

The 3 P's:

Panda's, Population and Power

Andrew Cook
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andy.cook@areva.com
434-832-3045



World Population & Energy FACTS

| <u>Country</u> | Energy Consumption Per Capita | |
|----------------|--|-------------------|
| | <u>MBTU</u> | <u>Population</u> |
| U.S. | 342 | 300M |
| China | 31 | 1,300M |
| World Average | 66 | 6,400M |

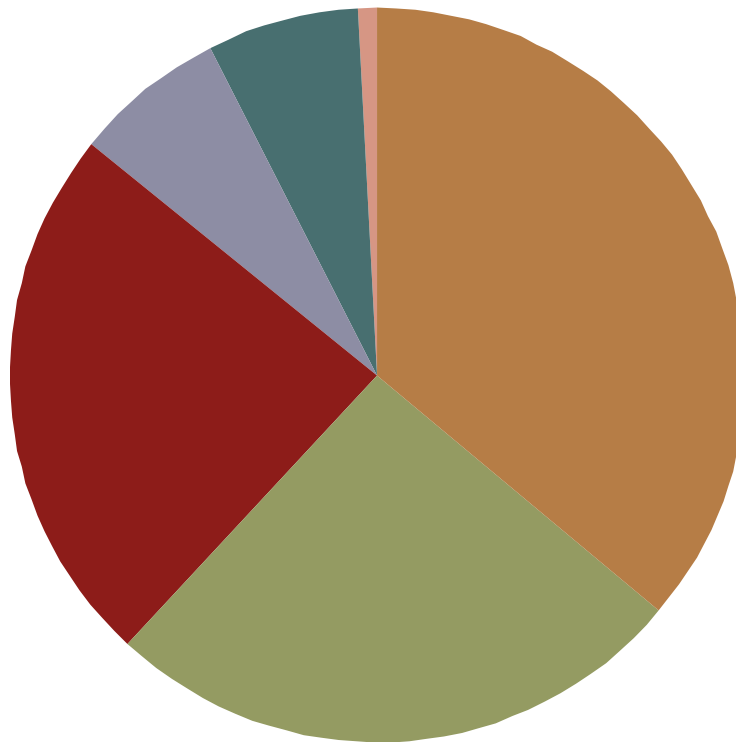
World Population

| | |
|------|--------------------------------|
| 1950 | 2.5B |
| 2000 | 6.0B |
| 2050 | 9.2B <u>Do you Believe it?</u> |

Today if China takes its per capita consumption to 1/2 of ours, World Energy Consumption increases 50%!



World Energy Production by Source



- 36.3%** Petroleum
- 2.58%** Natural Gas
- 23.9%** Coal
- 6.7%** Hydroelectric
- 6.6%** Nuclear
- 0.8%** Other*

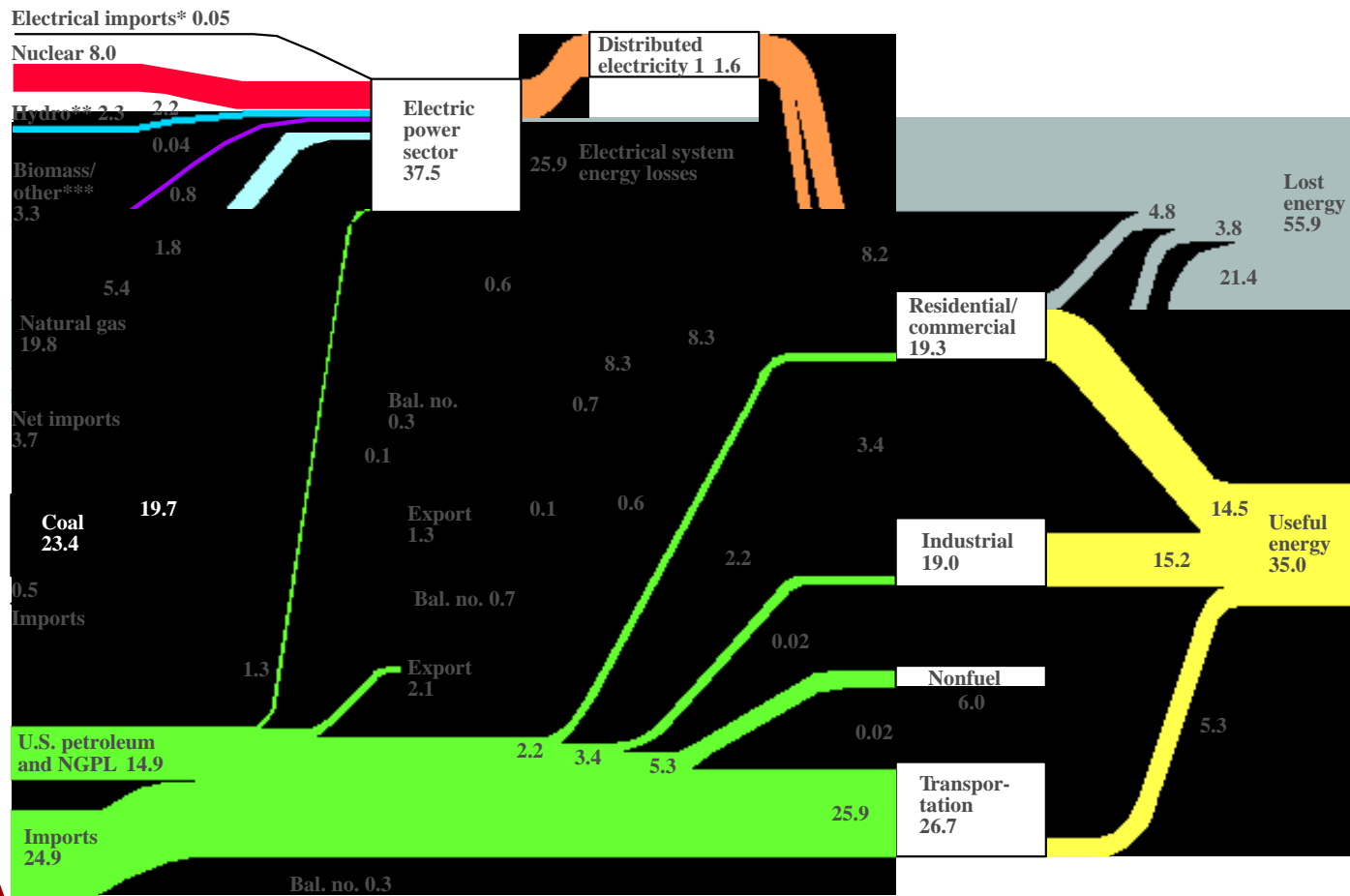
Includes geothermal, solar, and wind power.

Source: Energy Information Administration, 2001 data.

**86% of World Energy Produced by CO2
Emitting Fossil Fuels**

U.S. Energy Flow Trends 2001

Net Primary Resource Consumption 97~Quads



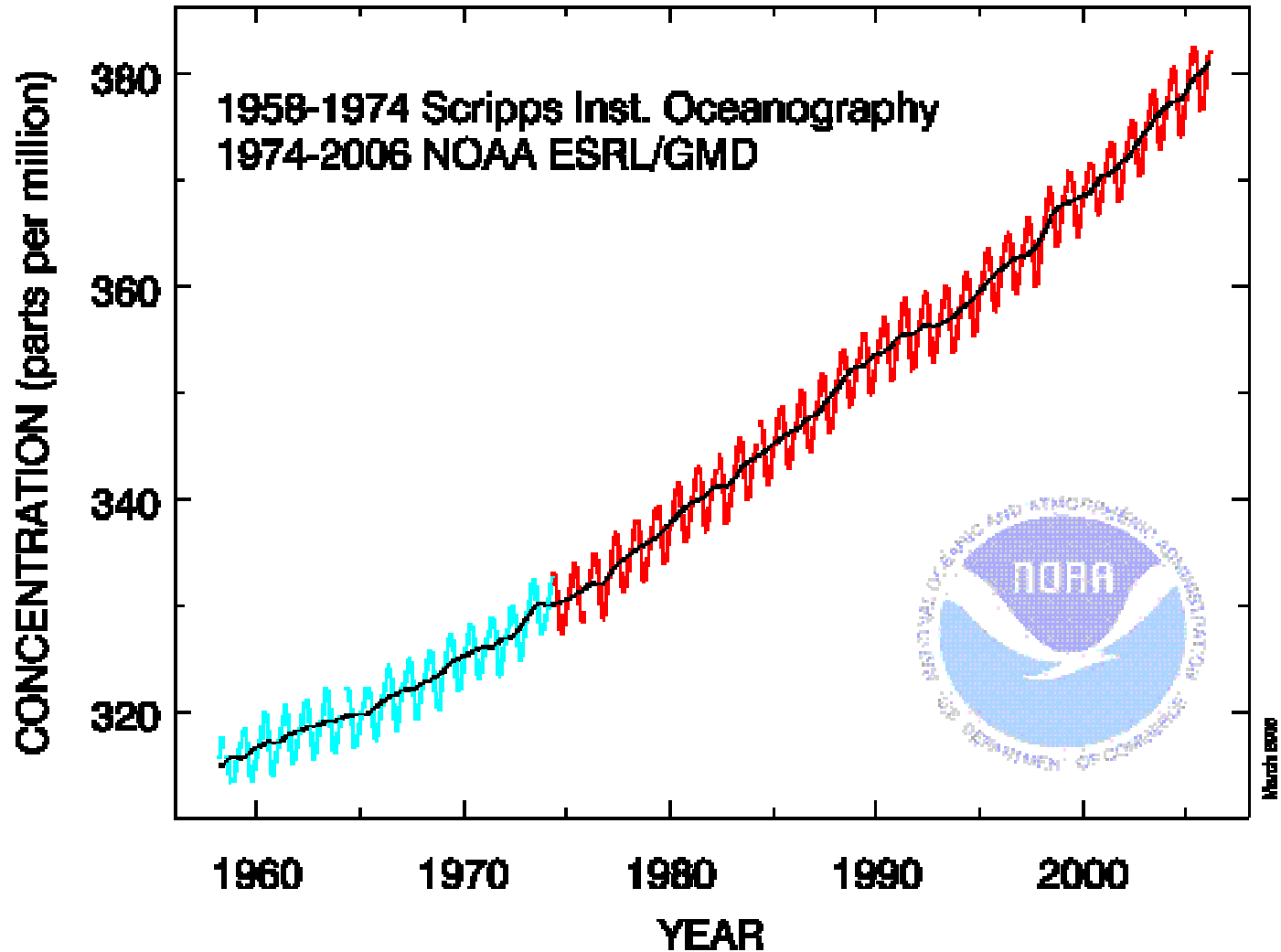
Source: Production and end-use data from Energy Information Administration, *Annual Energy Review 2001*

**Net fossil fuel electrical imports includes 0.2 quads of imported hydro
***Biomass/other includes wood, waste, alcohol, geothermal, solar, and wind.

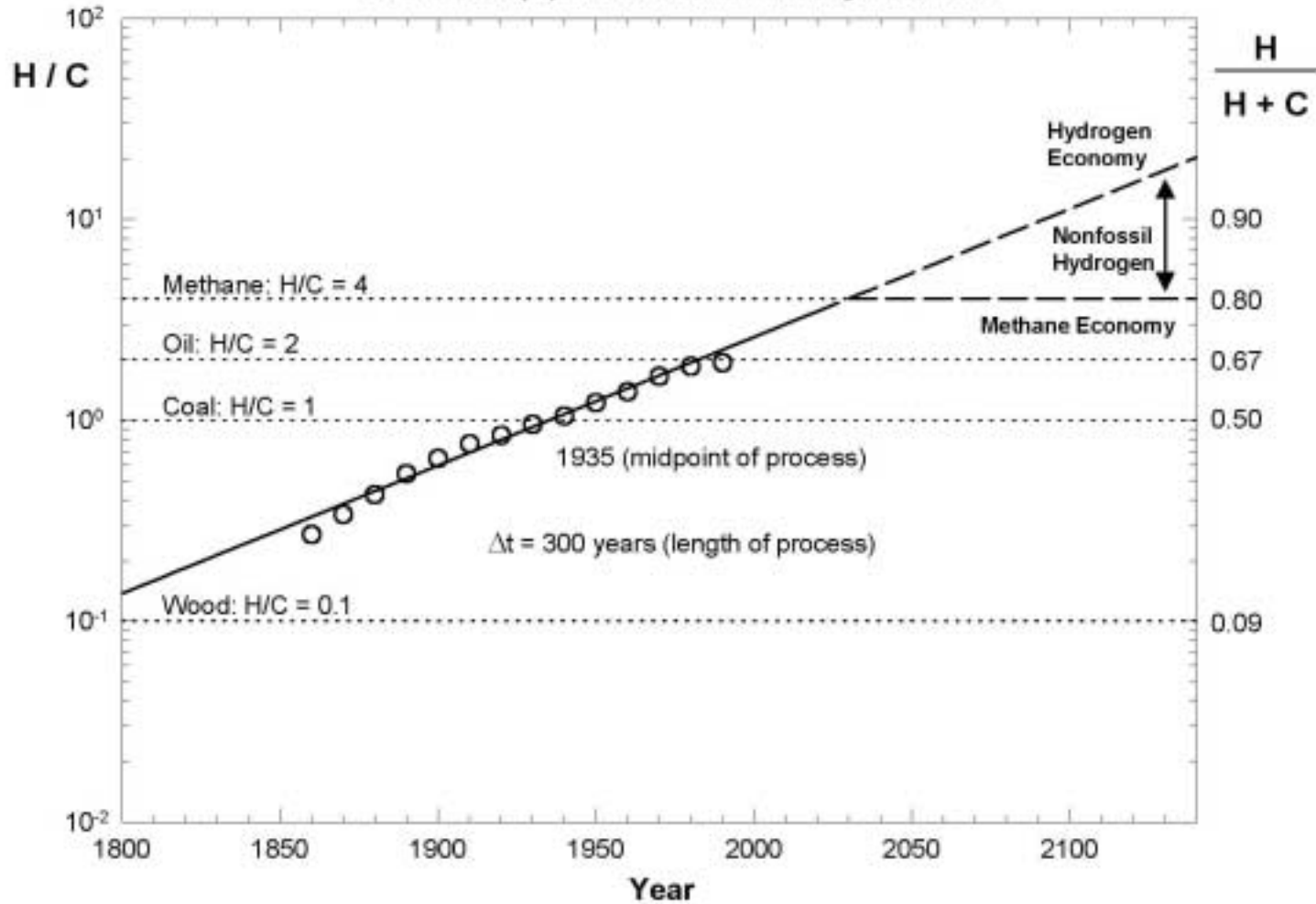
August 2003
Lawrence Livermore
National Laboratory
<http://eed.llnl.gov/flow>

