

The Mystery Of Oil

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World's Largest Commodity Still An Enigma

- Global oil usage represents a \$1 trillion per year business.
- Oil statistics are vast.
- Commodity markets (NYMEX and IPE) trade 200 million barrels per day.
- “Institutional transparency” began 3 decades ago.
- Yet...it is amazing how little we really know.
 - Demand is hazy.
 - Supply is uncertain.
 - Volatile prices create illusions versus beacons.
 - OPEC data simply collective guesses.



Our Lack Of Knowledge About Demand

- Demand data is only “apparent demand.”
- Any significant stock builds or draws beyond primary levels distorts real usage.
- There is no stock data outside OECD.
- Weather, highly unpredictable, still greatly influences short-term demand.
- Long-term demand far more robust than most believe.



Image courtesy of World Energy.

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What Knowledge We Lack About Supply

- Steady rise of decline rates make supply forecasts difficult to guess.

- Lag of data reporting makes short-term supply estimates, even in the U.S., “merely estimates.”



- Public oil and gas companies supply is often \pm 3% to 5% (“pluses” are rare).

“Stocks” Are Most Reliable Oil Data

- While never perfect, petroleum inventories are the only good “oil yard stick.”
- While stock revisions happen, they generally show up in a matter of months.



- Outside OECD, there are few places to store extra oil.
- Oil at sea is very steady.
- But many observers do not trust stocks.

OPEC Production/Exports Are Wild Guesses

- Seven media sources estimate OPEC 10 output monthly.
- Their collective sums are generally close.
- Individual country by country variances are often 1.2 to 1.8 million B/D.
- OECD OPEC imports generally prove most estimates are wrong.
- Where do these numbers come from?



Tanker Traffic Counting Is Still A Mystery



- Lloyds and Clarksons are the “gold standard” in tanker data.
- They have totally different tracking methodology (Clarkson tracks “fixtures”; Lloyds track “arrivals”).
- Both acknowledge they miss 20% to 25% of real data.
- The consultants (Petrologistics, etc.) pretend a degree of precision is impossible to gauge.
- Could consultants have an ulterior motive?

Everyone Has An Opinion On Oil Prices

- In a world of great uncertainty, you cannot be an “oil expert” without having an opinion on future oil prices.
- Most opinions are “plus/minus a penny or two.”
- Few turn out to be remotely vaguely correct.
 - \$10 oil will last forever. (March 1999)
 - \$27 oil has a \$7 war premium. (July 2002)
 - The war starts: oil drops \$12. (March 2003)
 - Is there any “normal” price for oil?

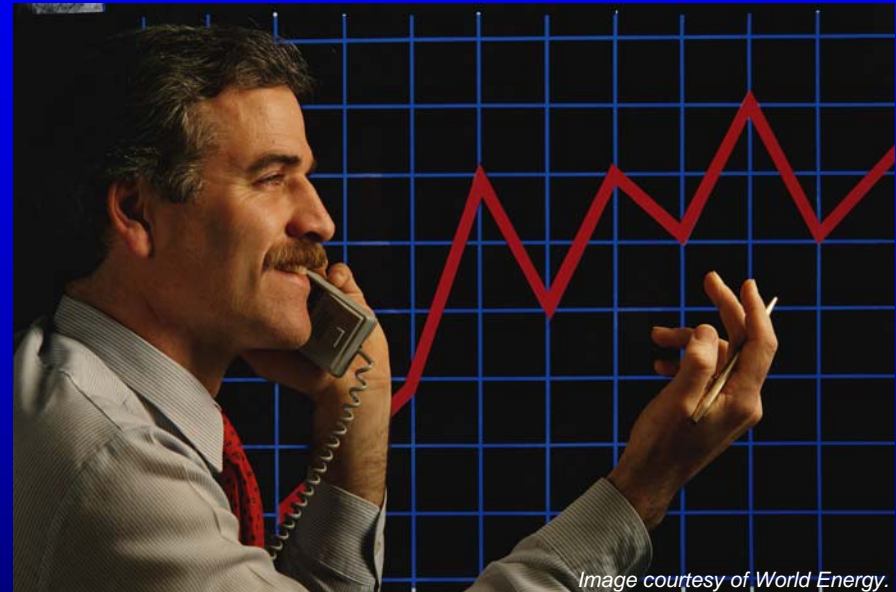


Image courtesy of World Energy.

