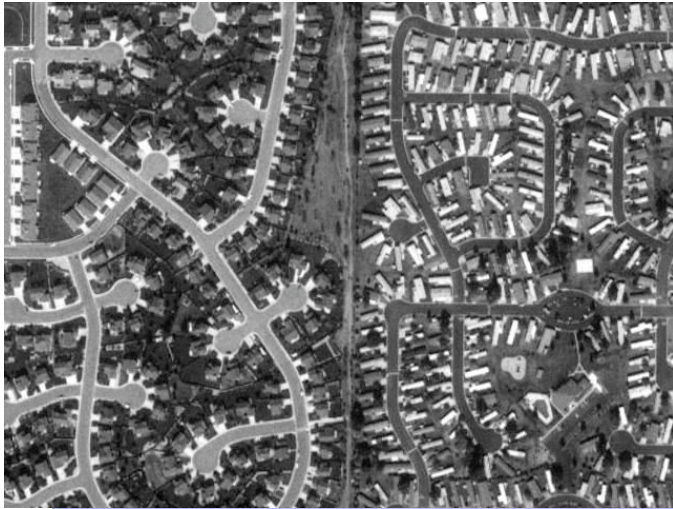


Fossil Fuel Energy – a 20th Century Miracle



20th Century – the Fossil Fuel Fiesta



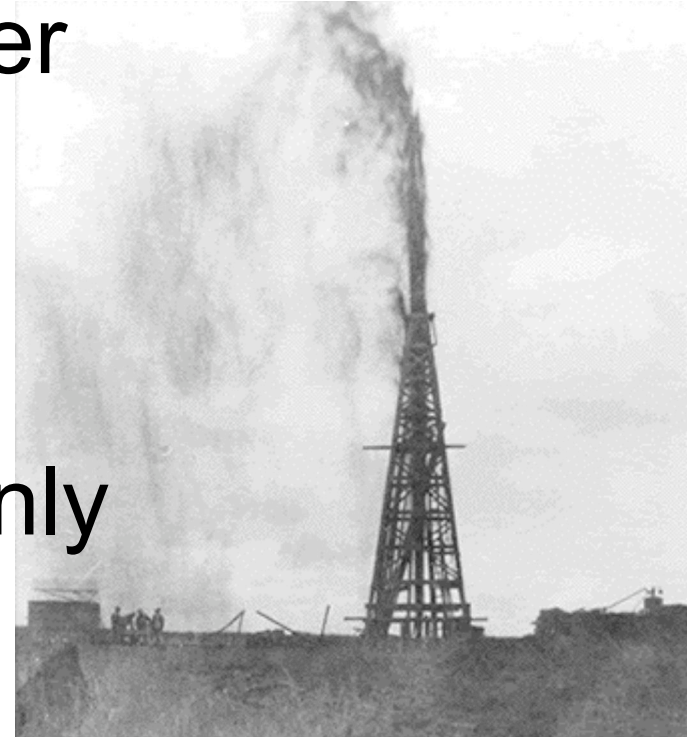
Myths About Oil in Our Time

Cheap oil would last forever

Price would remain cheap indefinitely

Cost of extraction would only go down.

Snazzy “new technology” would steadily reduce costs and lead to permanent oil glut.



Middle East Oil Fields In Decline



- Ghawar (Saudi Arabia)
- Burgan (Kuwait)
- Iran's Six Giant Oil Fields
- Iraq's Two Super Giants
- Syria, Yemen, Oman

