

APIC-CMAI Seminar

Seoul 14 May 2009



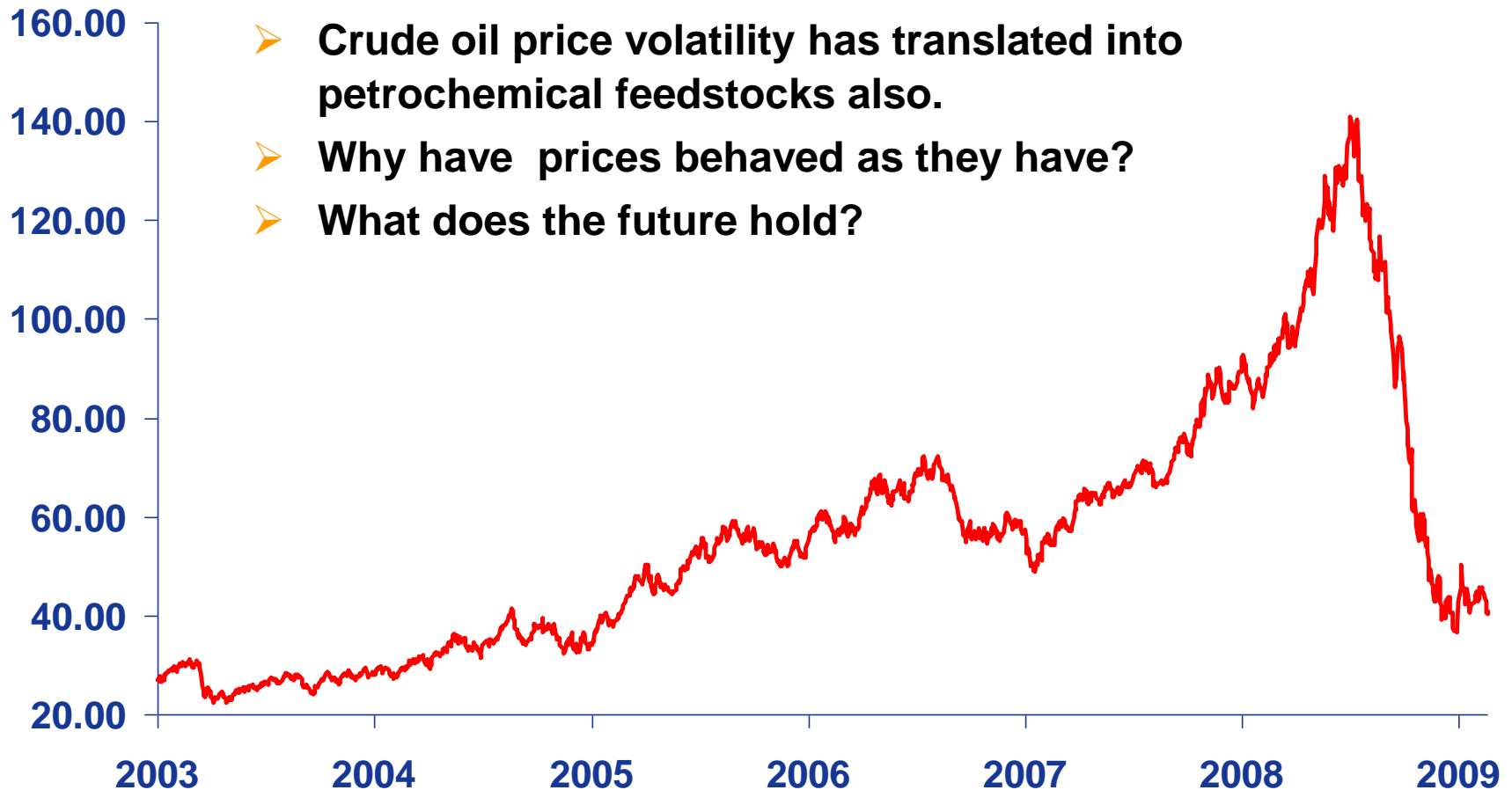
John H. Vautrain

**PURVIN
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Crude oil prices have risen and now collapsed.

Dubai, \$/BBL



- Crude oil price volatility has translated into petrochemical feedstocks also.
- Why have prices behaved as they have?
- What does the future hold?