CO₂ Levels in the Global Atmosphere

Atmospheric CO₂ at Mauna Loa Observatory

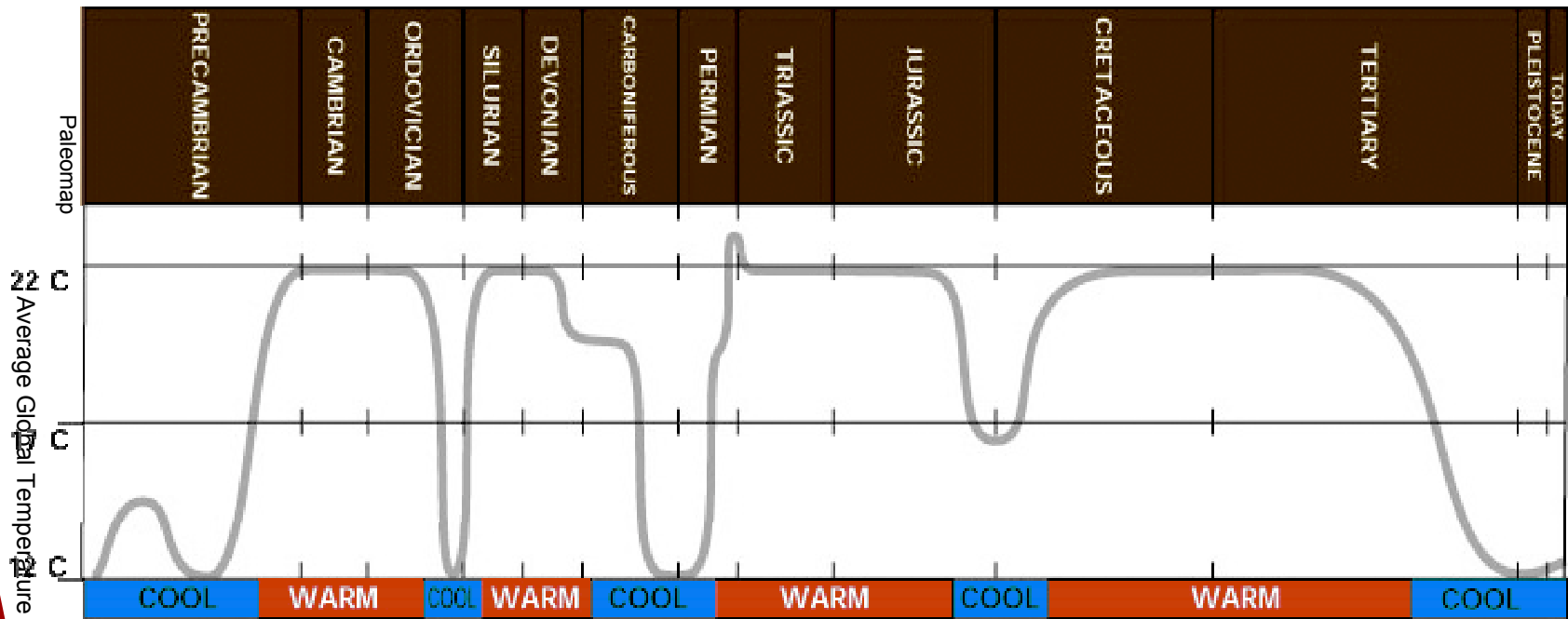


Decarbonization: Evolution of the Ratio of Hydrogen (H) to Carbon (C) in the World Primary Fuel Mix

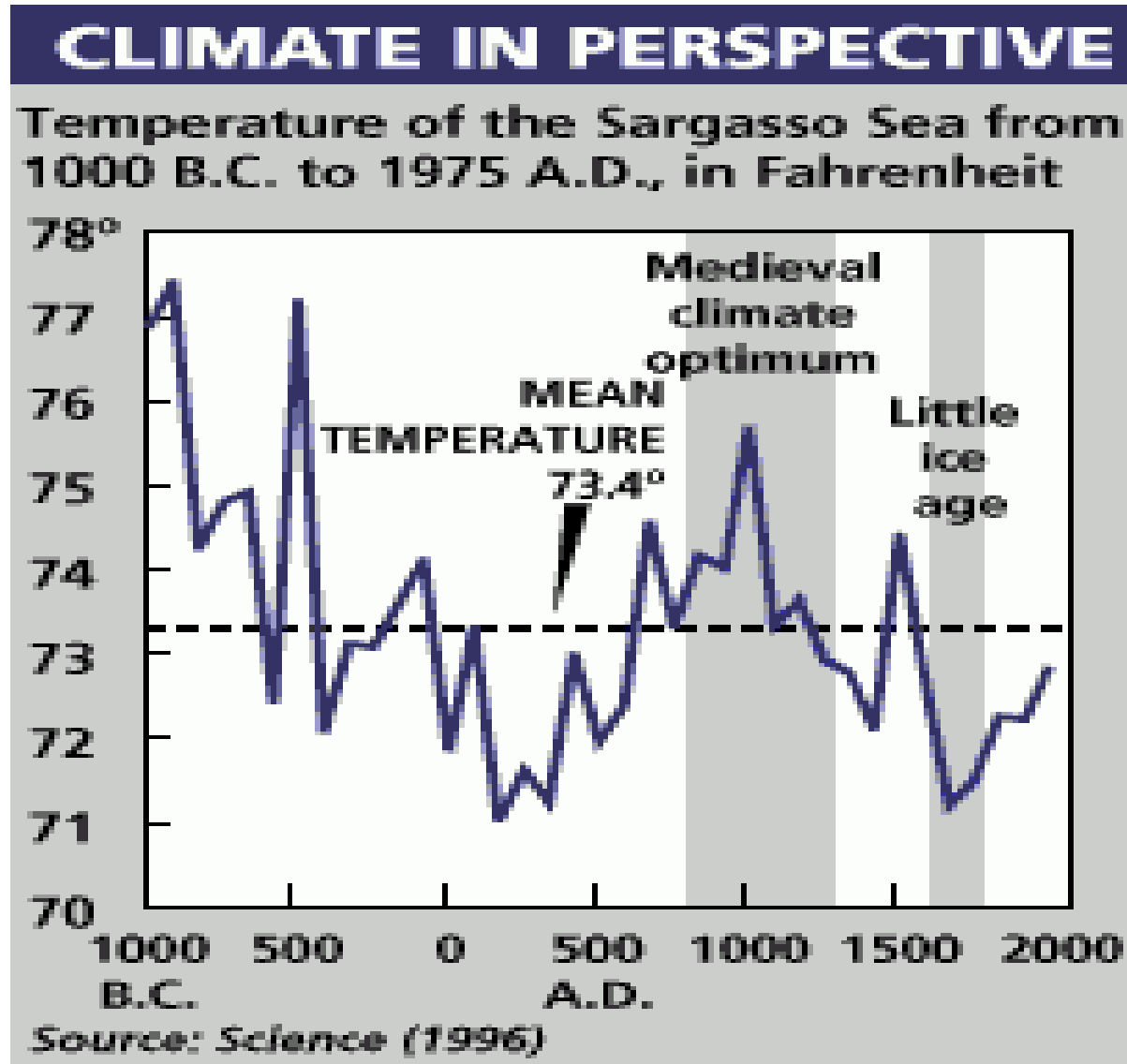


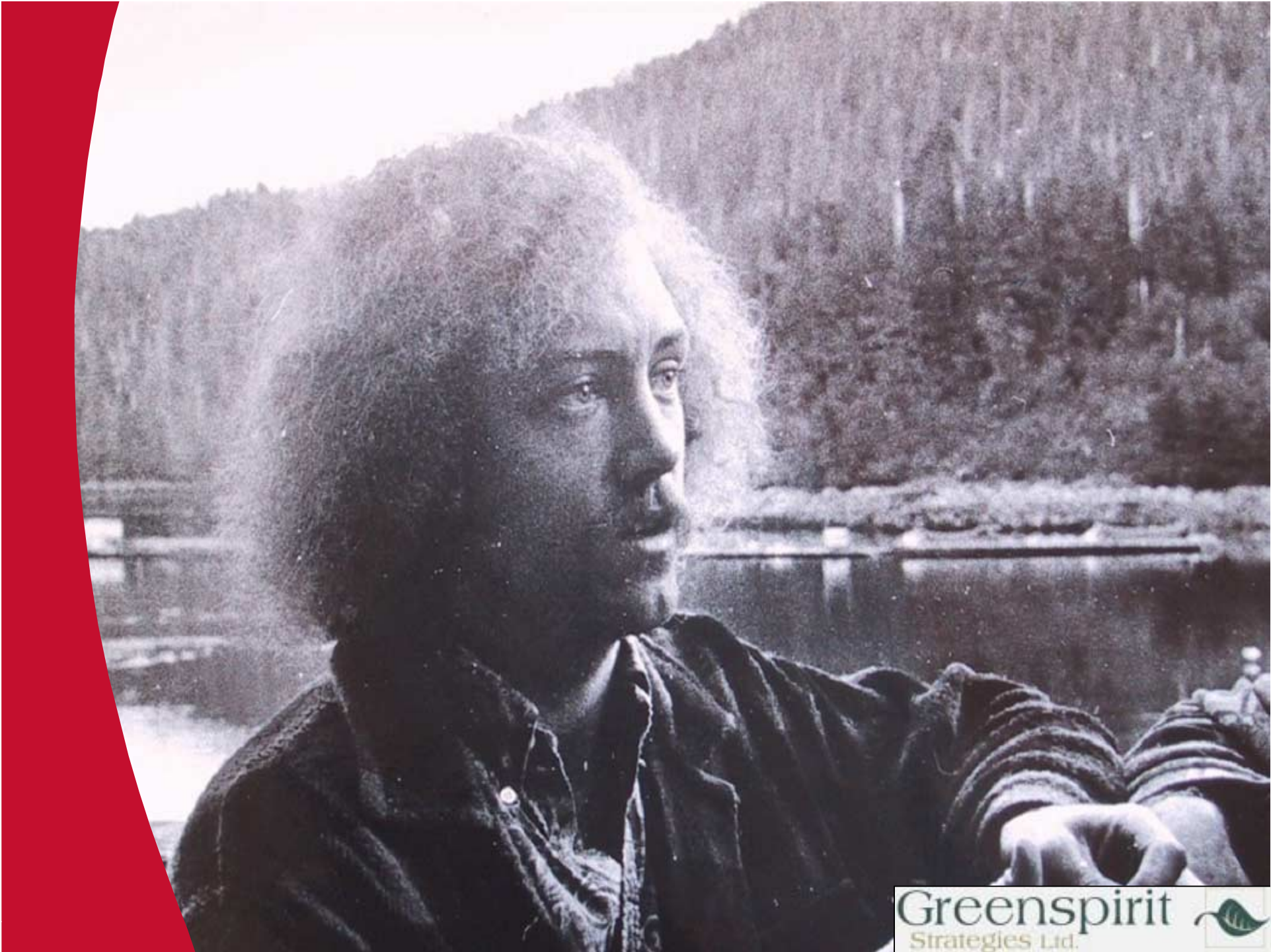
Source: Ausubel, 1996, after Marchetti, 1985

A Billion Years of Global Climate Change



Warmer = Better?