Oil Prices Are Driven By Speculators

- The net “non-commercials” NYMEX is the engine driving oil prices (post-1994).
- Heavy net longs drive prices up.
- Heavy net shorts drive prices down.
- Occasional “neutral holdings” are educational.
 - 2000: 13 weeks \$30.73
 - 2001: 6 weeks \$27.75
 - 2002: 4 weeks \$20.71 (2) / \$26.50 (2)
 - 2003: 4 weeks \$35.51

What Should The Price Of Oil Be?

- There is no data supporting a “fair price” for the world’s most important commodity.
- The past decade’s price was far too low.
- Financial returns throughout all parts of the industry were awful.
- Future oil prices need to be high to sustain oil system.

What We Can Learn About Demand

- For 85% of the 20th Century, it grew.
- In the past 40 years, it fell twice.
 - 1974 / 1975
 - 1979 / 1983
- 1988 to 1993, the FSU's illusion of "demand stagnation."
- 1987 to 2002: non-FSU demand grew by 20 million B/D.
- 80% of the globe still uses a tiny amount of oil.
- Oil is still the only way to "turn transportation wheels."

What We Know About Supply

- Non-OPEC supply, excluding FSU, has flattened out.
- FSU supply was a mystery surprise.
 - Lack of quality data makes some of this surge “suspect.”
 - Lack of exploration proves that further gains are “suspect.”
 - Logistical bottlenecks are limit to export growth.

Depletion Was The “Missing Link”

- Reason supply flattened (or peaked) was not lack of effort and no new technology.
- The industry had many great successes.
- They were not enough to offset depletion.
- Oilfield technology created a depletion rat race.
 - Smaller new fields were found.
 - Technology allowed them to be commercial.
 - But we raised decline rates to amazing levels.