Russia – a.k.a. Former Soviet Union



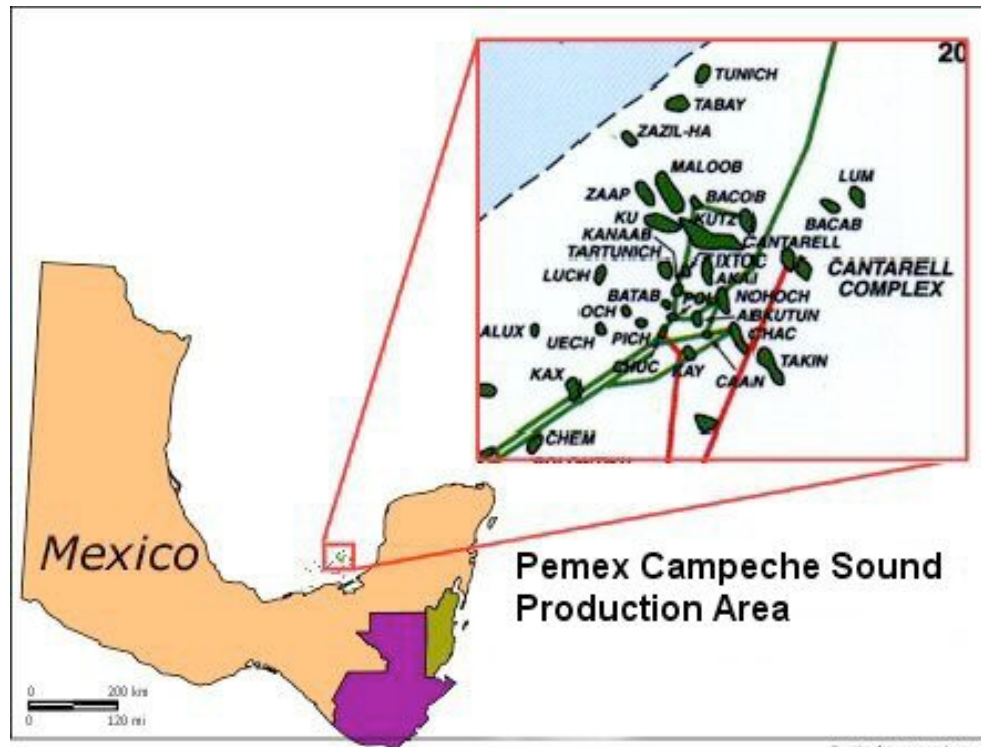
Peaked 1986

Most Giant Oil
Fields in
Steep Decline

Increased
Domestic
Consumption

Less to Export

Mexico's Cantarell Oil Field = 60 % of National Production



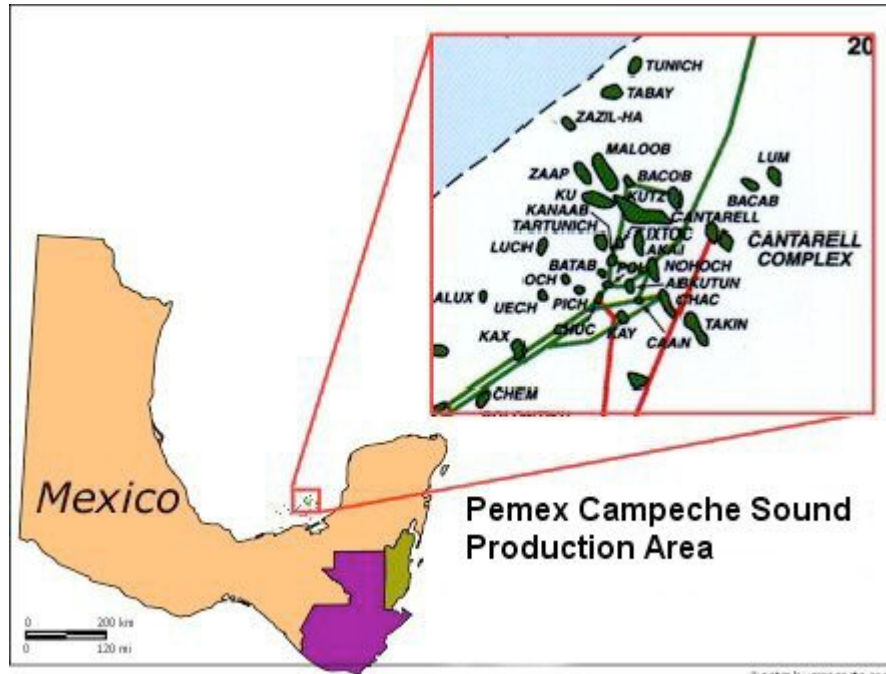
Past Peak in 2006

15% *Minimum* Annual Decline Forward

Domestic Mexican Consumption Increasing

Mexican Government gets 40% of all revenue from Pemex

Mexico's Cantarell Oil Field = 60 % of National Production



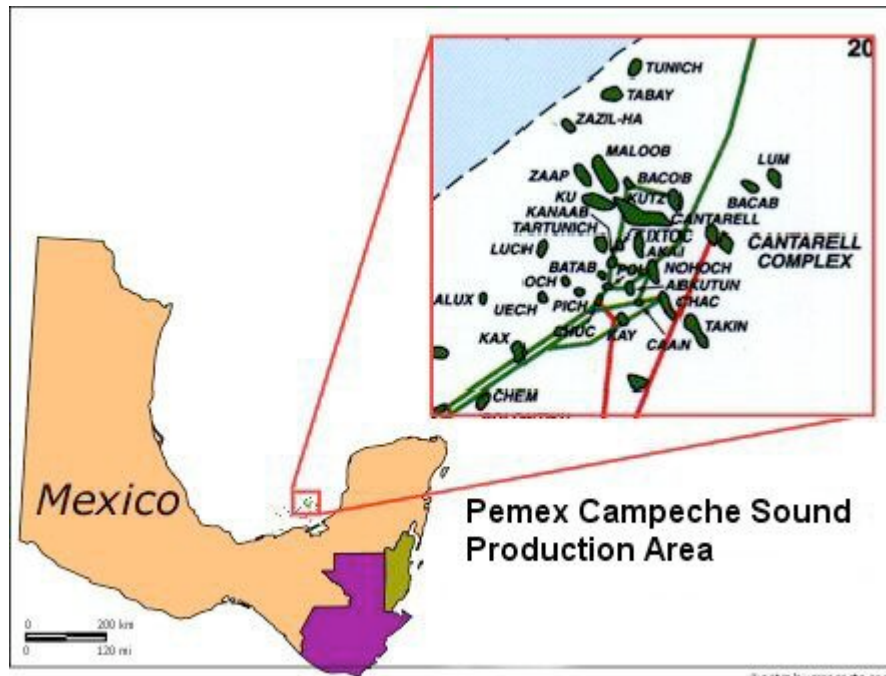
Past Peak in 2006

15% *Minimum* Annual
Decline Forward