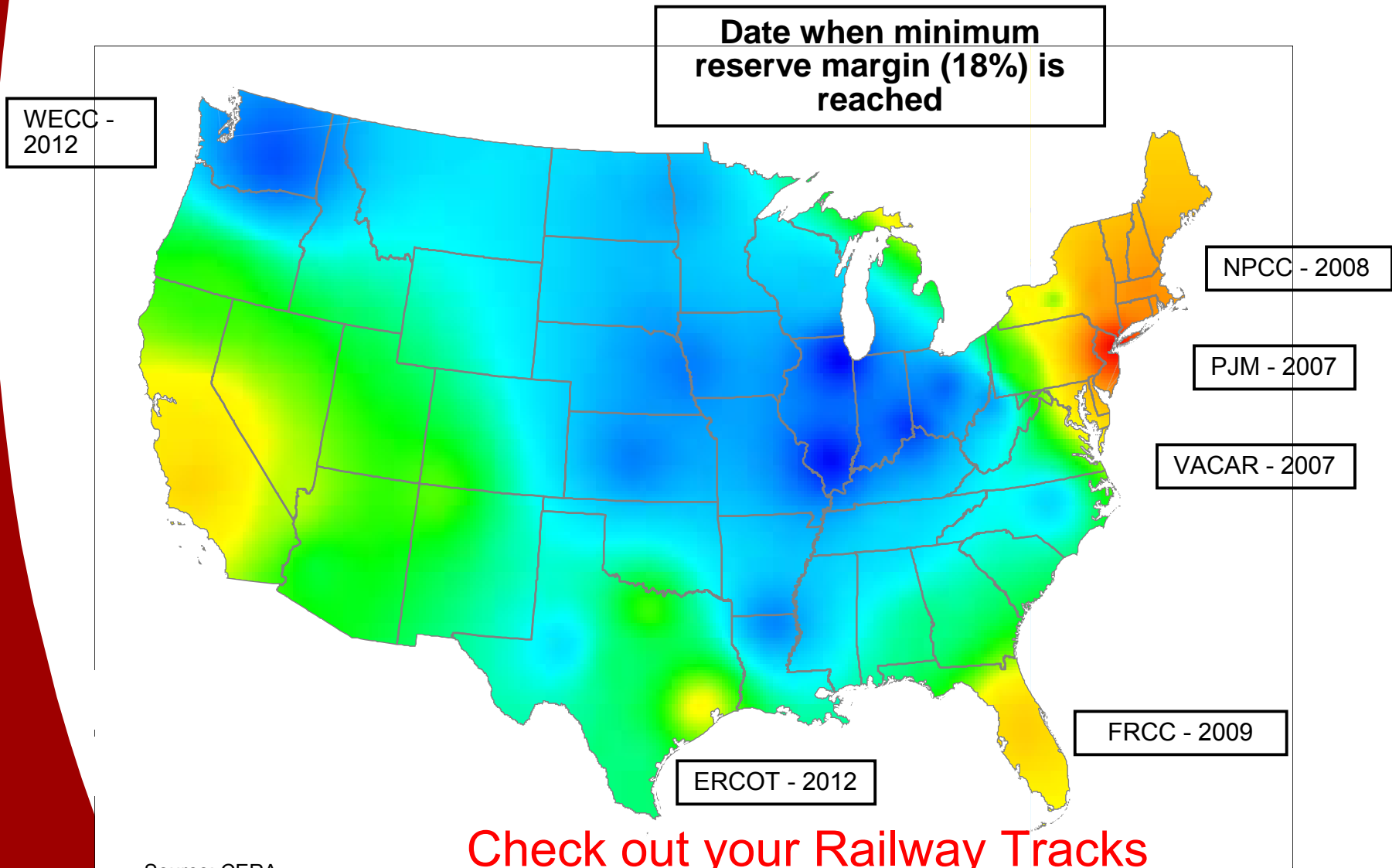
Greenspirit
Strategies Ltd.





Patrick Moore – Green Peace
Steve Brand – Whole Earth Catalogue
James Lovelock - GAIA
Greg Warren – Australian Wildlife Fund

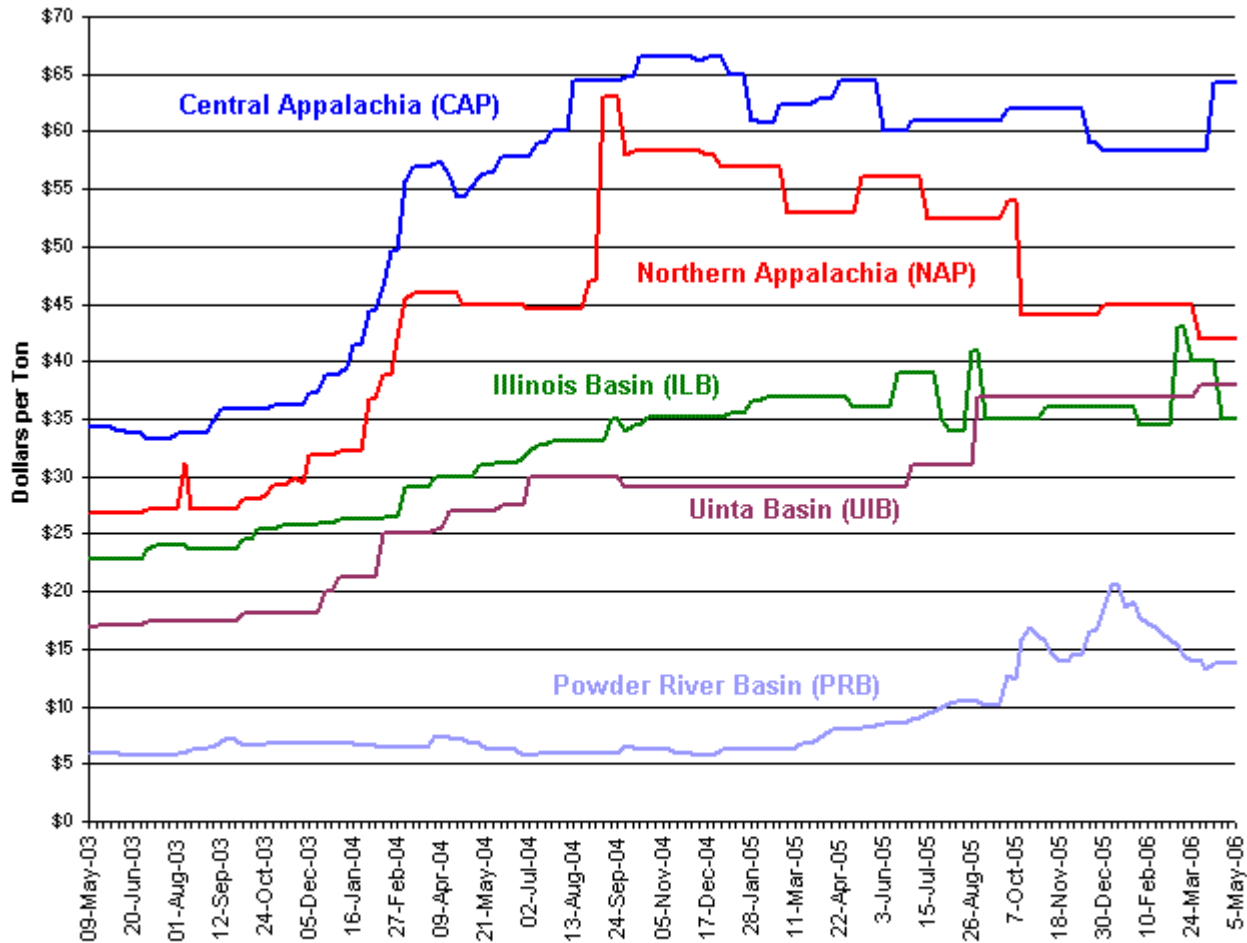
The US Has a Growing Need for New Generation



Source: CERA

Check out your Railway Tracks

Average Weekly Coal Commodity Prices



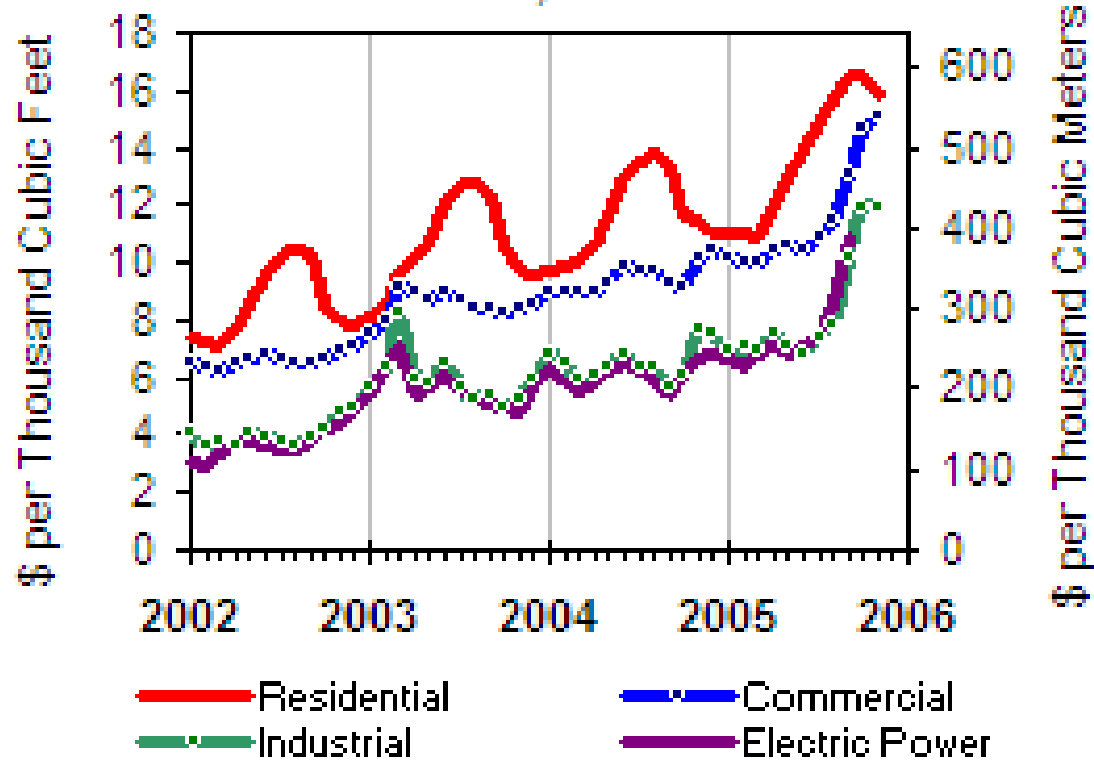
Key to Coal Commodities by Region¹

Central Appalachia: Big Sandy/Kanawha 12,500 Btu, 12 lb SO₂/mmBtu
Northern Appalachia: Pittsburgh Seam 13,000 Btu, <3.0 lb SO₂/mmBtu
Illinois Basin: 11,800 Btu, 5.0 lb SO₂/mmBtu

Powder River Basin: 8,800 Btu, 0.8 lb SO₂/mmBtu
Uinta Basin in Colo.: 11,700 Btu, 0.8 lb SO₂/mmBtu

Natural Gas Costs have Risen Dramatically

Average Consumer Price of Natural Gas
in the U.S., 2002-2005



Source: EIA

June '05 Vs June '06 Selected Energy Prices

| | June '05 | | | June '06 | | |
|---|----------------|----------------|----------------|-----------------|----------------|----------------|
| | High | Low | Avg | High | Low | Avg |
| PJM Electricity Prices | \$83.75 | \$14.50 | \$49.65 | \$108.00 | \$17.00 | \$46.50 |
| Spot Price of Eastern Coal (Central Appalachian) | \$61.00 | \$60.00 | \$60.20 | \$64.25 | \$64.25 | \$64.25 |
| Spot Price of Western Coal (Powder River Basin) | \$8.88 | \$8.61 | \$8.66 | \$12.85 | \$12.25 | \$12.40 |
| Natural Gas Prices – Henry Hub | \$7.83 | \$6.36 | \$7.19 | \$7.04 | \$5.82 | \$6.24 |
| Oil Prices | \$60.54 | \$52.54 | \$56.39 | \$73.93 | \$68.56 | \$70.93 |

