SESSION 1

LIFTOFF!
LAUNCHING OUR FUTURE TODAY

The Future of the Conversion of America's Most Abundant Resource

Session Presenter

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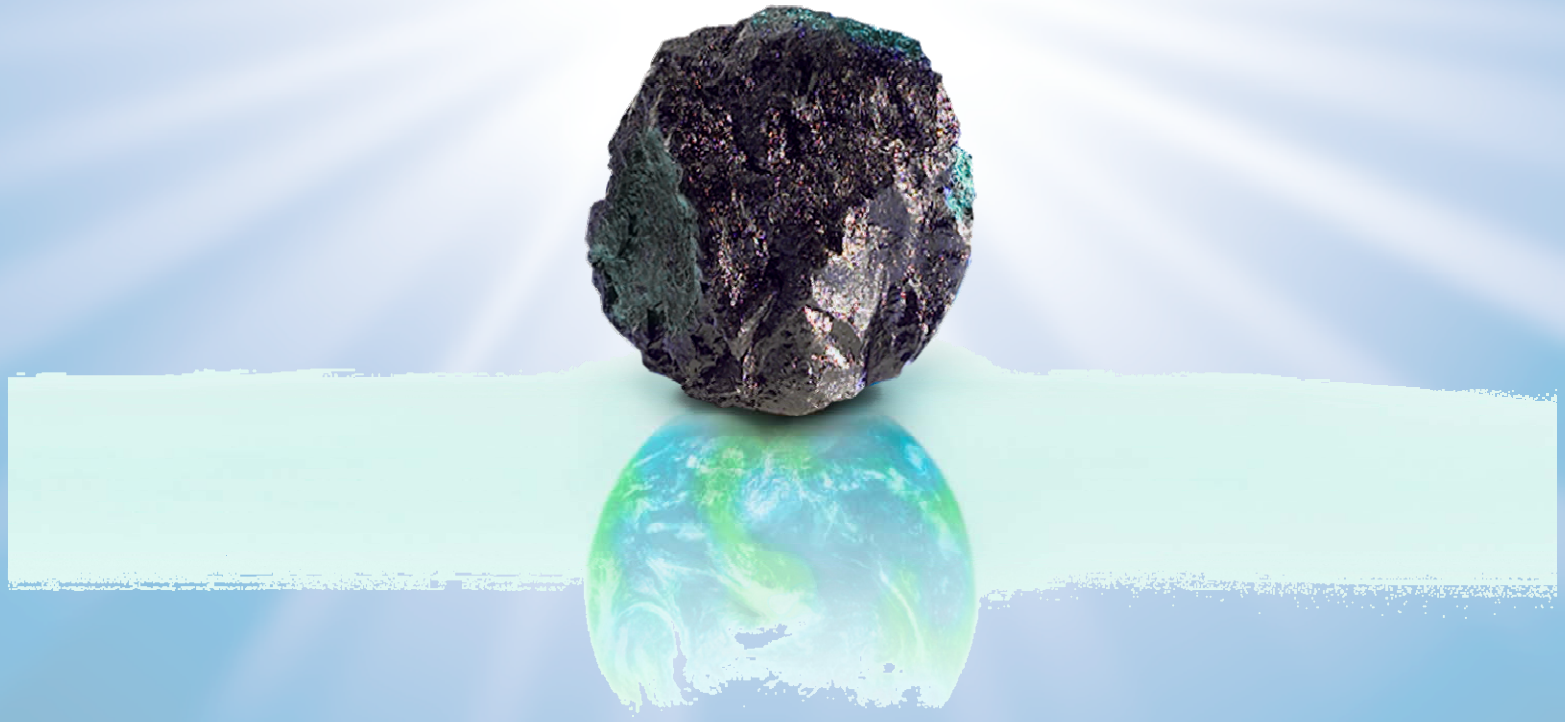
SVP BTU Conversion and Strategic Planning
Peabody Energy

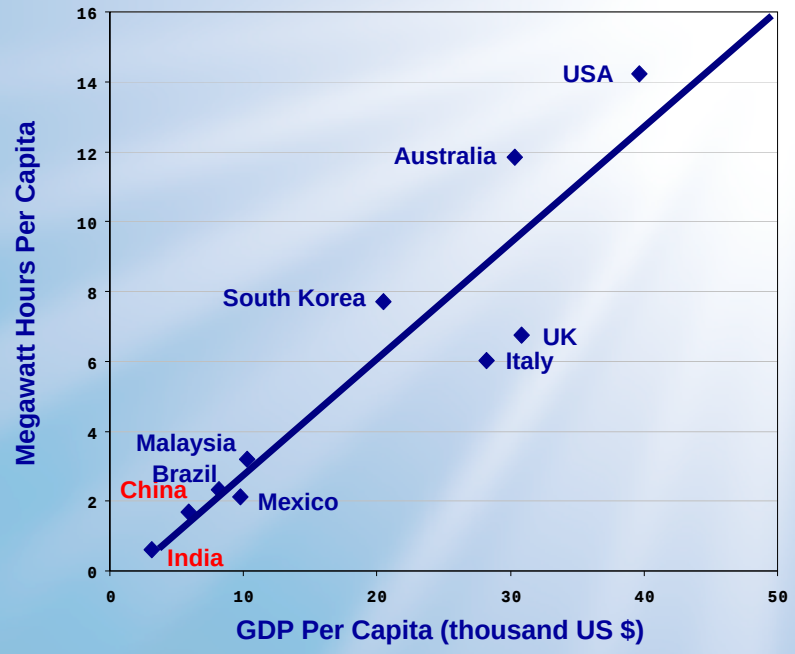
“The Future of the Conversion of America’s Most Abundant Resource”



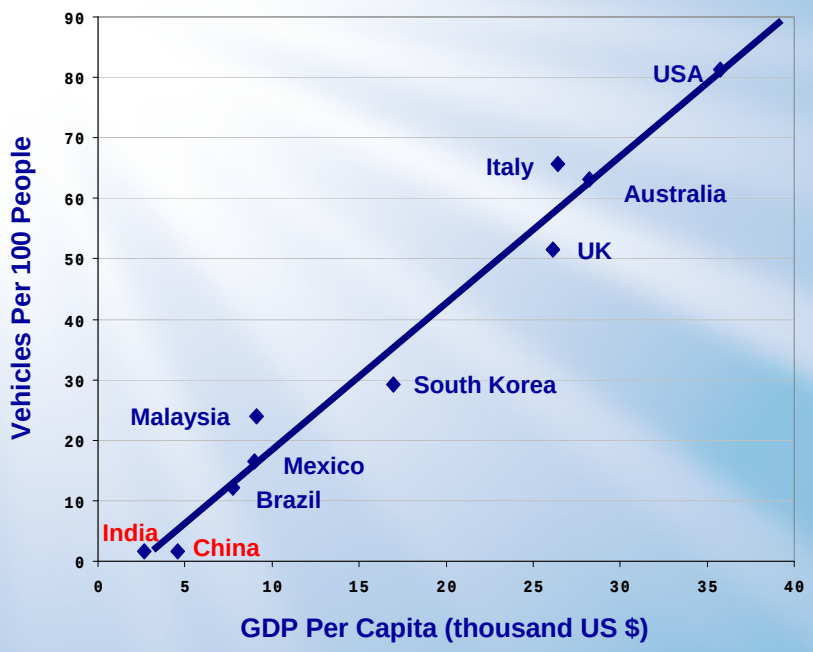

Why Coal?
How Coal?

