

# Welcome To The Gas Price Roller Coaster

...and where is  
Hubberts Peak?

# Light Crude - 2 Yr Price Trend

CLN05 [30]

LAST: 54.44

CHANGE: ▲ 0.16

HIGH: 54.46

LOW: 54.14

6/1/2005



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# Basic Petroleum Assumptions

- 1) A finite, non-renewable resource, created about 400 million years ago.

# Basic Petroleum Assumptions

2) Global oil endowment is approximately 2 Trillion barrels.

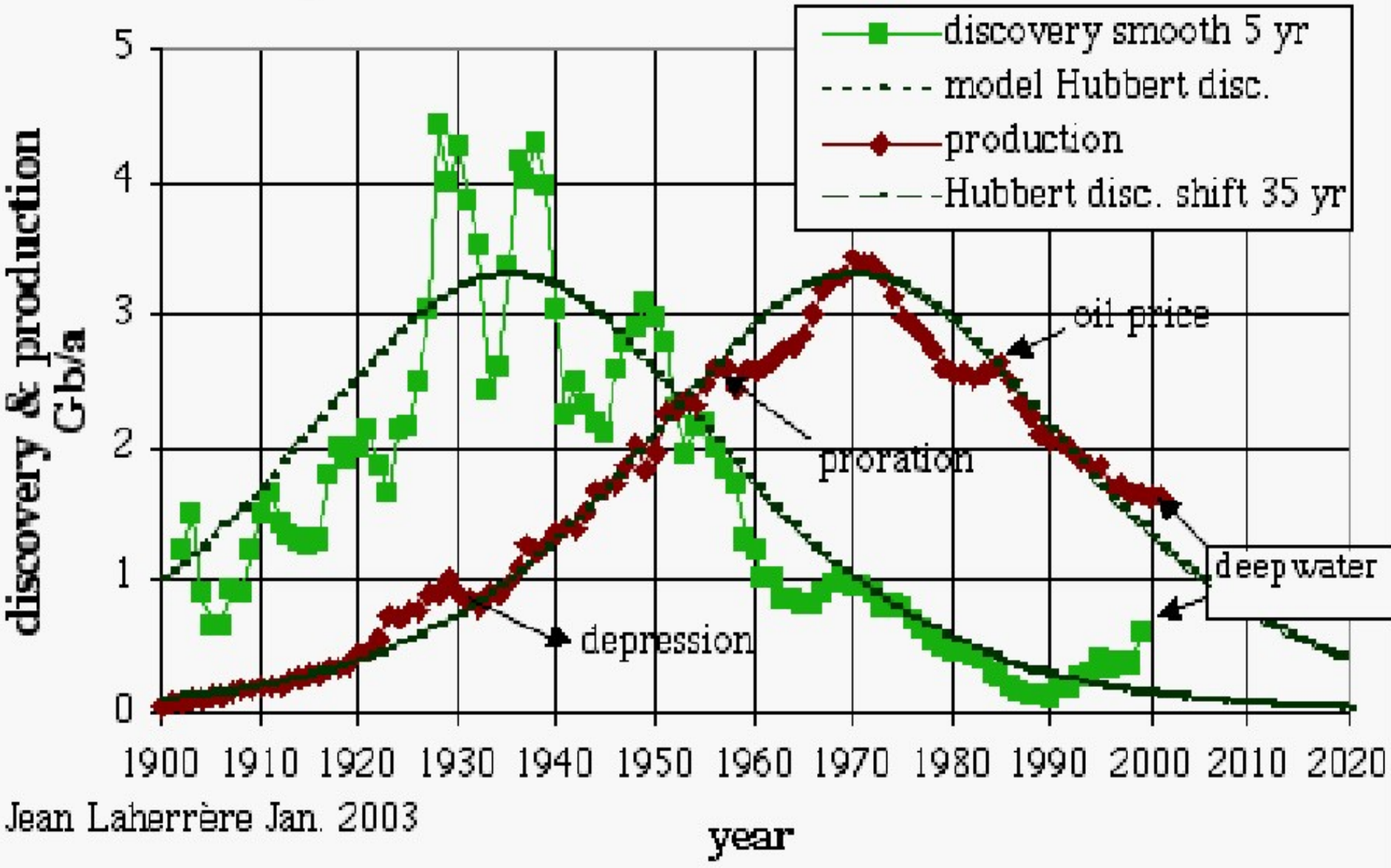
# Basic Petroleum Assumptions

3) 90% of US transportation energy is derived from petroleum.