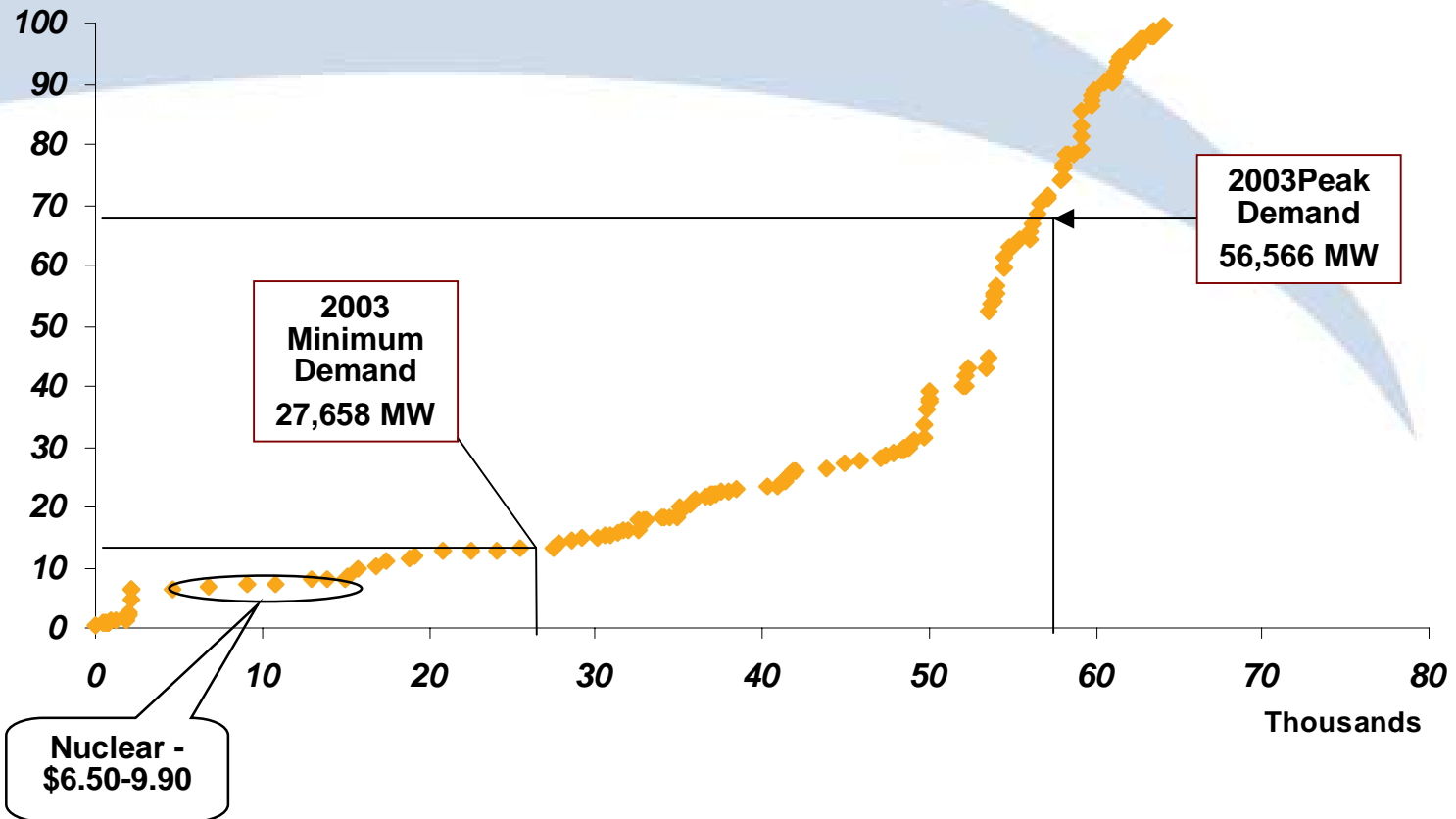


Market Factors are Increasing the Price of Electricity



PJM Dispatch Curve \$/MWh

Natural Gas at \$2



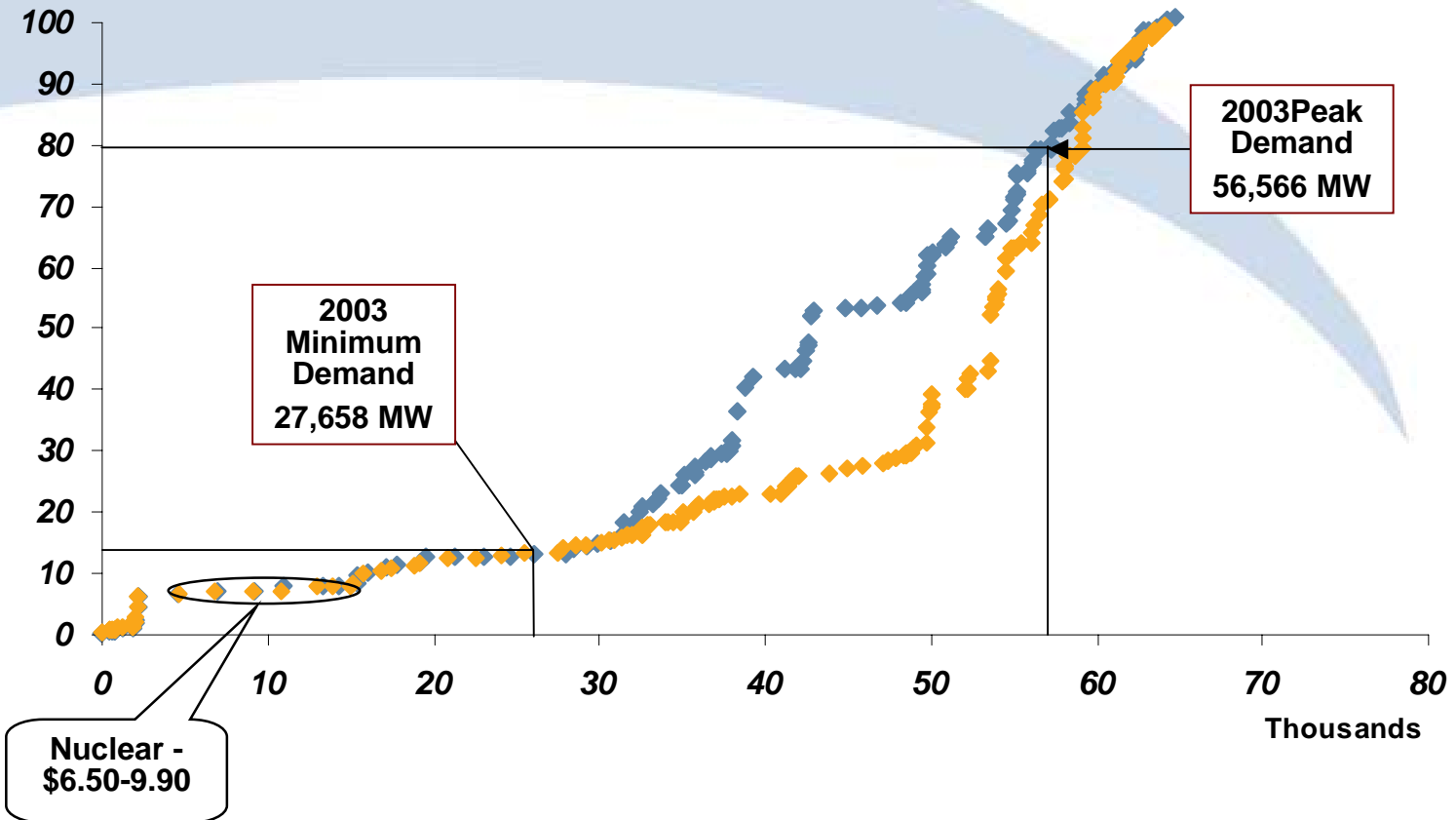


Market Factors are Increasing the Price of Electricity



PJM Dispatch Curve \$/MWh

Natural Gas at \$6

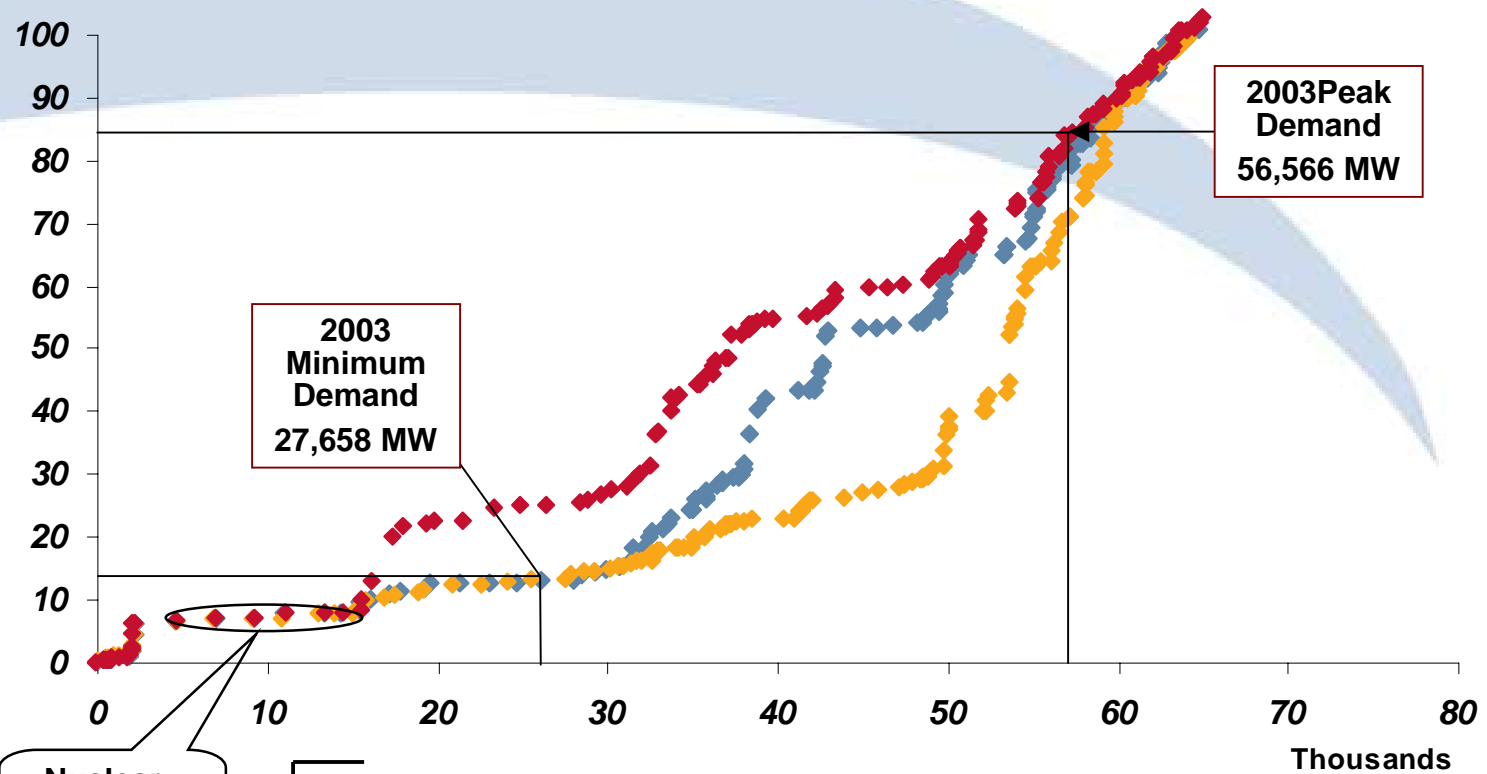




Market Factors are Increasing the Price of Electricity



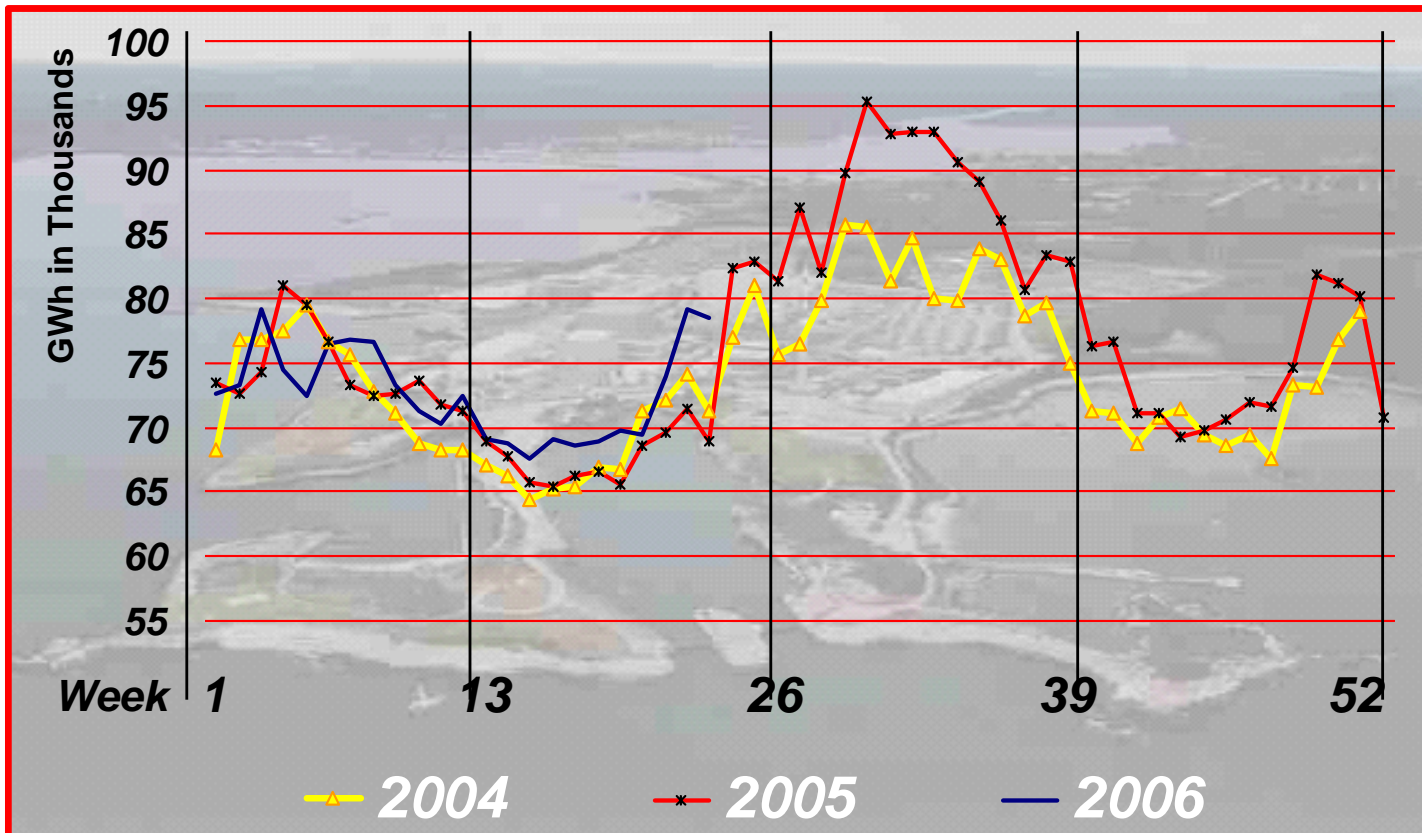
PJM Dispatch Curve \$/MWh
Natural Gas at \$6 and Doubled Coal Price