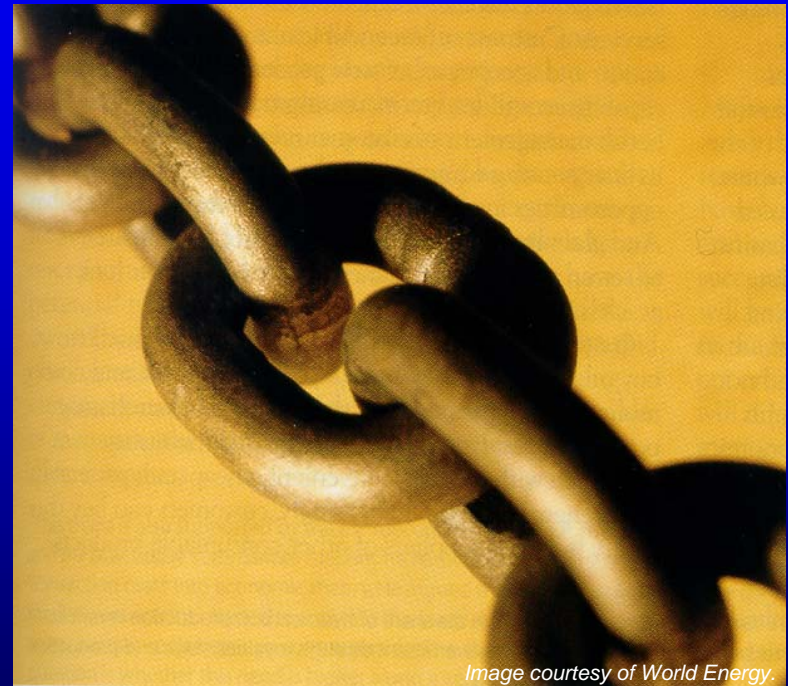
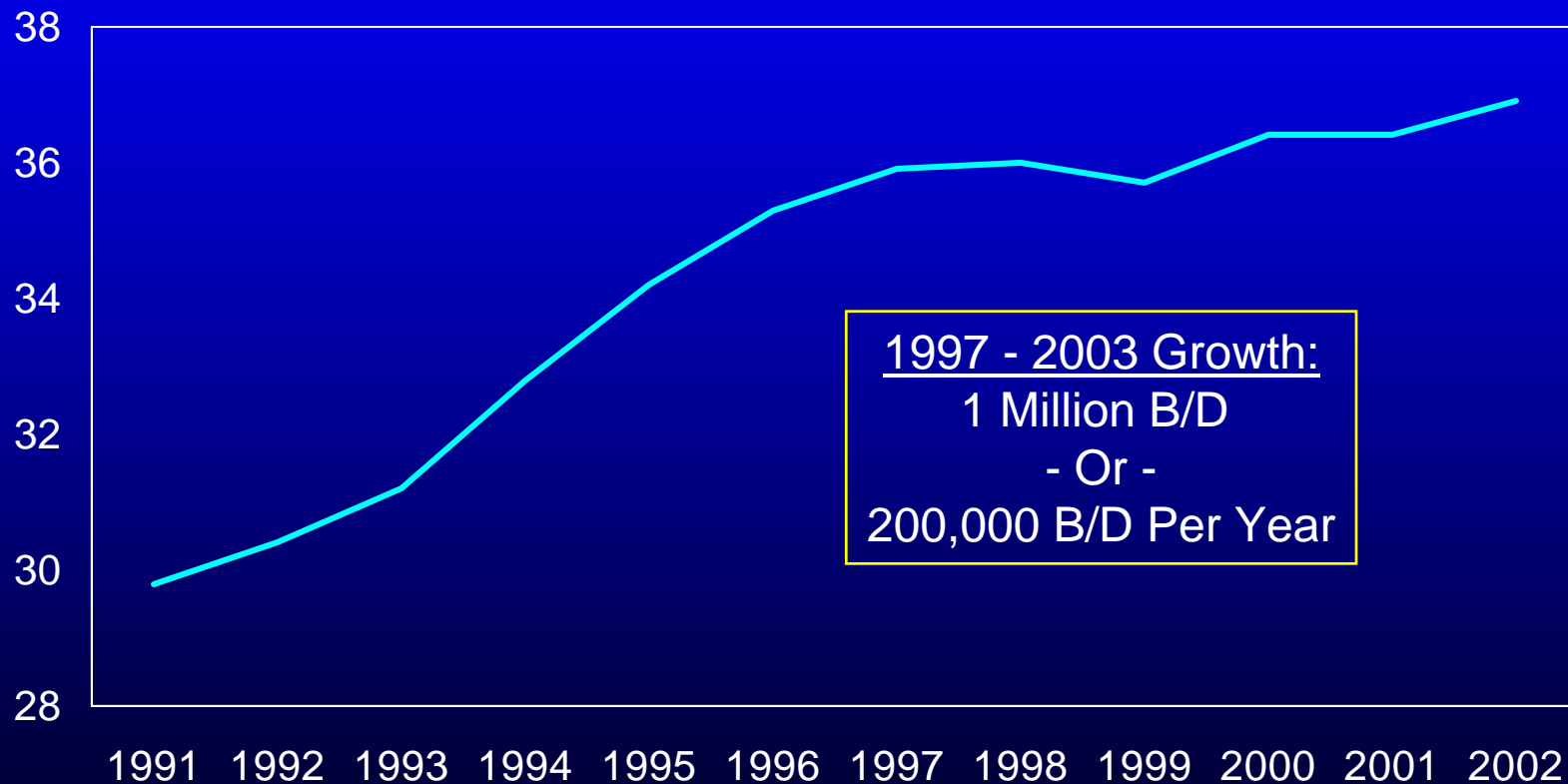


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Non-OPEC Supply (Excluding FSU)

12 Years Of Non-OPEC Supply (Excluding FSU)



Source: IEA.

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OPEC Seems To Hold All The Future Supply Cards

- FSU growth is “too suspect.”
- Remaining non-OPEC supply has plateaued.
- Too many non-OPEC participants are now in serious decline.
- Supply models should assume non-OPEC supply has probably peaked.
- Luckily there is always the Middle East.



OPEC Supply Really Means The Middle East

- Other big OPEC producers are past peak.
- Algeria/Libya could still grow, but are too small to offset the declines likely in Indonesia, Nigeria and Venezuela.
- Only “Middle East OPEC” could expand to replace declines elsewhere.
- But, Middle East energy transparency is an oxymoron.
- Some data does shed light on the topic.



The Middle East:

The “Promised Land”

Image Courtesy of National Geographic.

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Middle East Energy Is The “Promised Land”

- “All roads lead to Rome”
- Future for oil and gas: Rome is the Middle East
- Abundant reserves
- Cheap to produce
- Still extremely unexplored
- If the rest of world is “long in the tooth,” thank Allah for Mecca!