# Dr. M. King Hubbert 1903 – 1989



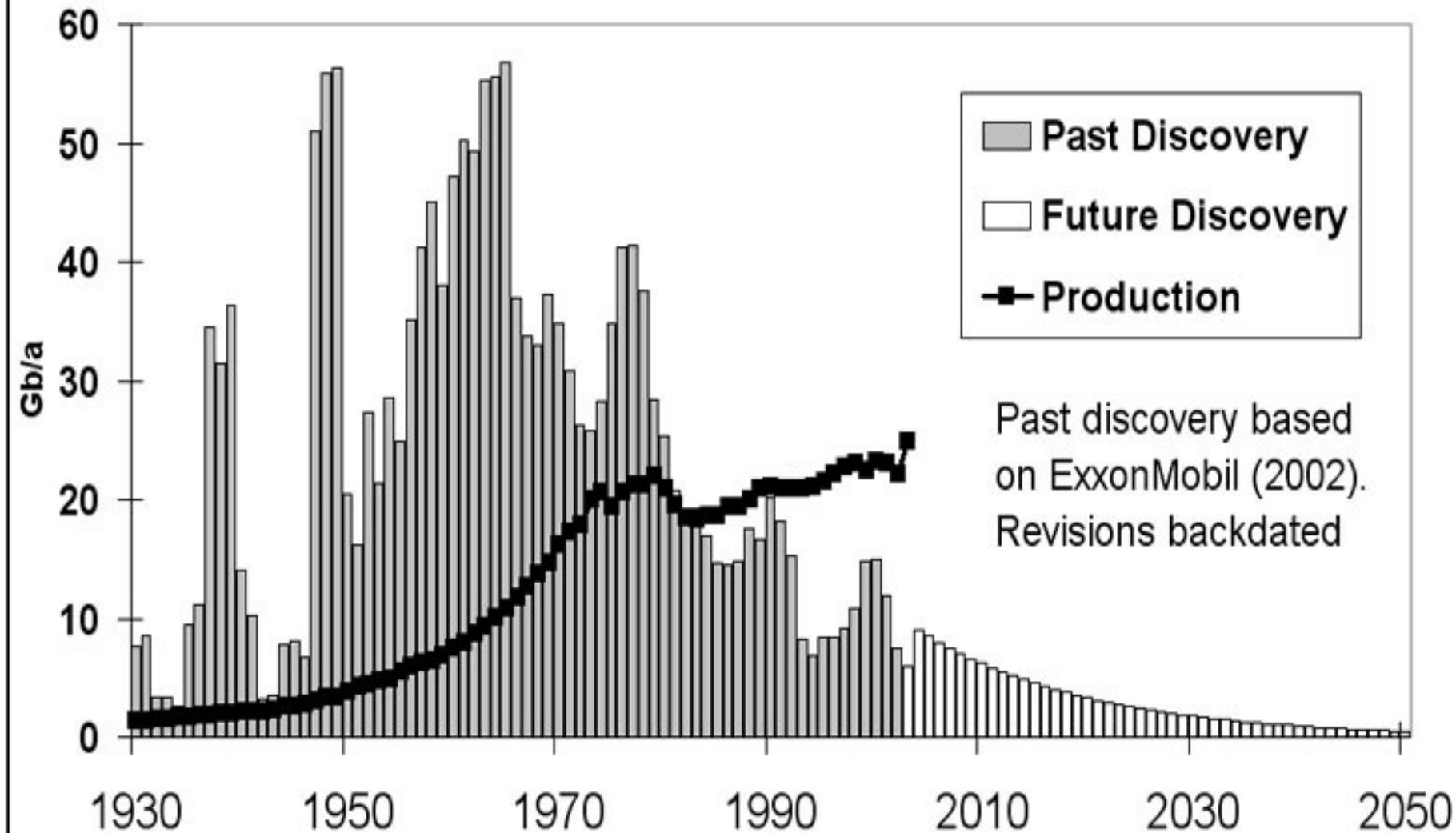
# US Lower 48: annual oil "mean" discovery & production with Hubbert discovery model