Short or long recession?



- The depth of recessions and the results of fiscal and monetary moves are most obvious later.
- Bad moves by key economic regulators could lengthen the recession.



King Hubbert is recognized as the father of Peak Oil theory.

- Hubbert predicted decline in US oil production fifteen years in advance.
- Similar predictions had been made earlier but Hubbert is credited with being correct.
- If oil production peaks, there are serious world-wide implications for energy pricing.
- How fast must new reserves be developed to supply our needs?

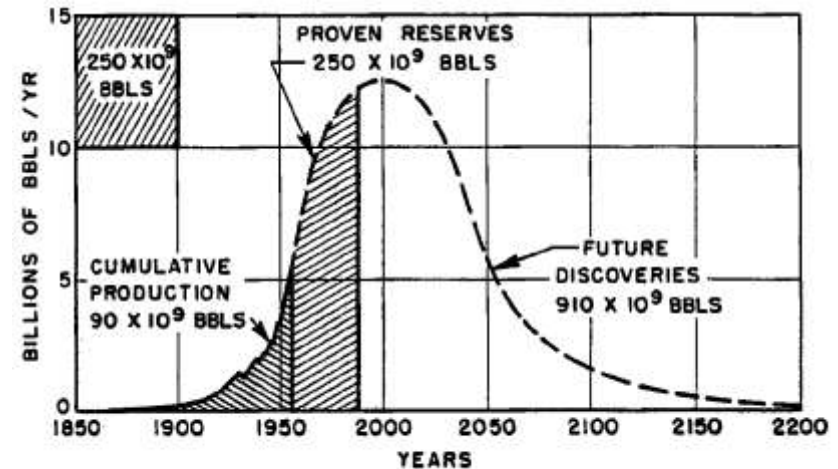
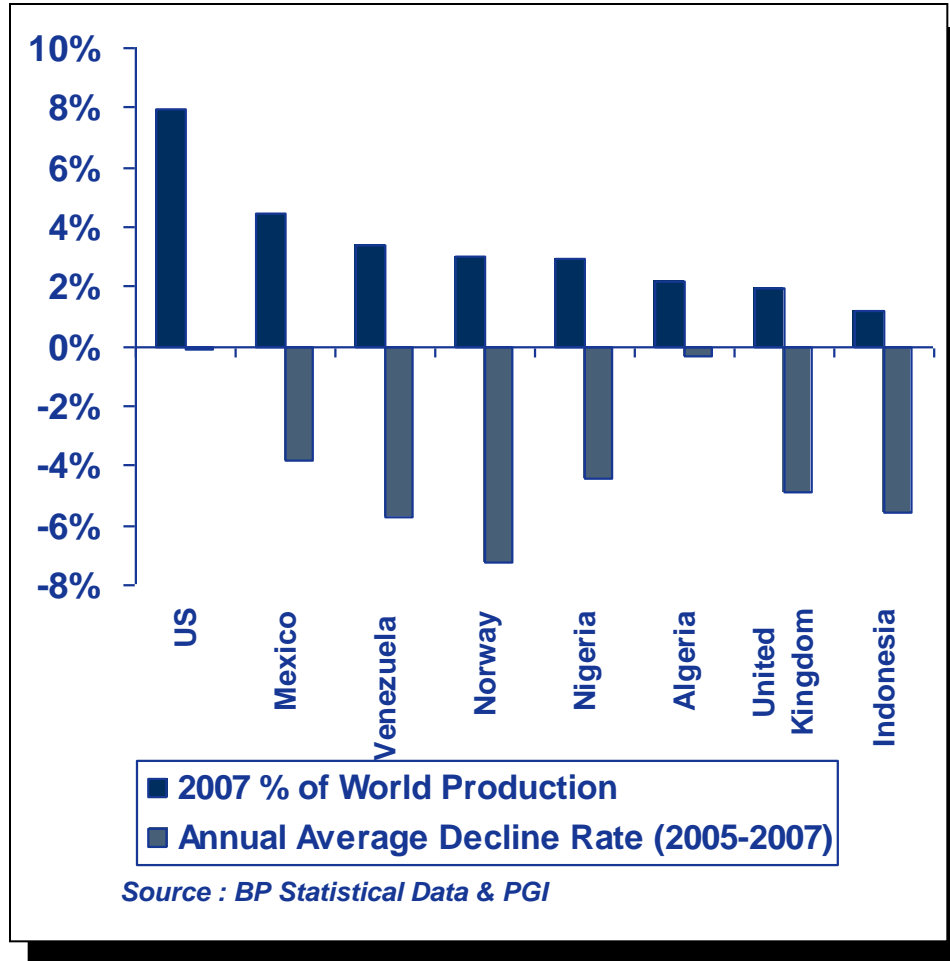