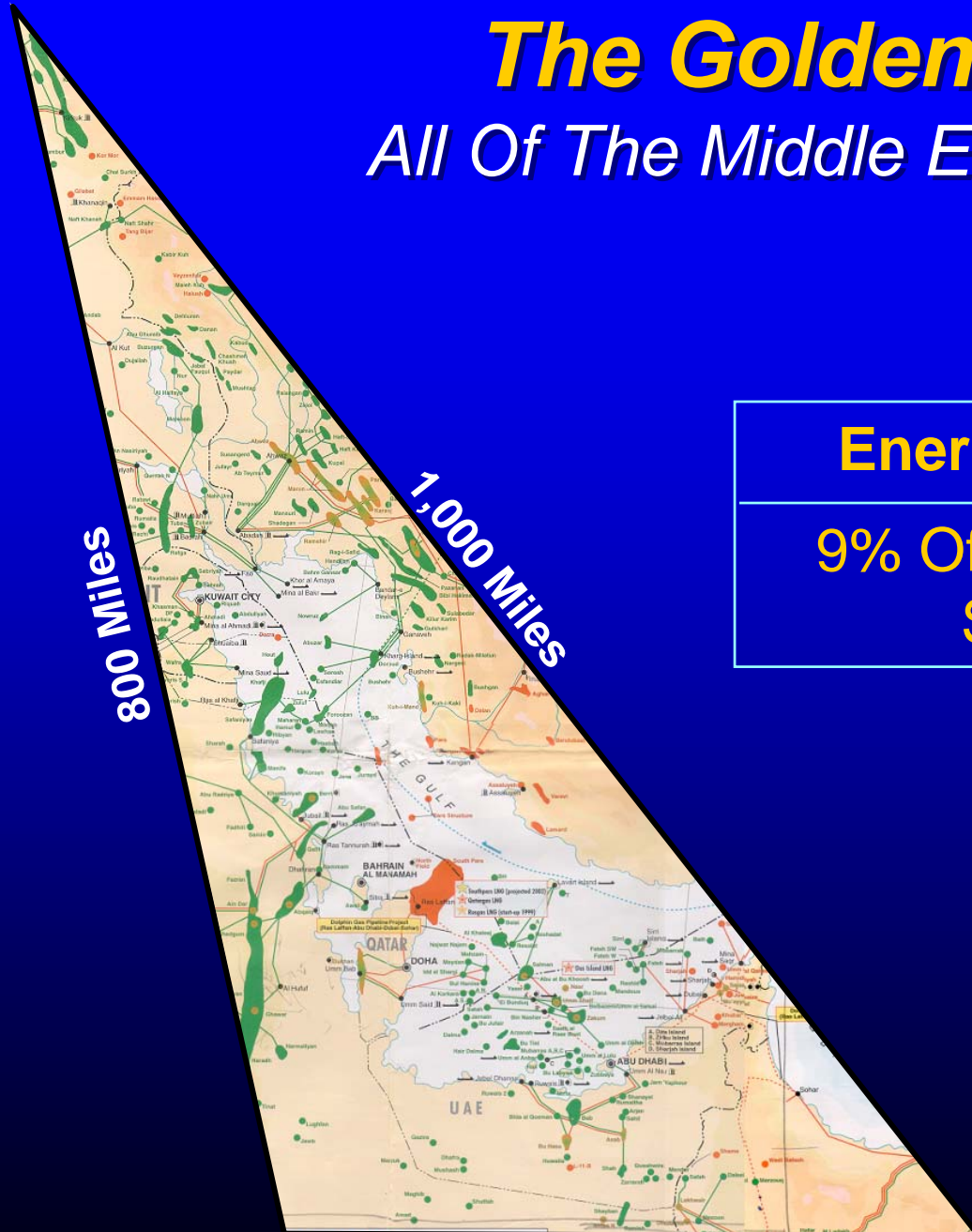
Are we sure this is true?

Middle East Oil And Gas Is Not “All Over” The Middle East

- Middle East: An enormous area (2.1 million square miles).
- All of oil and gas (as we know it today) is compressed into a “Golden Triangle” (190,000 square miles).
- All the great finds happened years ago.
- In the past 3 decades, exploration success has been modest (at best).
- Is this because no one looked very hard?
- Or because there was not much else to find?