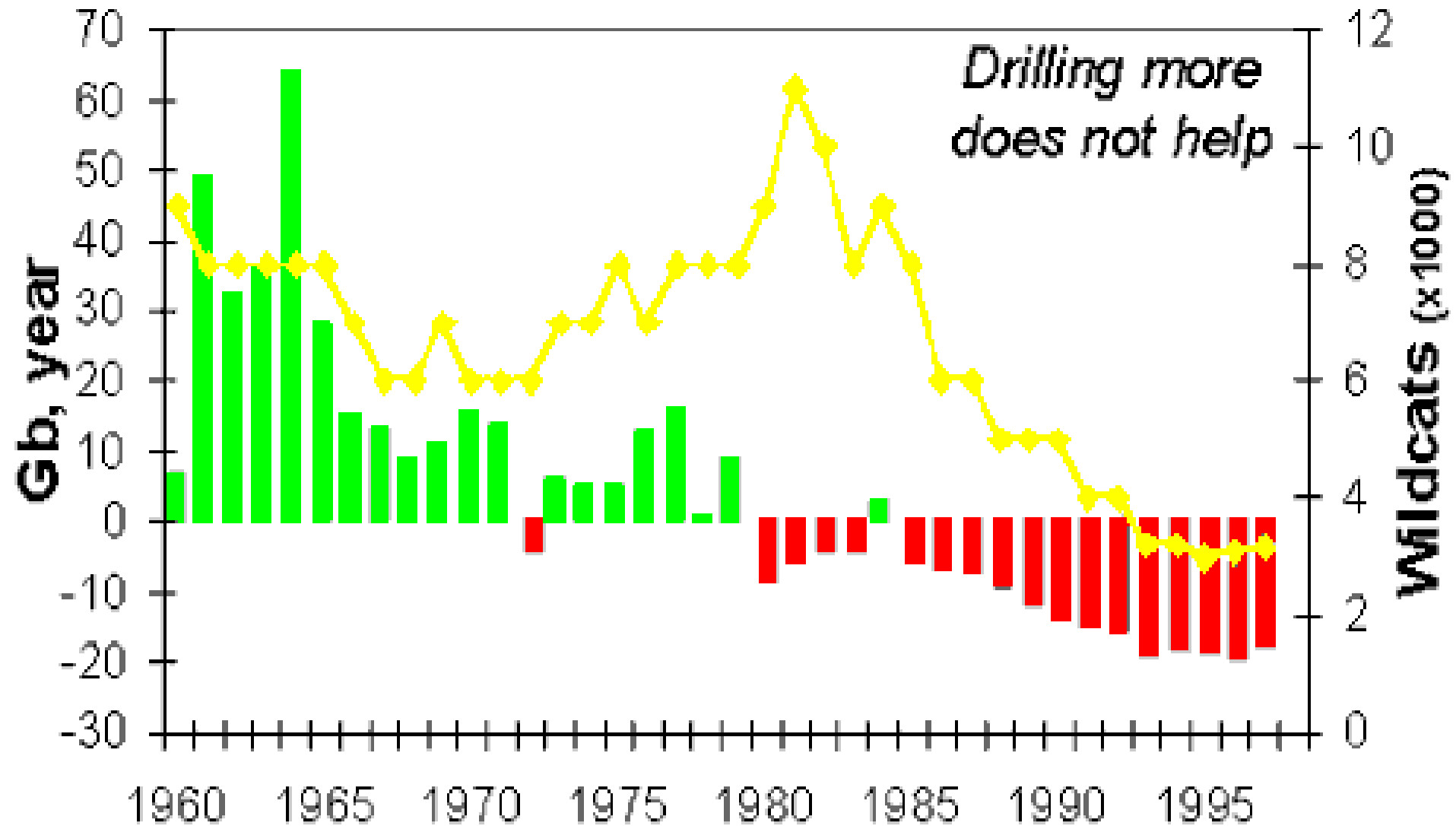
Jean Laherrère Jan. 2003

year

# THE GROWING GAP

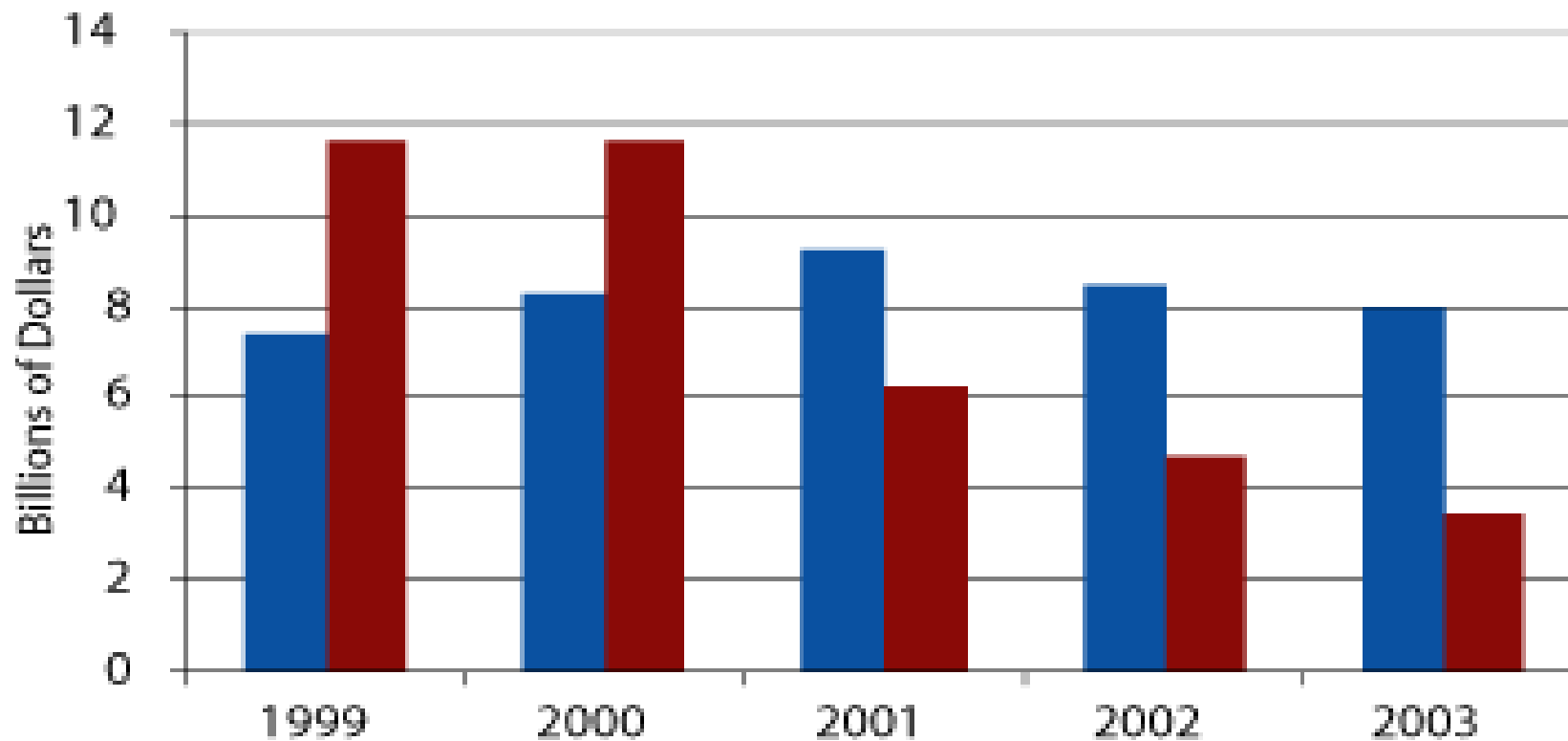


