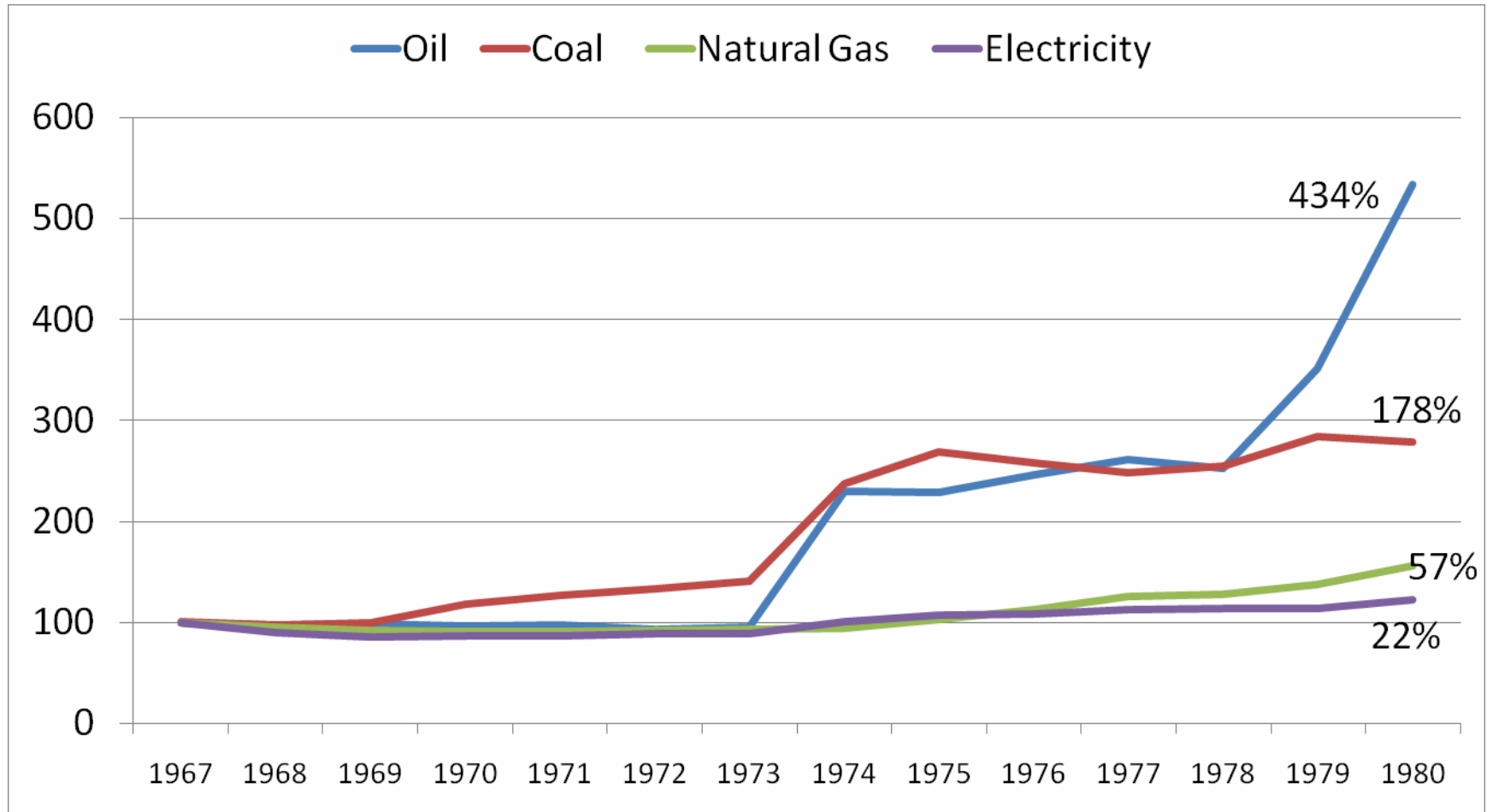
# Disclaimer and Credit

- My thoughts today are mine alone and do not necessarily reflect the positions of the Illinois Commerce Commission on any of the issues discussed today
- Most of these slides were developed by my colleague Commissioner Bob Lieberman and used in a prior presentation by him. For that development he has my thanks. If I screw up the presentation, the fault lies with me and not with him!