The Golden Triangle

All Of The Middle East Oil And Gas



Energy Triangle

9% Of Middle East
Surface

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450 Miles

Relative Size Of The Middle East Golden Triangle



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Middle East Demographics

	Square Miles	Population (In Millions)	
		1993	2000
Syria	71,498	14,070	16,200
Jordan	35,135	3,632	4,900
Iran	632,457	60,500	63,700
Iraq	169,235	18,815	23,300
Saudi Arabia	830,000	15,985	20,700
Yemen	203,850	12,215	17,500
Oman	82,030	1,617	2,400
Kuwait	6,880	2,388	2,000
UAE	32,278	2,590	2,900
Total	<u>2,063,363</u>	<u>114,100</u>	<u>153,600</u>

Sources: World Bank (2000 Population); Rand McNally, 1993.

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If “All Roads Lead To Rome,” Once There, Saudi Arabia Is Home

- Saudi Arabia became most important oil exporter once U.S peaked.
- While often not trusted, Saudi Arabia has constantly tried to become world’s most trusted supplier of oil. (It is all they have.)
- Saudi Arabia is assumed to hold virtually limitless amounts of cheap oil.

Saudi Arabia's Oil And Gas Challenges

- No major exploration success since the 1960s.
- Almost all its production comes from very old fields.
- Almost every field has high and rising water cut.
- Ghawar, the world's largest field, injects 7 million b/d of seawater to prop up the reservoir pressure.
- Outside “North Ghawar,” permeability and porosity are hard to find.
- Some key fields never worked.
- Others are watering out.
- It takes “fuzzy logic” to plan for Saudi Arabia's future.