# *The Growing Gap* between Discovery and Production



# Diminishing Returns

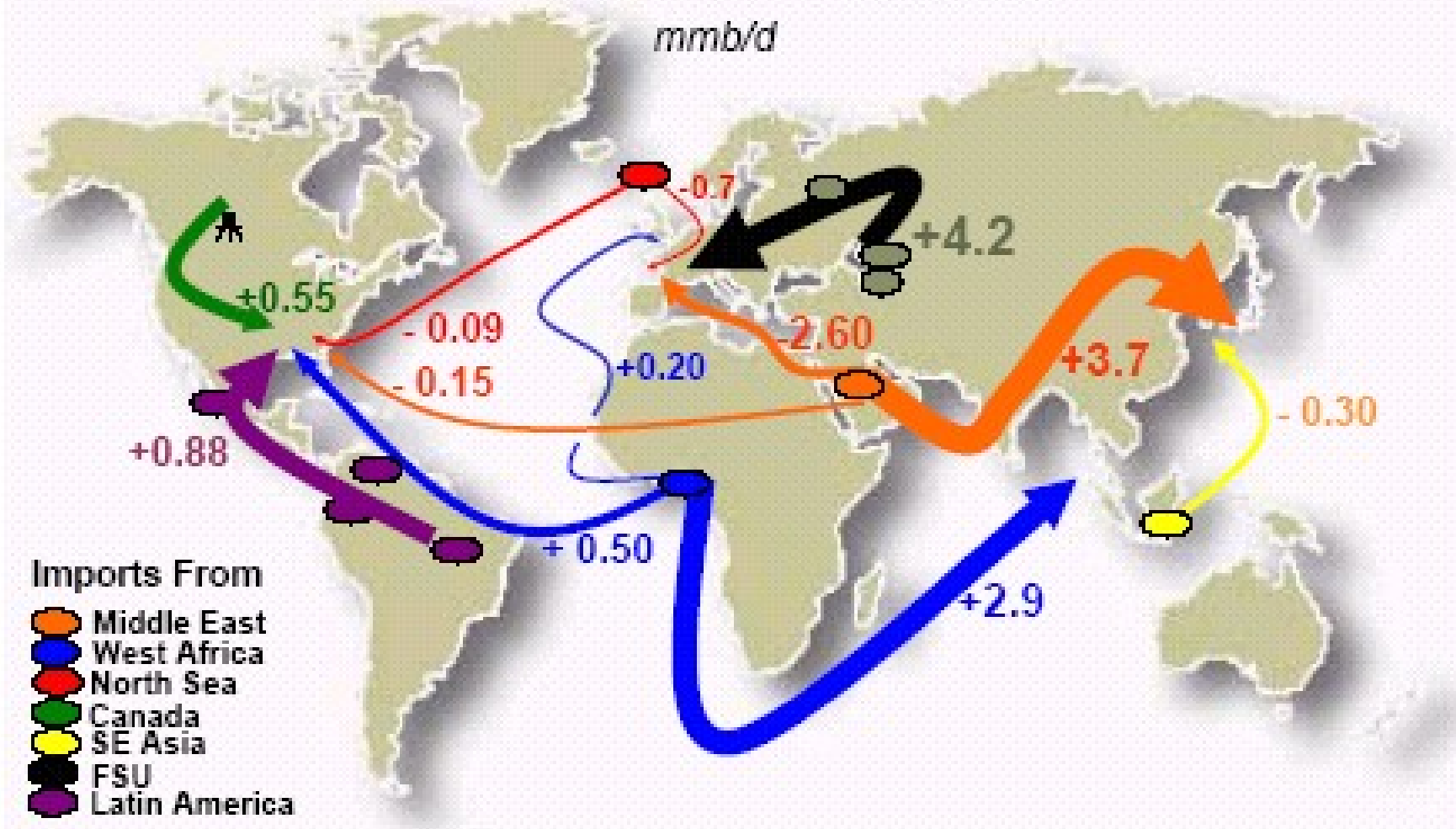
Exploration spending vs. value of discoveries