Domestic
Consumption
Increasing

Mexico is United States' # 3 Source of Imports

Mexico's Cantarell Oil Field = 60 % of National Production



Past Peak in 2006

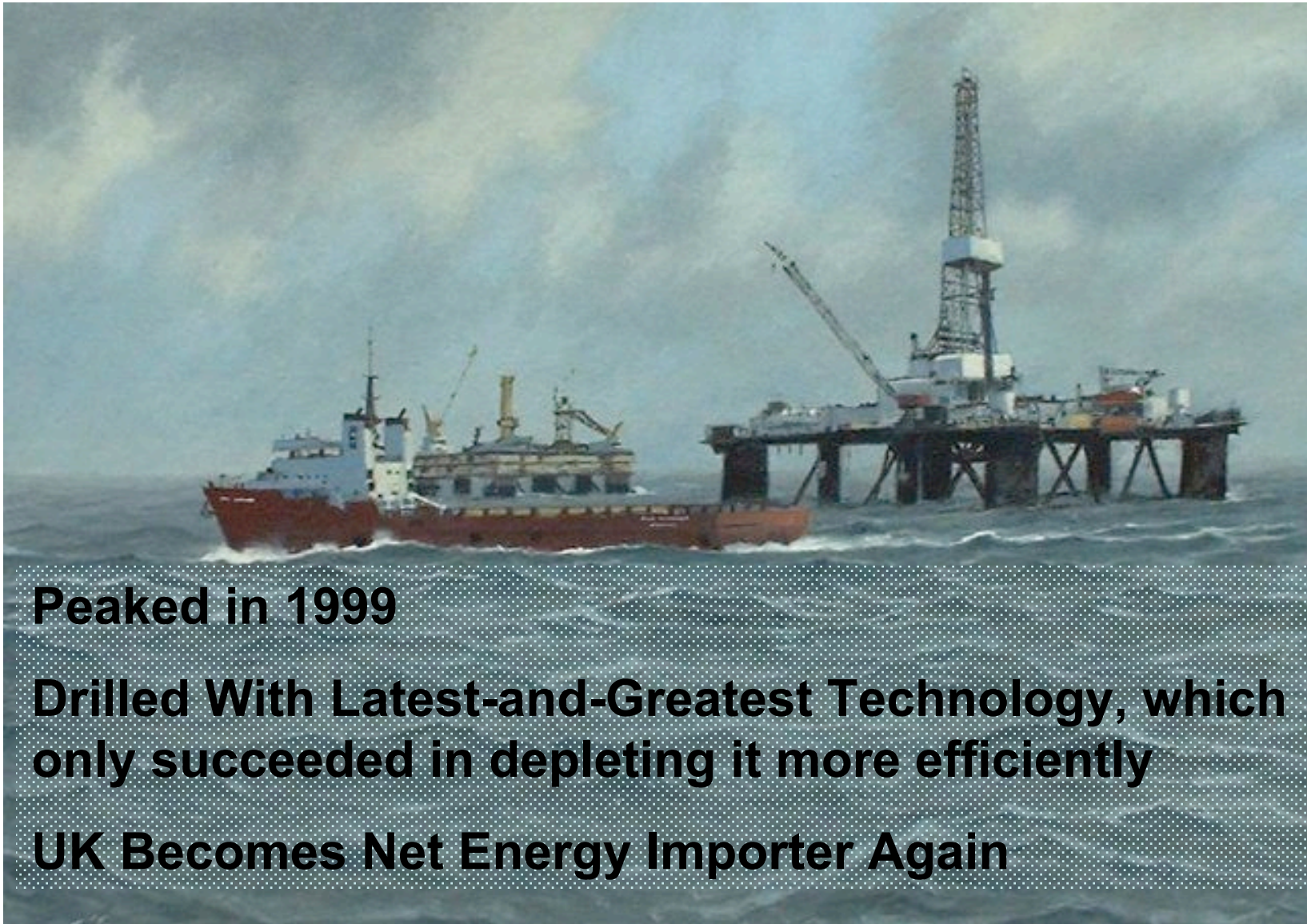
15% *Minimum* Annual
Decline Forward

Domestic
Consumption
Increasing

Mexico is United States' # 3 Source of Imports

**By 2010 (perhaps sooner) Mexico Will
Have No Surplus Oil to Export to the US**

North Sea – United Kingdom and Norway



Peaked in 1999

Drilled With Latest-and-Greatest Technology, which only succeeded in depleting it more efficiently

UK Becomes Net Energy Importer Again