Figure 20 - Ultimate world crude-oil production based upon initial reserves of 1250 billion barrels.



About 40% of 2007 global crude oil production came from countries with declining production.

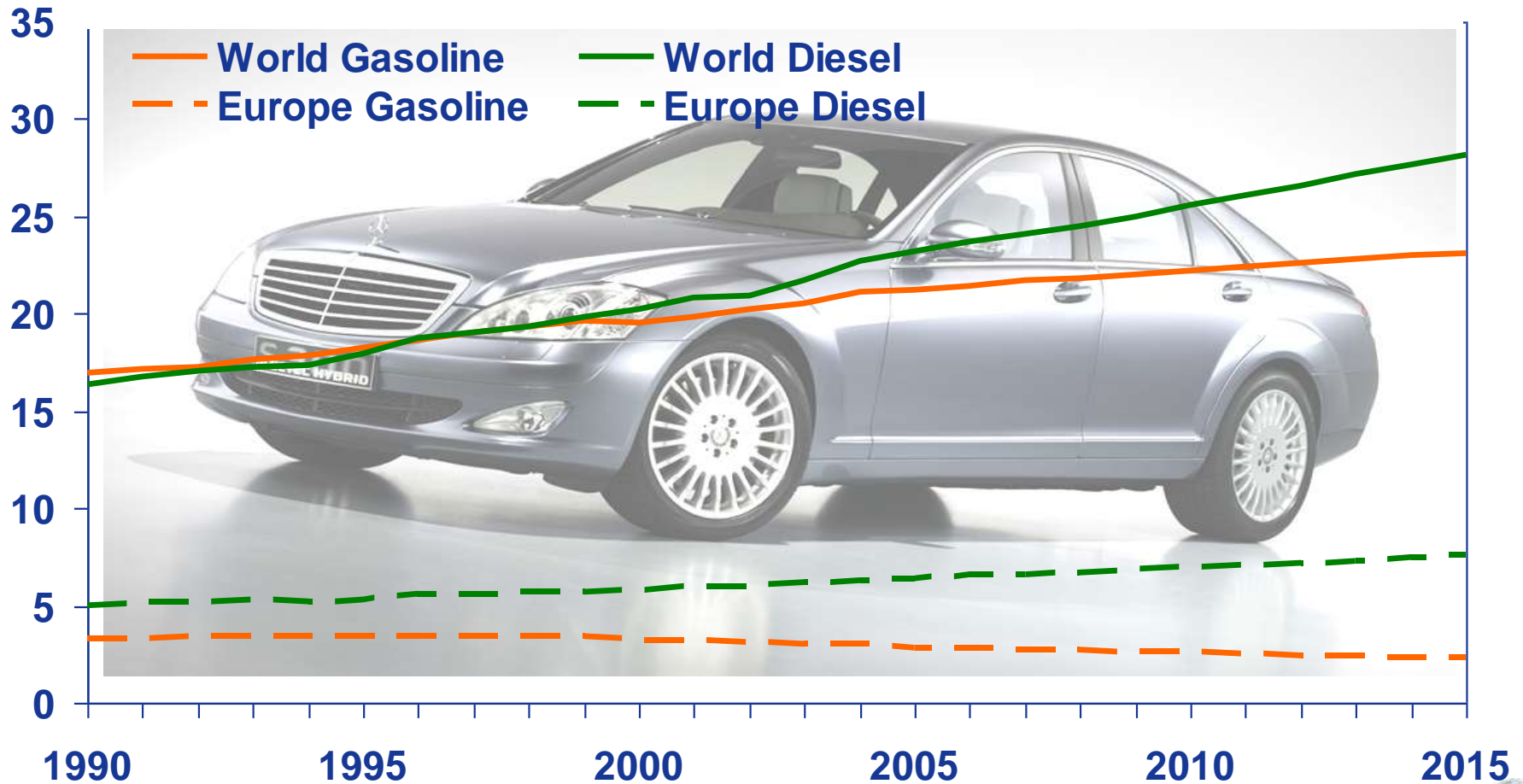


- Around the world oil production is falling in many countries.