In 2007 We Saw a Rising Tide as the World Awakened to Modern Energy

Electricity Usage per Capita



Passenger Vehicles per Capita

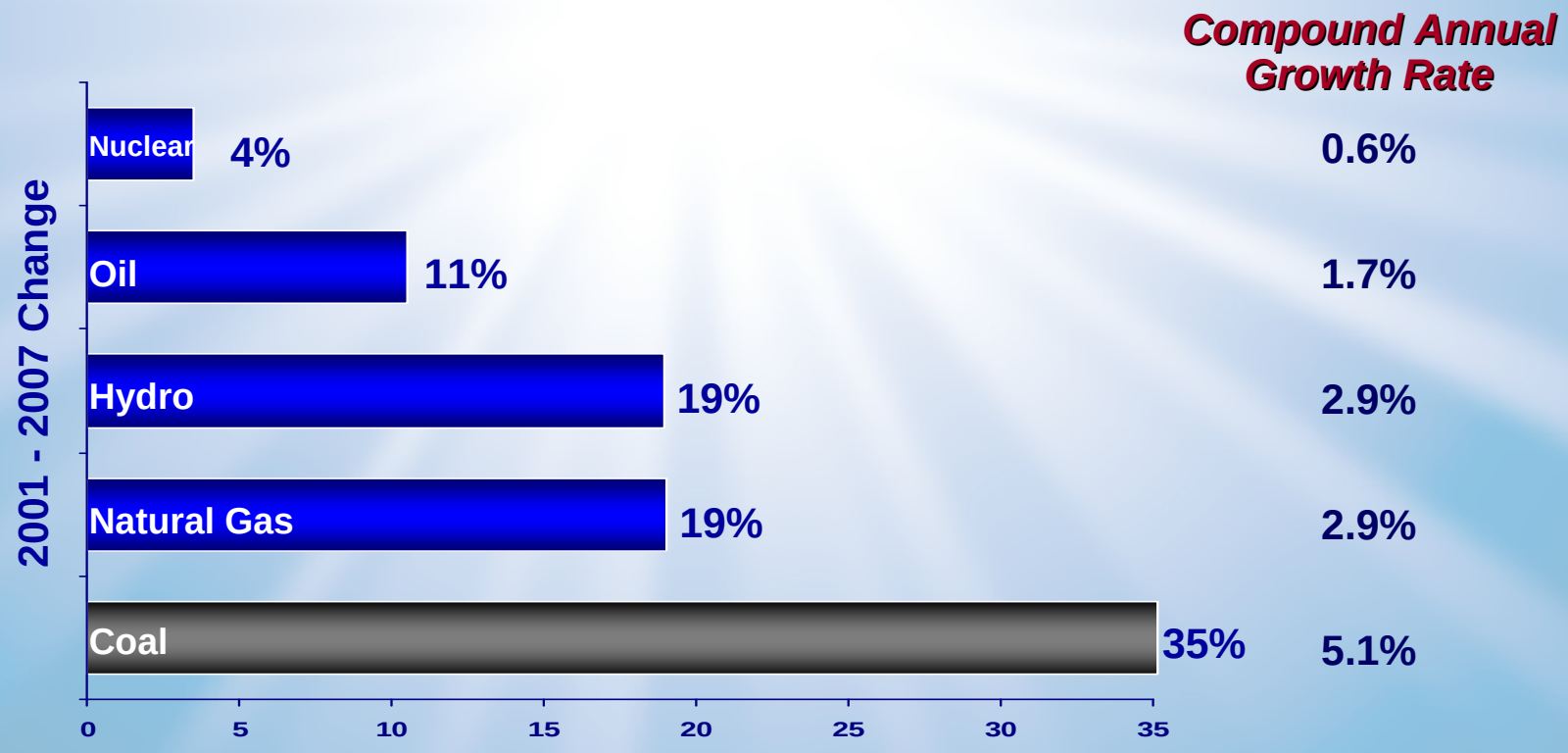


Per Capita Electricity Use Just 1/8th (China) and 1/25th (India) the U.S. Level

Source: United Nations' Human Development Report; Dargay, Gately & Sumner, 2007.