Other Major Oil Regions in Decline



Other Major Oil Regions in Decline



Venezuela



Indonesia – Peaked 1977

OPEC Member

Now Net Oil Importer

Other Major Oil Regions in Decline



Venezuela



Africa

Onshore in depletion

Chaos, Violence, Anarchy



Indonesia – Peaked 1977

OPEC Member

Now Net Oil Importer

And, of course. . . .



US Peak Oil 1970

1970 Production = 10 m/b/d

2007 Production = 5 m/b/d

US Oil Consumption = 25 % of World Total



US imports more than 60% of its oil now

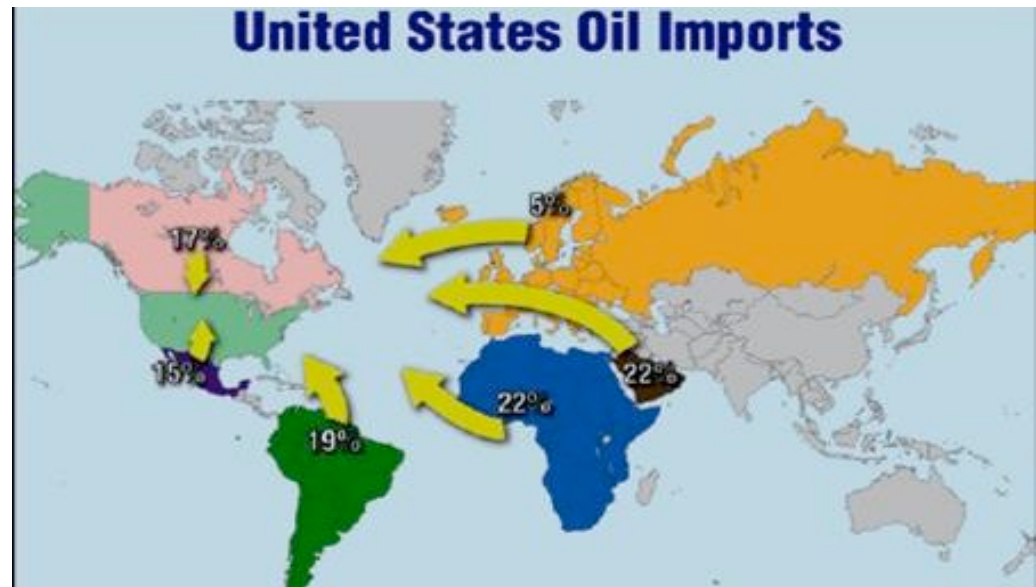
US oil import dependency = extreme vulnerability