- Old oil fields experience declines and new ones must be discovered and developed to maintain production.
- Increasing production means developing oil even faster.



Longer term diesel demand growth will outpace gasoline demand.

Global Gasoline and Diesel Demand, Million B/D



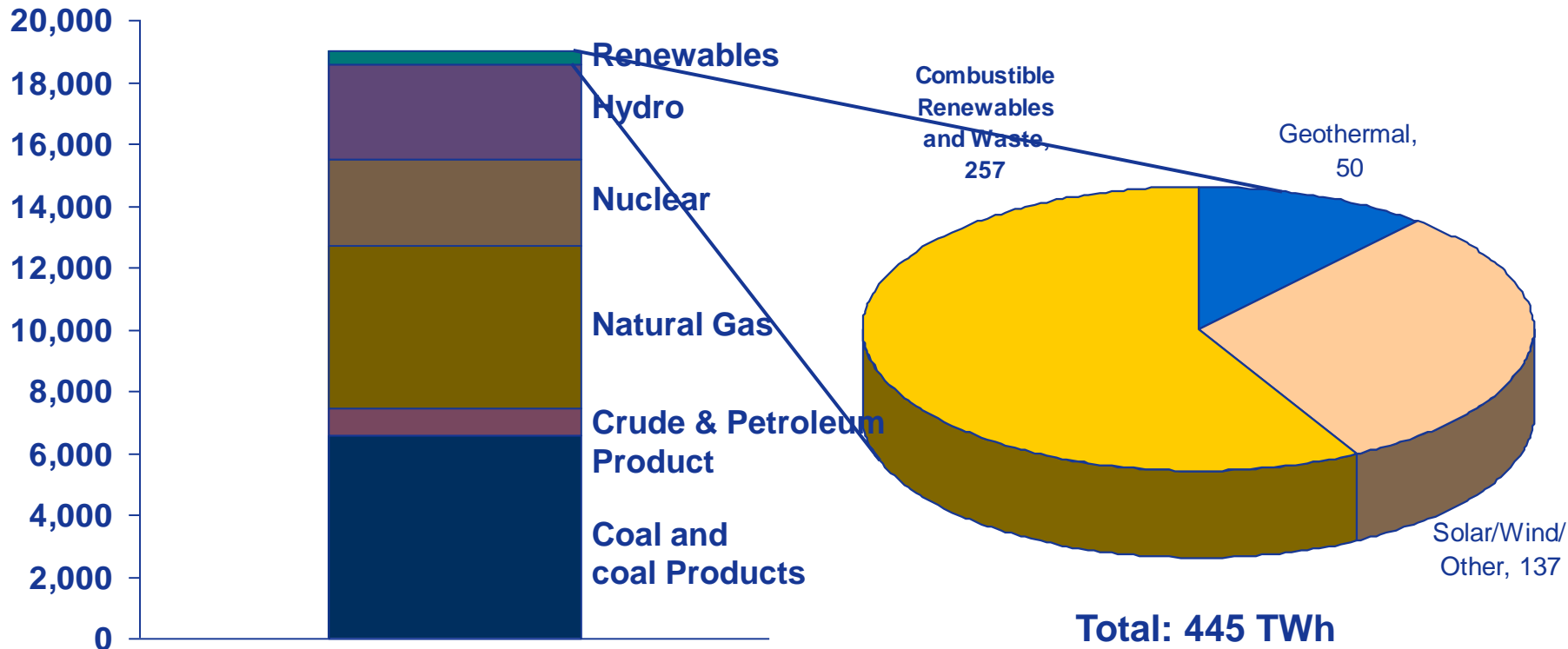
Alternative energy sources will supplement oil and gas.