Fossil fuel volatility can strongly impact electricity prices

Once Again, Things Are Changing

52 weeks ended 6/10/2006 +3.9%



U.S. Electricity Demand

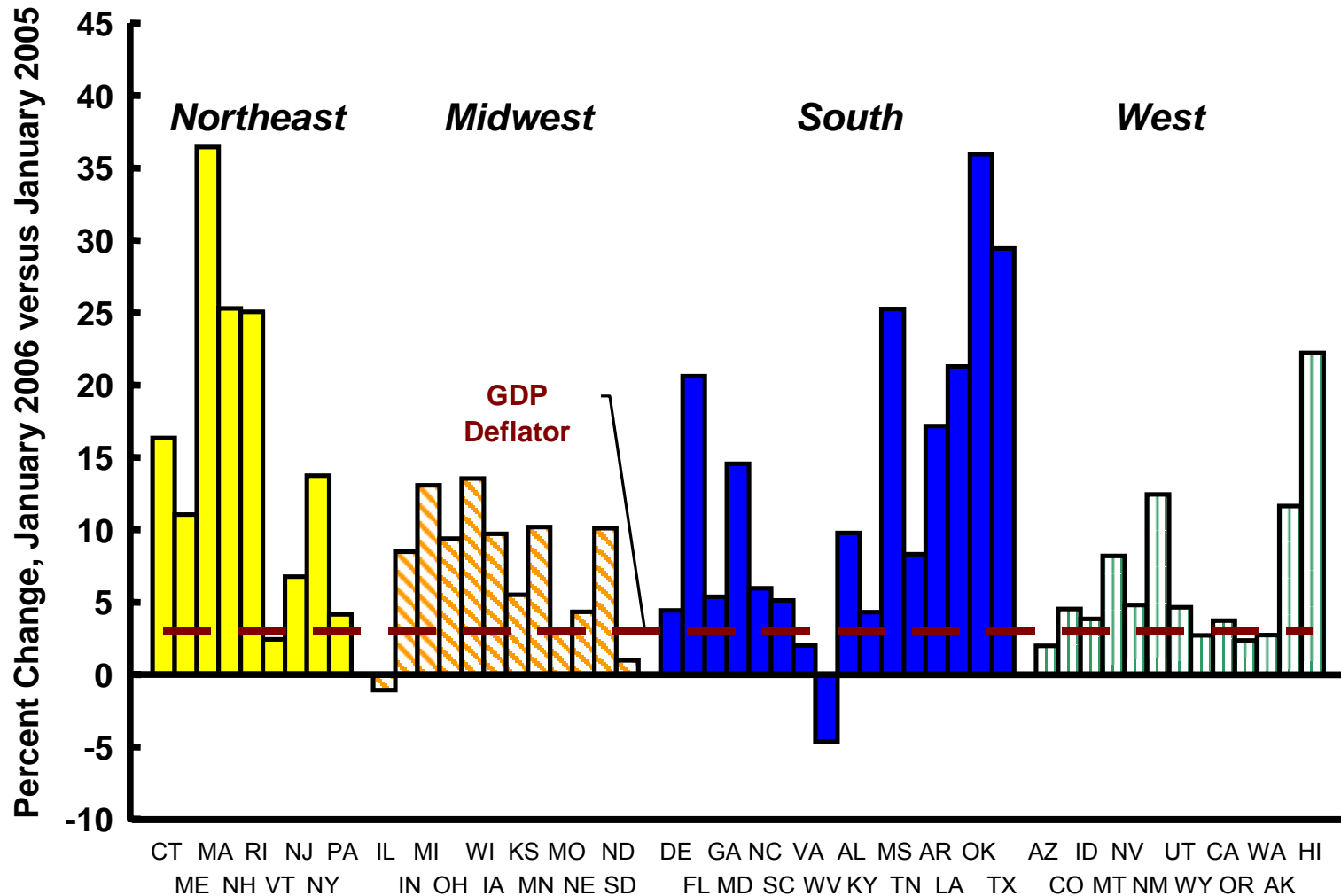


“OOPS!”



“Thank goodness for Bruce Power”

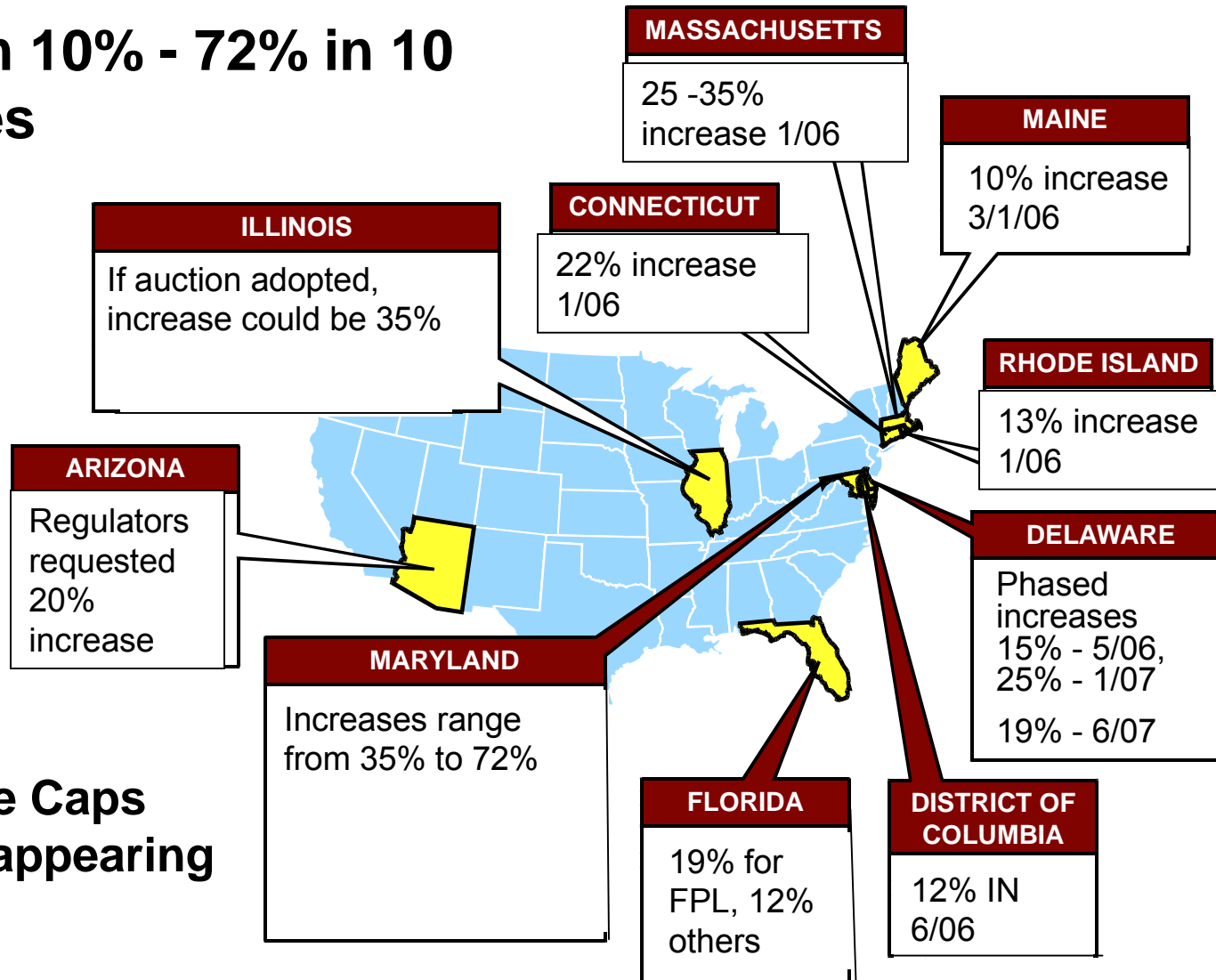
Change in Average Retail Electricity Prices, All Sectors



Source: Cambridge Energy Research Associates, US Energy Information Administration, and US Bureau of Economic Analysis.
U/O51117-4 / Avg_Retail_Elec_Price Jan 06 v Jan 05

Double-digit Residential Rate Increases

From 10% - 72% in 10 states

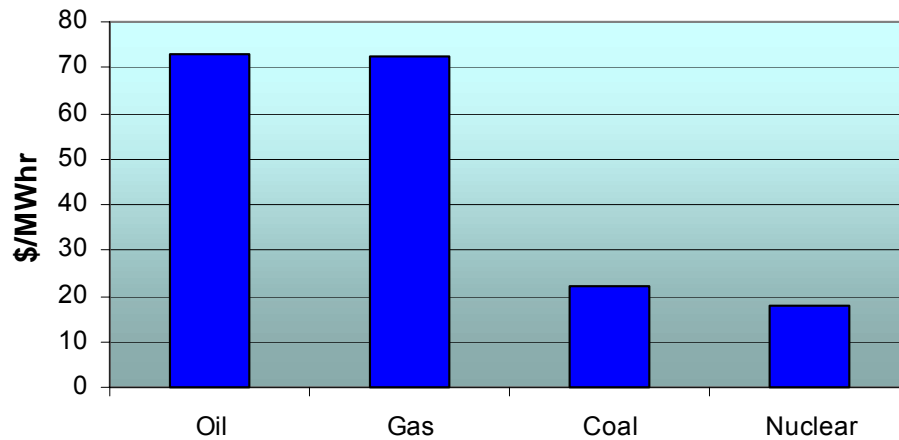


Rate Caps Disappearing



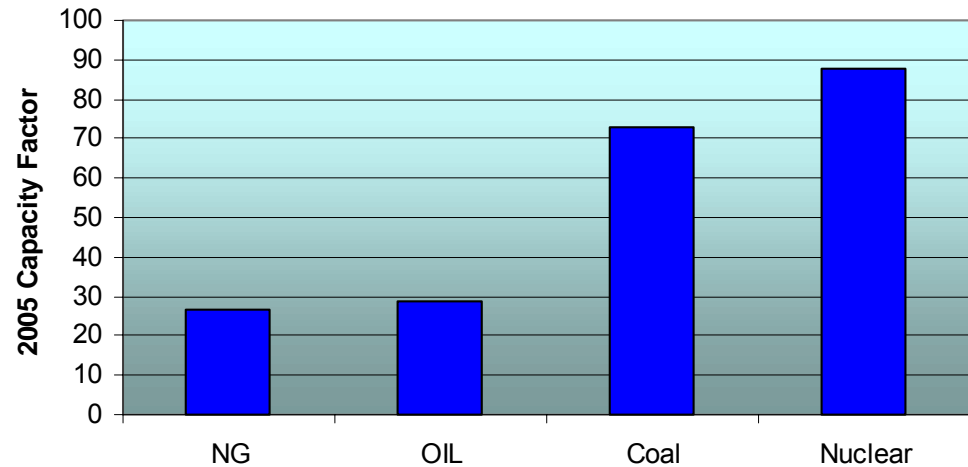
At the End of 2005 Nuclear Power was...

2005 Production Costs



2005 Average Outage Length = 37.8 days

2005 Capacity Factors



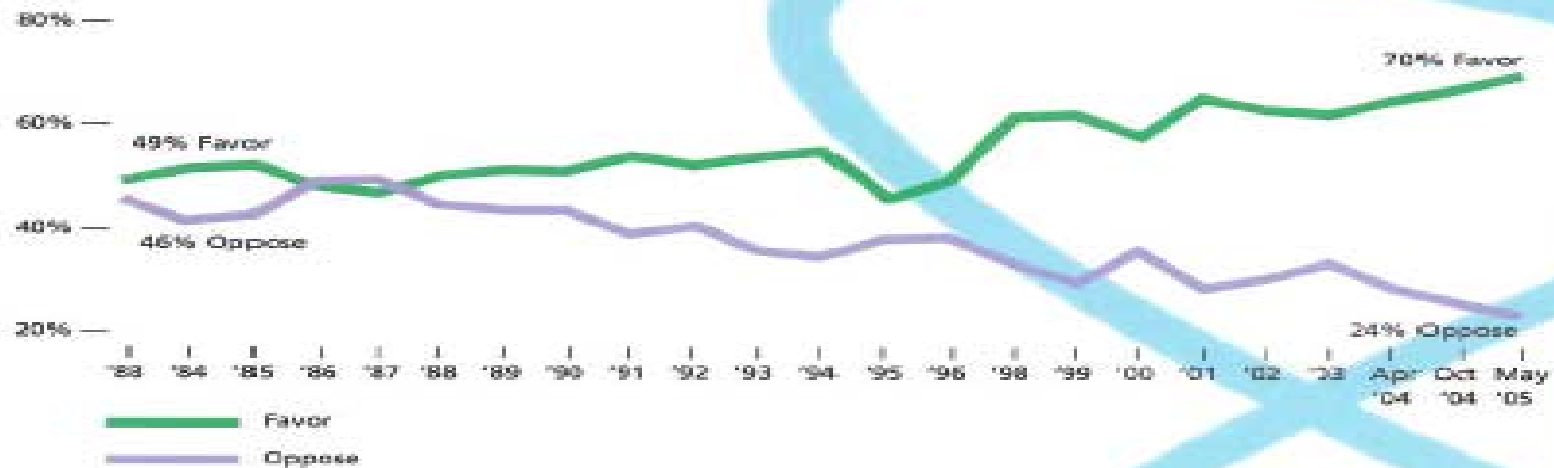
The Best in the Electric Power Industry!

Source: Platts

There is a Major Shift in Public Acceptance

Widening Gap Between Those Who Favor and Oppose Nuclear Energy—Annual Averages Until 2004

"OVERALL, DO YOU STRONGLY FAVOR, SOMEWHAT FAVOR, SOMEWHAT OPPOSE OR STRONGLY OPPOSE THE USE OF NUCLEAR ENERGY AS ONE OF THE WAYS TO PROVIDE ELECTRICITY IN THE UNITED STATES?"