Uh Oh

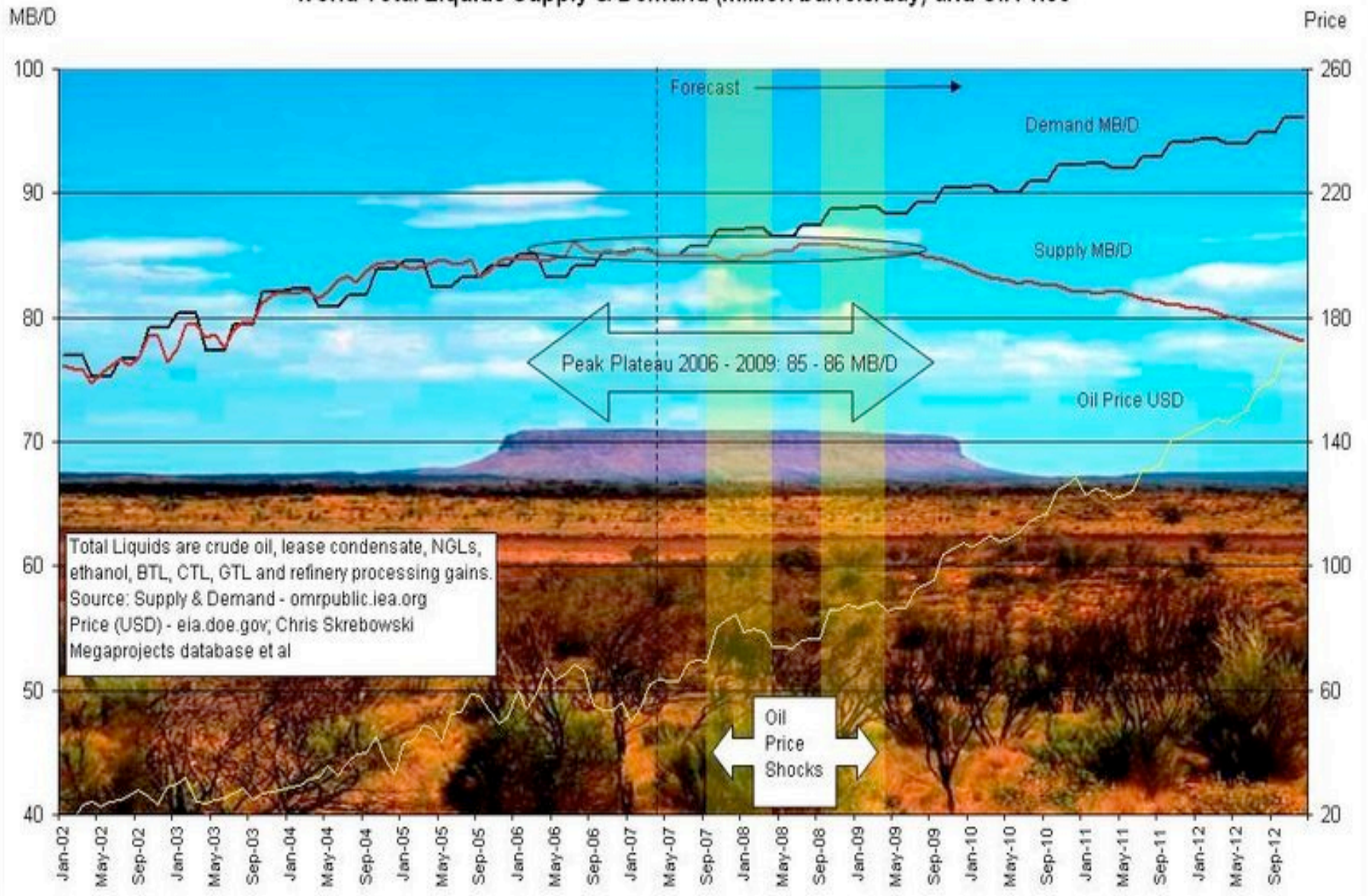
We import more energy than next two highest importers.