- Wind, solar, geothermal and other energy sources will contribute.
- These sources are environmentally preferable and politically popular.
- As installations grow, these technologies get less expensive.



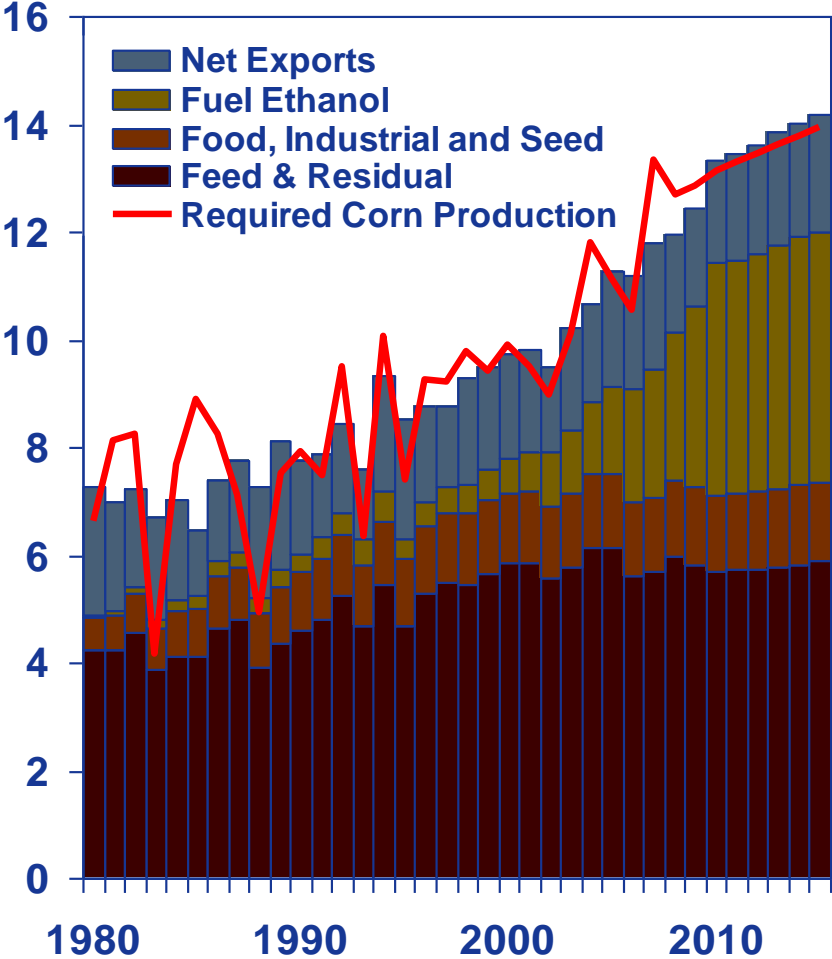
Alternative energies will need to grow from their small contribution to become more important.

Global Power Generation (TWh)