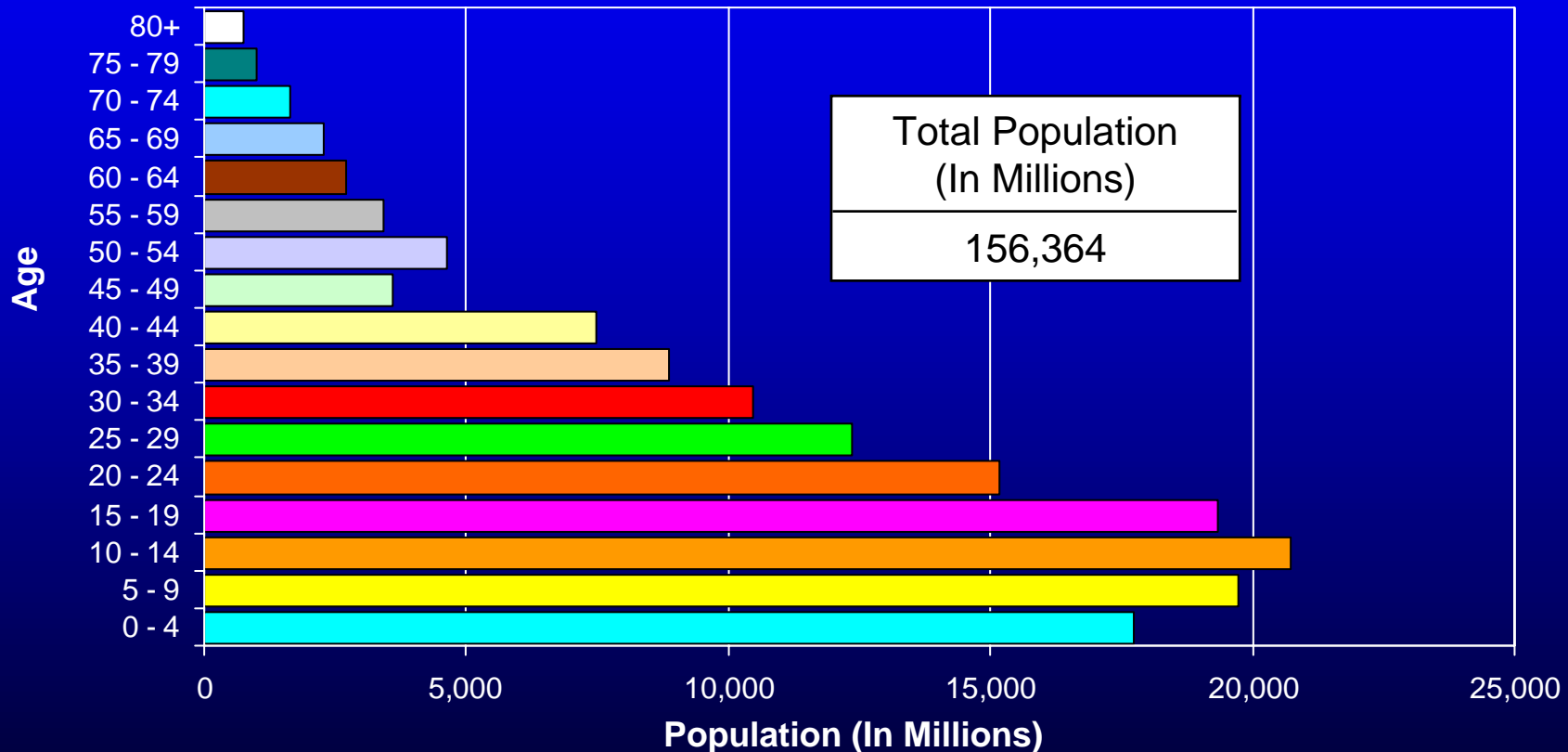


What Saudi Arabia's Real Energy Costs Might Be

- Saudi Arabia is no longer a low cost producer.
- Lifting cost must be rising exponentially.
- Natural gas finding costs are extremely high.
- What is Saudi Arabia's "right price" for oil?
Does anyone really know?

What Is The Right Price For Oil?

2000 Middle East Demographics



It Has To Be High Enough To Create
A Middle East Middle Class!

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The Optimists Were Wrong

- While the optimist/pessimist (Economists vs. Scientists) debate rages on, the jury has decided optimists have lost.
- Too much real data now proves their total thesis was wrong.
 - Supplies never surged.
 - Demand did grow.
 - Prices rose instead of falling.
- Does this prove the pessimists were right?

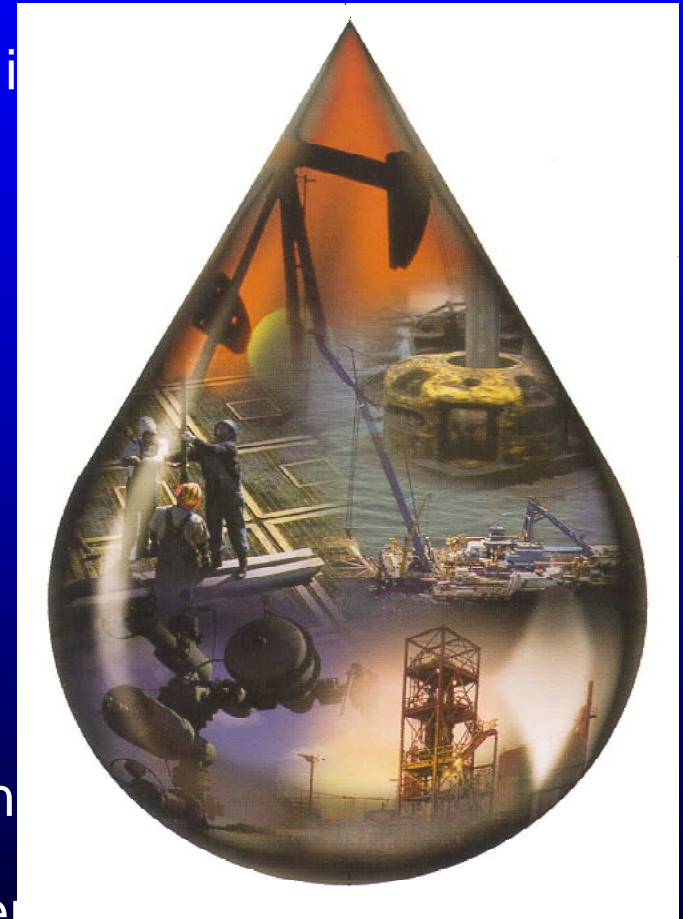


The Pessimists Might Also Be Wrong

- Most serious scientists worry the world will peak in oil supplies.
- But most assume the day is still years away.
- Most assume “non-conventional” oil will carry us through several additional decades.
- They were right to ring the alarm bell.
- But they might also be too optimistic.

Non-Conventional Oil Is Too Non-Conventional

- Light oil is easy to produce and convert into useable oil.
- Heavy oil is hard to produce, extremely energy intensive and very hard to grow rapidly.
- 3 of America's 9 largest oil fields are 100 years old.
- Heavy oil can last forever.
- But it is very hard to get out of the ground.
- And it takes remarkable amounts of energy to convert into useable energy.



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The Real Oil Issues

- What are current declines (by basin)?
- What will decline rates be by 2005? And beyond?
- What does it cost now to create new supply?
- Can growth of new fields replace constant declines?
- When peaking occurs, what energy substitute can take its place?
- At what cost will this substitute take?

All are serious questions.
None have easy answers.

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