# The First Great Energy Price Shock

## Inflation Adjusted Energy Price Change 1967 – 1980

Index 1967 = 100

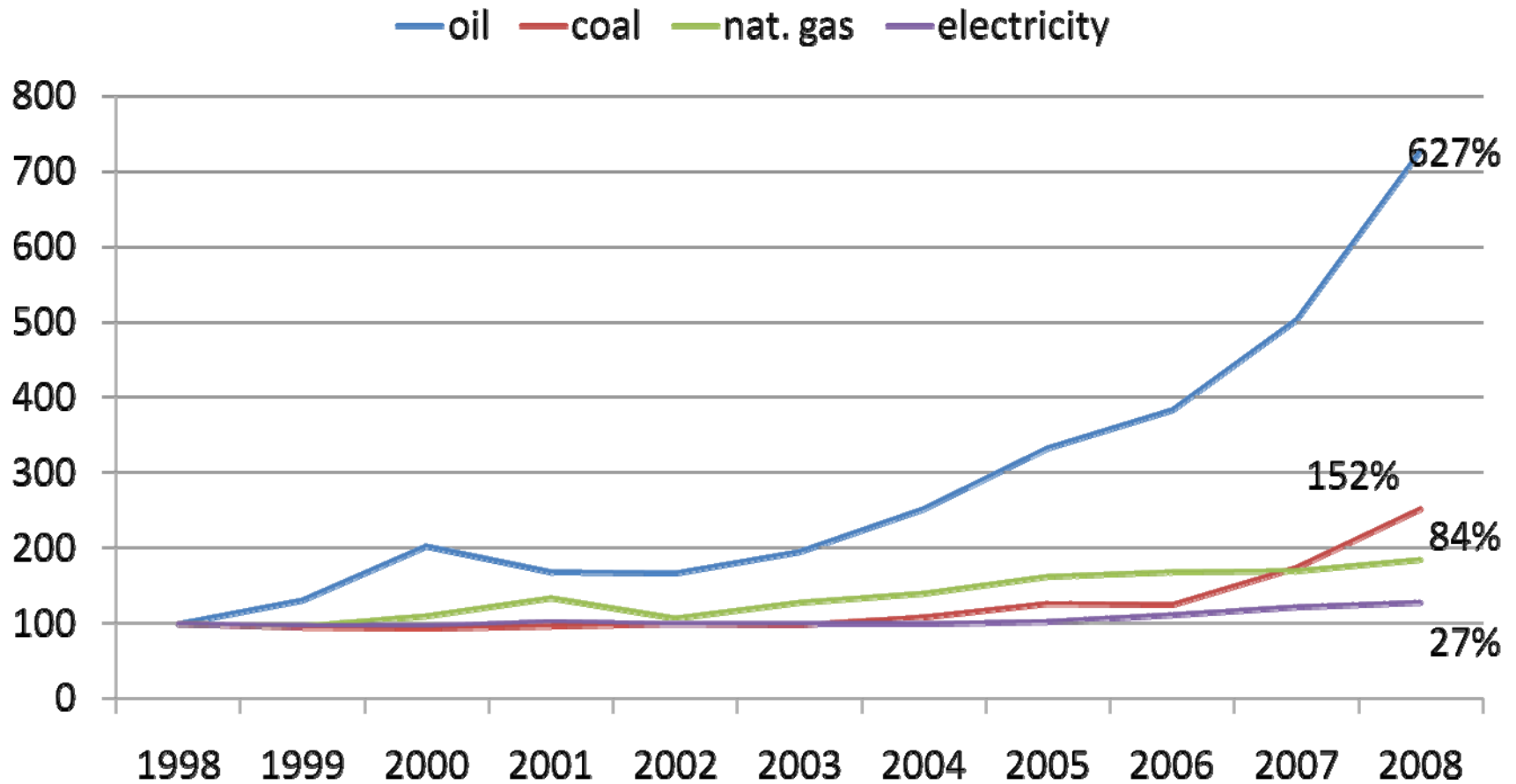


# The Second Great Energy Price Shock

## Inflation Adjusted Energy Price Change

1998 – 2008

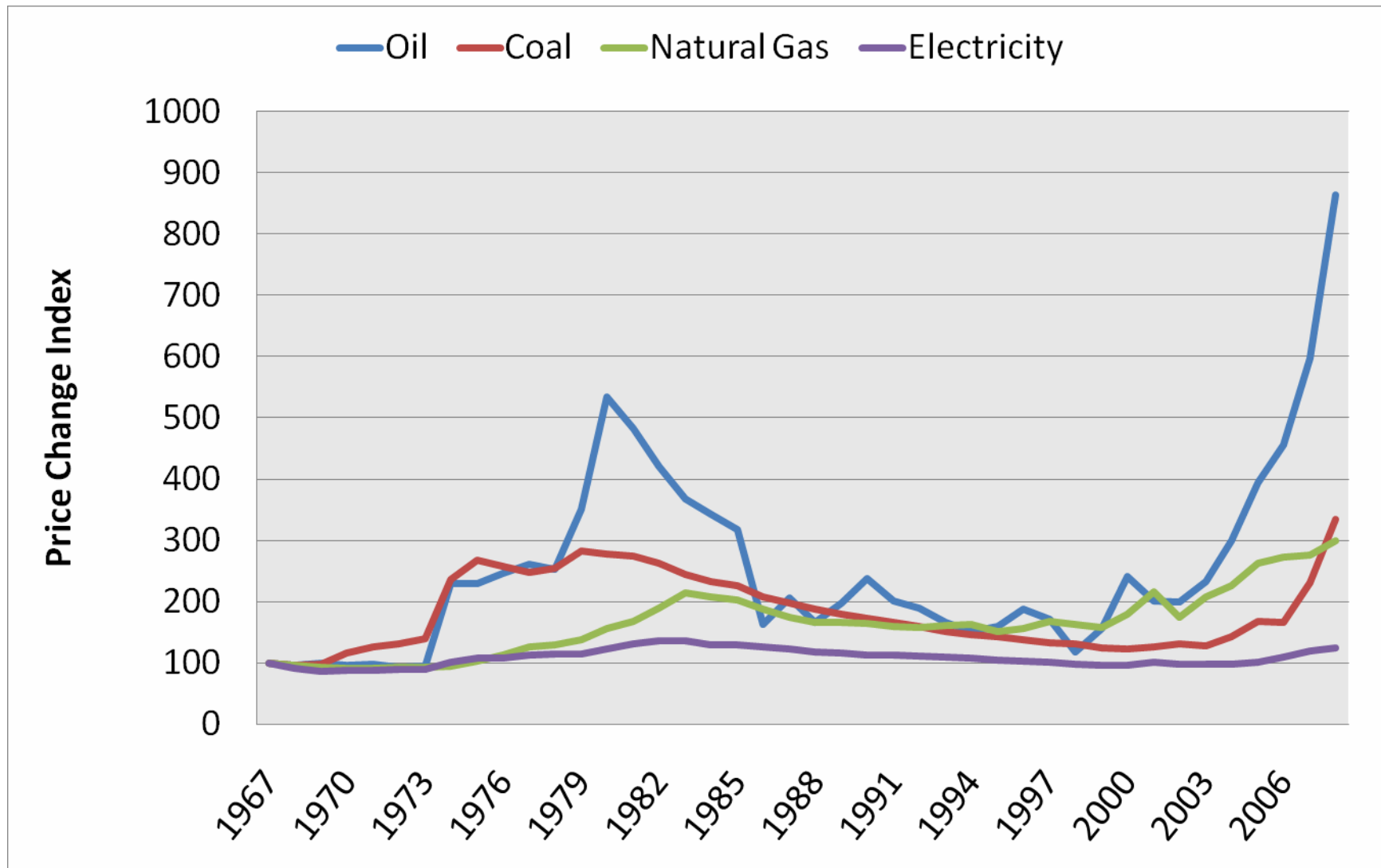
Index 1998 = 100



# What will we learn from the 2<sup>nd</sup> great energy price shock?

Inflation Adjusted Energy Price Change 1967 – 2007

Index 1967 = 100

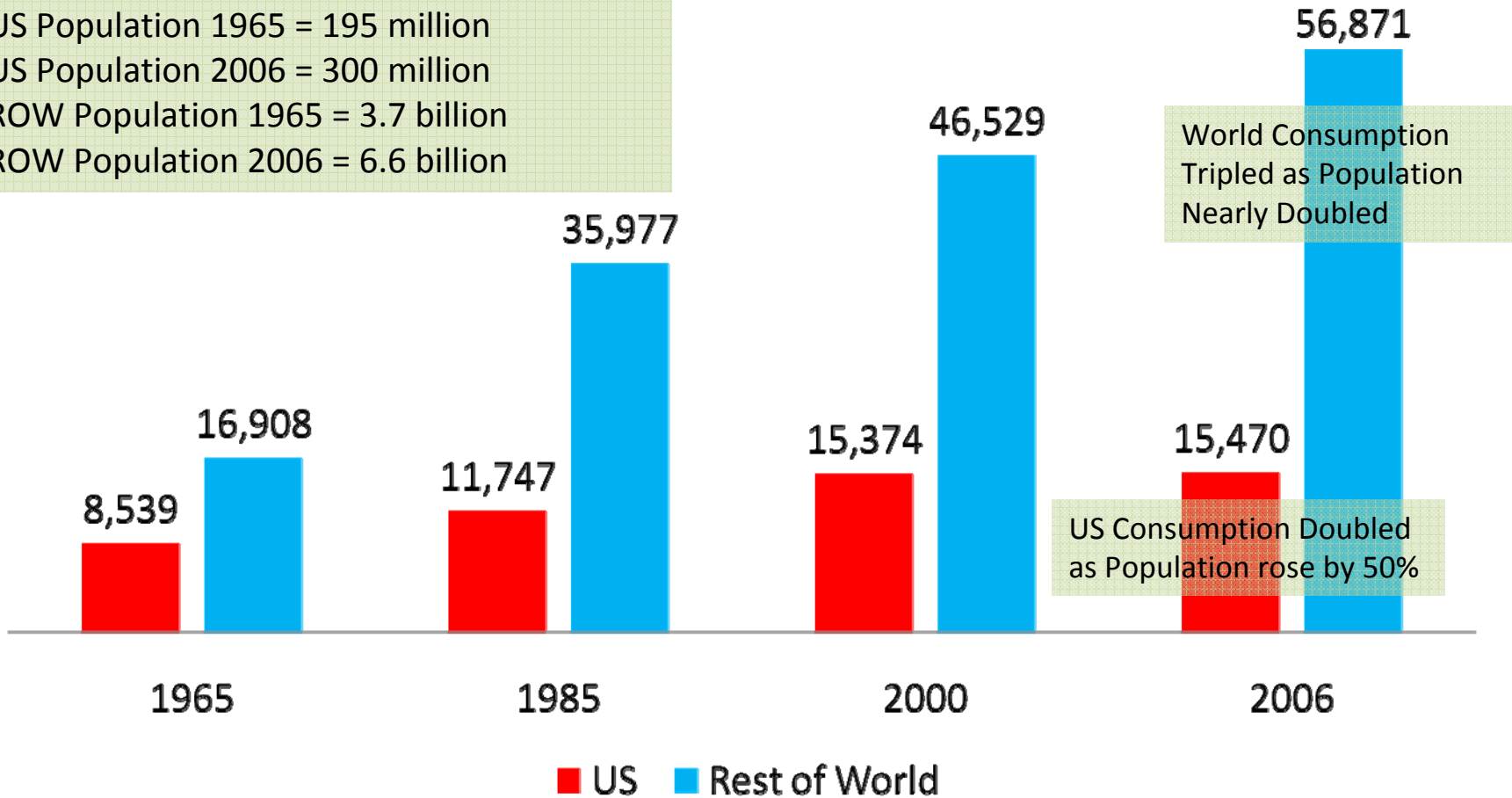


# Is this 1980 Redux or something completely different?

- 1980 was driven by supply “withholds” and regulatory constraints
- 2008 is driven by a different set of factors:
  - Global Dynamics
    - Globalization of energy markets
    - Structural changes in world economy
    - Rapid and sustained world wide increase in demand with no concurrent increase in new traditional supply
  - High cost non-carbon alternatives
  - Infrastructure constraints
    - Refineries
    - Oceans
    - Transportation bottlenecks
  - Geological realities
    - Peak oil?
  - Environmental
    - Carbon