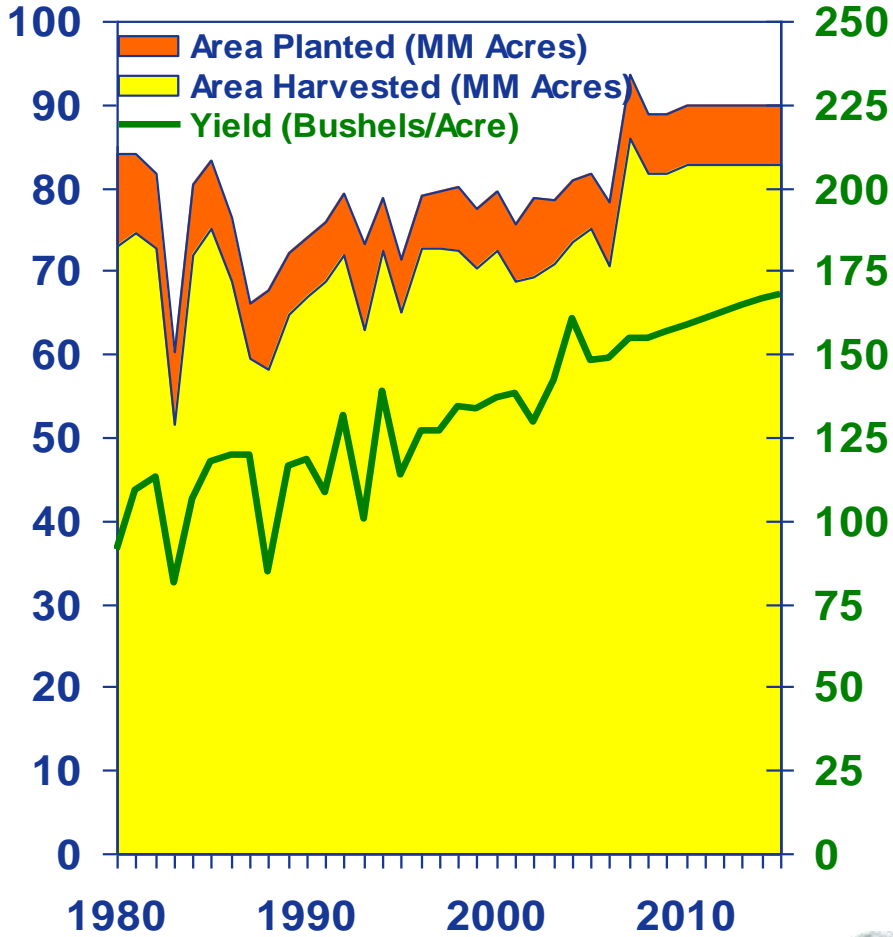
Agricultural limits will limit the ability of nations to satisfy energy needs based on agricultural products.

