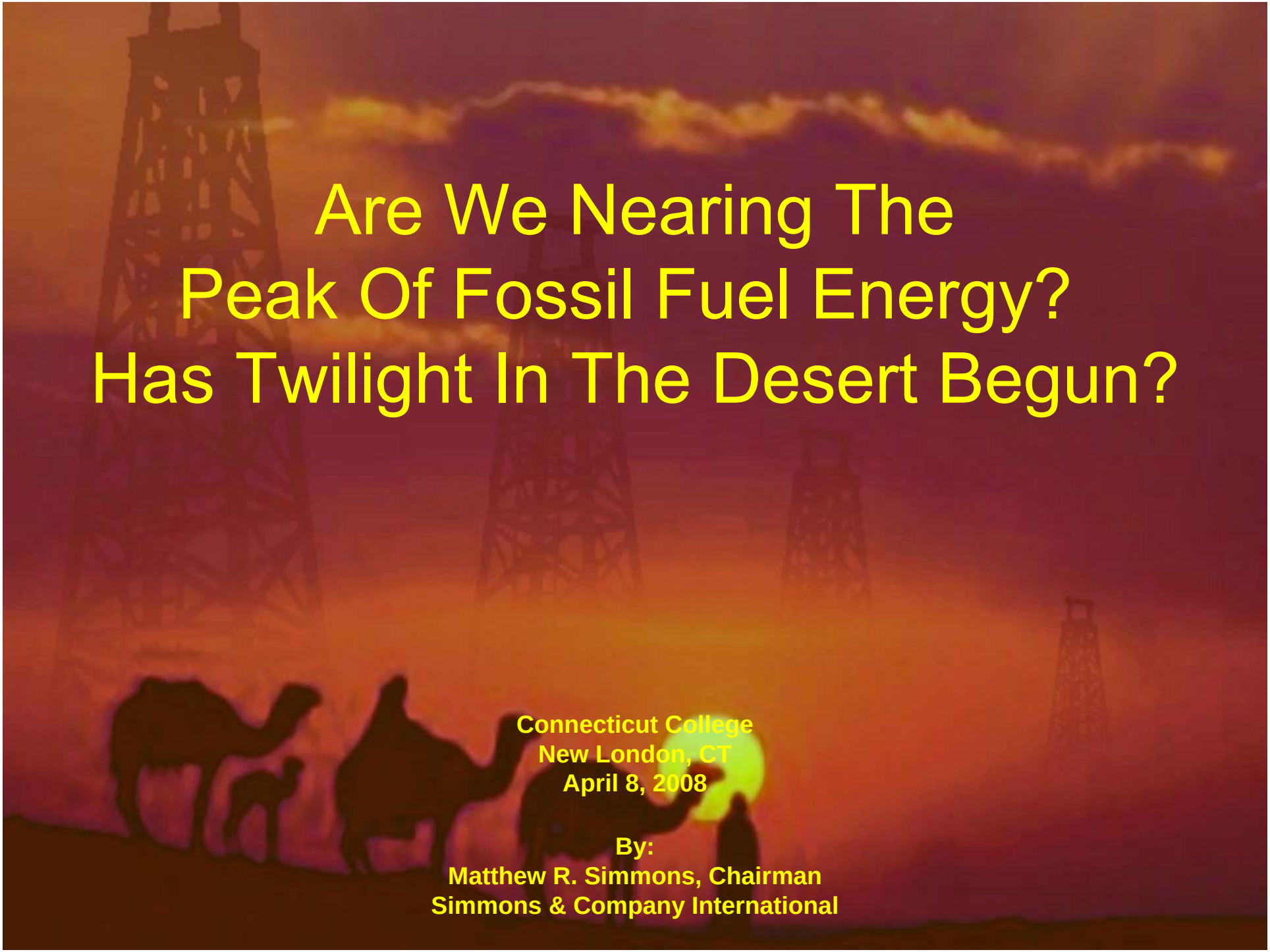


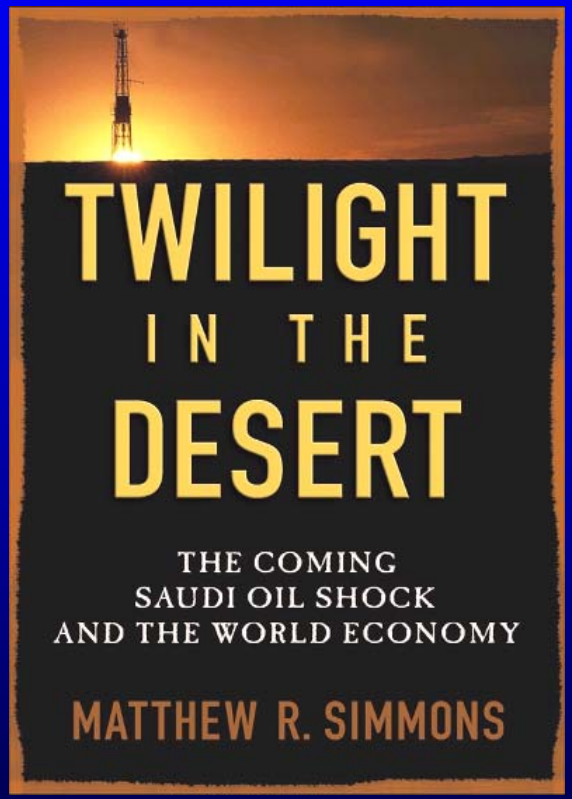
Are We Nearing The Peak Of Fossil Fuel Energy? Has Twilight In The Desert Begun?

Connecticut College
New London, CT
April 8, 2008

By:
Matthew R. Simmons, Chairman
Simmons & Company International

"Twilight In The Desert" Is My Pseudonym For "Peak Oil"

- When *Twilight in the Desert* was published (May 2005), its key messages were:
  - Saudi Arabia is the world's only swing producer
  - Its super giant oil fields are getting very mature
  - They will all begin to decline
  - Only uncertainty is timing
  - When Saudi Arabia passes peak oil production



THE WORLD'S OIL SUPPLY HAS PEAKED.

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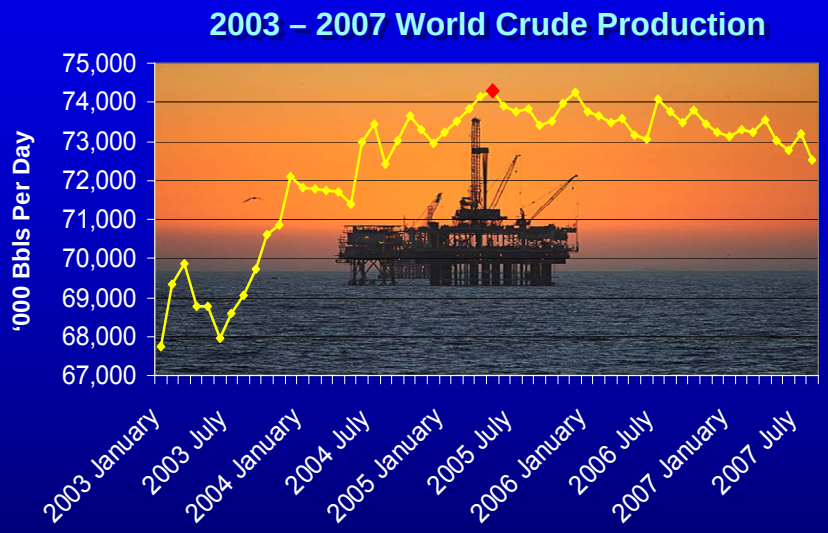
Much Has Changed Since May 2005

- Oil prices were $48/Bbl – now they are $100 – $110/Bbl.
- Oil demand has grown, unfettered by price rise.
- Oil supplies set all-time record in May 2005.
- Since then, supply has "flattened."
- Stocks (usable inventories) have shrunk in many places.
- Peak Oil debate has exploded onto world scene.



Source: EIA Monthly Energy Report

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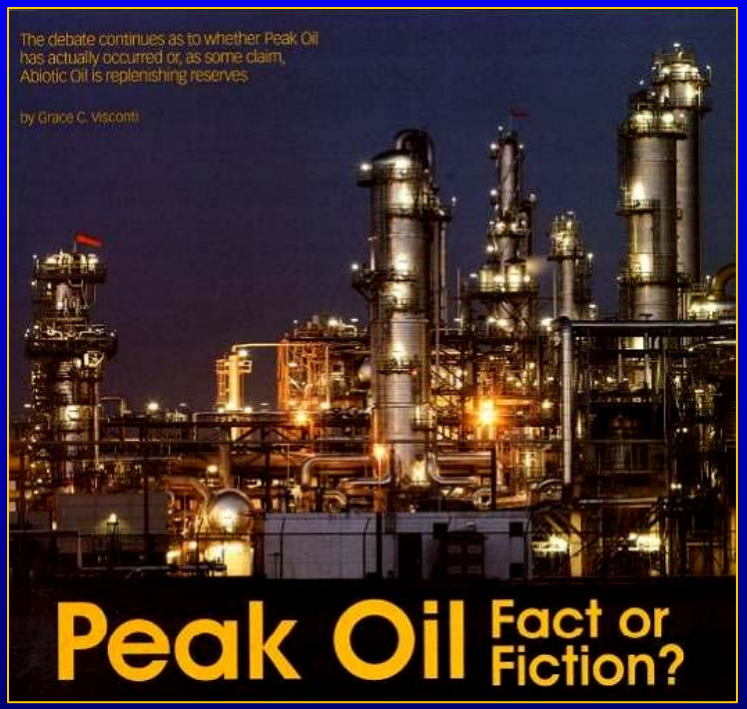
The Peak Oil "Debate" Has Been Intense

- While only a million people, thus far, are paying much attention to the Peak Oil debate, the discussion has grown exponentially in last few years.
- But, optimists still include many powerful voices and their message is believable and comforting.
- Also, many key groups and important people have never heard the term "Peak Oil."
- And, many who hear it do not know what it means?

Should We Debate "Peak Oil"

- Oil seems non-renewable.
- High percentage comes from "mature fields."
- High percentage of new fields are offshore with sharp peaks.
- Oil supply will peak, someday.
- Timing is only debate.