■ Total Exploration Costs ■ Net Present Value of Discoveries

# Increasing Dependency From Less Stable Areas

**2010-1997 Delta Growth in Crude Flows**  
**For Selected Consuming Regions**



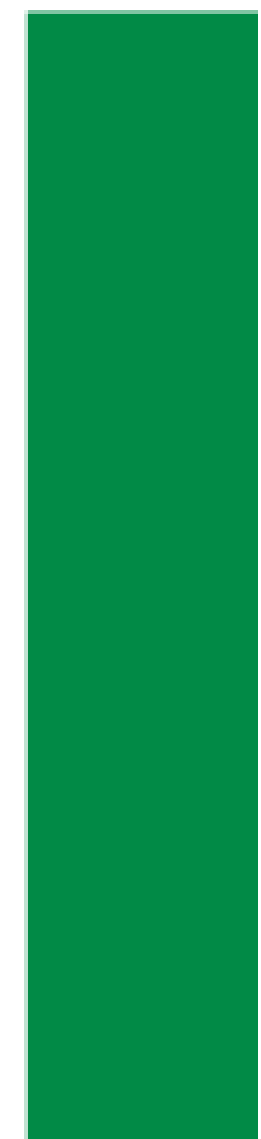
Do Not Include The Totality of Suppliers. Only the Most significant flows are shown.

The Map Includes Exports from Canada, Latin America, Middle East, North Sea, West Africa, West Africa, FSU to Selected Regions

**Proved oil reserves at end 2003**  
Thousand million barrels



Middle East  
726.6



Asia Pacific  
47.7



North America  
63.6



Africa  
101.8



S. & Cent. America  
102.2



Europe & Eurasia  
105.9



# Population/Demand Growth

- China's oil imports to increase 33% in 2005.