Coal Continues to be Fastest Growing Fuel, Straining Supplies & Raising Prices

Six-Year Change in Global Energy Consumption

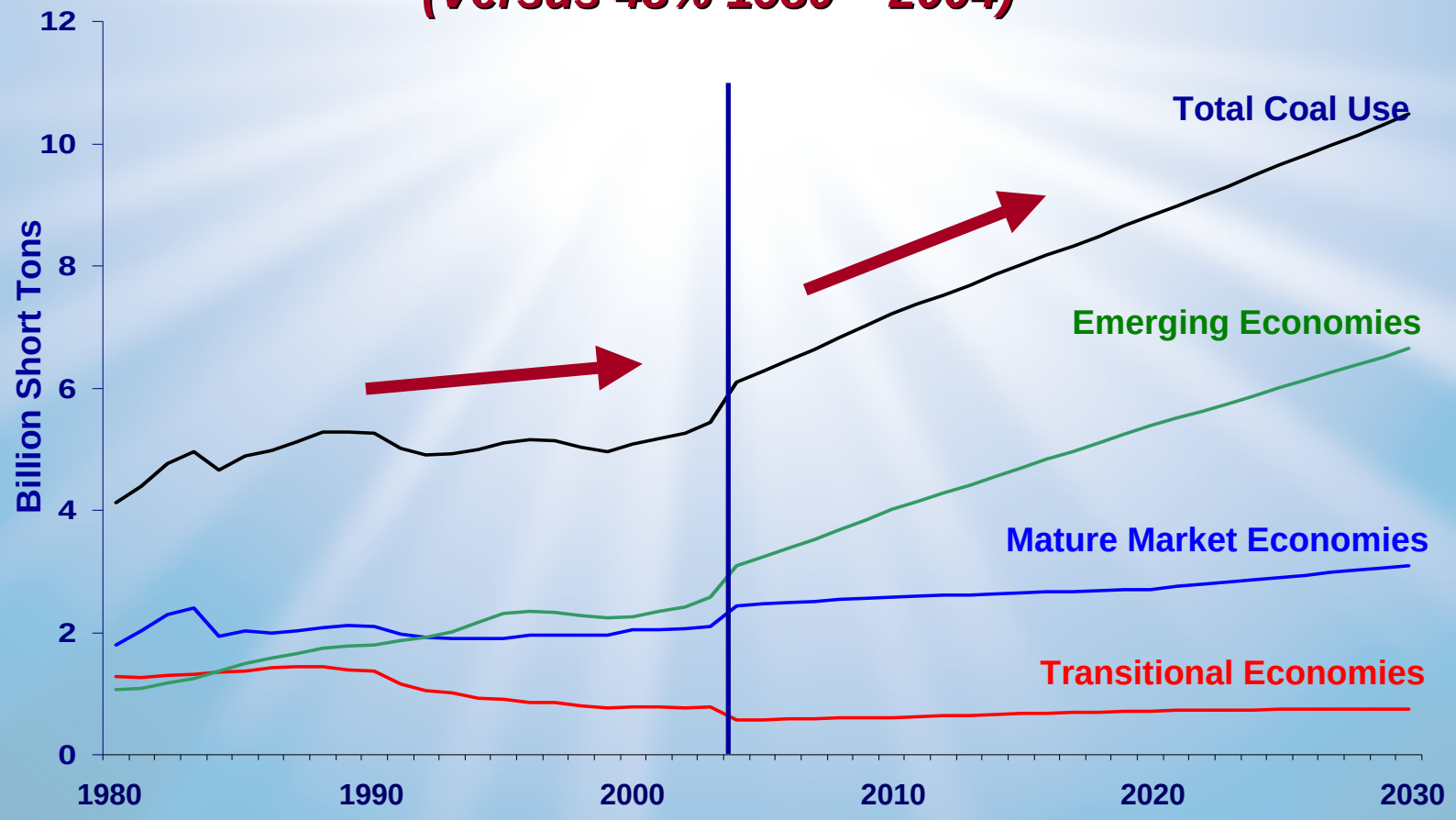


Seaborne Coal Demand Growing 7% Annually

Source: BP Statistical Review of World Energy, June 2008.

Future World Coal Demand Growth Likely to Be Greater Than the Past

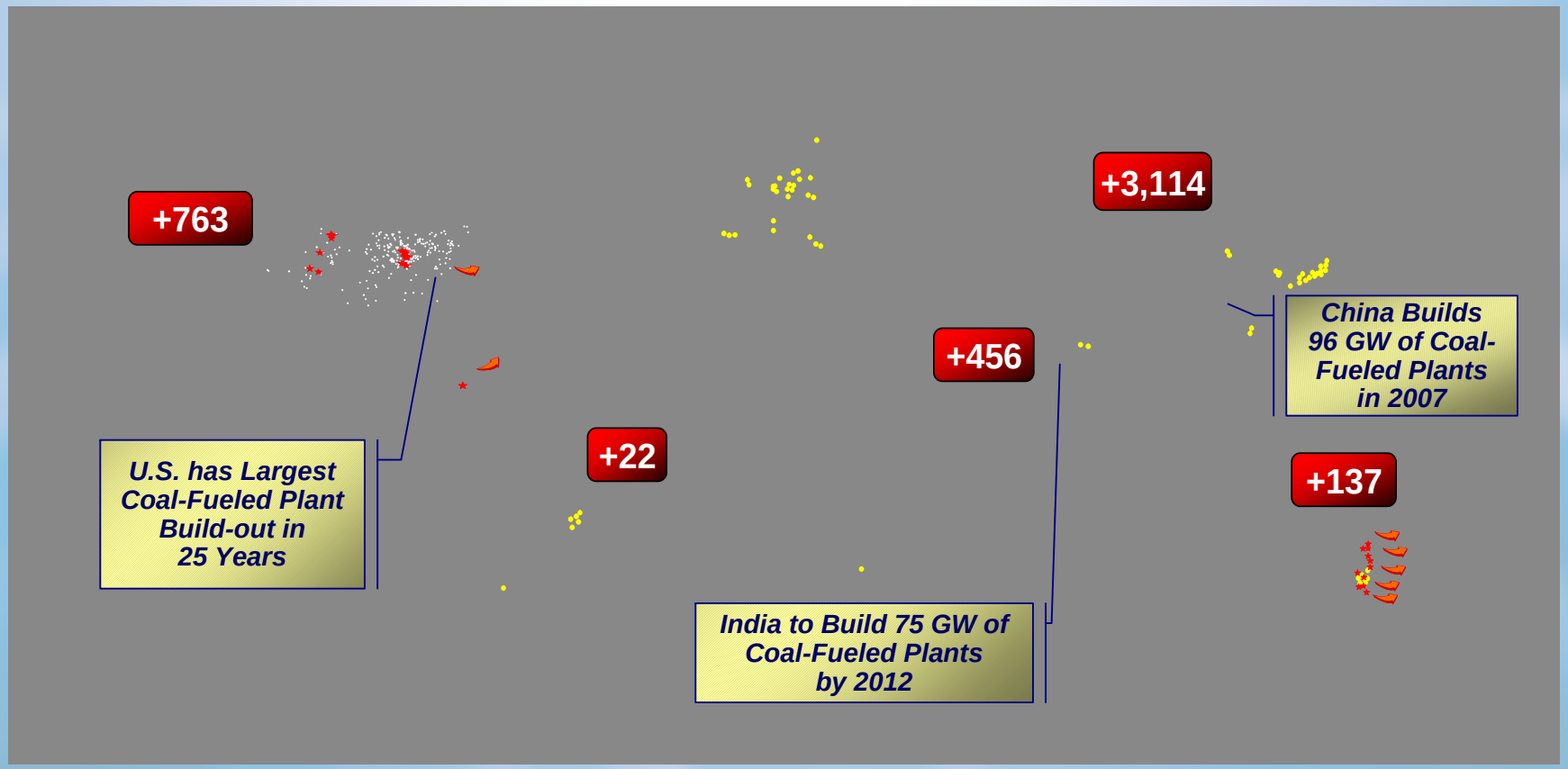
72% Growth in World Coal Consumption (Versus 48% 1980 – 2004)