**70% favorability among general public –
even higher near nuclear power plants:**

- ◆ **83% of residents near nuclear plants favor nuclear energy**

Source: NEI Website

- > **103 nuclear reactors are operating every day in the U.S., 442 world-wide.**
- > **No serious accident since 1986**
- > **No one has died as a result of a radiation-related accident in the history of the U.S. or Canadian civilian nuclear program**
- > **45,000 people die in automobile accidents every year in North America**

Proliferation

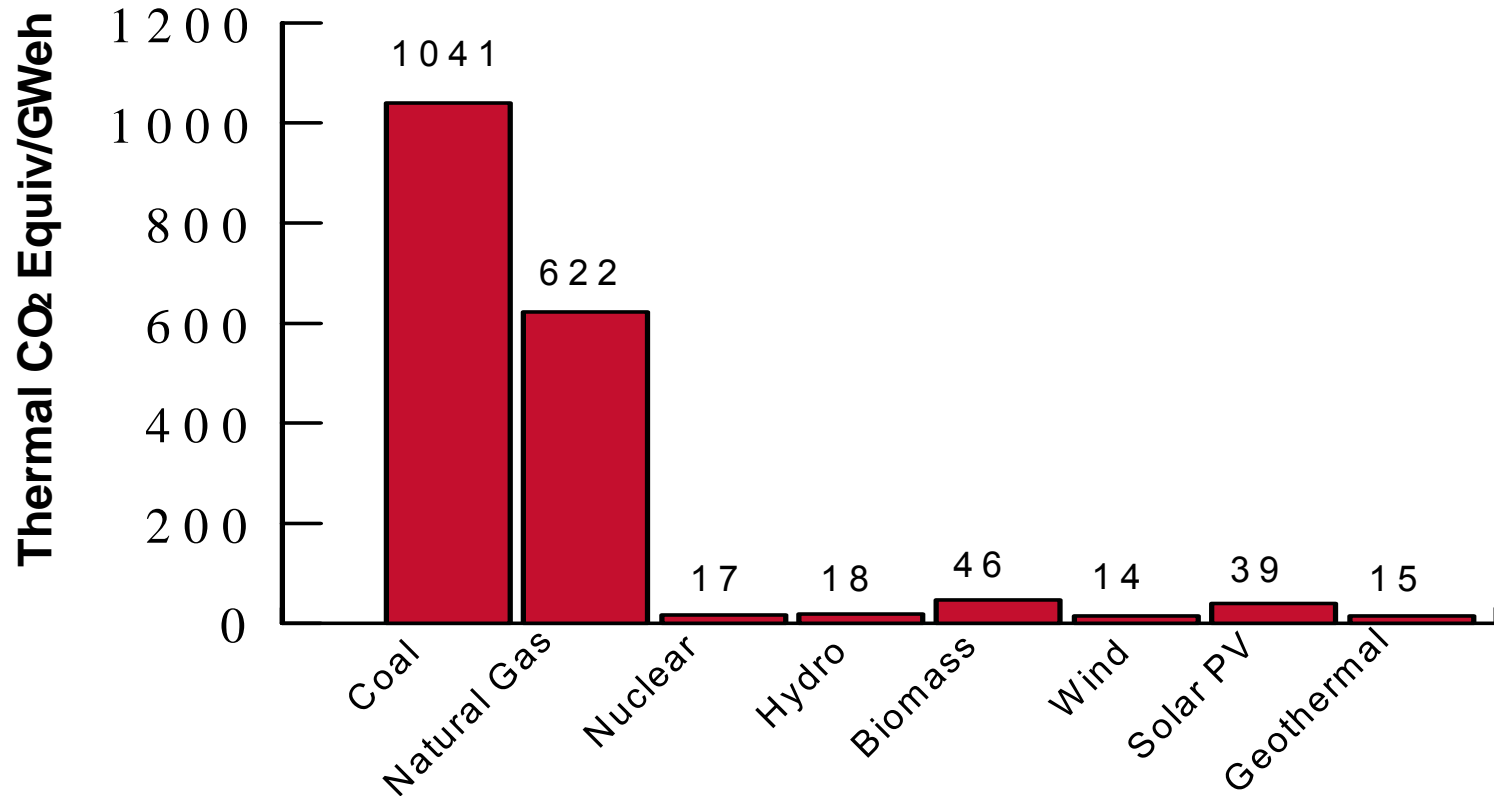
- > Many technologies can be used for good or evil; guns, machetes, car-bombs, fire. This doesn't mean you should ban the technologies.**
- > Higher priority must be placed on international efforts to prevent further proliferation of weapons of mass destruction.**

Nuclear Energy is the Only *Non-greenhouse Gas-emitting Energy Source That Can Effectively Replace Fossil Fuels and Satisfy Global Demand.*



- ✓ **Electricity**
- ✓ **Hydrogen**
- ✓ **Desalinization**
- ✓ **Heating**

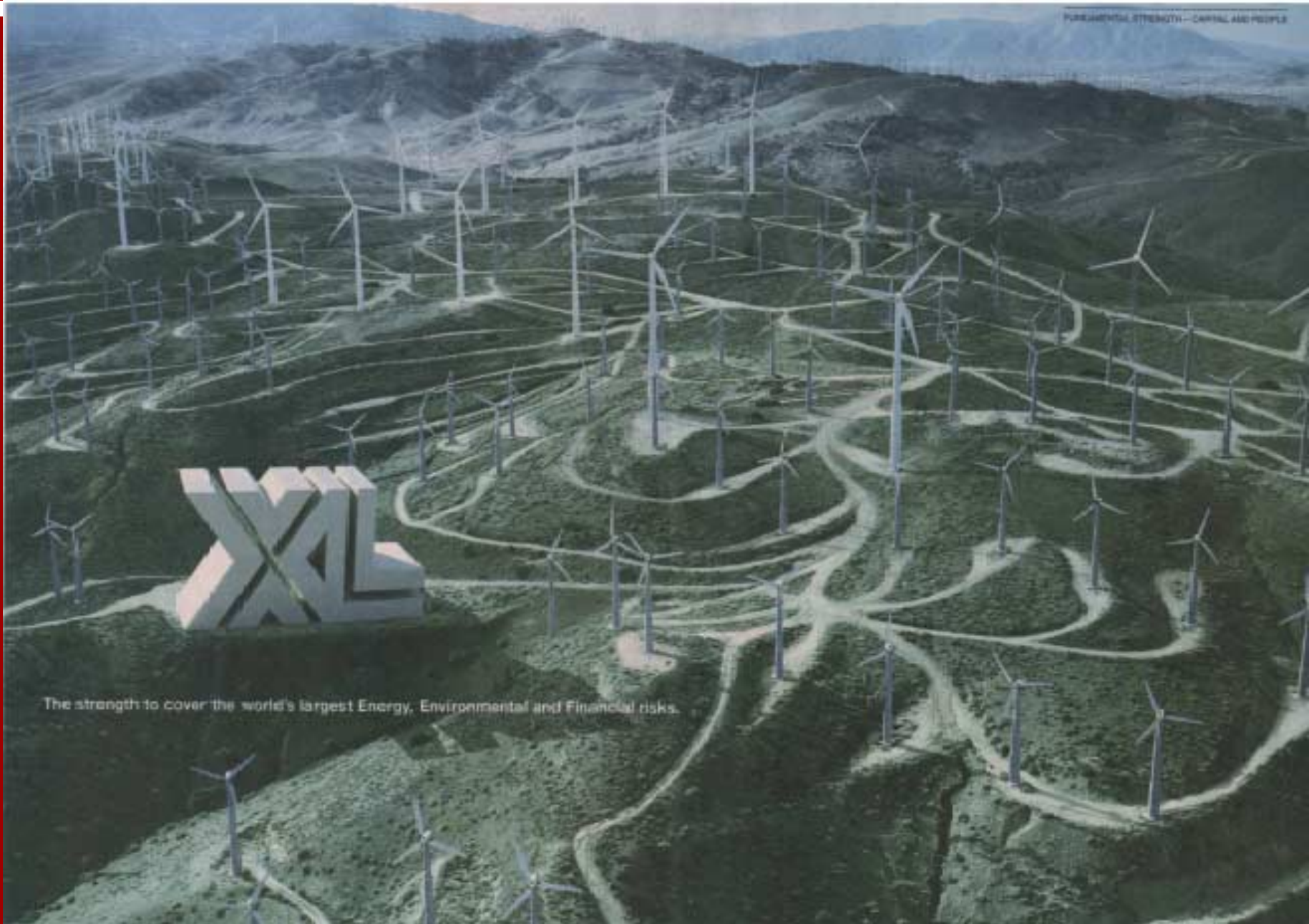
Comparison of Life Cycle Emissions



Source: "Life-Cycle Assessment of Electricity Generation Systems and Applications for Climate Change Policy Analysis," Paul J. Meier, University of Wisconsin-Madison, August, 2002.

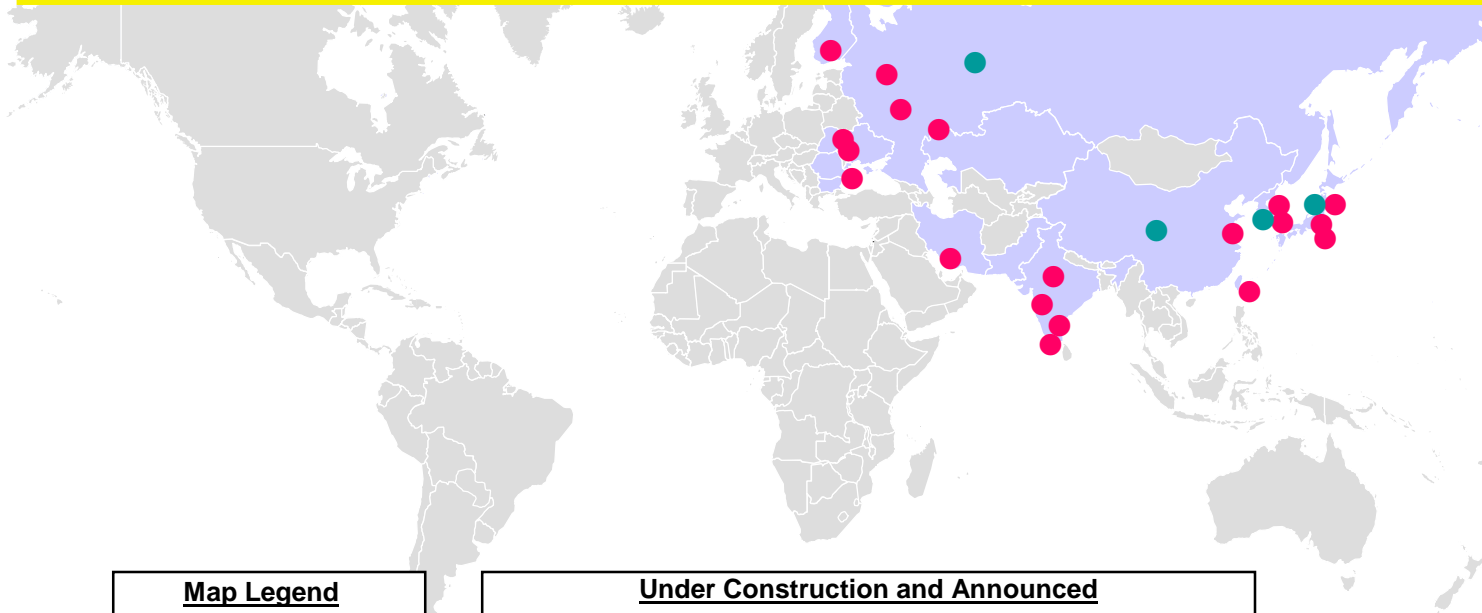
Isn't it Ironic?

- > **The “Environmental Movement” is a major obstacle to the realistic achievement of CO2 emissions reductions around the world.**
- > **Activists oppose nuclear energy, hydroelectric projects, many wind farms, intensive forestry, genetic enhancement and do little to promote geothermal energy.**
- > **Activist support for solar drains \$\$ from more effective technologies.**



The strength to cover the world's largest Energy, Environmental and Financial risks.

**24 Units Under Construction,
39 Units Announced**



| Map Legend | |
|-------------------------------------|--------------------|
| ● | Announced |
| ● | Under Construction |

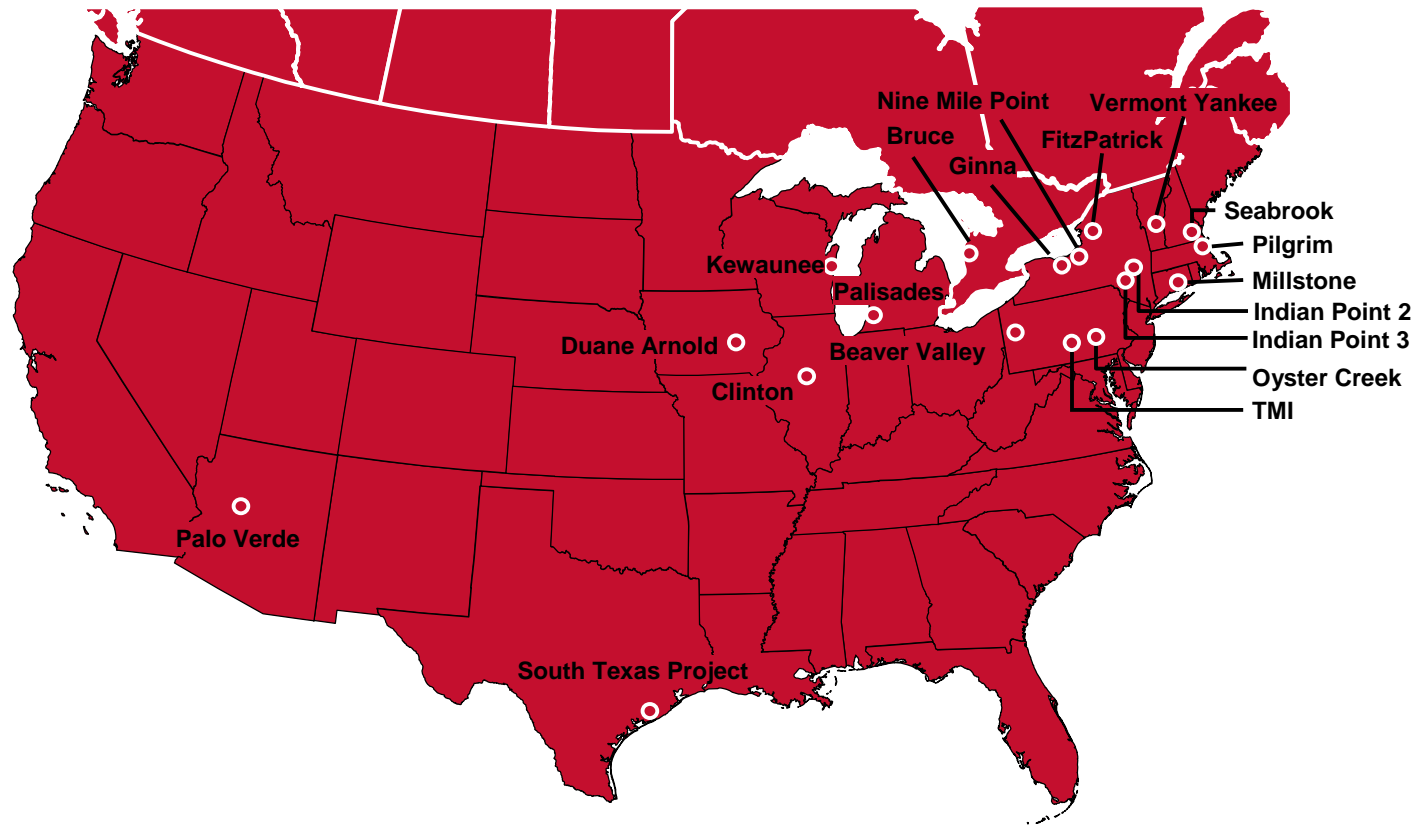
| Under Construction and Announced | | |
|---|--------------------------|---------------|
| Finland (1) | India (8) | Taiwan (2) |
| S Korea (8 announced) | Ukraine (2) | Iran (1) |
| Japan (1 + 12 announced) | Romania (1) | Argentina (1) |
| Russia (4 + 3 announced) | China (2 + 16 announced) | Pakistan (1) |