# Population/Demand Growth

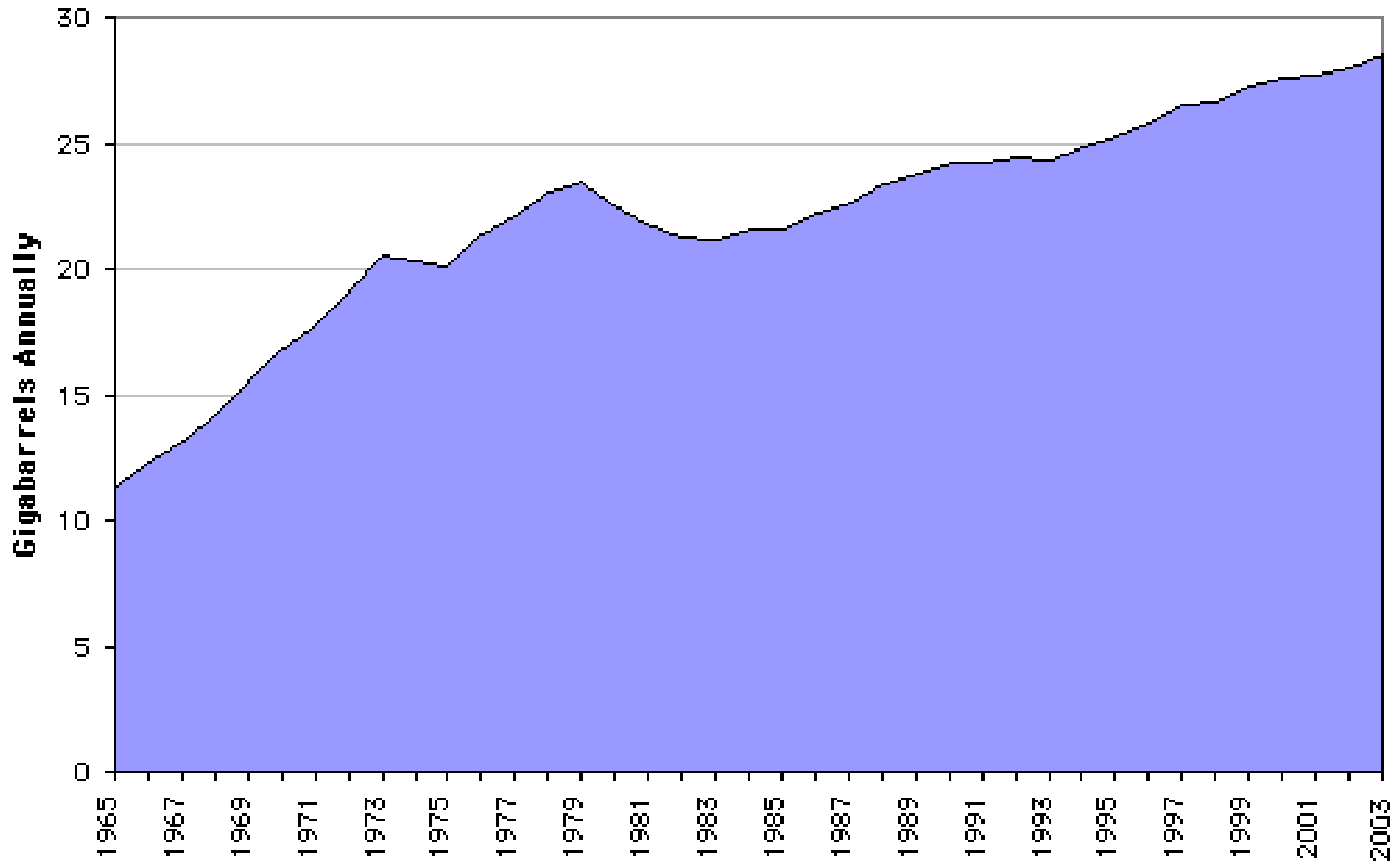
- Global consumption is 1 billion barrels every 12 days.