- Fog of non-transparency creates the debate.
- With precise supply data, the debate would end.

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Fuzzy Terms Create Great Confusion

- Some fuzzy terms:
  - Decline rates: Does this mean depletion?
  - Depletion: Does this mean oil is gone?
  - Resource endowment: Amount of original oil that might be in place ("OOIP")
  - Recoverable resource: Amount of OOIP that might be recoverable
  - Flow rate: The physical oil volume coming out of a well
  - Peak flow rate: The highest oil volume a well will produce
  - Water cut/gas coning: Why the flows decline (crowding out)

These terms get intermingled too often.

Conventional Vs. Non-Conventional Oil

- Another confusion is intermingling “conventional” oil with family of “non-conventional oils.”
- “Conventional” is also not precise term.
- Highest quality conventional is extra light crude flowing at high volumes from pressurized reservoirs.
- Conventional heavy oil: Tar melted into heavy oil by steam.

- Non-conventional oil: All sources worse than heavy oil:
  - Low flows
  - Low quality oil
  - High water content and energy intensive to produce

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Stark Difference Between High Quality Crude And Oil Sands

- Arab Light/Extra Light used to come from North Ghawar, Abqaiq and Berri oil fields at 40,000 to 60,000 B/D per well (these high flow rate wells are now depleted).
- Shell Oil's Athabasca Oil Sands Project wants to expand volume of flow by 100,000 B/D (from 155,000 B/D now):
  - Latest cost estimates: ≈$20 billion (est.)
  - Time to create: 5 – 7 years (perhaps)

There is no comparability between high flow light oil and Canadian oil sands, tar is even worse.

Non-Conventional Issues Worsen When Expanded To Orinoco Oil Belt And Oil Shale

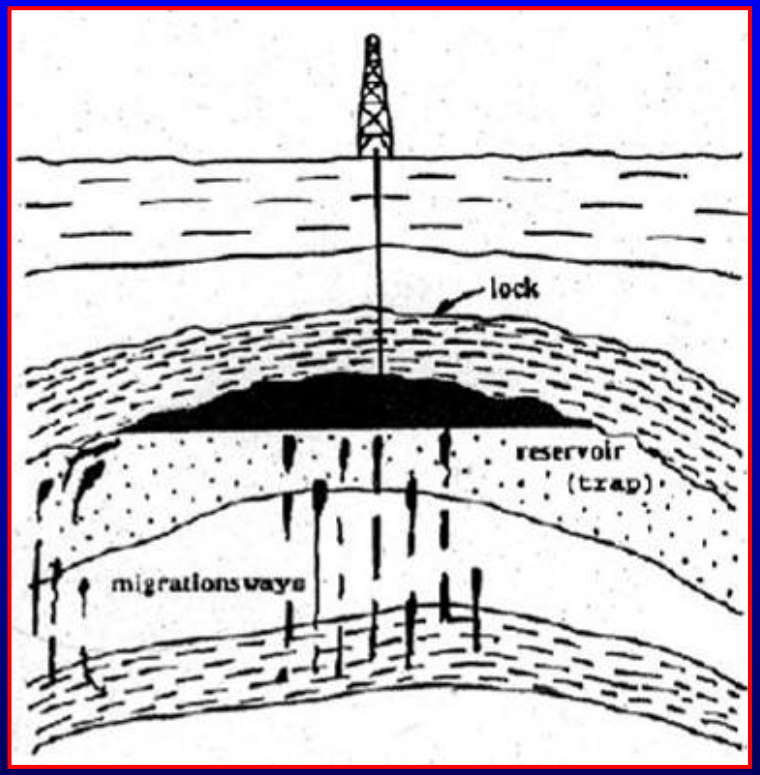
- Estimated volumes of both Orinoco Oil Belt and oil shale are vast.
- No technology has yet created a non-energy intense way to turn either into high flows of usable oil.

- Whether the water usage is worse than energy expended to create energy should be “debated.”

Beyond Oil Shale Is "Abiotic Oil"

- Over the years, believers in Abiotic Oil arise to refute "Hubbert's Peak."
- Abiotic Oil Theory: Oil is being constantly created from migrations of magma gasses.
- Newest Theory:
  - Saturn's Titan
  - Atlantic Trench

  } Have vast hydrocarbons



- No one, thus far, has figured how to produce Abiotic Oil.

“Remaining Reserve Estimates” Also Fuzzy

- Remaining proven reserves are non-scientific guesses on remaining OOIP and amount that can be recovered.
- Recent slurry of technical papers question ability to guess these parameters. What is needed:
  - Well-by-well flow rates (not gathered at GOSPs)
  - Water cut by well
  - Numerous well logs throughout heterogeneous fields
  - Core samples throughout any carbonate fields
- Without all four inputs, reservoir simulation models are simply educated guesses without sufficient information.

This is fuzzy logic².

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Data Scarcity Rampant Throughout Middle East

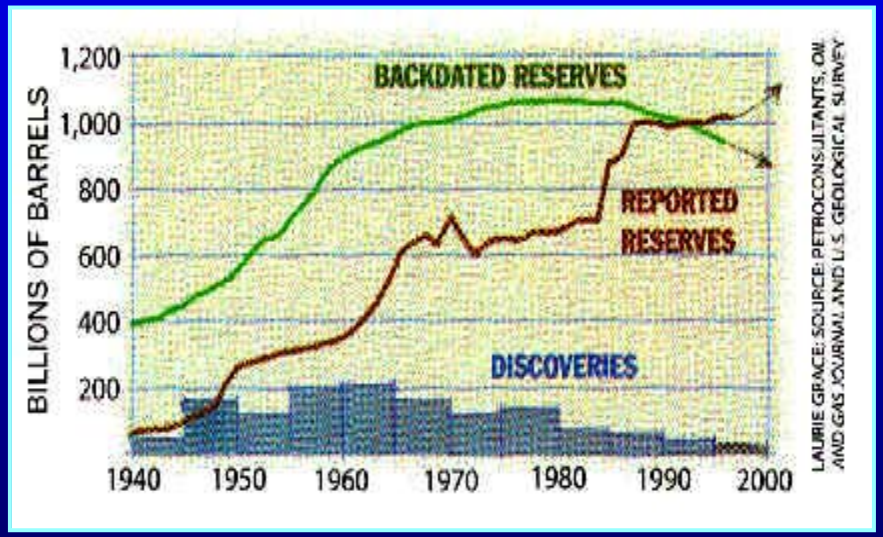
- Only small numbers of super giant Middle East fields have metering at the wells of oil and water:
  - Too many aggregated by GOSP gathering systems
- Small number of cores from producing rocks hinder all future modeling:
  - This complex exercise was too risky and costly when it seemed Middle East Oil was everywhere

Many Deepwater Fields Face Same Data Problems

- The expense to core and flow test deeper water fields was very high.
- If rocks were also in need of fracturing, costs grew even higher.
- Too many offshore "failures" came through drilling minimal amount of appraisal wells and rarely flow testing for any length or cutting a core sample.

Paper Barrel Reserves Muddied Proven Reserve Issue

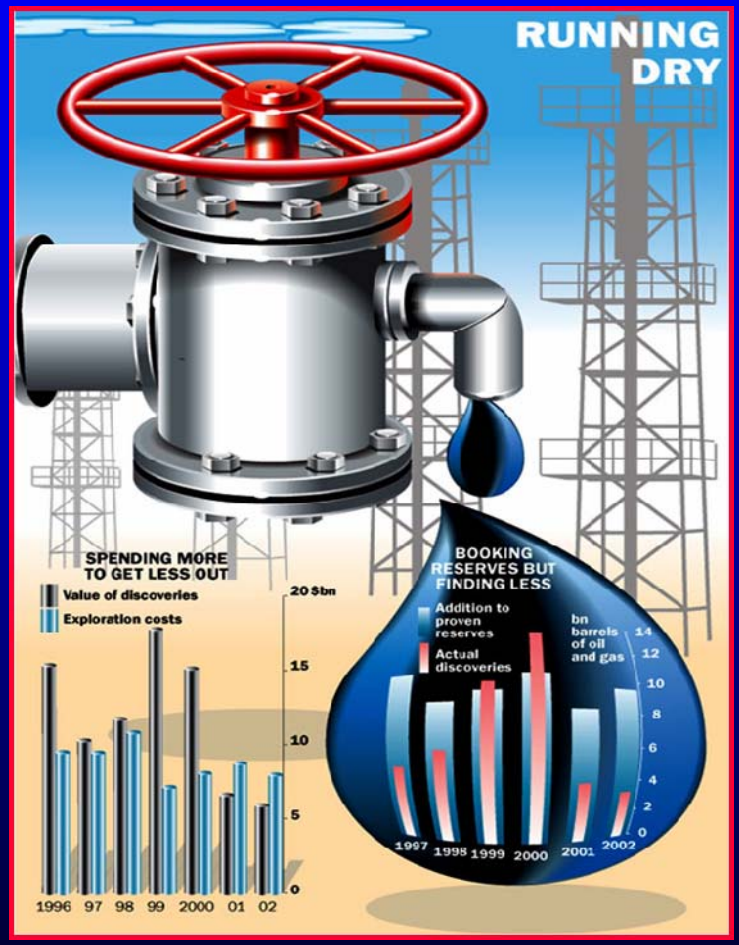
- It is factual that many OPEC producing countries arbitrarily doubled or tripled reported "proven reserves" in 1982 – 1988 era.
- Then, the data stayed stagnant for next two decades.
- This created illusion that the numbers were extremely conservative.



"At least 300 billion of reported global reserves were imagined." - Retired Senior Officer of an NOC

"Proven Reserves" Also Fuzzy In Relation To Peak Oil Flows

- Even though the world can still have vast amounts of "proven reserves", oil flows can still decline.
- Lumping heavy oil, tar sands, tight rock oil reservoirs and oil sands together with high quality oil is the equivalent of mixing chalk and cheese.