Most imports come from shaky or unfriendly suppliers.

Many key suppliers are one to two months travel time away.



World Total Liquids Supply & Demand (million barrels/day) and Oil Price



Global Energy Truths

Global Oil Supply is peaking and will decline over the next two decades.

Global oil demand rising remorselessly

Only uncertainties are:

**Exact timing of “peak”
(perhaps already past)**

Extent of decline

Effects on daily life

Possible mitigation (unlikely)

Energy Infrastructure Is Too Old

80% of equipment worldwide is rusty and decrepit.

- Wellheads
- Drilling Rigs
- Refineries
- Tank farms
- Railroad systems
- Tanker ships



US Refineries Running at over 90 percent capacity 2007

Inconvenient Realities of Fossil Fuels

The World Has Used Up Most Of Its Highest Quality Oil

We devoured our highest quality fossil fuels at extremely cheap prices

High BTU, high flow methane gas is rapidly depleting.

“New technology” only allowed depletion to occur more efficiently!

High BTU black coal is rapidly depleting.



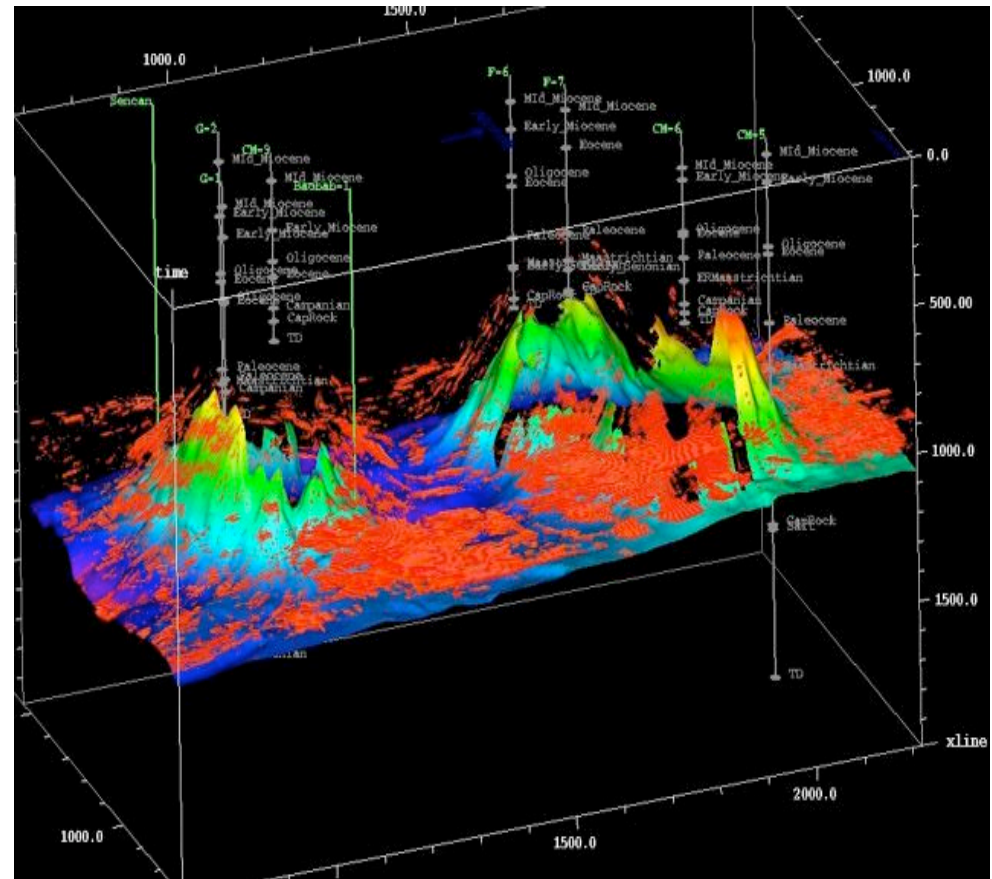
Oil Field Technology Created Mythical Cheap Energy Era