# Population/Demand Growth

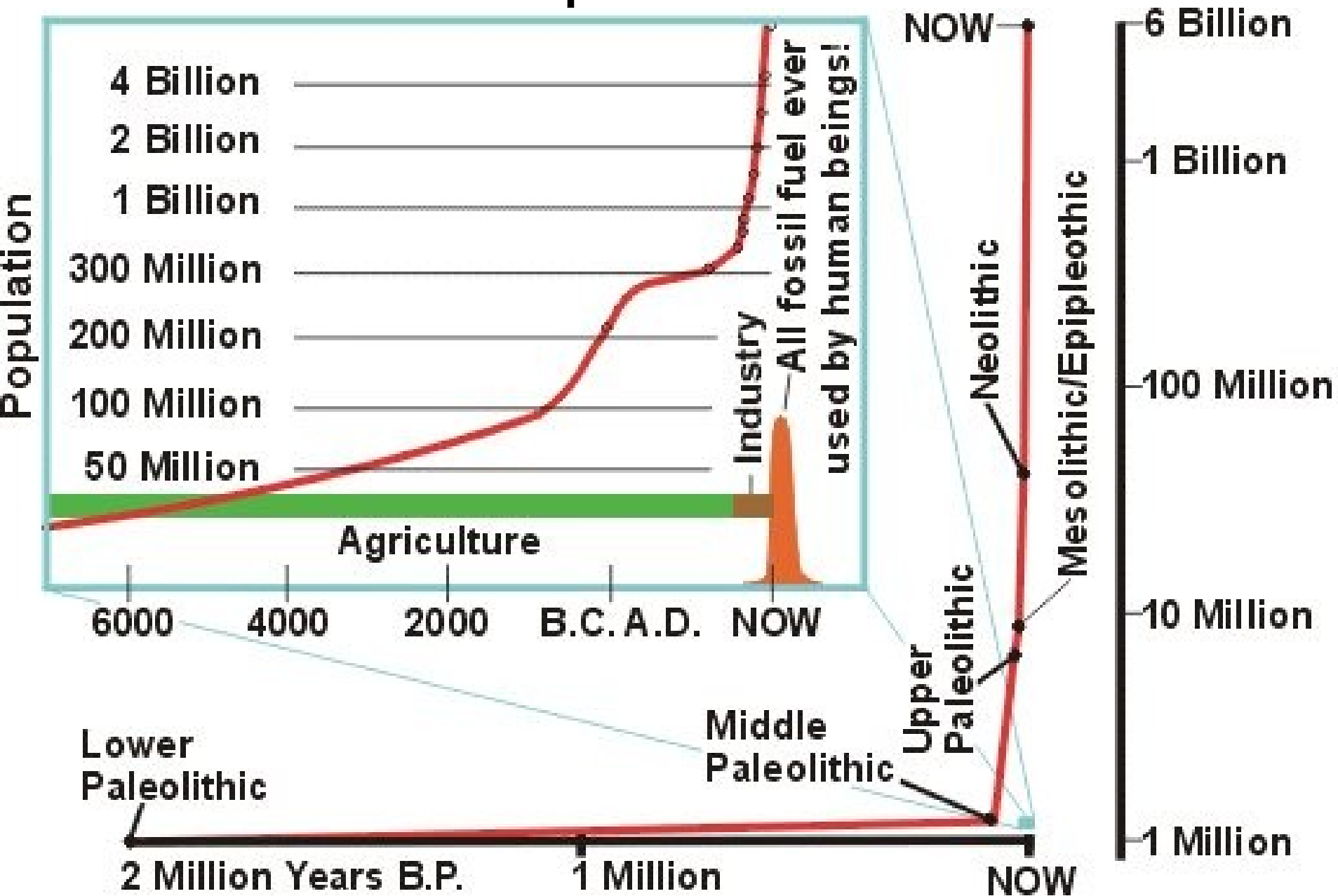
- US comprises 5% of global population yet consumes 1/4 of global oil production\*.

\*US Dept. of Energy, Energy Information Administration.

# Global Consumption Growth



# World Population Growth



# Secondary Petroleum Uses

Air conditioners, ammonia, anti-histamines, antiseptics, artificial turf, asphalt, aspirin, balloons, bandages, boats, bottles, bras, bubble gum, butane, cameras, candles, car batteries, car bodies, carpet, cassette tapes, caulking, CDs, chewing gum, combs/brushes, computers, contacts, cortisone, crayons, cream, denture adhesives, deodorant, detergents, dice, dishwashing liquid, dresses, dryers, electric blankets, electrician's tape, fertilizers, fishing lures, fishing rods, floor wax, footballs, glues, glycerin, golf balls, guitar strings, hair coloring, hair curlers, hearing aids, heart valves, heating oil, house paint, ice chests, ink, insect repellent, insulation, jet fuel, life jackets, linoleum, lip balm, lipstick, loudspeakers, medicines, mops, motor oil, motorcycle helmets, movie film, nail polish, oil filters, paddles, paint brushes, paints, parachutes, paraffin, pens, perfumes, petroleum jelly, plastic chairs, plastic cups, plastic forks, plastic wrap, plastics, plywood adhesives, refrigerators, roller-skate wheels, roofing paper, rubber bands, rubber boots, rubber cement, rubbish bags, running shoes, saccharine, seals, shirts (non-cotton), shoe polish, shoes, shower curtains, solvents, spectacles, stereos, sweaters, table tennis balls, tape recorders, telephones, tennis rackets, thermos, tights, toilet seats, toners, toothpaste, transparencies, transparent tape, TV cabinets, typewriter/computer ribbons, tires, umbrellas, upholstery, vaporizers, vitamin capsules, volleyballs, water pipes, water skis, wax, wax paper

# Temporary or Non-Solutions

- ANWR - six-month supply, that will take ten years to extract.

# Temporary or Non-Solutions

- Hydrogen fuel cells – an energy sink.

# Temporary or Non-Solutions

- Nuclear – ‘safe’ nuclear energy is an oxymoron.

# Long-term Solutions

- Economic re-localization – producing what we need closer to where we need it.

# Long-term Solutions

- Paradigm shift to renewable energy (solar, wind, biofuels, etc).