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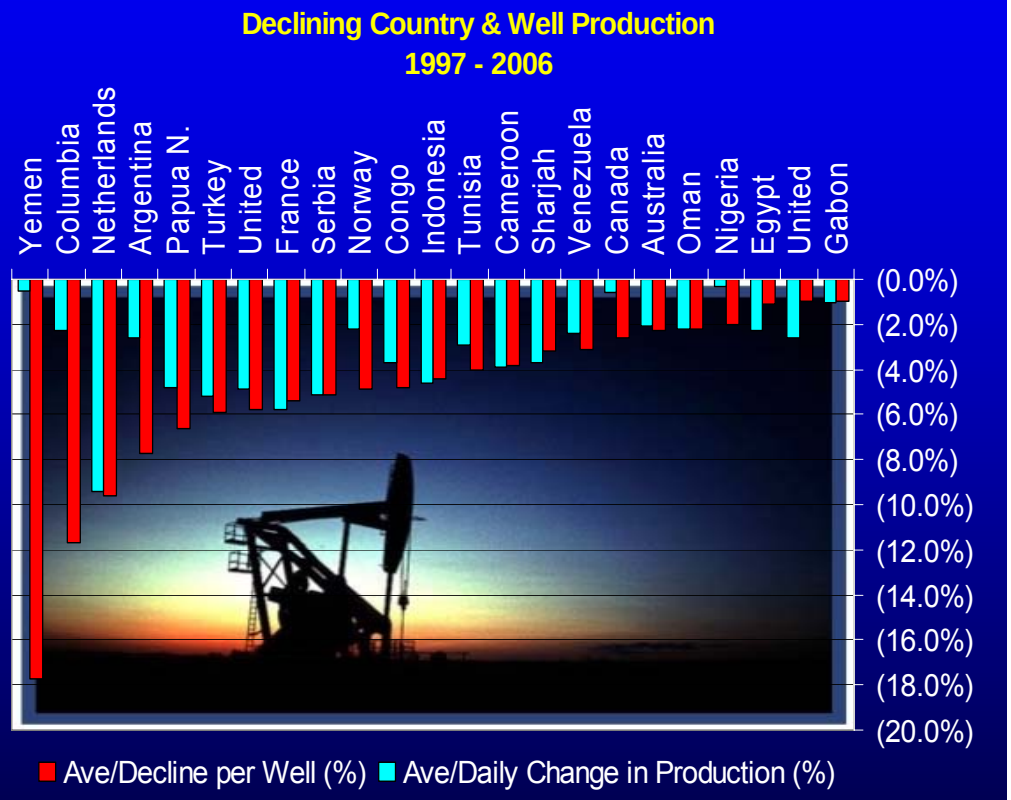
High Flow Rate Wells Do Decline

- Some drain every layer of reservoir oil ASAP.
- This is necessary to create sufficient IRR.
- But, it led to “monster decline rates”:
  - See pictures of 24 “typical” fields:
    - Real production rates of 20,000 to 100,000 B/D
    - A few super giant fields peak at 1.5 to 2.2 MMB/D
    - A few in between 100,000 B/D and 1.5 MMB/D



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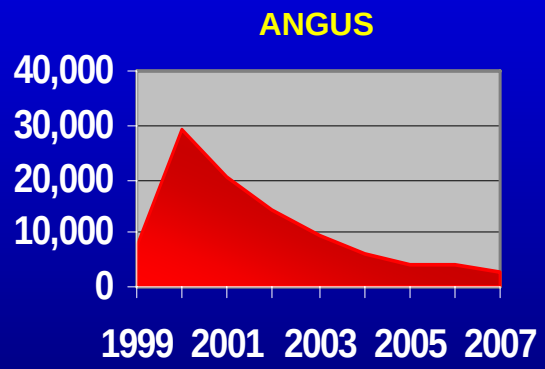
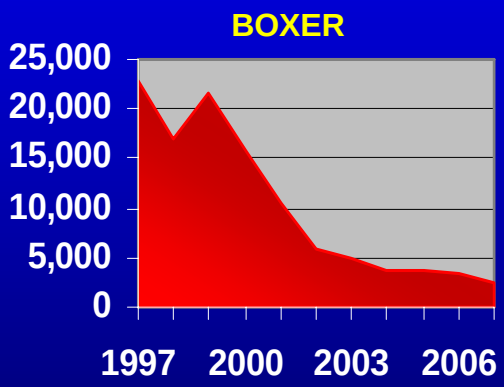
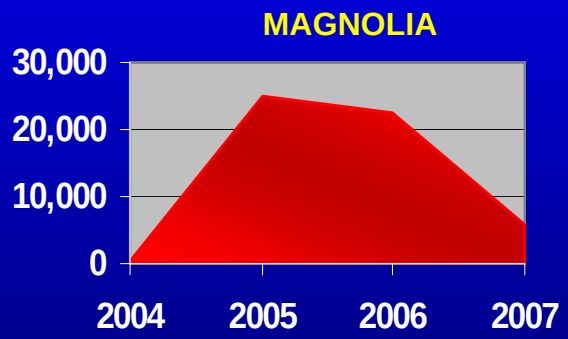
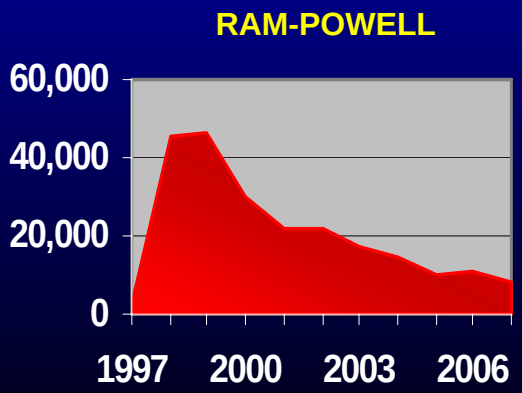
How Fast Do Oil Fields Decline?
(GOM Deepwater Field Production – Part I)

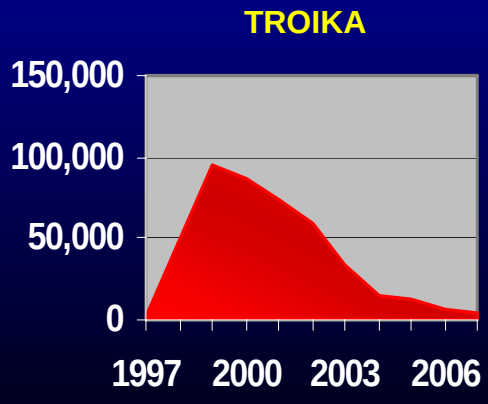
- Vacuum of solid decline data is alarming.
- But digging into data does reveal shocking pictures.
- "A picture is worth a 1,000 words":





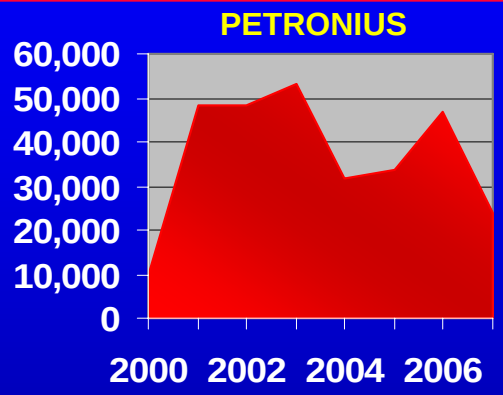


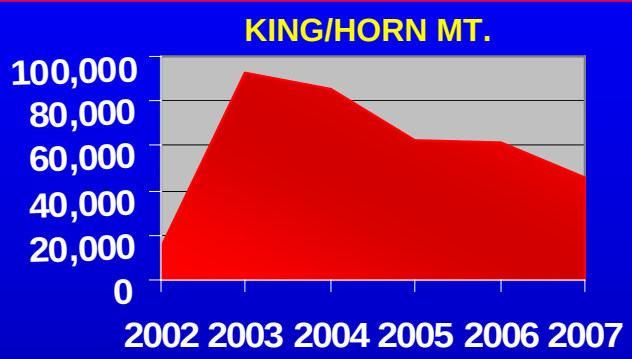


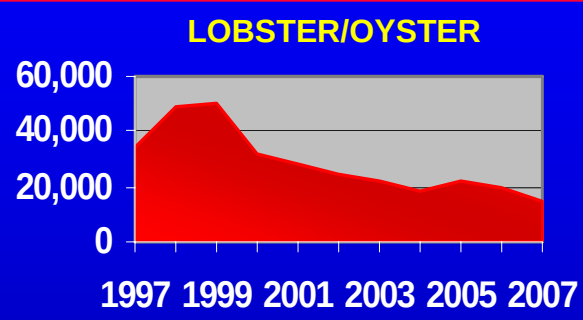


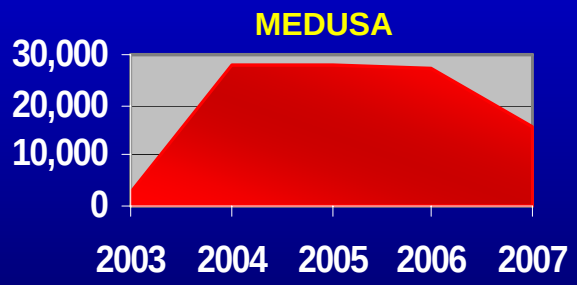
Source: Minerals Management Services

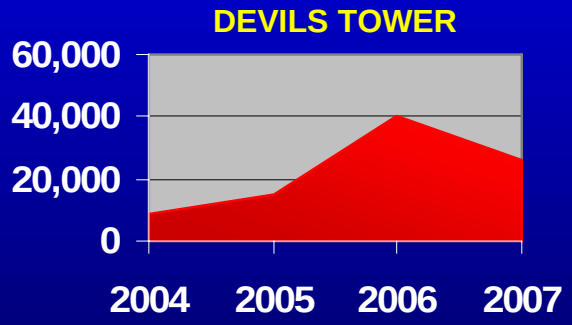
How Fast Do Oil Fields Decline?
(GOM Deepwater Field Production – Part II)