Source: EIA International Energy Outlook 2005

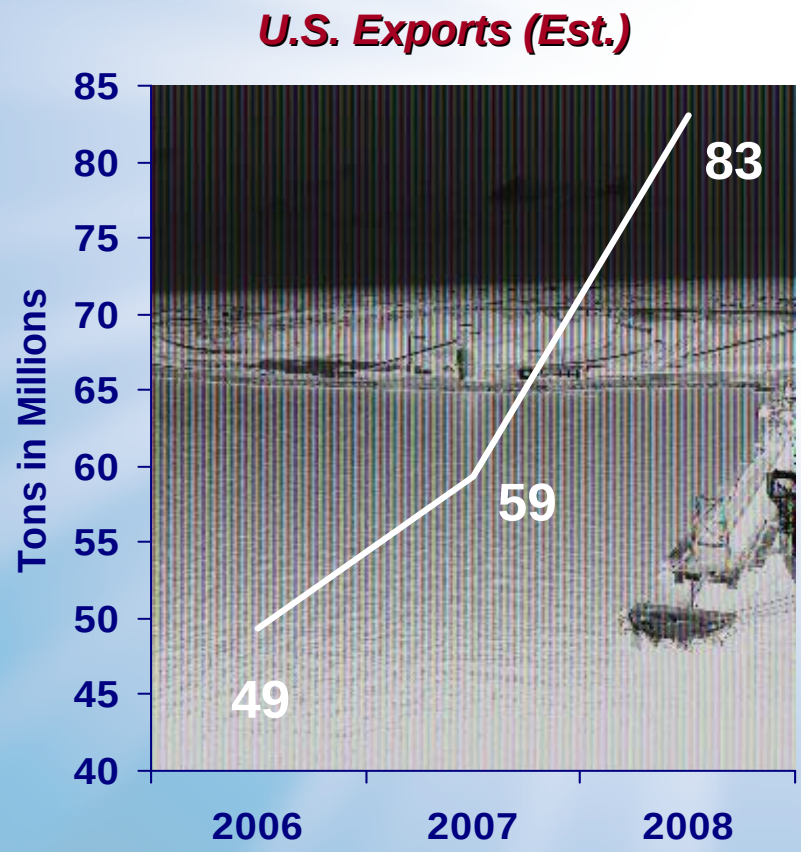
Power Demand Driving Global Coal Growth

Long-Term Coal Demand Forecasts Continue to Rise



Growth through 2030. Amounts in million short tons.
Source: U.S. Department of Energy, Energy Information Administration, International Energy Outlook 2006. International Energy Agency.
Projected Australia export flow for 2004-2030.

U.S. Net Exports Expected to Quadruple Over Two Years



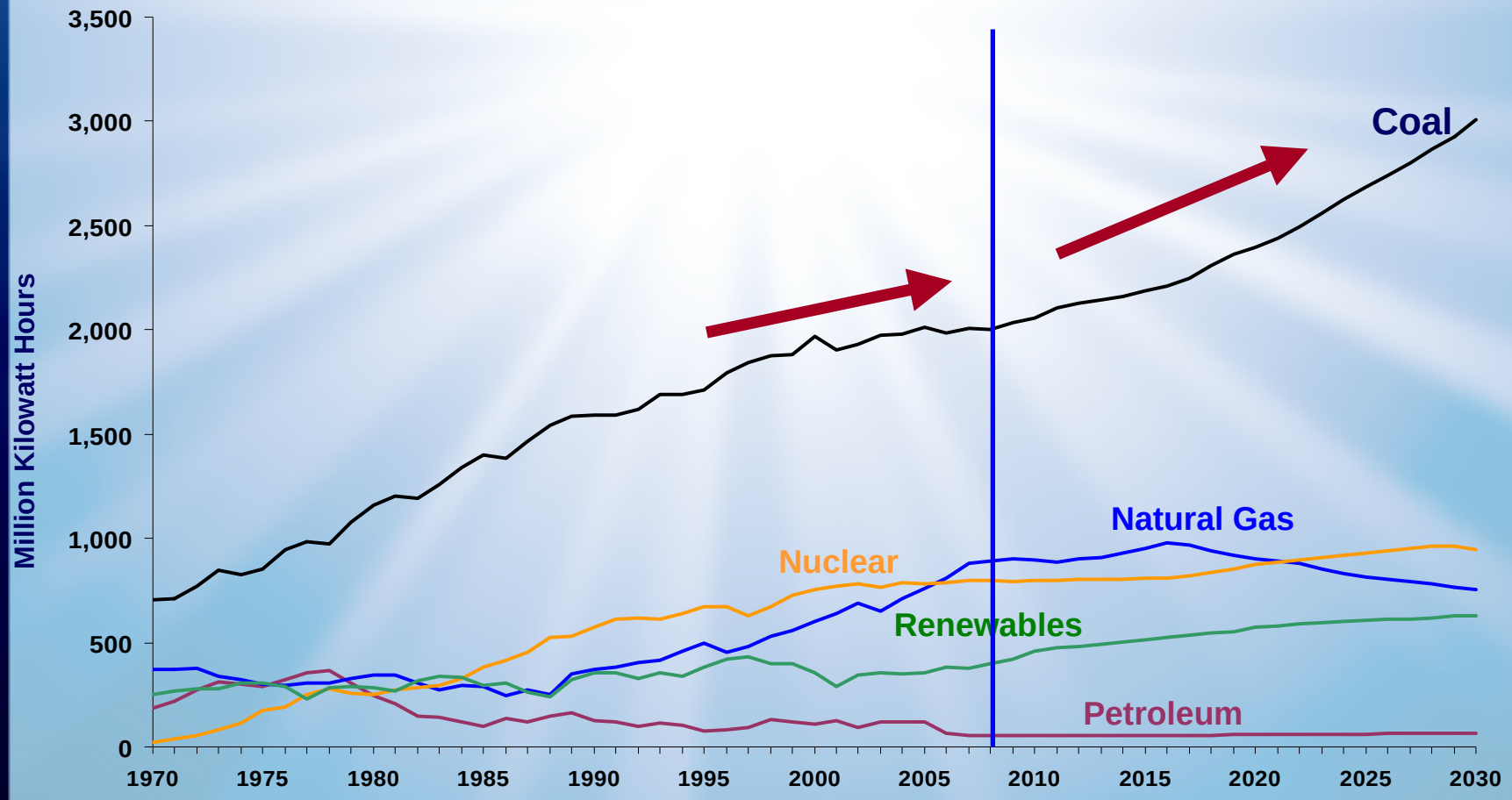
U.S. Net Exports	13	23	52

- Net exports grow due to global coal shortages, European demand, weak dollar and reduced U.S. imports
- Q1 sees inventories decline; normally stockpiles build in Q1
- Creates pull to PRB, Colorado and Illinois Basin markets

Source: National Mining Association, International Coal Review Monthly, January 2008 and Peabody estimates.