# Total Energy Consumption US and Rest of World (Million barrels of oil equivalent)

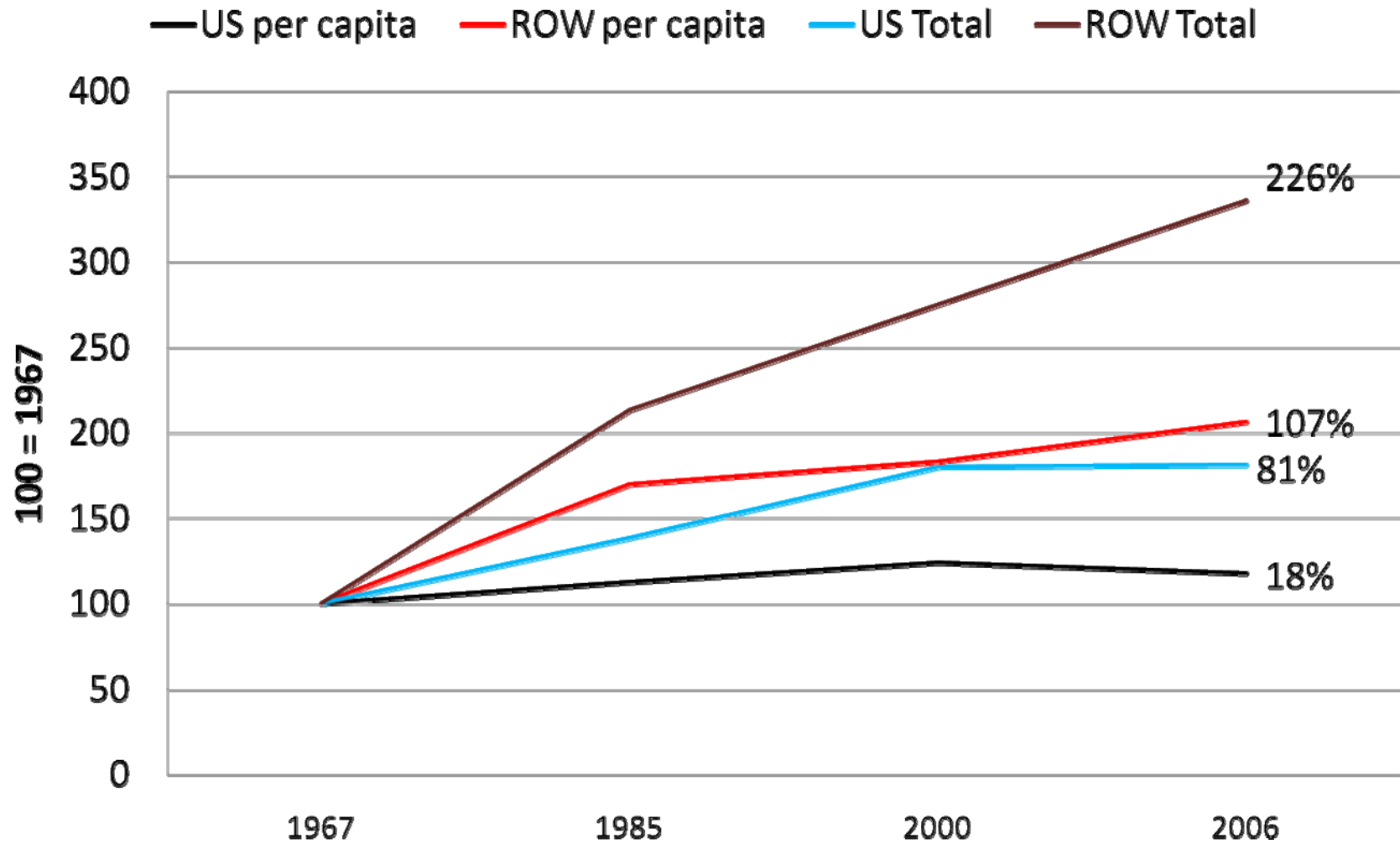
US Population 1965 = 195 million  
US Population 2006 = 300 million  
ROW Population 1965 = 3.7 billion  
ROW Population 2006 = 6.6 billion



# Per Capita % growth in energy consumption US and Rest of World (ROW)

1967 – 2006

1967 = 100



## “China spurs coal-price surge

Once-huge exporter now drains supply; Repeat of oil’s rise? “

WSJ 021208

- “China is doing for coal what it once did for oil: pushing prices to new highs, adding more pressure to the creaking global economy.
- China has long been a huge supplier of coal to itself and the rest of the world. But in the first half of last year, it imported more than it exported for the first time, setting off a near-doubling of most coal prices around the world.
- Thermal coal prices at Australia's Newcastle port, an Asian price benchmark, finished at \$125 a metric ton Monday, according to the globalCOAL international trading platform. That was up 34% since Jan. 25 and up 143% from January 2007.
- On Monday, Central Appalachian coal futures on the New York Mercantile Exchange for delivery in March stood at \$78.25 per U.S. ton. That's double its price at the start of 2007 despite weak domestic demand and above-average stockpiles due to a mild U.S. winter.”