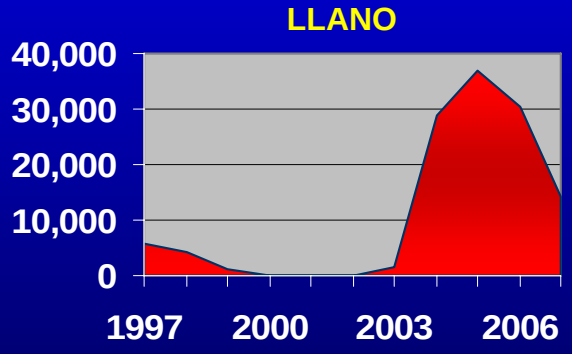


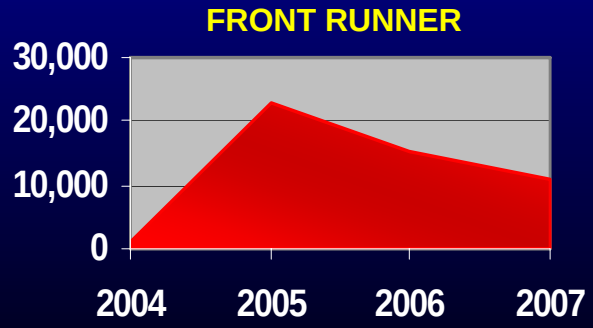


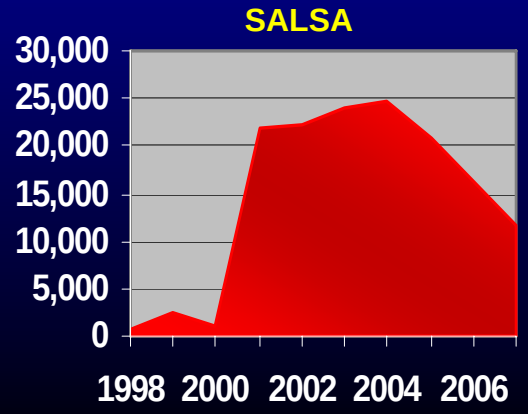


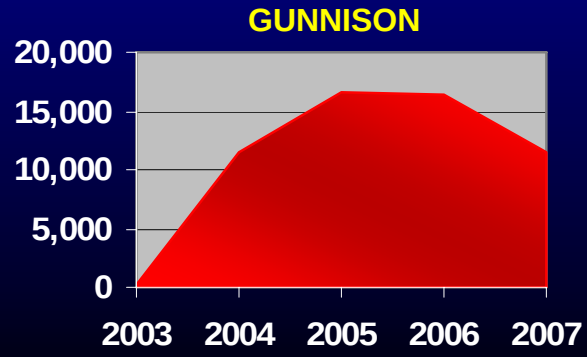








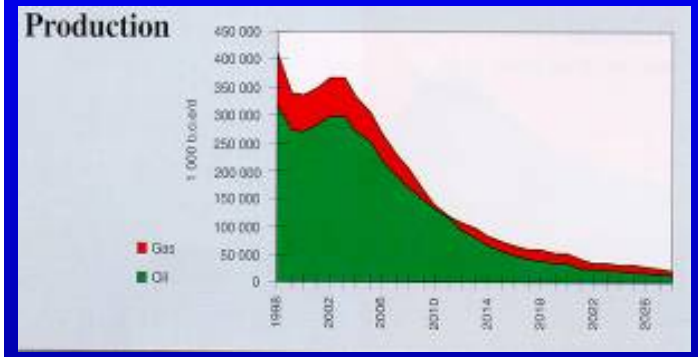




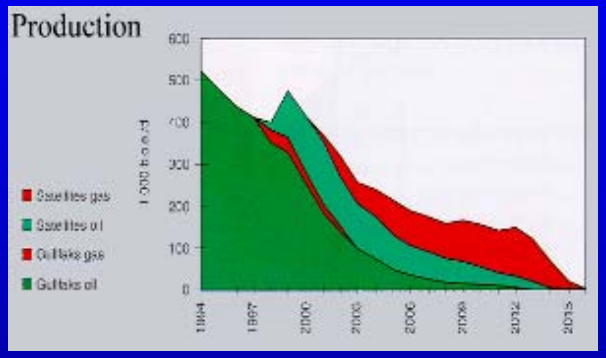
Source: Minerals Management Services

How Fast Do Oil Fields Decline?
(North Sea – Part III)

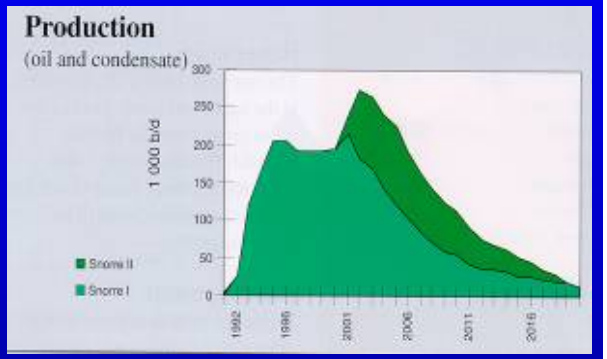
Ekofisk Area



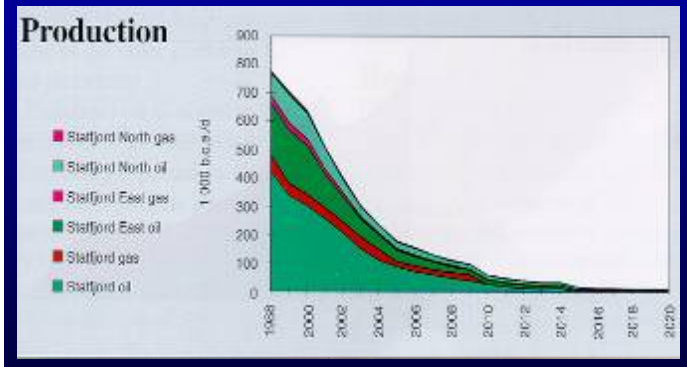
Gullfaks Satellites



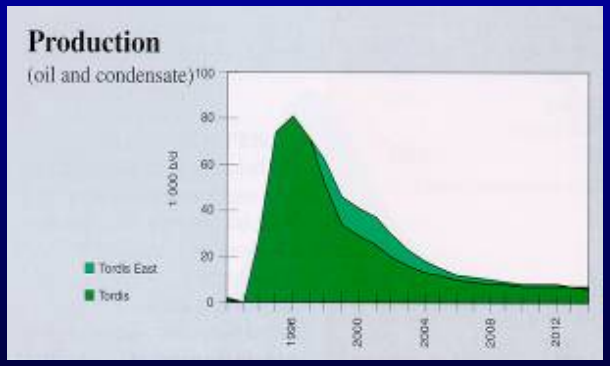
Snorre B



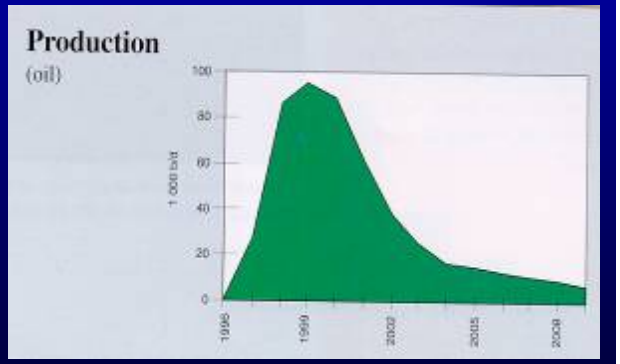
Statfjord Field



Tordis East



Vigdis



Source: Saga Petroleum Report

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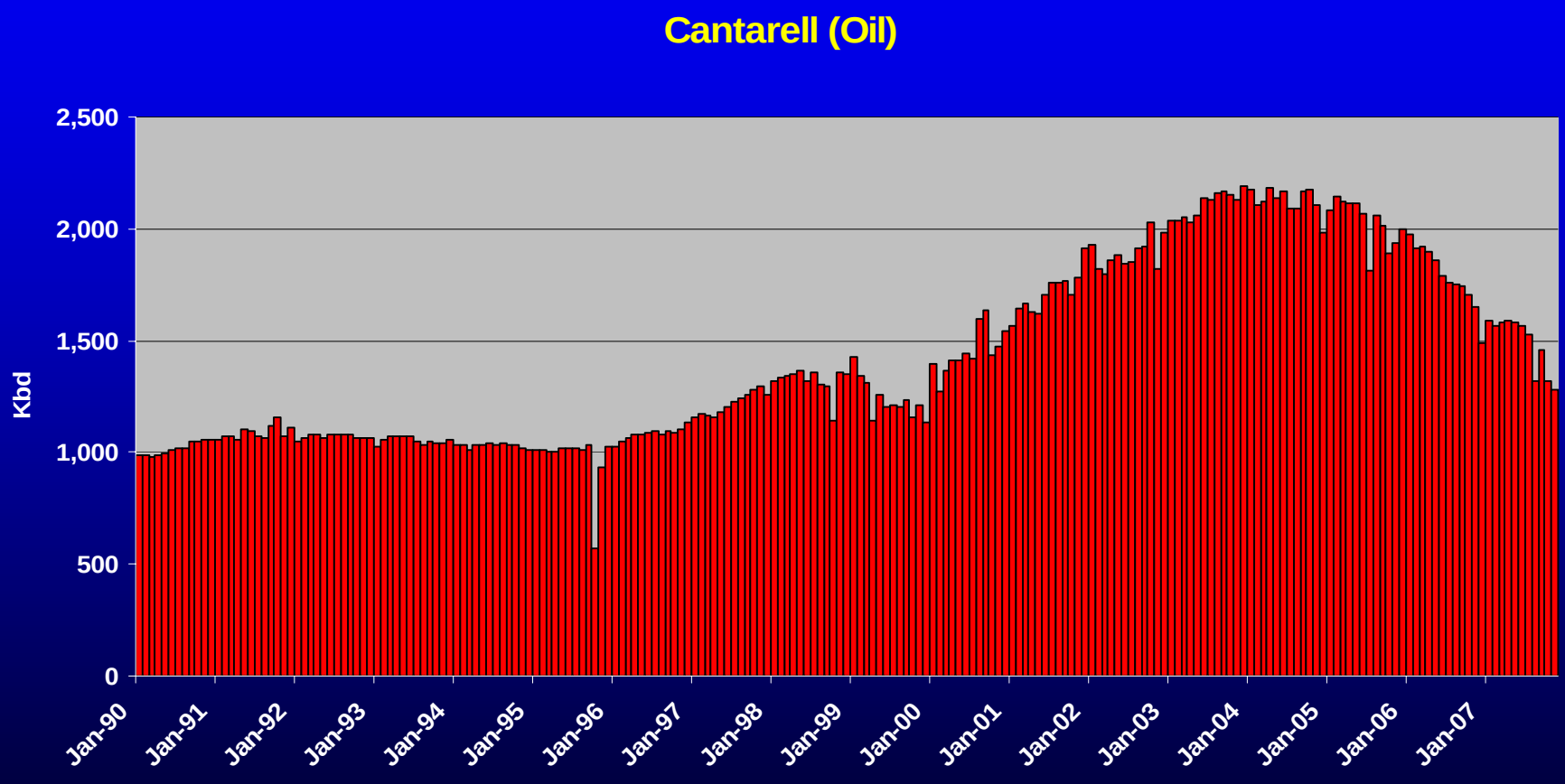
Cantarell Is A Classic Decline Curve Study