U.S. Coal Use Expected to Accelerate Over Next Several Decades

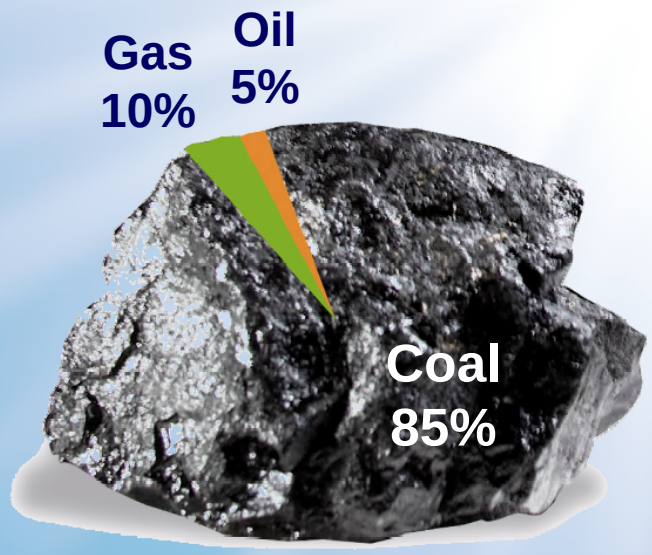
U.S. Electric Power Generation by Fuel Type



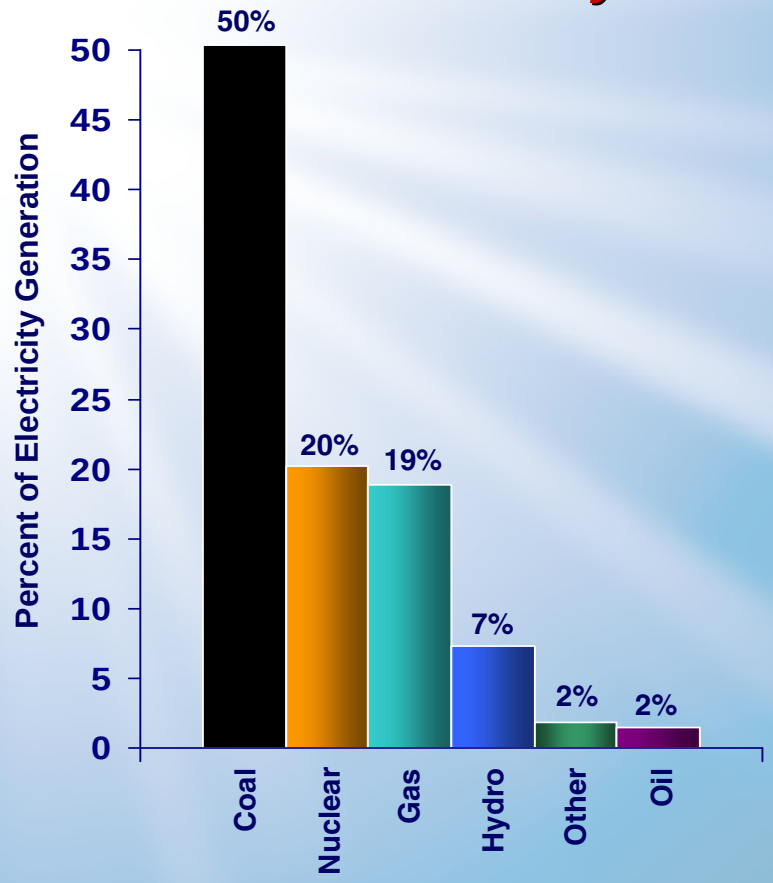
Source: Energy Information Administration, Annual Energy Outlook 2008.