Sources: NEI Web Site (Jan 2006)

Global M&A Madness: What's Happening

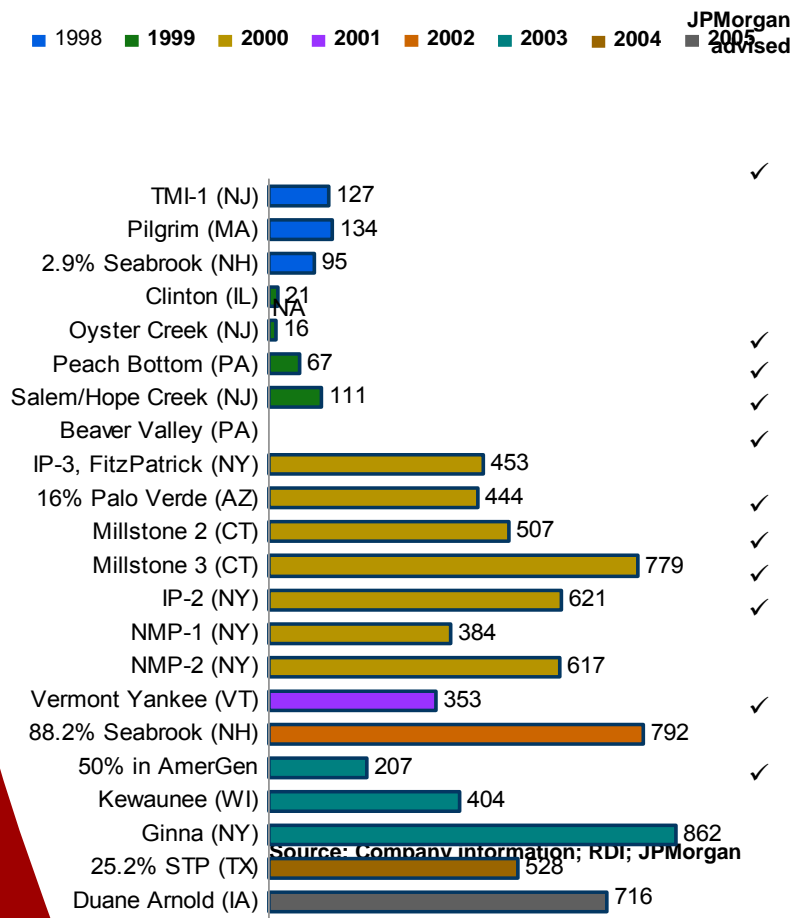
Paul Dabbar
Managing Director,
Global Mergers & Acquisitions
JPMorgan

29 Nuclear Generation Units Have Been Sold...



Valuations Have Become Extremely Healthy...

Nuclear transaction multiples (\$/kw)



Determinants of value

- ▶ Increasing role of nuclear generation in corporate strategies
- ▶ Developing buyer views on nuclear risks vs alternative generation types
- ▶ Perceived lack of supply in nuclear M&A market
- ▶ Existence of PPAs and/or bullish views on merchant baseload
- ▶ Buyer views on operational skill sets
- ▶ Experienced views on synergies
- ▶ Transfer of expertise
- ▶ Reduction in cost of capital

U.S. Energy Policy Act of 2005

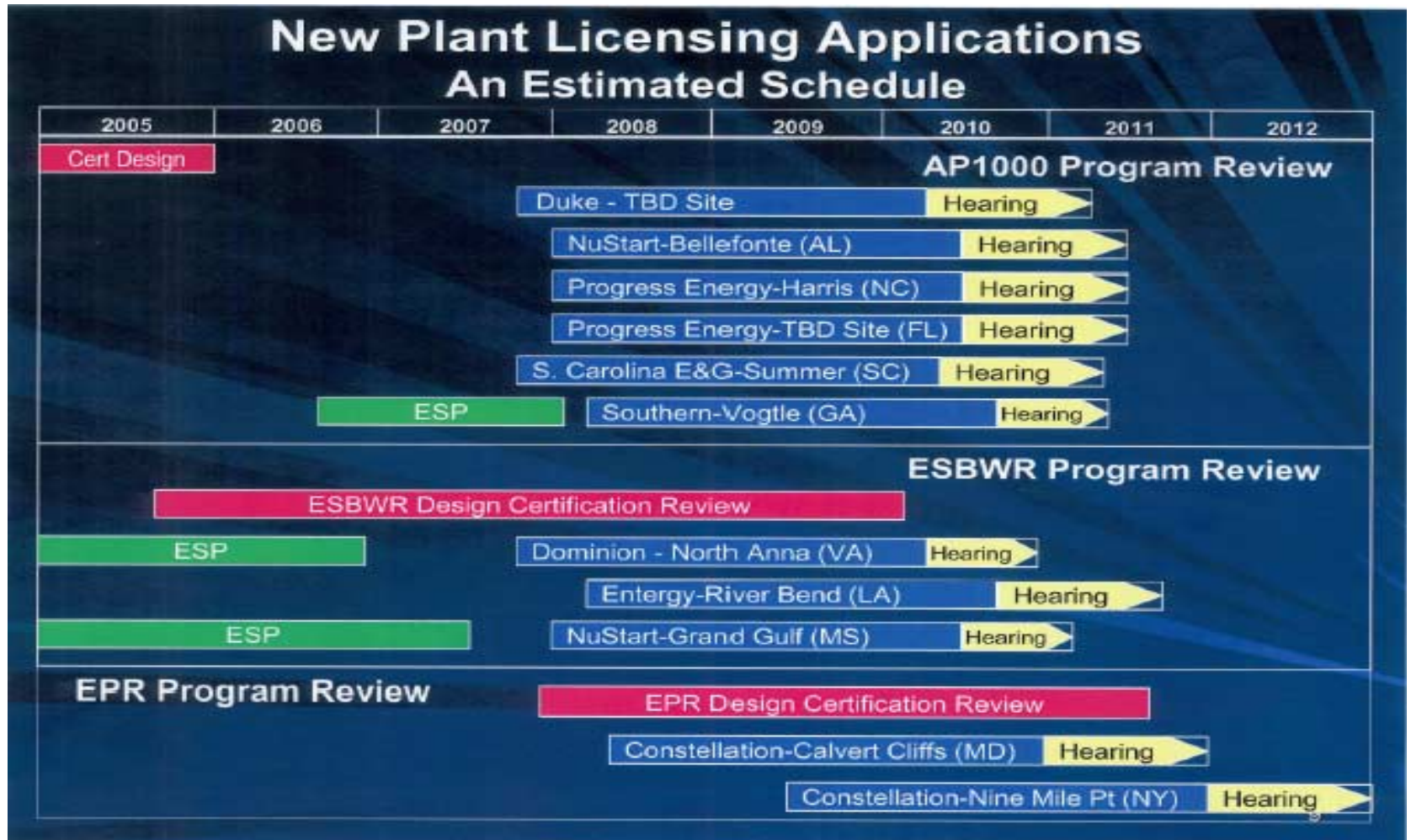
- Investment stimulus for new nuclear generation:
 - ◆ Production tax credit (\$18/MW-hr)
 - ◆ Government Loan Guarantees
 - ◆ Standby Insurance Protection
- 20 year renewal of Price-Anderson
- Updated tax treatment of decommissioning trust funds
- Substantial R&D authorization



New Nuclear Plant Investment Stimulus

- **Loan guarantees for up to 80% of project cost**
 - ◆ Higher leverage, lower debt cost reduces overall project cost by approximately \$200 – \$300 million
- **Production tax credit of \$18 per MWhr for new nuclear capacity through 2021, subject to 2 limitations:**
 - ◆ \$125 million per 1,000-MW per year
 - ◆ 6,000-MW eligible, allocated among available capacity
 - ◆ Treasury Department/IRS rulemaking: February 2006
- **Insurance protection against construction delays until commercial operation (factors beyond private sector's control)**
 - ◆ Coverage: \$500 million for first 2 plants, \$250 million for next 4
 - ◆ Covered delays: NRC licensing delays, litigation delays
 - ◆ Major covered cost: Debt service
 - ◆ Final rules: August 2006

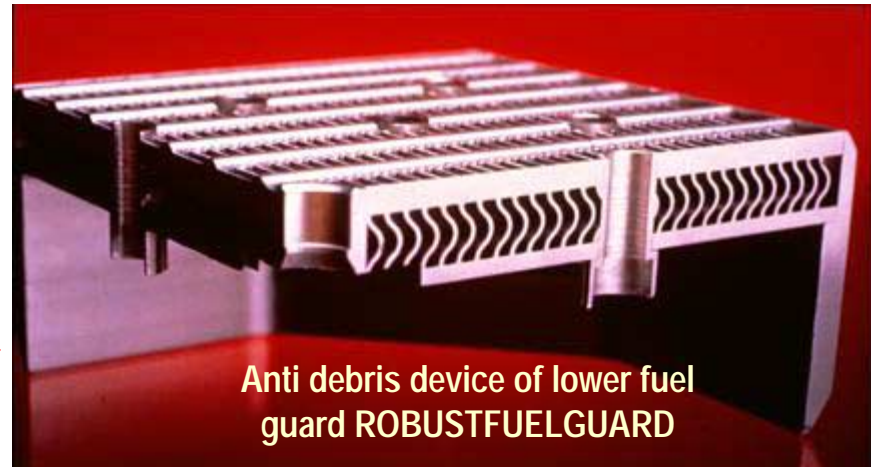
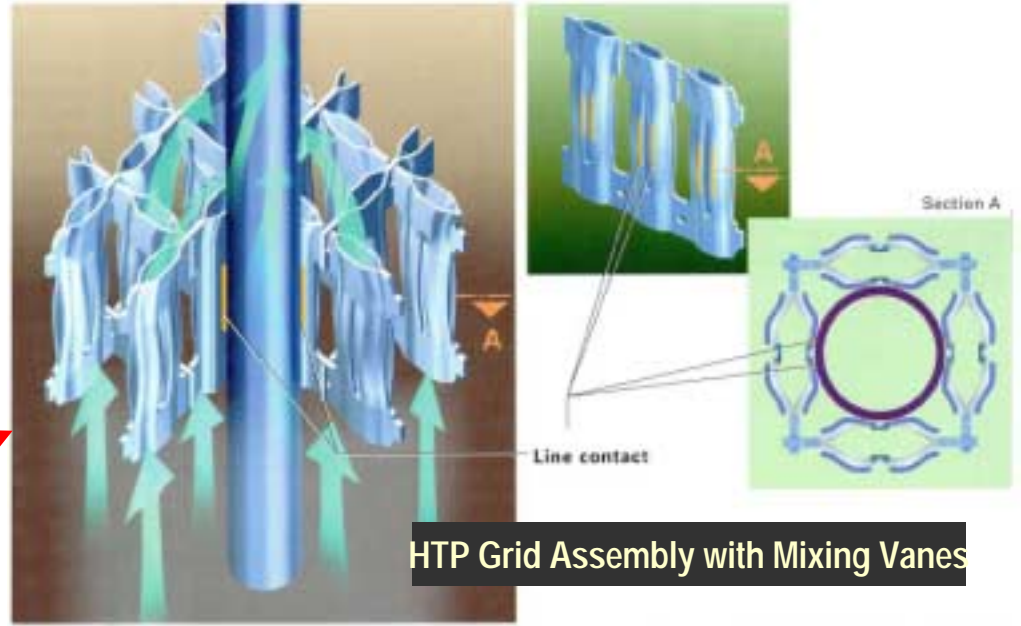
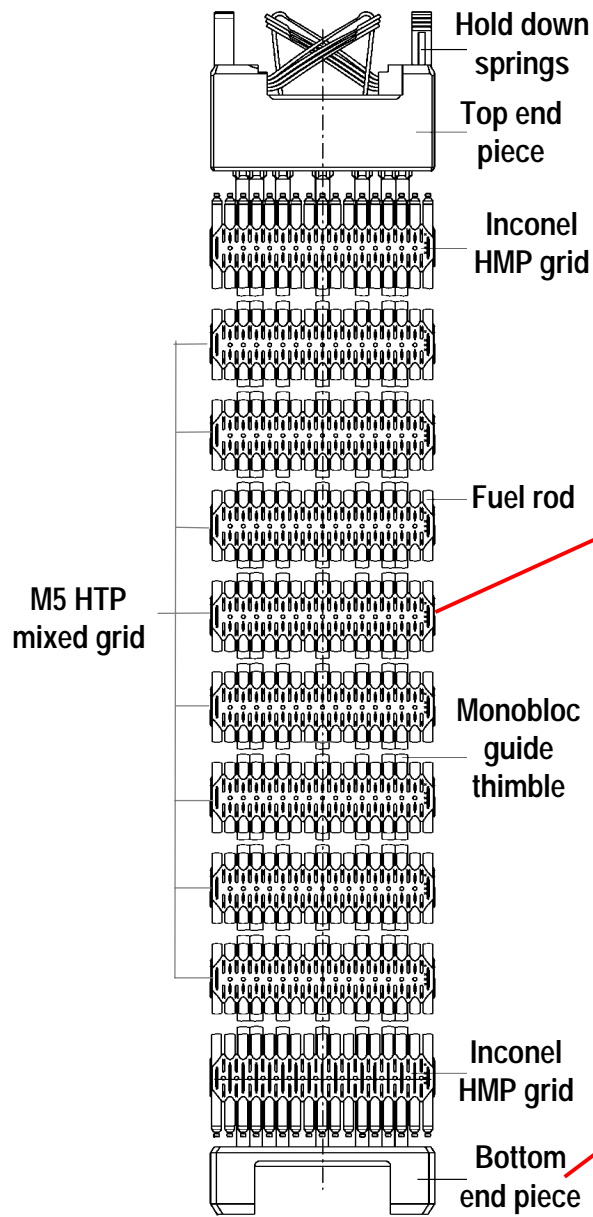
New Nuclear Activity: National