Source: Pemex

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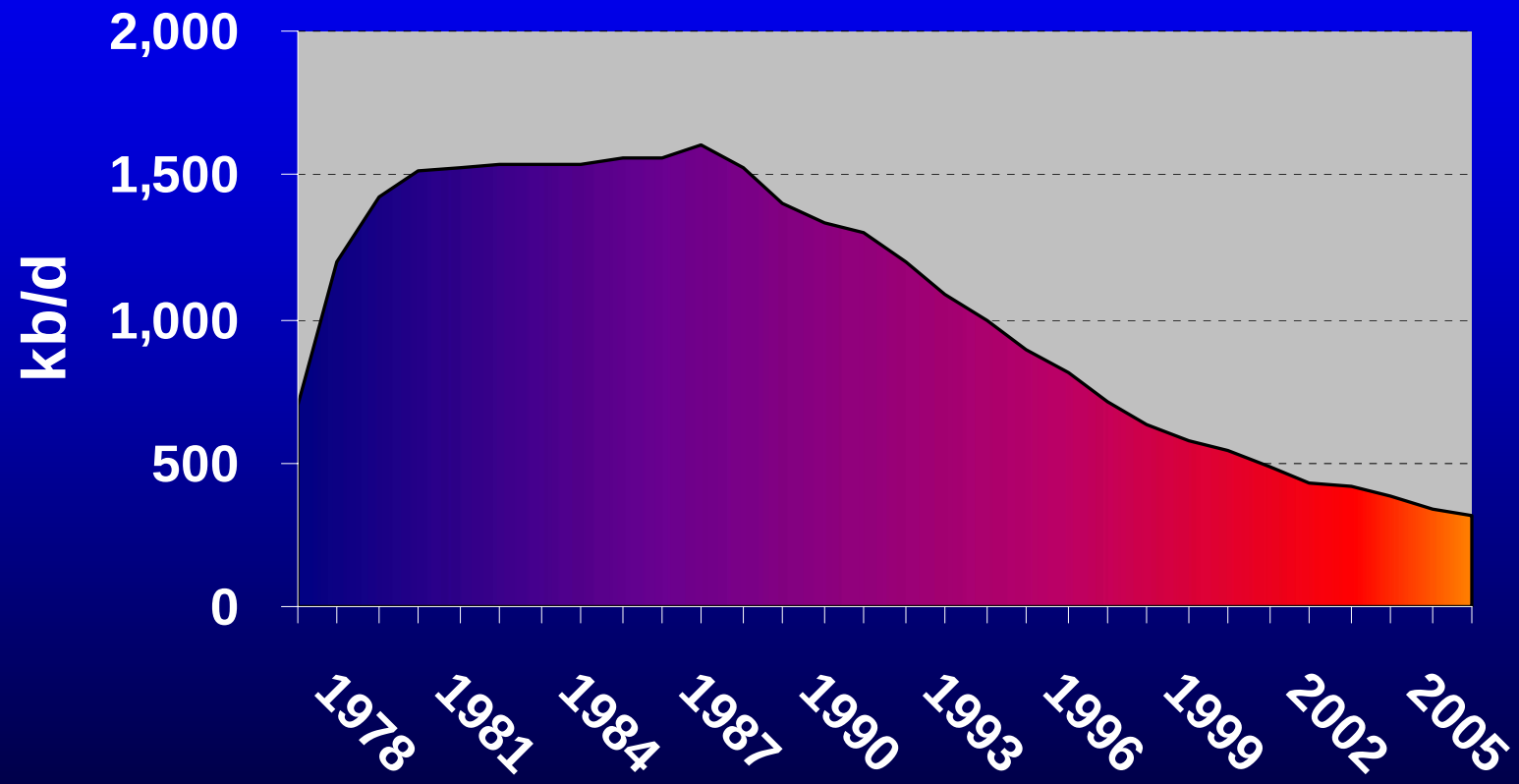
Prudhoe Bay Decline



Source: Government Sources

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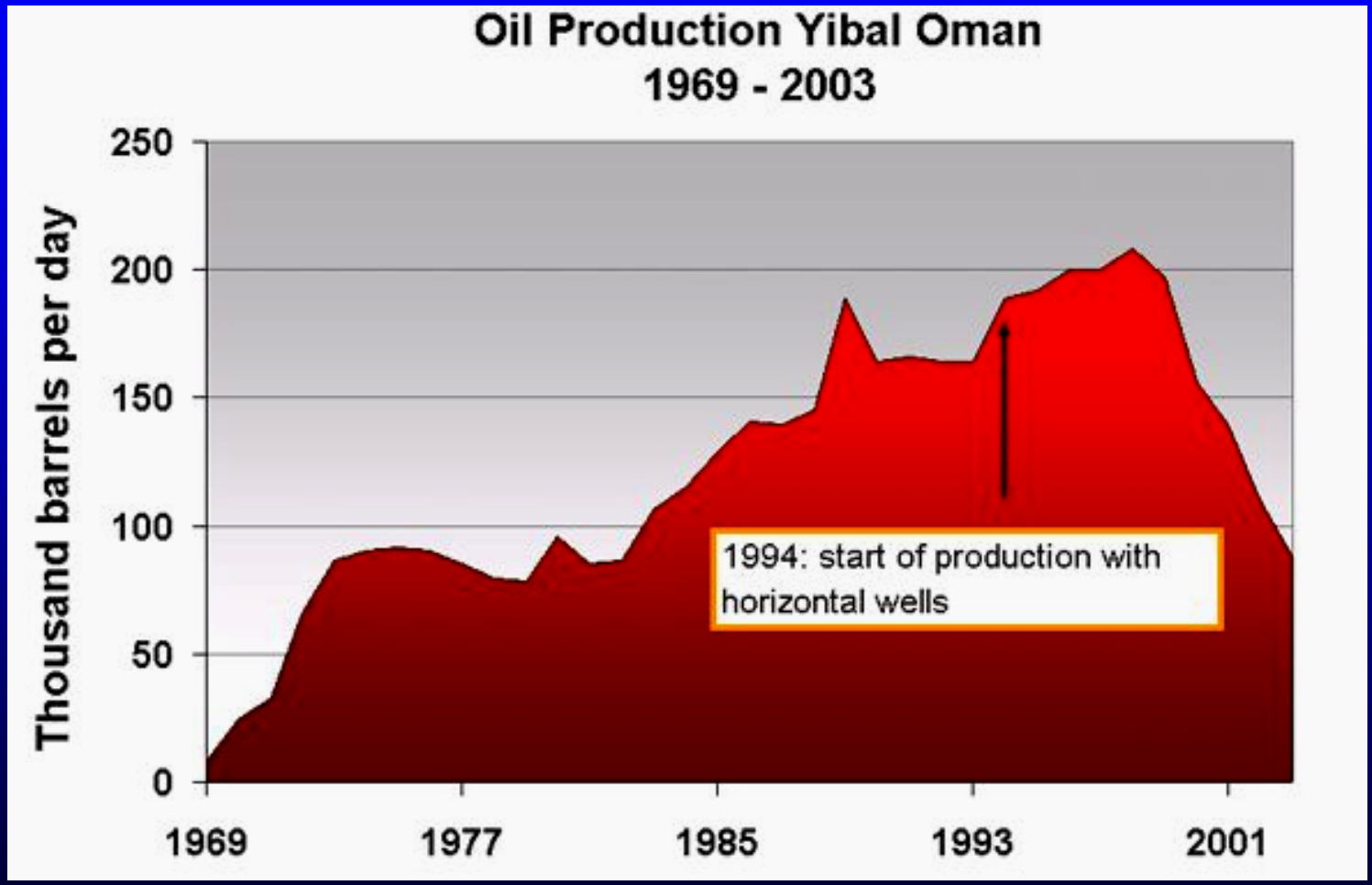
Yibal, Oman


Oil Production Yibal Oman
1969 - 2003
Thousand barrels per day
250
200
150
100
50
0
1969
1977
1985
1993
2001
1994: start of production with horizontal wells

Is Growing Demand Greatest "Enemy Of Peak Oil?"

- Oil demand was thought to peak in 1988 – 1994 at 66 – 68 MMB/D.
- Instead, it grew to over 88 MMB/D by early 2008.
- This unplanned growth used up 99% of world's spare capacity.
- Demand growth came despite ten fold rise in oil prices.

- China and India are on the march to prosperity.
- Their 2.4 billion people want to drive cars:
  - China is now buying 6 – 8 million vehicles a year
  - India's current rate (average motorbike) is only 1.8 million/year

What Is Driving Oil Demand Growth?