Coal Comprises 60% of Global Energy Resources

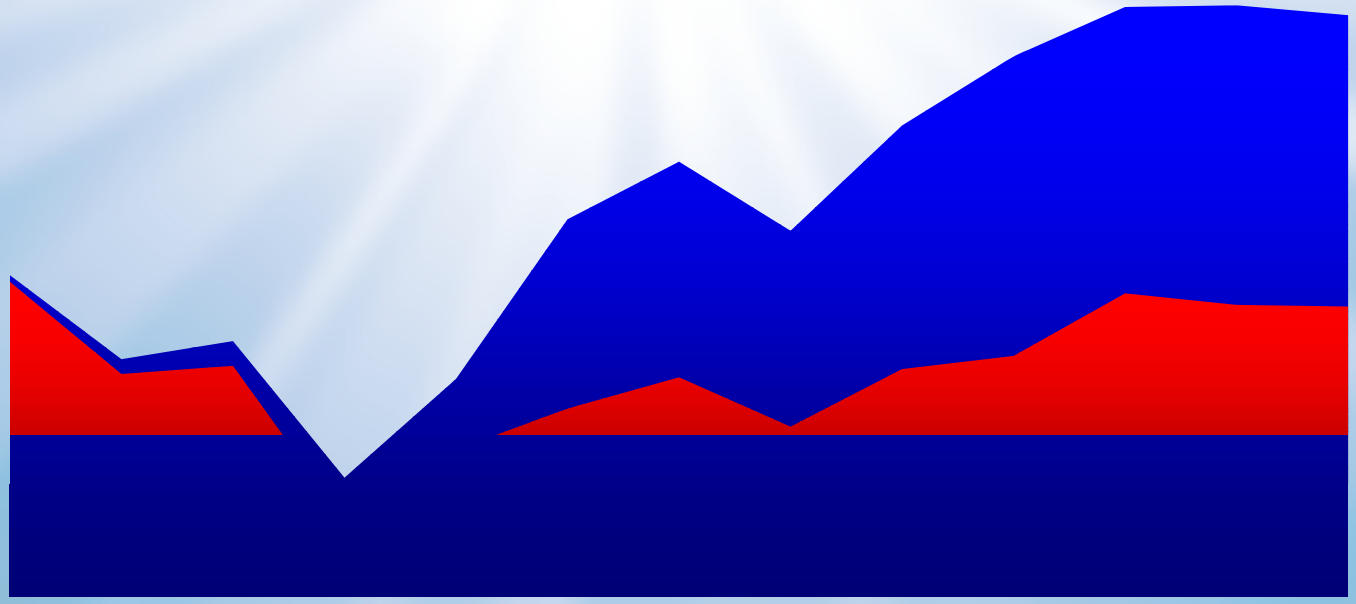
… And 85% of U.S. Fuel Resources



… And 50% of U.S. Electricity



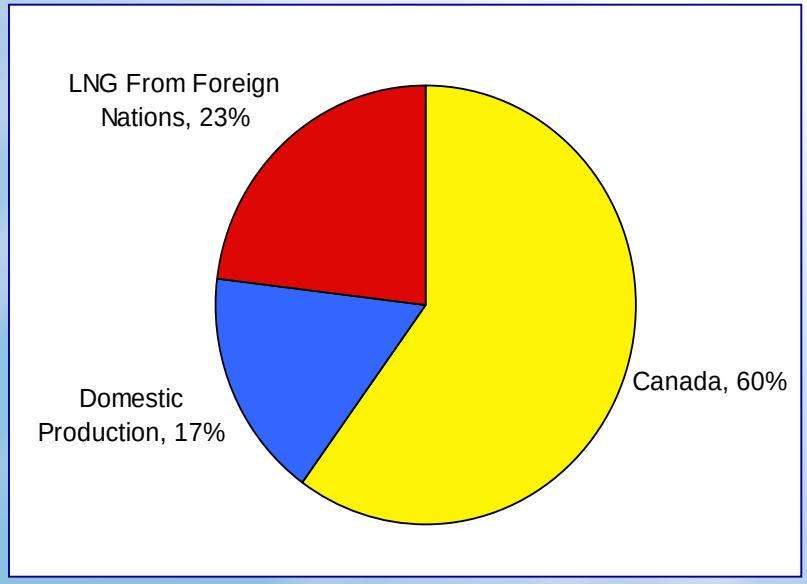
Ultimately recoverable demonstrated reserves on Btu basis. Source: USGS, National Assessment of United States Oil and Gas Resources, U.S. Coal Reserves; Energy Information Administration Monthly Energy Review, March 2007 Table 7.2b, 2006 data.



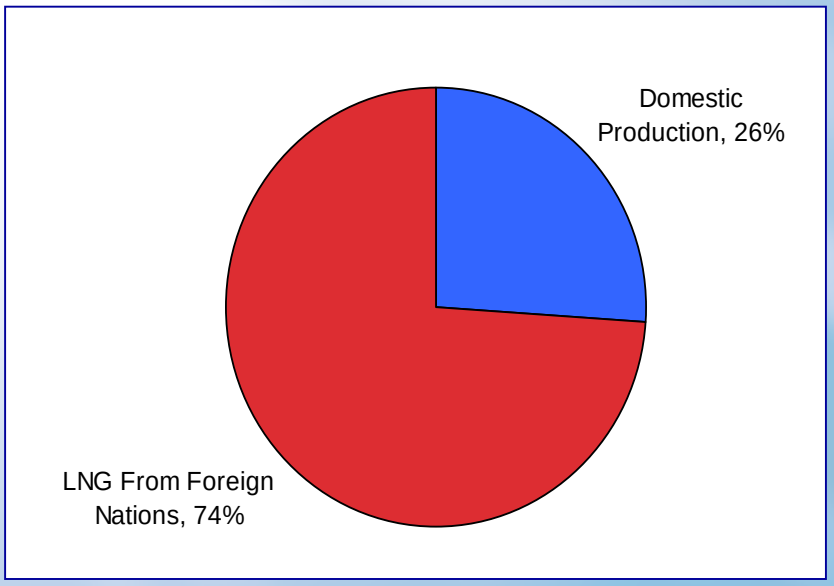
Source: Energy Information Administration, Annual Energy Review 2003, 1970-2000; Annual Energy Outlook 2007 Reference Case, 2005-2030.

The U.S. Bets On A Brave New World

Where new NG supply came from 1993 - 2006



Where new supply is projected to come from 2006-2019



"North America is setting itself to import LNG in large quantities" (IEA, 2007)

•***Source: EIA***

*Systematic Bias: Since 2000, EIA has:

- **Overestimated NG production in 23 of 28 forecasts**
- **Underestimated NG used for generation in 27 of 28 forecasts**
- **Underestimated price of NG to generators in 27 of 28 forecast**

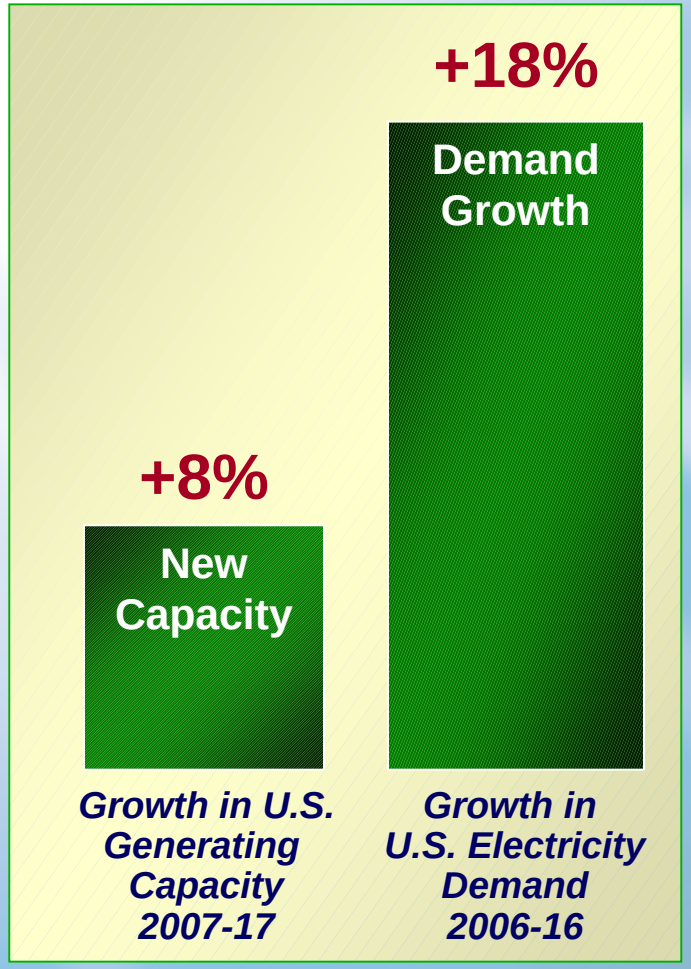
*** Frank Clemente Ph.D. - Penn State University**

SO WHY NOT COAL?