U.S. Corn Consumption
Billion Bu



Source: USDA and Purvin & Gertz

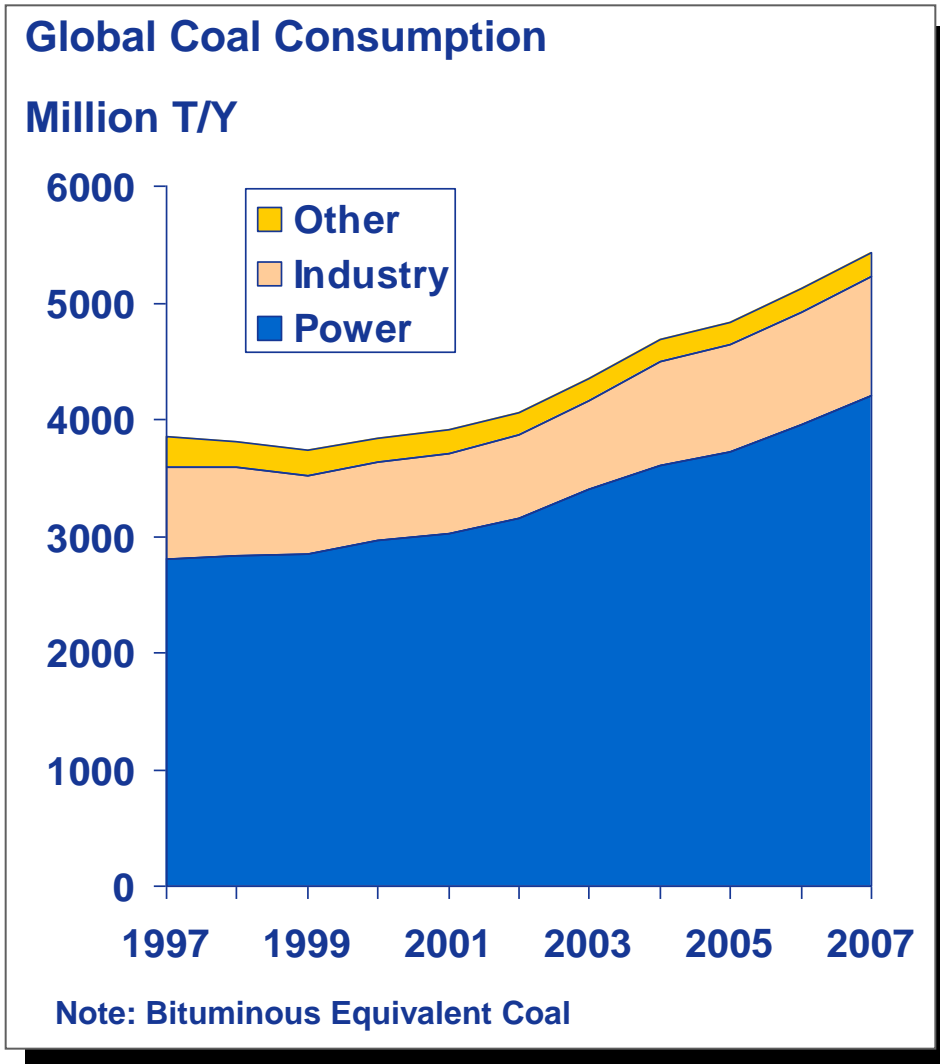
US Corn Plantings and Yields
MM Acres



Source: USDA



Global coal consumption is rising even more rapidly than petroleum.

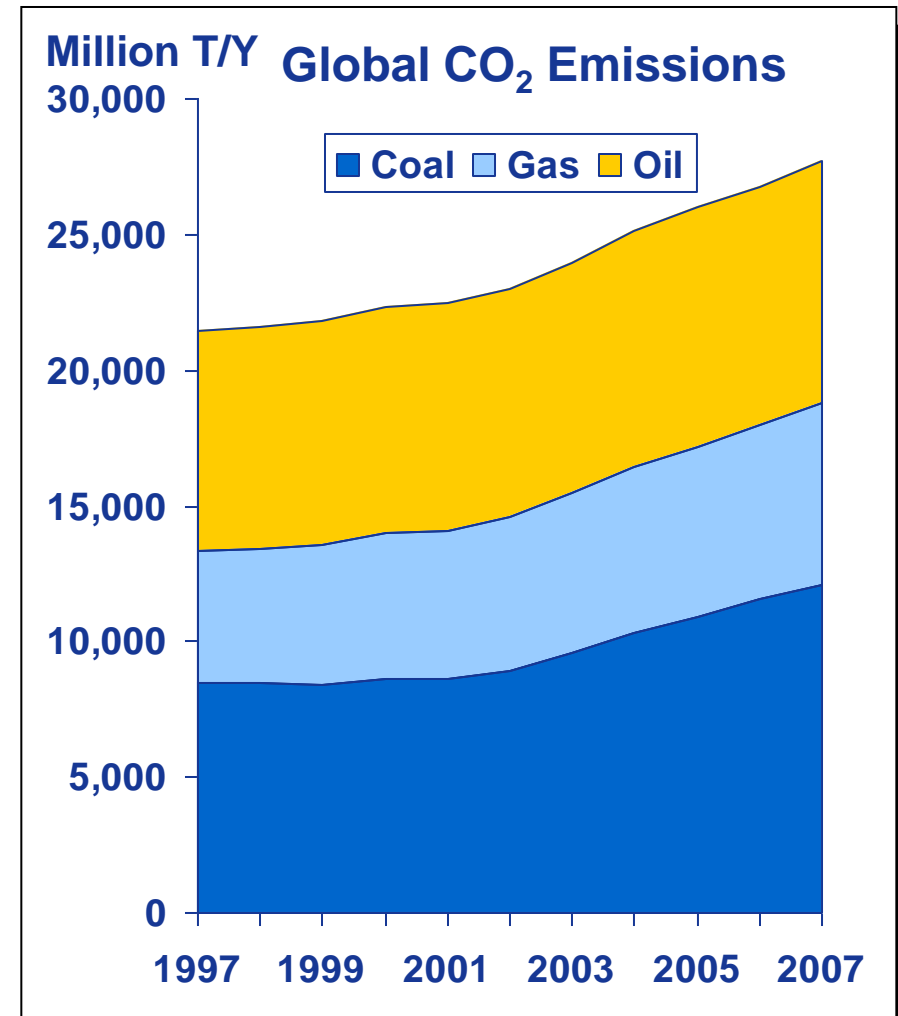


- Emerging markets demand coal to meet mostly power needs.
- Coal consumption is up over 1 billion tonnes per year in five years.
- What does this rush of coal consumption do to GHG targets?
- Can consumption increases at this rate continue to be supplied?