China produces a (2) new coal-fired power station every week, and will be the world’s biggest emitter of carbon-dioxide by 2030 (2010).

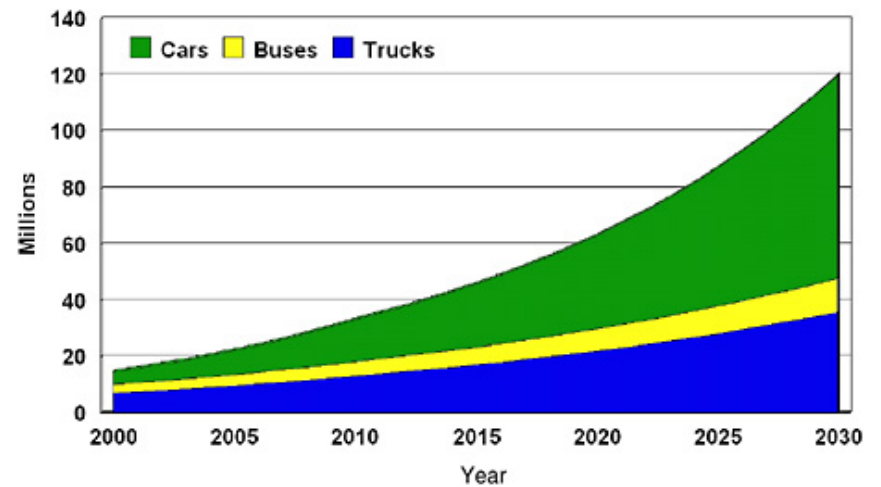
EU Trade Commissioner  
Peter Mandelson

## “China to raise investment in power plants and grid”

- Feb. 25, 2008 (China Knowledge) - China may increase the investment on power plants and grids by at least 9.3%, and the power utilities may invest at least RMB 600 billion, according to sources.
- It is predicted that China's power demand will keep the fast growth this year, as the economy is growing rapidly on the back of strong domestic demand.
- Currently, China's generation capacity is 713.3 gigawatts, and the country may add around **100 gigawatts** of generation capacity this year. However, the demand is likely to rise only 12.5% this year, down from the 14.4% growth in the previous year, according to a government official.

Context
<ul style="list-style-type: none"><li>• MISO 125 GW installed generating capacity</li><li>• PJM 165 GW installed generating capacity</li></ul>

# Forecast of Chinese vehicles



## Is the sky really falling?

- Asian energy demand growing rapidly
- China is 2<sup>nd</sup> largest oil importer behind the US
- Bicycles recently banned in parts of Beijing
- A new Chinese subdivision named “Orange County”
- August 12, 2005 private cars waiting in line for gasoline



# Welcome to the new world

“Three years ago, Dow's annual bill for energy and hydrocarbon raw materials was \$8 billion. Today that number approaches \$22 billion... The high price of natural gas accounts for most of the rise. And it is a direct consequence of the failed energy policies of the 90's, which encouraged the overbuilding of power stations without increasing the availability of gas.”

New York Times, December 17<sup>th</sup>, 2005

"For years, Washington has failed to address the issue of rising energy costs and, as a result, the country now faces a true energy crisis, one that is causing serious harm to America's manufacturing sector and all consumers of energy,”.

New York Times, May 24<sup>th</sup>, 2008

Andrew N. Liveris, CEO of Dow Chemical



**Dow Chemical facility recently built in Oman, instead of US**

# The Globalization of the Natural Gas Markets

## World Natural Gas Reserves 2004

Country	Proved Reserves, trillion cubic feet (2004)	Gross Gas Production, billion cubic meters (2004)	Reserves to Production Ratio (R/P)*
Qatar	910.1	39.2	657.7
Iran	970.8	85.5	321.6
United Arab Emirates	213.9	45.8	132.3
Saudi Arabia	238.4	64	105.5
Russia	1694.4	589.1	81.5
Algeria	160.4	82	55.4
Turkmenistan	102.4	54.6	53.1
Malaysia	87	53.9	45.7
Indonesia	90.3	73.3	34.9
Uzbekistan	65.7	55.8	33.3
Norway	84.2	78.5	30.4
Netherlands	52.7	68.8	21.7
Argentina	21.4	44.9	13.5
United States	186.9	542.9	9.8
Canada	56.6	182.8	8.8
Britain	20.8	95.9	6.1

\*The Reserves-to-Production Ratio is the number of years the estimated reserves will last at the current level of production.

## The Globalization of the Natural Gas Market, cont.

“Only a month after [Cheniere Energy](#) inaugurated its \$1.4 billion liquefied natural gas terminal here, an empty supertanker sat in its berth with no place to go while workers painted empty storage tanks.

The nearly idle terminal is a monument to a stalled experiment, one that was supposed to import so much L.N.G. from around the world that homes would be heated and factories humming at bargain prices.

A longstanding assumption of American energy policy has been that natural gas would be plentiful abroad, and therefore readily available for importation, as production falls off in North America, where many fields are tapped out.