NERC Study: U.S. Generation Lagging Capacity

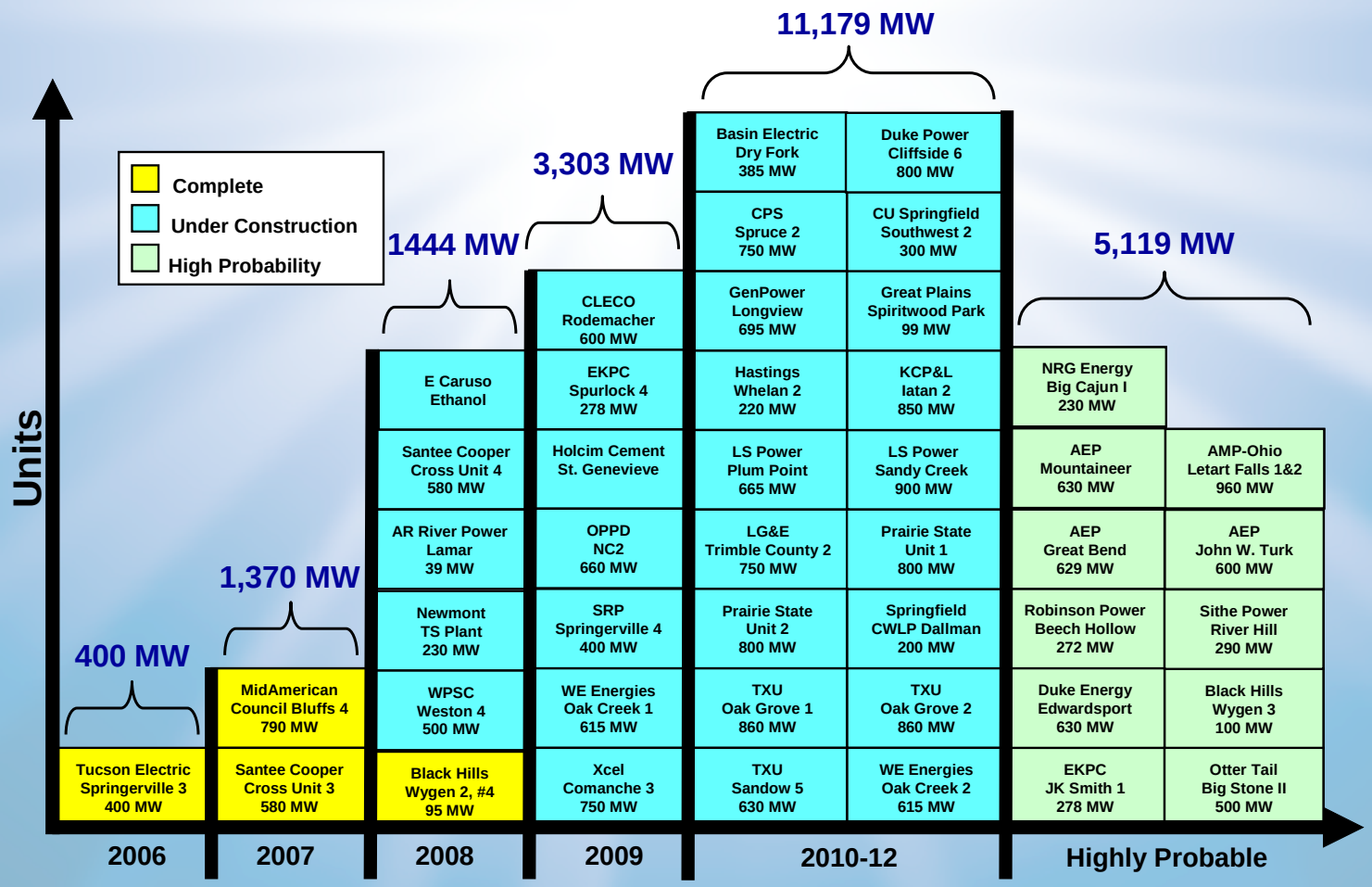
Is South Africa a Warning for the United States?

- U.S. baseload generation capacity reserve margins have greatly declined
  - 30% - 40% for baseload in early 1990s
  - 15% in 2008?
- Generation capacity to grow just 8% in the next 10 years while demand grows 18%
  - 2007 North American Electric Reliability Corporation study



Increased Long-Term Coal Demand Due to Increased Coal Generation

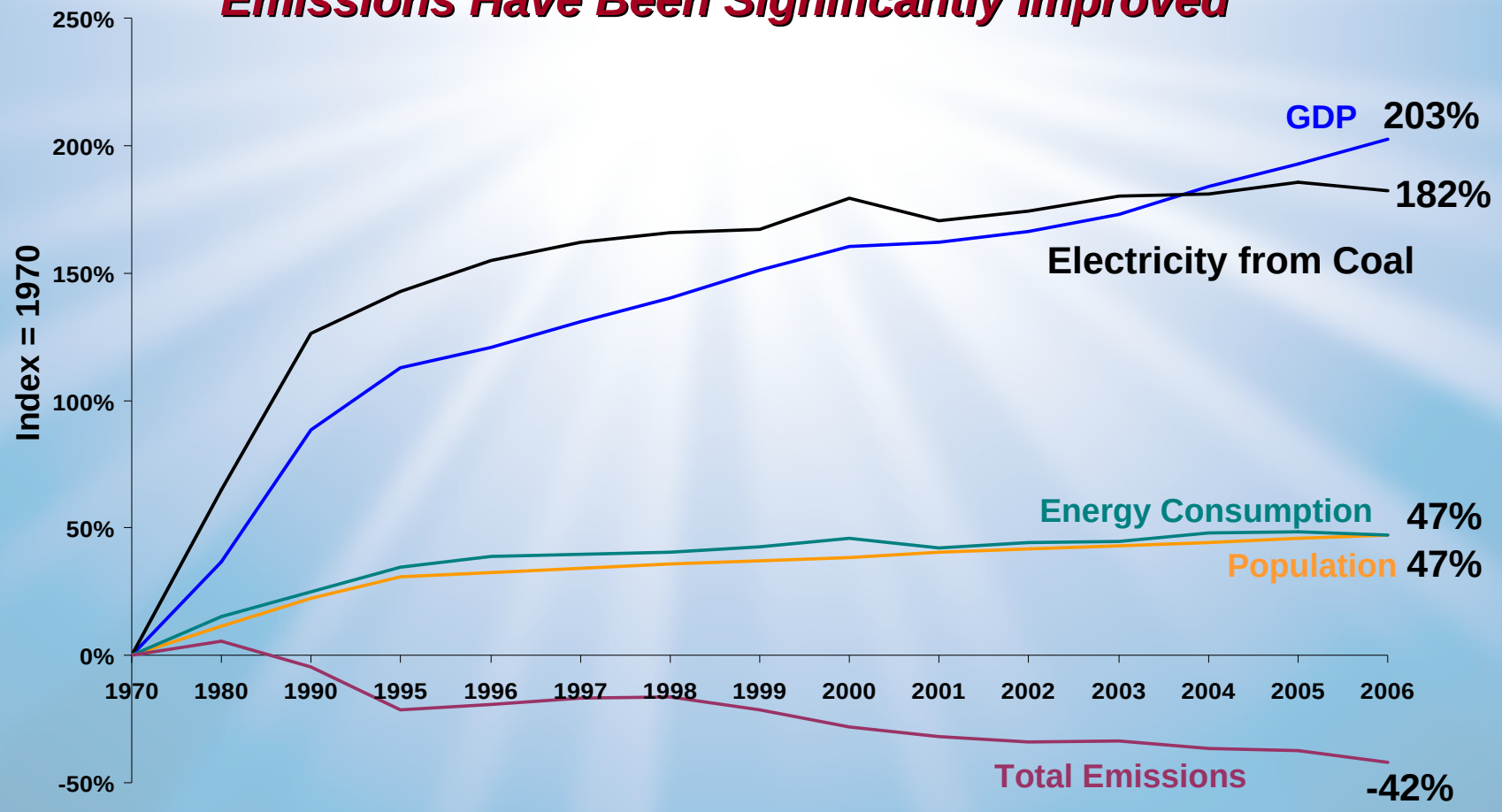
45 Units Totaling 22+ GW Represent 94 MTPY of Coal Use