Mobility and Prosperity

Mobility

Growth In Oil Use Seems Inexhaustible

- EIA, IEA, World Bank, et al. project steady growth through 2020 – 2030.
  - Estimates range by various scenarios
  - All end up with oil demand ≈115 to 125 million Bbls/day in 2025.
- Disparity of vehicles drives this growth:

	Population	No. of Vehicles	Vehicles per 1,000 people
	------ In Millions ------		
North America	437	280	641
Western Europe	532	252	472
OECD Pacific	200	92	462
OECD Total	1,169	624	534
FSU/Eastern Europe	341	62	182
Developing Economies - China	1,314	23	18
Rest of the World	3,579	184	51

Source: OPEC's World Oil Outlook, 2007 (2004 Data)

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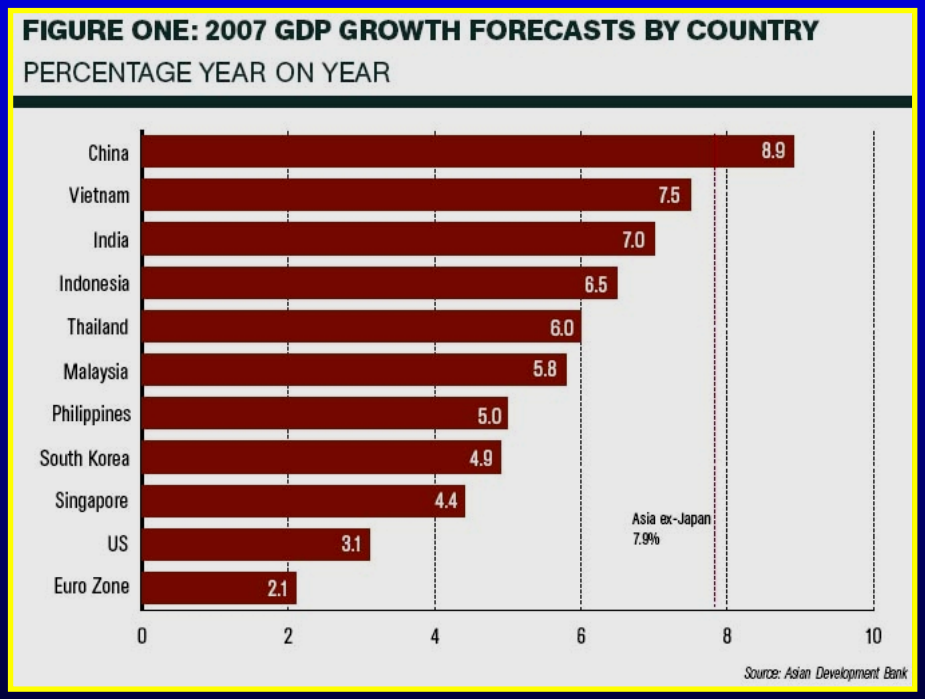
Prosperity



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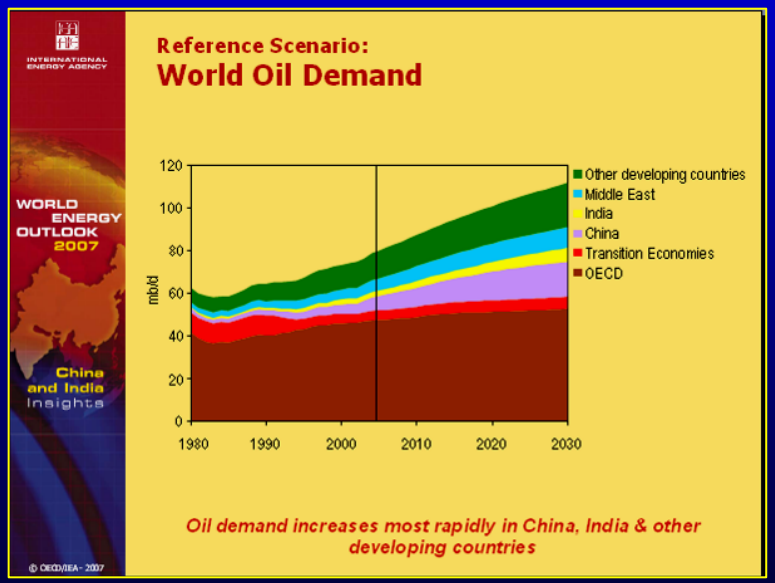
Oil Demand Headed Towards 100 MMB/D

- Unless global economies collapse, this should be planned to happen (on all current trends).
- Betting on hard landings in India and China is dangerous.
- Once 100 million mark is breached, system feeds on itself to further this growth:
  - Prosperity in many resource nations creating fast internal growth
  - $100+ oil is creating prosperity in Middle East



Global Crude Oil Had Peak In May 2005

- This record (EIA data) 74.3 MMB/D is now almost 3 years old.
- 32 added monthly supply estimates have failed to breach this record.
- Climbing to 75 – 77 MMB/D quickly becoming far-fetched dream.
- The gap to supply 88 MMB/D is spread thin and not sustainable:
  - NGL's
  - Refinery processing gains
  - Sliver of biofuels

Table 11.1b World Crude Oil Production: Persian Gulf Nations, Non-OPEC, and World (Thousand Barrels per Day)

	Persian Gulf Nations[b]	Selected Non-OPEC[a] Producers									Total Non-OPEC[a]	World
		Canada	China	Egypt	Mexico	Norway	Former U.S.S.R.	Russia	United Kingdom	United States		
1973 Average	20,668	1,798	1,090	155	486	32	8,324	NA	2	9,208	24,888	55,679
1975 Average	18,934	1,430	1,490	235	706	189	9,523	NA	12	8,376	26,892	62,828
1980 Average	17,961	1,435	2,114	595	1,936	486	11,706	NA	1,622	8,597	32,802	69,568
1985 Average	5,630	1,471	2,505	887	2,746	773	11,685	NA	2,630	8,971	37,554	63,966
1990 Average	16,279	1,563	2,774	873	2,663	1,630	10,976	NA	1,820	7,355	36,822	60,492
1995 Average	17,208	1,805	2,990	920	2,618	2,766	--	5,995	2,489	6,560	35,736	62,386
1996 Average	17,387	1,837	3,131	922	2,866	3,091	--	6,860	2,568	6,466	36,682	63,762
1997 Average	18,095	1,922	3,206	865	3,023	3,142	--	6,920	2,618	6,462	37,320	65,744
1998 Average	19,337	1,981	3,198	844	3,070	3,011	--	6,884	2,616	6,252	37,465	66,906
1999 Average	18,667	1,907	3,196	852	2,906	3,019	--	6,079	2,684	5,881	37,599	65,922
2000 Average	19,892	1,977	3,240	768	3,012	3,222	--	6,479	2,276	5,822	38,482	68,496
2001 Average	19,098	2,029	3,300	720	3,127	3,308	--	6,917	2,282	5,801	39,014	68,101
2002 Average	17,794	2,171	3,390	715	3,177	3,131	--	7,408	2,202	5,746	39,919	67,168
2003 Average	19,063	2,306	3,459	713	3,371	3,042	--	8,132	2,093	5,681	40,724	69,448
2004 Average	20,787	2,398	3,486	673	3,383	2,954	--	8,805	1,845	5,419	41,637	72,612
2005 January	21,285	2,330	3,561	658	3,351	2,720	--	8,870	1,775	5,441	41,358	73,231
February	21,355	2,298	3,570	658	3,349	2,809	--	8,920	1,771	5,494	41,516	73,514
March	21,405	2,172	3,594	662	3,252	2,867	--	8,925	1,802	5,601	41,541	73,842
April	21,565	2,300	3,584	659	3,409	2,864	--	8,888	1,771	5,556	41,793	74,140
May	21,375	2,360	3,611	656	3,441	2,795	--	8,900	1,743	5,581	42,062	74,298
June	21,485	2,330	3,646	656	3,425	2,398	--	9,026	1,643	5,460	41,558	73,516
July	21,695	2,339	3,654	658	3,082	2,715	--	8,960	1,625	5,240	41,143	73,757
August	21,655	2,372	3,668	655	3,414	2,643	--	9,140	1,342	5,218	41,169	73,818
September	21,915	2,262	3,623	659	3,367	2,663	--	9,170	1,518	4,204	40,413	73,399
October	21,525	2,462	3,649	664	3,221	2,577	--	9,230	1,612	4,534	40,885	73,497
November	21,425	2,548	3,621	667	3,311	2,645	--	9,210	1,543	4,837	41,425	73,980
December	21,325	2,645	3,520	647	3,388	2,683	--	9,240	1,645	4,984	41,803	74,268
Average	21,501	2,389	3,609	658	3,334	2,698	--	9,043	1,649	5,178	41,401	73,807
2006 January	21,175	2,595	3,670	654	3,372	2,657	--	9,030	1,707	5,106	41,579	73,759
February	21,375	2,504	3,662	657	3,311	2,620	--	9,040	1,639	5,045	41,412	73,647
March	21,260	2,411	3,710	651	3,350	2,610	--	9,160	1,597	5,045	41,396	73,488
April	21,280	2,531	3,680	663	3,370	2,407	--	9,170	1,590	5,128	41,496	73,591
May	21,050	2,341	3,712	655	3,329	2,535	--	9,190	1,500	5,161	41,386	73,154
June	21,305	2,336	3,700	607	3,287	2,365	--	9,260	1,392	5,160	40,979	73,061
July	21,680	2,512	3,716	620	3,232	2,571	--	9,240	1,453	5,102	41,627	74,076
August	21,710	2,543	3,660	630	3,252	2,430	--	9,330	1,202	5,059	41,175	73,754
September	21,360	2,601	3,549	640	3,258	2,338	--	9,380	1,354	5,037	41,242	73,465
October	21,135	2,602	3,650	660	3,173	2,380	--	9,460	1,482	5,106	41,793	73,809
November	20,805	2,658	3,672	615	3,163	2,466	--	9,320	1,504	5,105	41,805	73,437
December	20,695	2,669	3,592	619	2,978	2,508	--	9,420	1,472	5,166	41,864	73,218
Average	21,232	2,525	3,673	639	3,266	2,491	--	9,247	1,490	5,102	41,464	73,639
2007 January	20,476	2,578	3,811	616	3,143	2,431	--	9,420	1,510	[e]5,196	41,857	73,133
February	20,356	2,618	3,739	614	3,148	2,454	--	9,460	1,654	[e]5,147	42,124	73,315
March	20,445	2,694	3,685	612	3,182	2,391	--	9,473	1,554	[e]5,178	41,993	73,240
April	20,494	2,634	3,748	609	3,182	2,427	--	9,369	1,566	[e]5,218	42,067	73,520
May	20,494	2,585	3,781	649	3,110	2,181	--	9,390	1,564	[e]5,240	41,680	72,985
June	20,403	2,580	3,826	679	3,206	1,921	--	9,440	1,495	[e]5,139	41,521	72,710
July	20,508	2,572	3,643	679	3,166	2,327	--	9,460	1,436	[e]5,120	[e]41,666	[e]73,154
August	20,462	2,709	3,746	679	2,843	2,135	--	9,390	1,228	[e]4,976	[e]41,003	[e]72,469
September	21,012	2,670	3,716	679	3,161	2,190	--	9,520	1,381	[e]4,899	[e]41,229	[e]73,318
October	21,158	2,592	3,722	609	2,995	2,273	--	9,500	1,507	[e]5,038	[e]41,614	[e]73,938
November	20,873	2,594	3,727	609	2,901	2,287	--	9,425	1,409	[e]5,006	[e]41,582	[e]73,751
December	21,474	2,515	3,607	609	2,954	2,235	--	9,400	1,436	[e]5,072	41,355	74,202
Average	20,682	2,611	3,729	637	3,082	2,270	--	9,437	1,477	[e]5,103	41,637	73,310