1970 – 2000 oil field “new technology” revolution inadvertently created deceptive energy picture:

Horizontal drilling
Multi-lateral well completions
Sub-sea wellheads
3D and 4D seismic

Illusions created myth that cheap energy would get even cheaper.

Reality: World rapidly used last of highest quality energy.



US DOE Shows Global Crude Oil Peak Dec 2005

Crude oil now makes up only 85% of total world oil supply.

The other 15 percent is natural gas liquids, tar sands byproducts, and other “unconventional” oil.

It ain't cheap.



The Natural Gas Picture is Spooky

Many key natural gas basins
are now in decline

- USA
- Canada
- Western Siberia
- UK (North Sea)
- Indonesia



More than half the homes in the USA heated with gas

Approx 20 percent of electric power generated from gas

Guess Where the Most Gas Is

?

Guess Where the Most Gas Is?



Guess How it has to get here

?

Guess How it has to get here



Very Expensive !!!

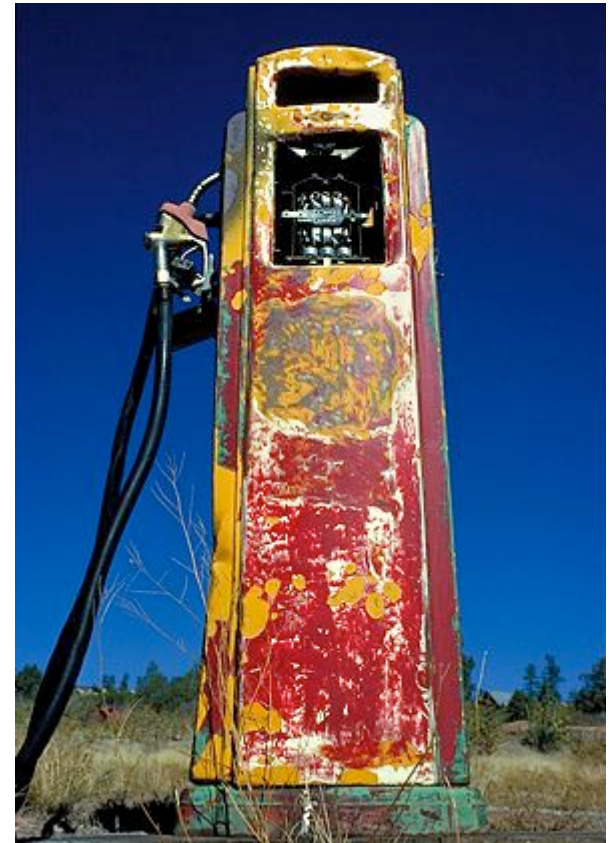
Unconventional oil won't fill gap as demand soars

Heavy oil, oil sands, tar sands, oil shale are plentiful.

All are very energy and water intensive to turn into low quality oil.

Capital cost per barrel are huge.

Oil shale still beyond economic development



Peak Oil's "First Crisis" Might Be USA Gas Lines



Remember 1973 ?



End of April gasoline stocks at record lows.

America's gasoline demands are at record highs.

Inventory measured by days' use is lowest since the 1950s.

We're importing over 1 million b/d of *gasoline!*

Gasoline shortage leads to hoarding.

Hoarding creates "run on the bank" reaction.

Gasoline rationing could happen this summer.

Implications For New Urbanists



Implications For New Urbanists

N.U. no longer a mitigation program for suburbia

Demise of production homebuilders

Scarcity of investment capital

TND become transitional artifact of history

Future activity focused on existing towns / cities

Much more modest increment of development

Forget about Skyscrapers



. . . And megastructures.

Remember: It's All Good !