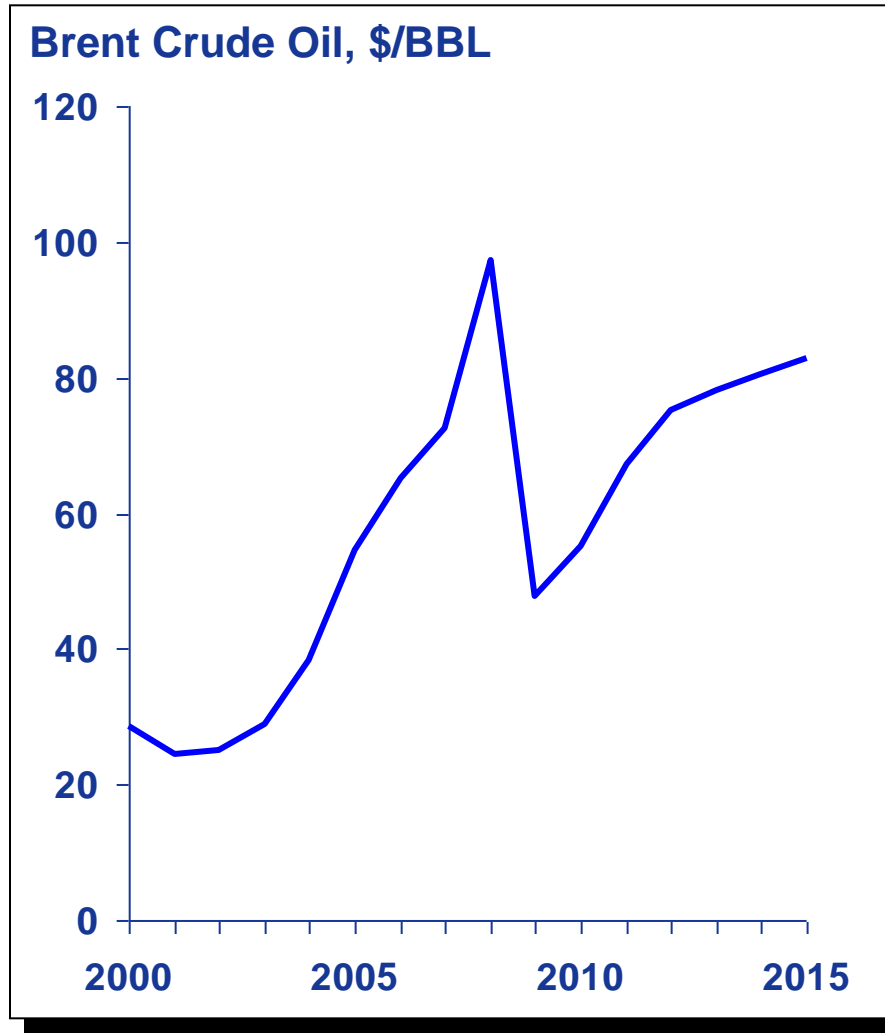


Coal contributes to global CO₂ emissions.

- Political pressure is building to reduce ever-growing emissions.
- New means of regulation tend to focus on life-cycle emissions.
- Industrial energy consumers need to be sensitive to GHG attributes of projects.



Crude oil prices are likely to recover along with economy in the coming decade.



- **Fundamental supply issues are not greatly improved from 2008.**
- **Continued access to resources is a critical uncertainty.**
- **Funding availability must be large and reasonably steady.**



What does the future hold?

- **Naphtha/gasoline complex will be weak versus crude oil and average petroleum products.**
- **Octane values will lack strength as bio-fuels expand, octane demand falls and gasoline volume growth lags distillates.**
- **Coal consumption will grow to satisfy energy demands in expanding economies.**
- **GHG concerns and regulations will widen. That issue will affect many internationally-traded energy-intensive commodities-- possibly including petrochemicals.**



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