[a] Organization of the Petroleum Exporting Countries.
[b] The Persian Gulf Nations are Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates. Production from the Neutral Zone between Kuwait and Saudi Arabia is included in "Persian Gulf Nations."
R=Revised. NA=Not available. -- =Not applicable. E=Estimate.
Notes: • Crude oil includes lease condensate but excludes natural gas plant liquids. • Monthly data are often preliminary figures and may not average to the annual totals because of rounding or because updates to the preliminary monthly data are not available. • Data for countries may not sum to World totals due to independent rounding. • U.S. geographic coverage is the 50 States and the District of Columbia.
Web Page: See http://www.eia.doe.gov/emeu/mer/inter.html for all available data beginning in 1973.
Sources: See end of section.

Source: EIA Monthly Energy Report – March 2008

Stock Liquidation Is The Last Game Left

- Demand does not slow down when supply slows.
- Draining usable inventories is last great supply frontier.
- We have no gauge when usable “stocks” dwindle from ¼ full to “empty.”
- Empty creates shortage that morphs into a giant “run on the energy bank.”

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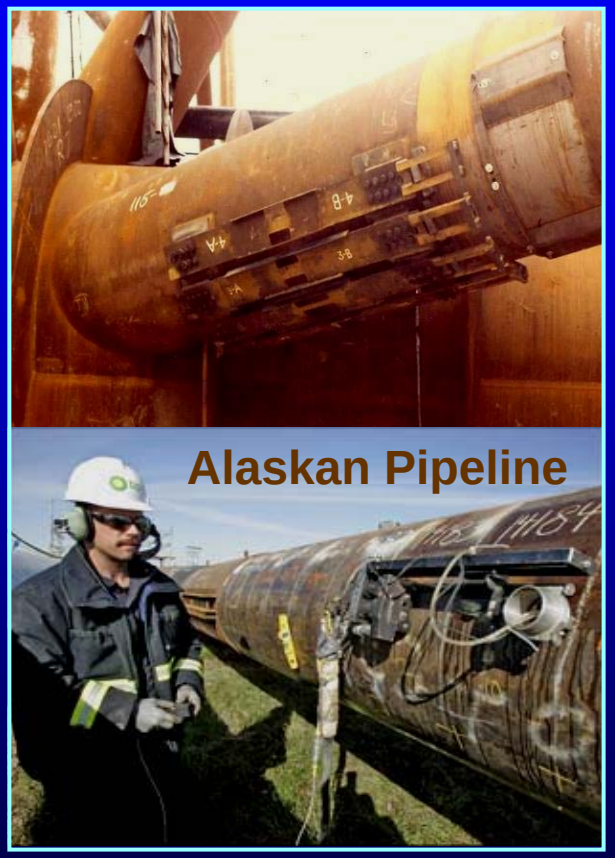
Two Added "Above Ground" Supply Risks Add Urgency To The Crisis

- Rust: Most of the oil and gas infrastructure is built of steel and beyond original design life:
  - High percentage is un-inspectable until leaks happen
  - "Rust" never sleeps
  - We need to rebuild 80% of current infrastructure
- Maturity of workforce: High percentage of global energy work force is too old and retiring:
  - The ex-pats around the world are "coming back home"
  - Talent wars and poaching are getting fierce



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“For Lack Of A Nail, The War Was Lost”

- Does it matter how the 1871 Great Chicago Fire started? (i.e. whose lantern the cow kicked over)
- Above ground risks will hamper supply but can ultimately be fixed (in decades).
- Below ground risks are the age of reservoirs, declining quality of heavier tainted oil and deteriorating quality of producing reservoir rocks (these cannot be fixed).

Demand Will Start To Slow Down

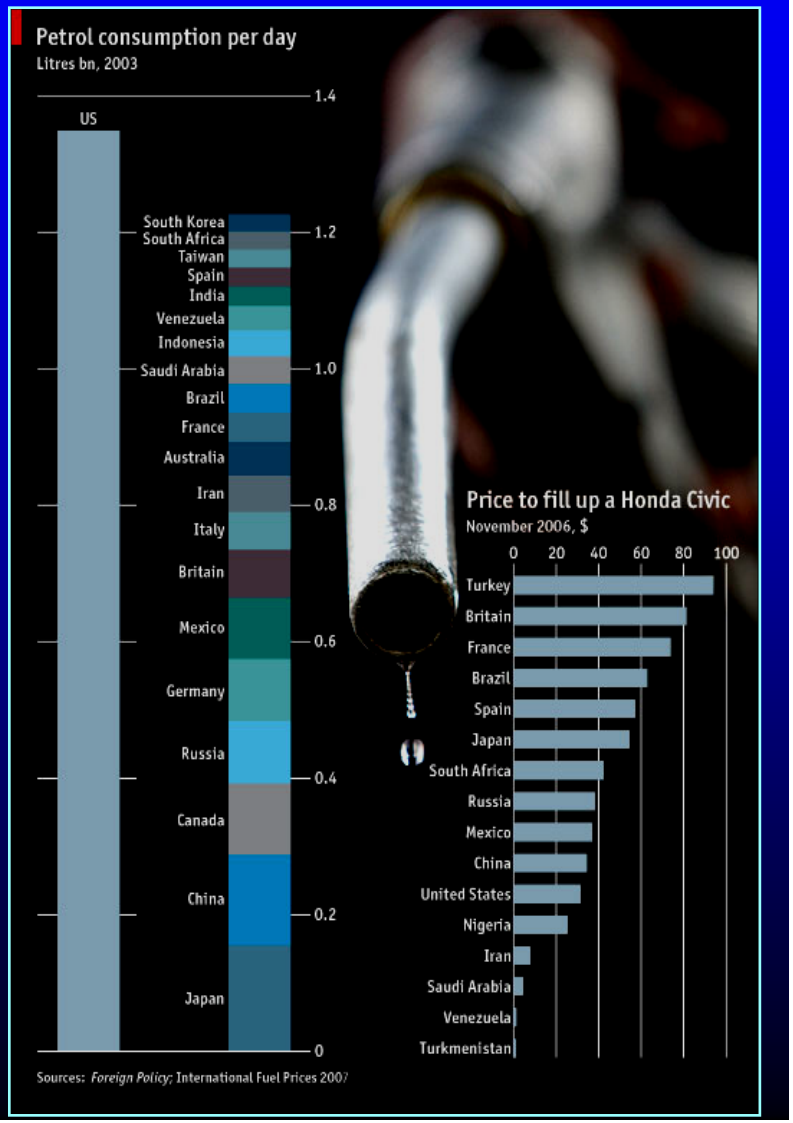
- Demand can never outstrip supply for long.
- Stock liquidation soon leads to shortages.
- USA oil demand at limit to growth:
  - The system is running 24/7/365
  - Oil imports at logistical limits
  - Refineries ran too hard (and blew up)
  - Domestic production in slow, steady decline

- Oil demand story still widely misunderstood.

Can The World Survive$100 (And Higher) Oil?

- Simple answer:
  $100/Barrel = $.15 a cup.
  - Oil is still dirt cheap
- More complex answer: Motorists in UK paid $9.00/gallon last fall:
  - This equates to $378/Barrel
  - Many other less valuable liquids sell much higher:

Liquid	Container Size (ounces)	Price per Container	Price Per Gallon	Price Per Barrel
Lowfat milk	128	$3.79	$3.79	$159.18
Evian spring water	33.8	$1.69	$6.40	$268.80
Budweiser	12	$0.83	$8.88	$372.96
Carlo Rossi blush wine	135.6	$5.99	$5.65	$237.30



The Real Value Of Liquids

Could High Oil Prices Help The Economy?

- Most large oil producing nations live in poverty (the oil curse).
- As prices rise, they gradually become prosperous.
- This prosperity rise buys goods from OECD:

Examples	Population (million)	GNI* Per Capita
Algeria	34.6	6.8
Azerbaijan	8.3	N/A
Brazil	195.6	8.2
Egypt	84.4	4.4
Indonesia	243.0	3.7
Iran	67.0	8.0
Iraq	30.0	N/A
Kazakhstan	40.0	7.7
Mexico	112.0	10.2
Nigeria	145.0	1.0
Saudi Arabia	29.2	14.7
UAE	5.0	N/A
Venezuela	27.0	6.4
Total	1021.1	

Collectively these countries are poor but produce ≈34 MMB/D oil

*Gross National Income (per person) on purchasing power basis
Source: 2007 The World Bank Group

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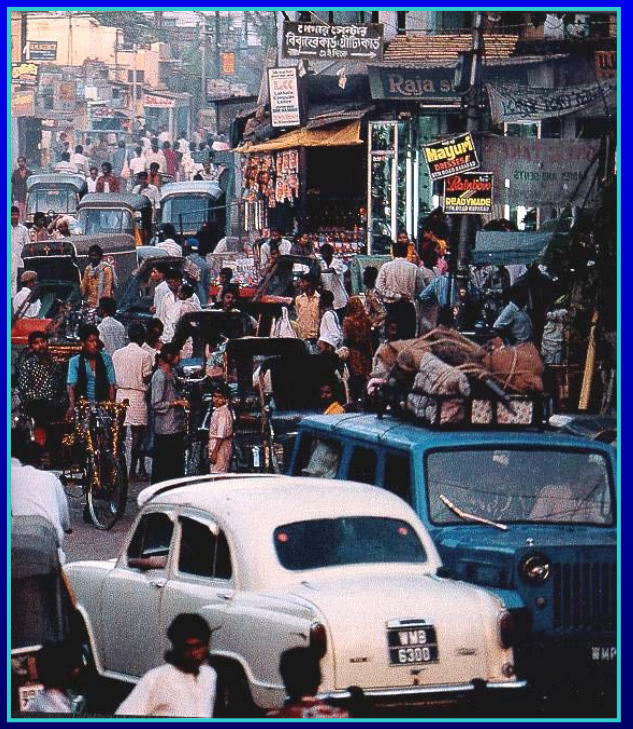
Sample Of Poverty To Prosperity Ladder

- These 13 oil producers with one billion people:
  - Their average per capita GDP of ≈$7,100 per person
  - More normal prosperity (per person):

Australia	$30,600
Western Europe	$33,000
Canada	$32,200
Greece	$23,600
Portugal	$19,700
Poland	$13,400



- As poverty turns to prosperity, people buy goods and services.
- Most need to be imported from OECD.