EPR - An Evolutionary PWR Product

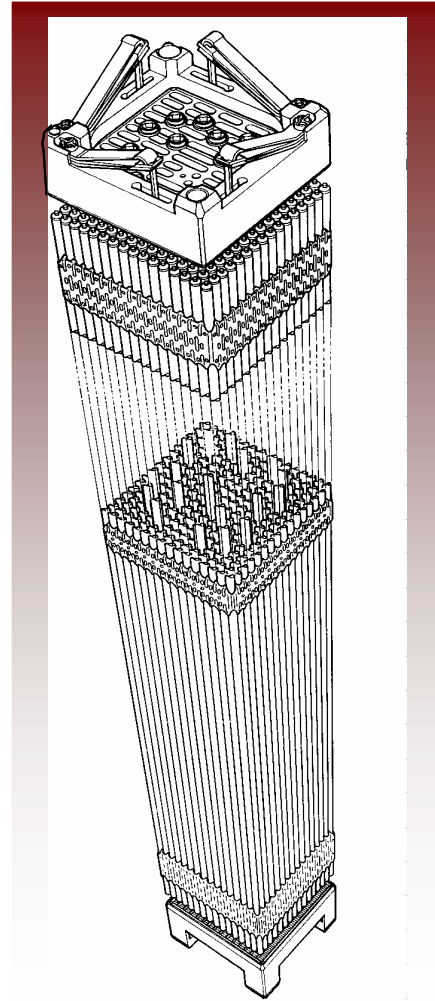


HTP Fuel Assembly Outline



Fuel Design Proven By Operation

- > **17x17**
- > **Typical Pitch-to-Diameter Ratio**
- > **M5 Cladding**
- > **Heated Length Similar to N4**
- > **M5 HTP Mixing Vane Grids**
- > **Anti-Debris Lower End Fitting**
- > **Significant Design Margins**
- > **MOX Compatible**



EPR Projects: Olkiluoto 3 and Beyond



Building a Global Fleet of EPRs

Reactor Pressure Vessel



Cylindrical shells
welded



Nozzle



RPV Closure Head

Olkiluoto 3 Progress



Olkiluoto 3 Progress (cont'd)



Olkiluoto 3 Progress (cont'd)



Olkiluoto 3 Progress (cont'd)



Olkiluoto 3 Progress (cont'd)



Flamanville 3



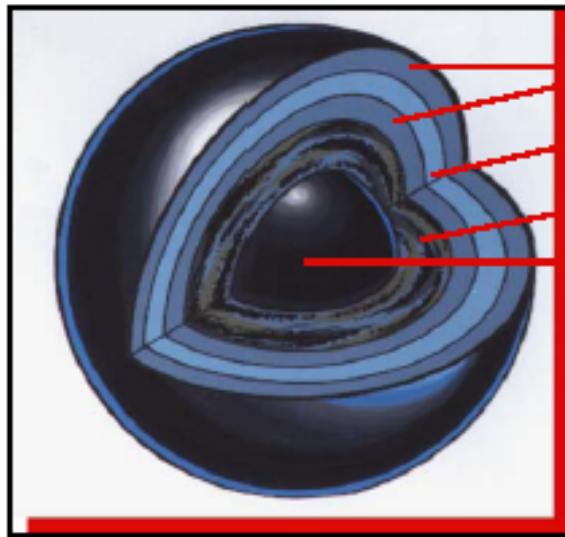
Construction Start 2007, Operation 2012

AREVA-HTR - An Advanced Nuclear Product

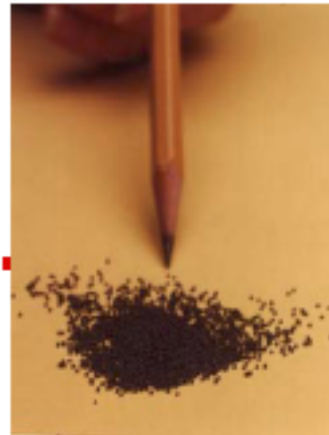


AREVA-HTR - Particle Fuel Components

Particles/Compacts/Assemblies



- Pyrolytic Carbon
- Silicon Carbide
- Porous Carbon Buffer
- Uranium Oxycarbide



Particles



Compacts



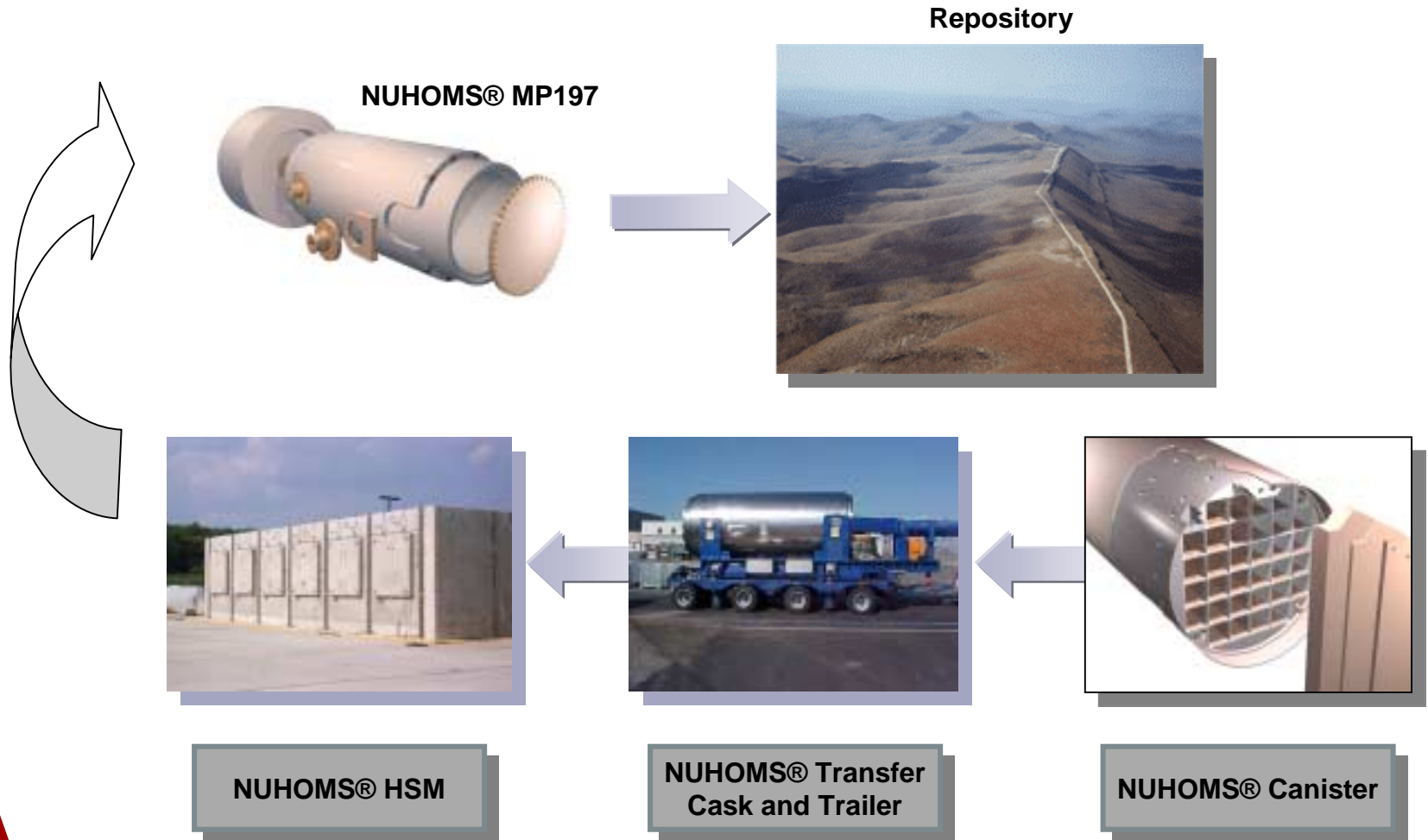
Assemblies

Sources : Kazakhstan KATCO (In situ leaching)

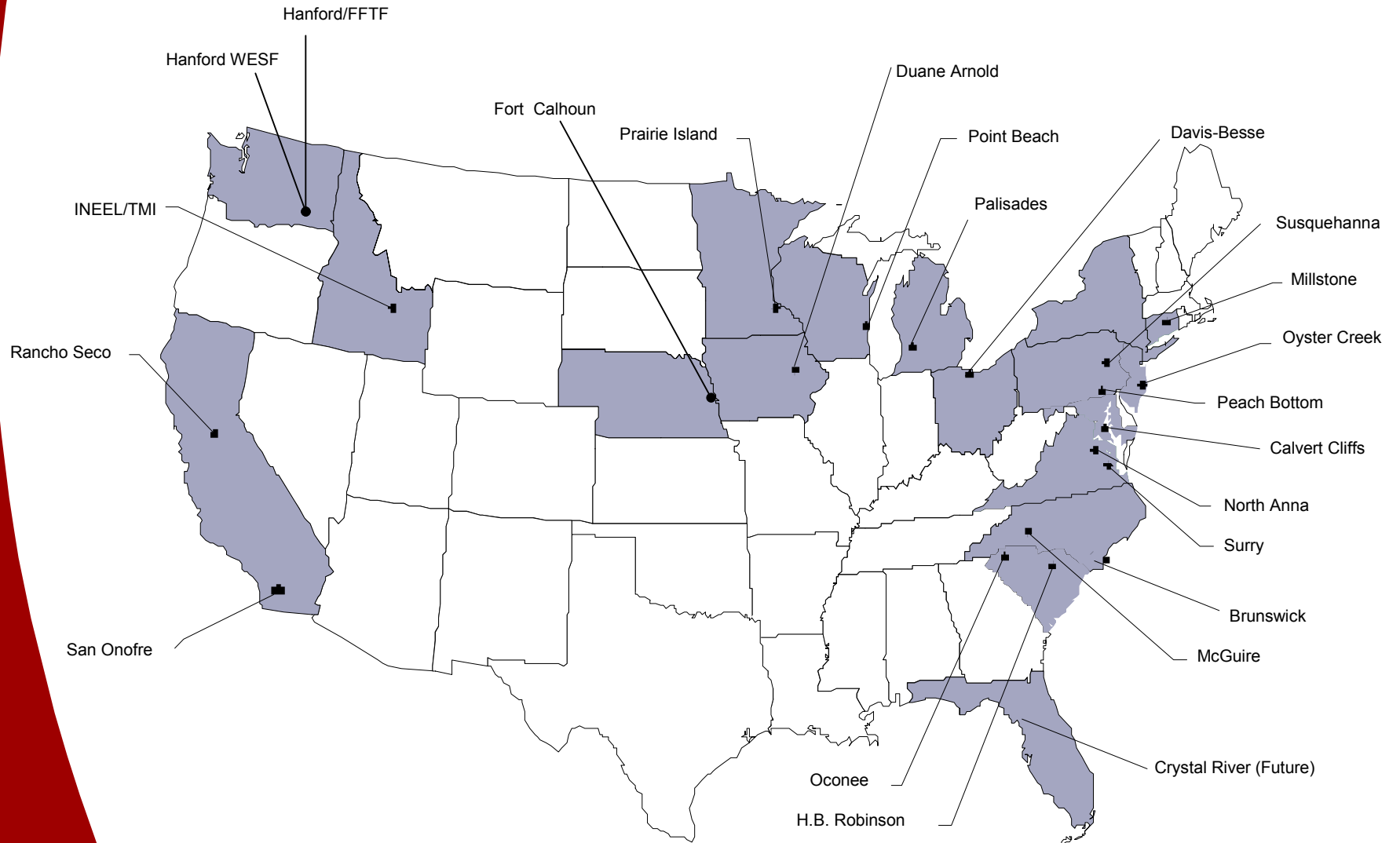


McClellan Lake - JEB TMF



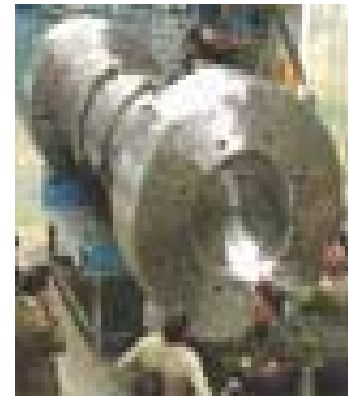


Serving 23 ISFSI Sites



World Class Transportation Capabilities

- > Four decades of comprehensive transportation services**
- > More than 30,000 metric tons of fuel transported to date**
- > Over 200 spent fuel shipments in 2003**
- > A fleet of 2200 casks in service today**



Yucca Mountain



10 AREVA Sustainable Development Commitments

- 1. Customer Satisfaction**
- 2. Governance**
- 3. Financial Performance**
- 4. Innovation**
- 5. Continuous Improvement**



“THESE ARE OUR COMMITMENTS”

10 AREVA Sustainable Development Commitments (Continued)

- 6. Community Involvement**
- 7. Respect for the Environment**
- 8. Risk Management and Prevention**
- 9. Commitment to Employees**
- 10. Dialogue & Consensus-Building**



“THESE ARE OUR COMMITMENTS”





The 3 P's: Panda's, Population and Power

“Make good choices by having:

- Knowledge***
- Understanding***
- Facts”***