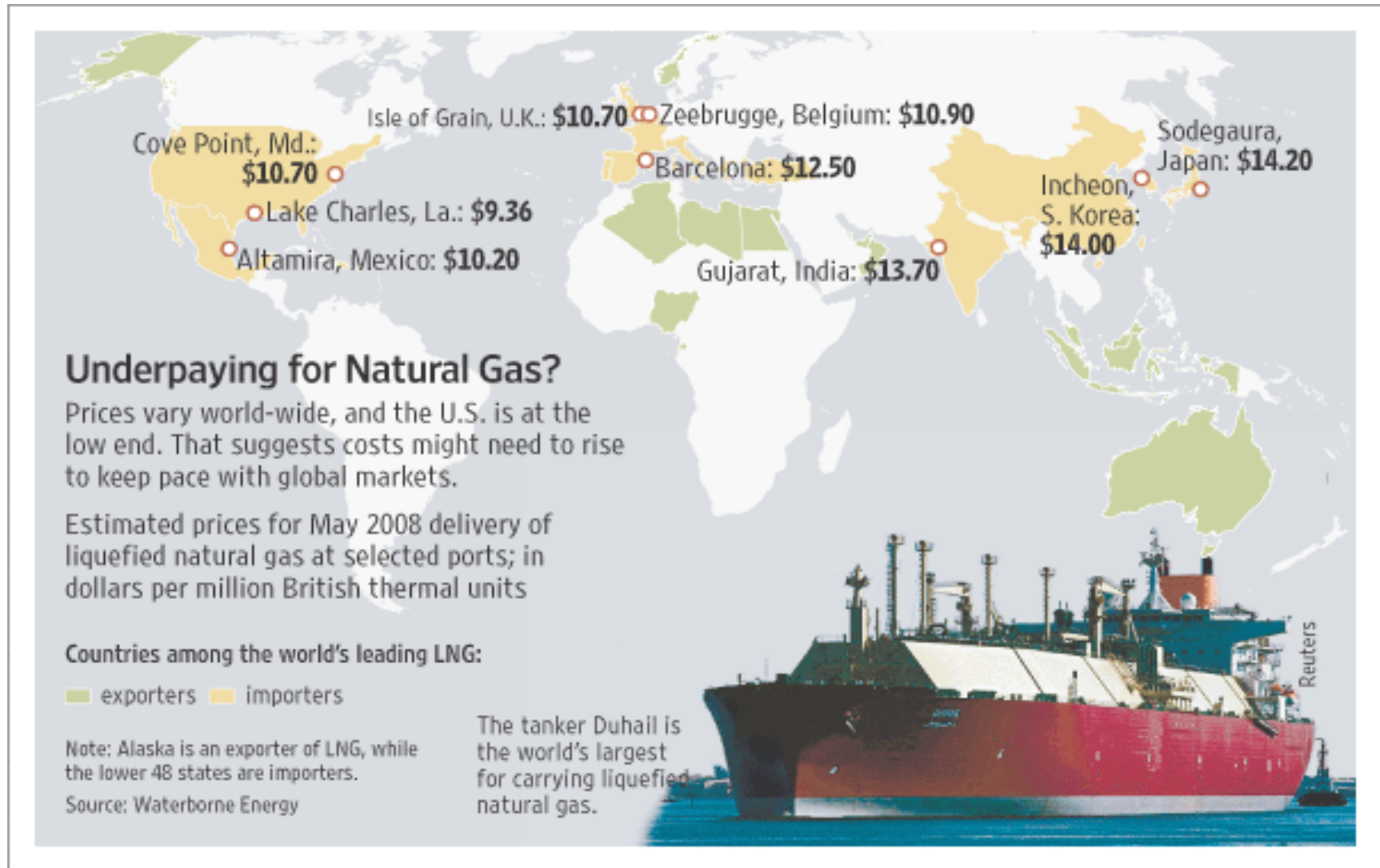
But some experts are starting to question that idea, saying natural gas could be subject to the same explosion in overseas demand that has made oil so expensive.

As it is, the supertankers that were supposed to deliver cargoes of gas from Africa and the Middle East to the United States are taking them to places like Spain and Japan instead, pushing up gas prices and depleting the nation’s stockpiles as the hurricane season approaches.”