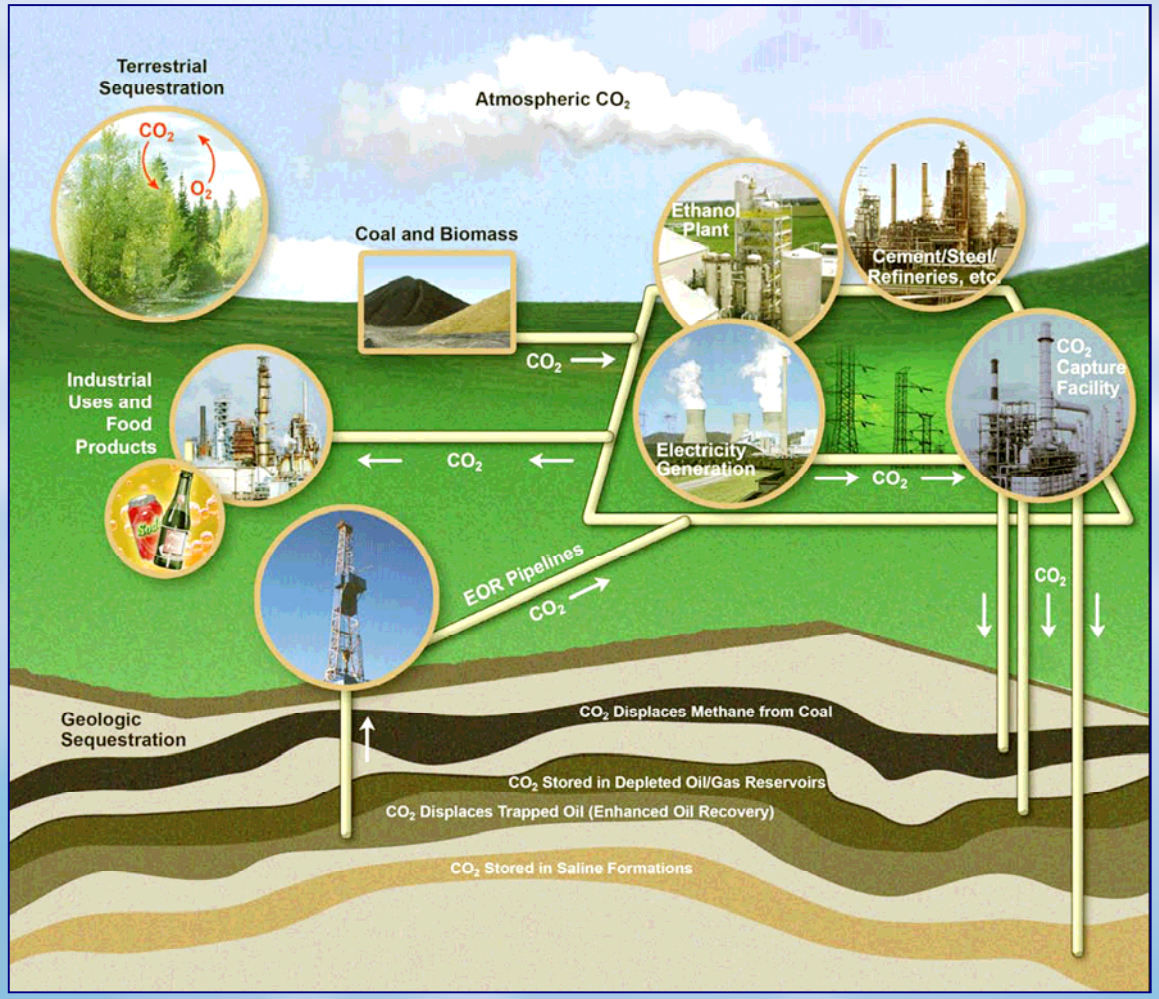
Source: Public filings; Peabody analysis.

Technology is Driving Greater Coal Use and Economic Growth With Lower Emissions

Electricity from Coal Has Tripled Since 1970 While Emissions Have Been Significantly Improved



The Enabling Technology: Carbon Storage



Source: U.S. Department of Energy, Office of Fossil Energy, National Energy Technology Laboratory, Carbon Sequestration Atlas of the United States and Canada.

So What Will Impact Conversion Opportunities?

- Social sentiment towards coal's environmental impact vs. high energy prices appears to be swinging back the other way as consumers become more educated on cost and availability.
- High energy prices across all commodities (oil, natural gas, and to a lesser extent, coal) have resurrected many coal conversion projects, i.e., coal to gas, coal to chemicals and coal to liquids.
- Technology development around carbon capture has potential to create at step change in coal utilization
- Legislation is desperately needed to provide user certainty and consumer price signals.
- Continuation of capital cost increases at a faster pace than energy prices will continue to stall new capital projects.
- Technology demonstration is needed to bring more project investors as well as EPC contractors to the table.

So Where are the Opportunities Going to Be?

- Selection of high probability opportunities with well funded developers that can survive the test of time.
- First opportunities lie in coal to SNG as next few years will be high volatile years.
  a. CO_2 capture percentages are very high.
  b. The gas market is very liquid and has a longer term forward market.
  c. Gas can be stored, unlike power.
- Next market opportunity is in capture and sequestration technologies.
- IGCC should begin to get legs as capital cost and availability become demonstrated.
- Coal to liquids plants will eventually be built, but are likely to be later in very select opportunities.

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