# Long-term Solutions

- Conservation - greater efficiencies by doing more with less.

# Conclusions

- 1) Global discoveries peaked in 1963, and have declined since.

# Conclusions

2) Global demand is outstripping inelastic production capacity.

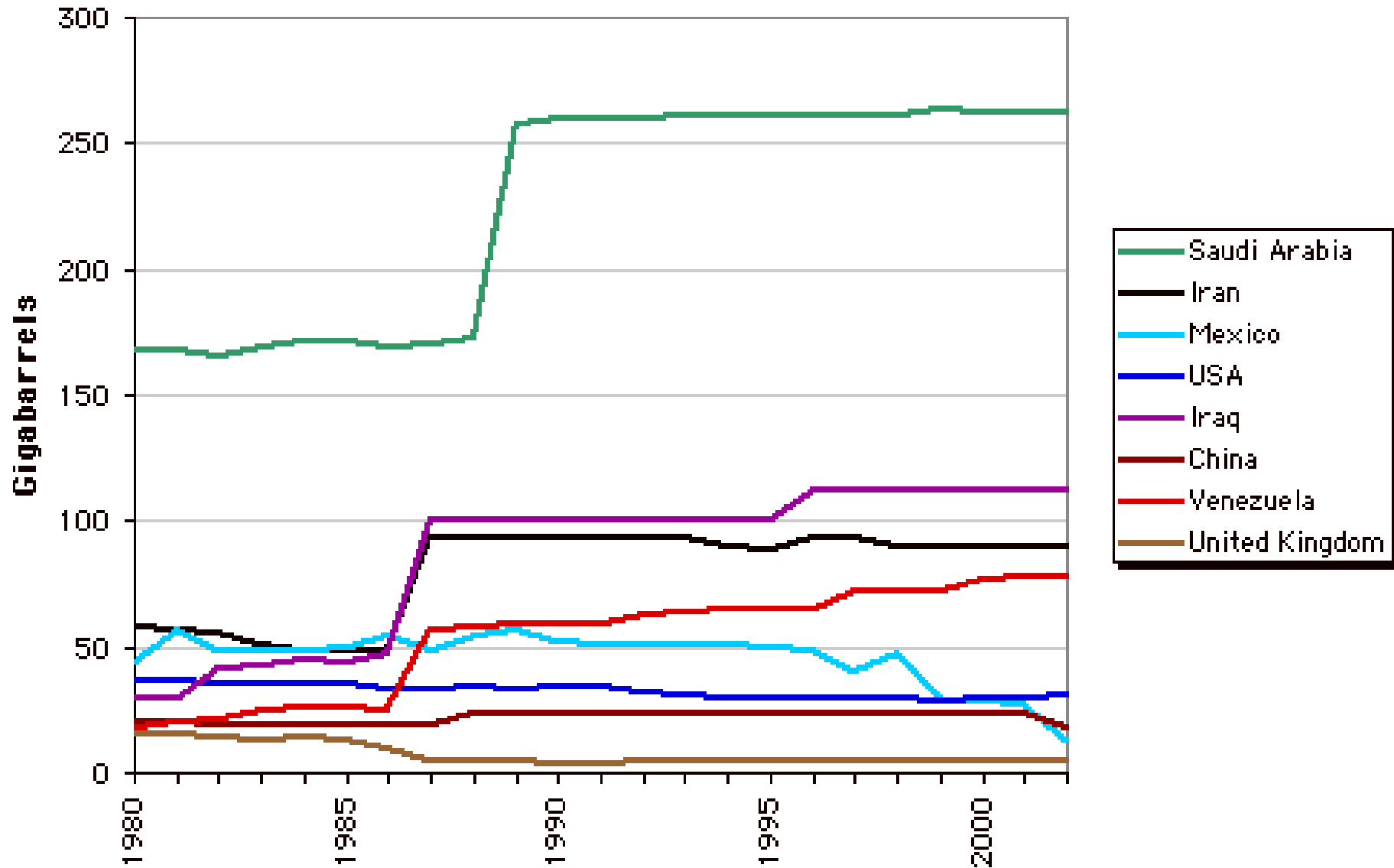
# Conclusions

3) Industrial society complexity contributes to oil price volatility.

# Peak Oil Links

- <http://www.wolfatthedoor.org.uk/>
- <http://postcarbon.org/>
- <http://energybulletin.net/>
- <http://www.oilcrash.com/>
- <http://www.odac-info.org/>
- <http://www.hubbertypeak.com/>
- <http://www.planetforlife.com/>
- <http://www.oilempire.us>

# Reserve Jump



## Regular Oil & Natural Gas Liquids 2003 Base Case Scenario