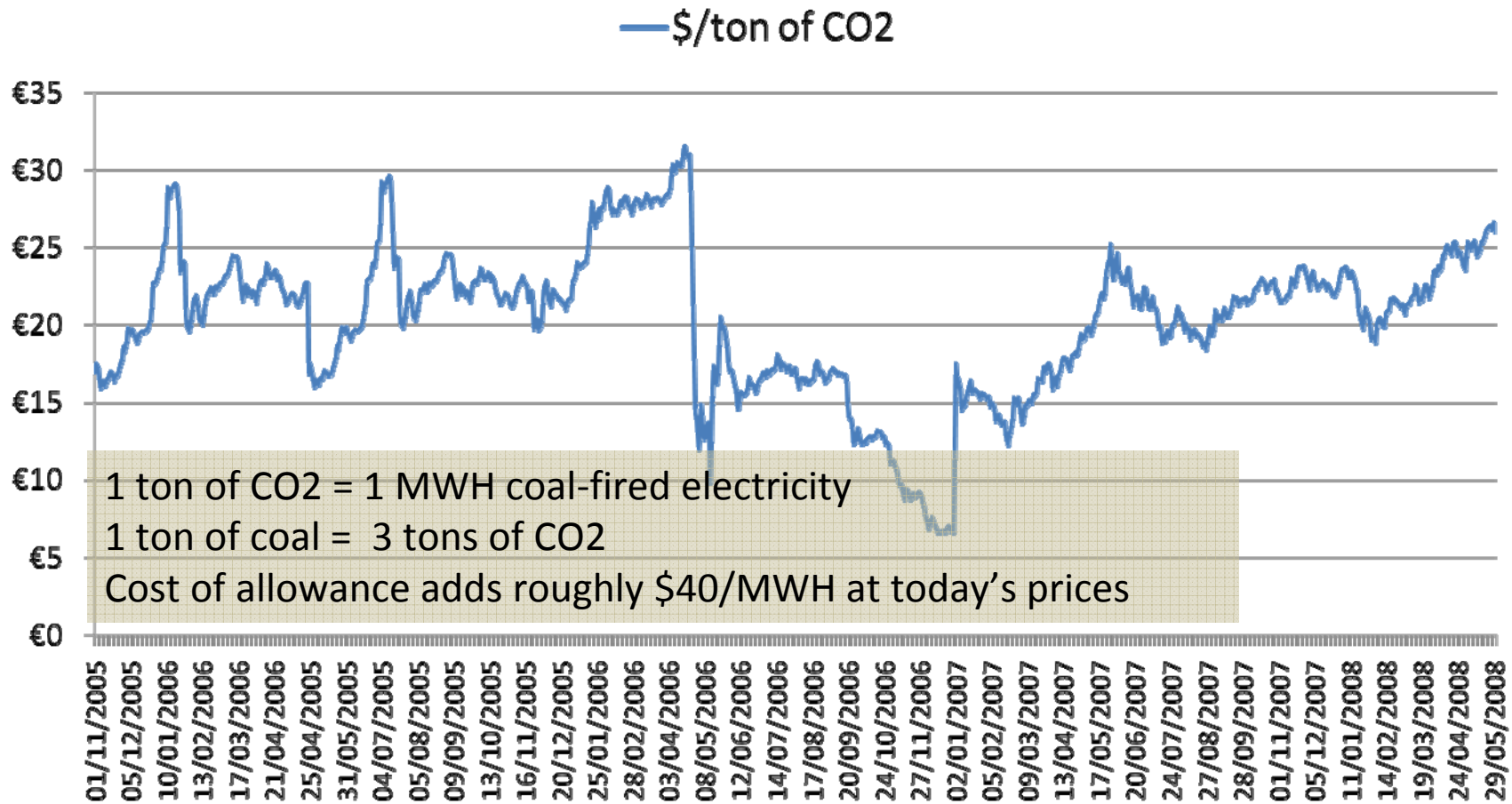
NY Times May 28<sup>th</sup> 2008



# The globalization of the Natural Gas Market, cont.



# Carbon Effects: Price Trend of European CO2 Allowances 2005 – 2008 (1 euro = \$1.56)

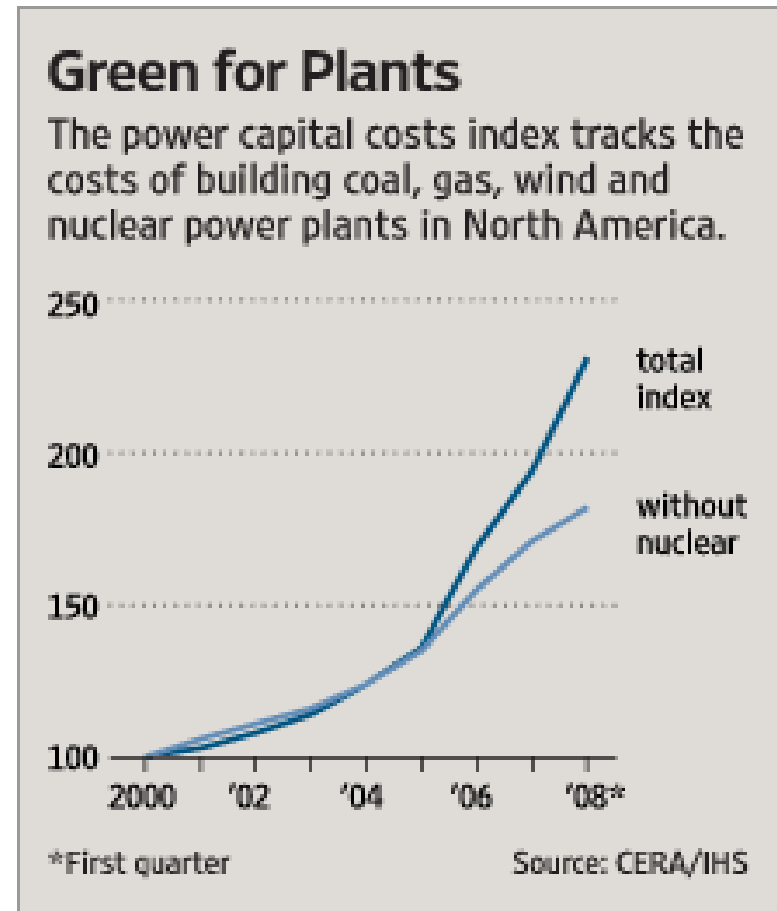


# Capital Costs: Rapid Escalation in the Costs of Building New Generating Capacity

“Construction costs for power plants have more than doubled since 2000... and inflationary pressures will continue to put the squeeze on electricity prices...the construction of new generating capacity that would have cost \$1 billion in 2000 would cost \$2.31 billion if construction began today.

Components and construction materials for nuclear power plants scored the biggest run-up in costs, up 173% -- nearly tripled -- since 2000.

Costs for turbines used to generate wind power more than doubled, at 108%, and natural gas-fueled and coal-fired plants saw their capital costs nearly double, up 92% and 78%, respectively.”



Wall St. Journal May 27<sup>th</sup> 2008

# The sky is falling!

## Drivers

- Globalization of world energy markets
- Fossil Fuel Price Rise
- Carbon constraints
- Need for New Capital Expenditures
- Continued Electrification

## Brakes

- Decline in institutional credibility
- Bitterness over winners and losers in the restructuring process
- Flat or declining incomes for many residential customers
- Limited policy options

Why am I Telling you all of this when I'm supposed to be talking about a Telecommunications Future? **It's all about Technology!** It's not a question of *whether* we are going to spend the money,

- It's a question of what we are going to spend the money on:
  - The Smart Grid?

# What Does Congress Tell Us?

- It is the policy of the United States to support the modernization of the Nation's electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth and to achieve each of the following, which together characterize a Smart Grid:
  - (1) Increased use of digital information and controls technology to improve reliability, security, and efficiency of the electric grid.
  - (2) Dynamic optimization of grid operations and resources, with full cyber-security.
  - (3) Deployment and integration of distributed resources and generation, including renewable resources.
  - (4) Development and incorporation of demand response, demand-side resources, and energy-efficiency resources.
  - (5) Deployment of `smart' technologies (real-time, automated, interactive technologies that optimize the physical operation of appliances and consumer devices) for metering, communications concerning grid operations and status, and distribution automation.
  - (6) Integration of `smart' appliances and consumer devices.
  - (7) Deployment and integration of advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal-storage air conditioning.
  - (8) Provision to consumers of timely information and control options.
  - (9) Development of standards for communication and interoperability of appliances and equipment connected to the electric grid, including the infrastructure serving the grid.
  - (10) Identification and lowering of unreasonable or unnecessary barriers to adoption of smart grid technologies, practices, and services.
- Source: Energy Independence and Security Act of 2007 from THOMAS (Library of Congress)

# Maybe You've seen the headlines?

- **Dominion Virginia Power To Install \$600M Smart Grid**
- **Boulder to become first Smart Grid City**
- **Duke Proposes Statewide Smart Grid**

## What is the Smart Grid and what does it mean for the Telecommunications Future?

- The Smart Grid concept involves automating the electric grid. This may be achieved by outfitting the grid with smart controls, **two-way communications systems**, and sensors. It has the potential to reduce power consumption through demand response, facilitate grid connection to intermittent power stations and distributed generation projects, enable storage of electricity, and improve grid reliability.

# It's all about two-way Communications!!

- **Broadband Solutions**
  - Power Broadband for Consumers
  - Utilities can deploy Consumer Power Broadband access equipment to provide individual broadband customers high speed internet access from any electrical outlet in their residence.
  - Leading Broadband over Power Line suppliers will be selected to meet the unique requirements of your electrical infrastructure. Support for broadband applications includes:
- **Broadband Triple Play**
  - High speed data (1 to 10 Mbps)
  - Telephony/VoIP
  - IPTV and Video on demand
- \*\*Source: BPLGlobal at [BPLGLOBAL.net](http://BPLGLOBAL.net)

# The War Begins?

- A judge in Nashville said Friday she will rule next week whether to allow a cable trade organization's lawsuit against EPB to be reinstated.
- Davidson County Chancellor Ellen Hobbs Lyle on April 14 dismissed the lawsuit filed by the Tennessee Cable Telecommunications Association trying to prevent EPB from offering fiber to the home.
- Since Chancellor Lyle dismissed the lawsuit, Stacey B. Briggs, president and executive director of the cable group, said she submitted a business plan for EPB's \$219.8 million bond issue that shows the utility is cross-subsidizing its cable initiative.
- Ms. Briggs said the bond issue is more than two times larger than any other in the history of Chattanooga and is being funded with rate-payer money.
  
- Source: Chattanooga Free Press Saturday, June 21, 2008

# The War Begins Cont.

- “We believe this is a cross-subsidy and a clear violation of state law,” Ms. Briggs said.
  - Aldous McCrory, vice president of legal services for EPB, has said he is disappointed the cable group is attempting to delay EPB’s fiber-optic plan.
  - He disagreed with the cable group’s theory the plan is a cross-subsidy claiming that the business plan actually shows the smart grid and the fiber-optic plans are separate projects and that proceeds from the bond will be used to improve the electric system.
  - Ms. Briggs said the initial lawsuit was dismissed on procedural grounds and should be reinstated.
- 
- Source: Chattanooga Free Press Saturday, June 21, 2008

# The War Begins Cont.

- “We are hopeful that this will ease the stalemate and move us closer to resolving this case on its merits,” she said.
- Lacy Newton, spokeswoman for EPB, said the utility’s legal counsel argued Friday why they feel the judge was correct when dismissing the lawsuit.
- EPB obtained the bond proceeds to install fiber-optic lines to enhance the electric system, also known as a smart grid. The smart grid is an electric command and control system that EPB officials said is efficient and can serve as the backbone for cable television, Internet and telephone service.
- Utility officials have said cable television and other services could be available to some area residents by the end of the year.
- The case was dismissed on July 14<sup>th</sup>.

# In Conclusion

- There's a (not so) new player in the game
- Unlike the traditional players, this player can substantially reduce its operational costs by introducing smart grid technology
- It remains to be seen whether regulatory and other barriers delay or prevent implementation
- And whether they (or some partner) want to offer communications and content delivery
- However, there is another option out there and momentum is gathering.