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The Power Of Oil

Wellhead Revenues @ 88 MMB/D	---- in $Billions ---- $20/BBL	$40/BBL	$100/BBL	$200/BBL
Revenue per year	$642	$1,285	$3,212	$6,424
The 13 poor producers share	$250	$501	$1,253	$2,505
$ Per capita	$250/person	$501/person	$1253/person	$2505/person

Extend high oil prices over 5 – 10 years and
the Middle East/North Africa become Asian Tiger economies.

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How Bad Is “Rust” Issue?

- The entire oil and gas infra-structure is built of steel.
- All steel rusts.
- In dirt, sea water and corrosive flows rust accelerates.
- Low oil price era kept maintenance at minimum levels.
- High percentage of infrastructure now beyond original design life.
- 80% needs rebuilding ASAP.
- The job gets paid for through wellhead reinvestment.

Rebuilding The Oil And Gas Infrastructure: World's Largest Construction Project

- This requires 100,000 (?) miles of pipeline.
- ≈50 million barrels of new refinery capacity:
  - Cost = $30 trillion?
- 500 new offshore rigs:
  - Cost = $500 million/rig = $250 billion?
- Risk issues:
  - Are there enough skilled people to get the job done?
  - Does world have enough steel (and iron ore) capacity?
  - How many new plants would this require?

This construction job has no rough blueprints, yet.

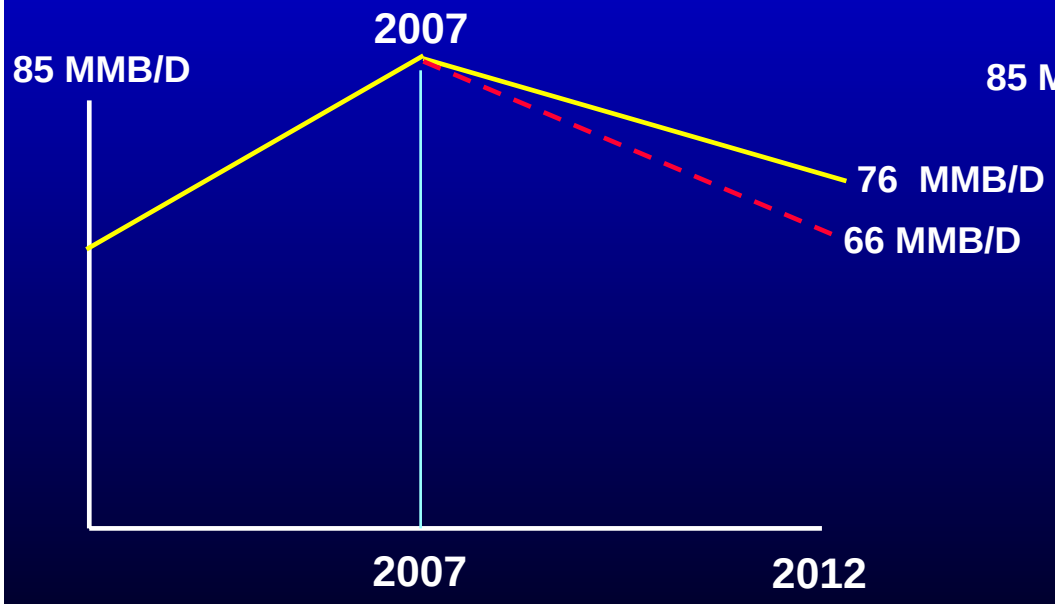
The Pearl GTL Project (Qatar): Tip Of "Energy Spend" Iceberg

- A "simple gas to liquids plant" in Qatar will create 140,000 b/d diesel.
- North Field gas from two offshore platforms sends 1.6 bcf/day onshore to GTL plant.
- Pearl is enormous:
  - The complex covers area equal to 450 football fields
  - Building plant uses 300,000 tons of piping, structure steel and equipment
  - Construction workforce peaks at 35,000 workers
  - Energy needs for conversion is enormous
  - Cost estimate was $12 – 18 billion when workforce was 11,000

How Fast Could Supply Fall?

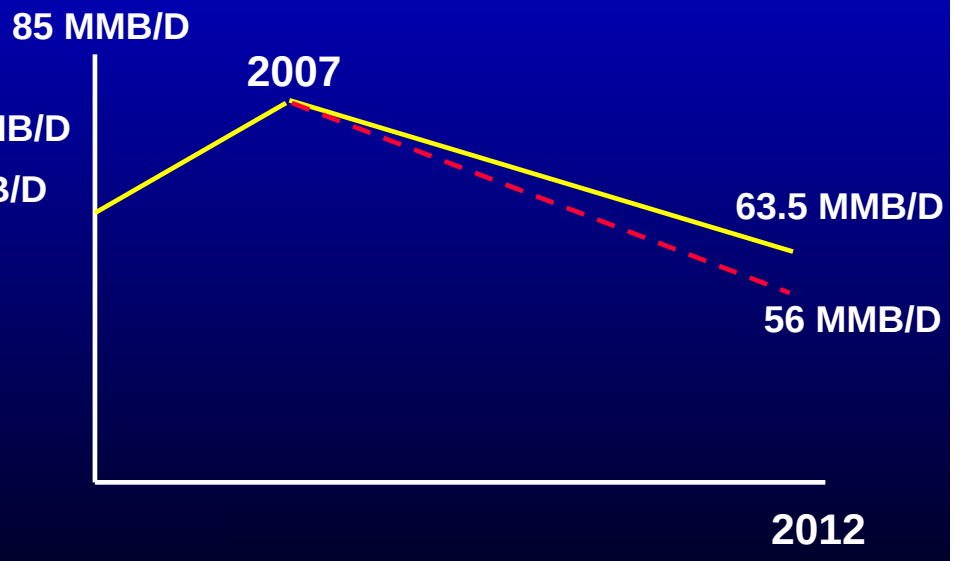
- It all depends on two factors:
  - Average future decline rates
  - Added new annual supplies
- Two "what if's" highlight challenge:

Case One – 5% Base Decline



2 MM B/D new projects added per year

Case Two – 8% Base Decline



1.5 MM B/D new projects added per year

The Odds Of These Scenarios

- Rating odds of either case “educated guess”:
  - Case 1: 33%
  - Case 2: 33%

Issue:
Is there a 33% upside or is the other 1/3 greater downside?

Are There Any "Winners" In Post-Peak Oil World?

- Answer either "yes" or "no."
- "No": If Peak Oil ignored.
- "Yes: If we plan for it.
- Winners will win BIG!
  - Implementation of massive "efficiency plans"
  - The oil service and equipment industry
  - The world's engineering and construction companies
  - Companies that can adapt to high energy costs fast
  - All consumer goods who win market share in building prosperity among oil producing world

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Is Low Oil Price Era Fading Into The Sunset?

- Low oil price concept built on sands of Twilight in the Desert "Middle East Cheap Oil Abundant Forever."
- This was once true.
- Then it, too, got old.
- Twilight years of abundant oil are here.

- Oil then becomes "non-cyclical" and scarce.
- Price of next generation energy needs to be high.

Does Darkness Always Follow After Twilight?

- Yes, but…
  - "It is always the darkest before dawn"
- With dawn can come a wonderful Post-Peak Oil era:
  - We travel less
  - High oil prices create shiny new industry and oil producers prosper
  - New era might also discover sustainable new form of energy that scales

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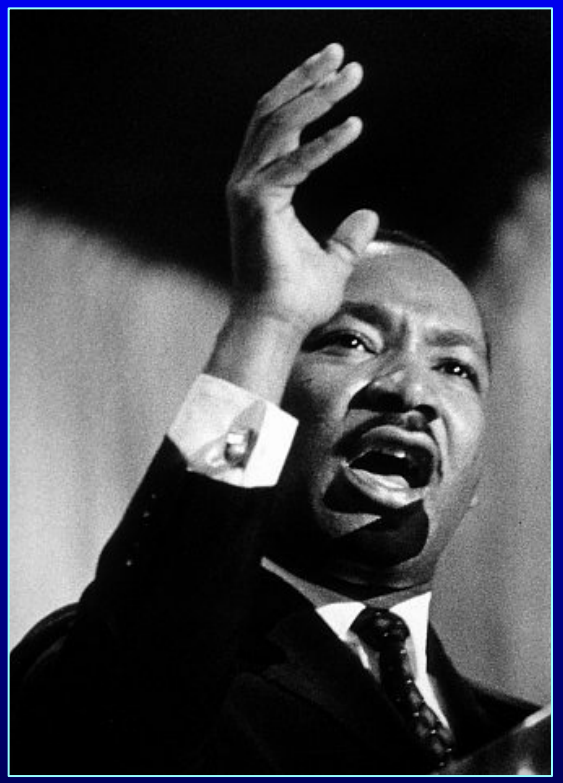
"I Have Been To The Mountain Top"

"He's allowed me to go up the mountain and I've looked over, and I've seen the Promised Land. I might not get there with you, but I want you to know, tonight, that we as a people will get the Promised Land." -Martin Luther King, Memphis, TN – April 1968



- We are at peak and we can see over the mountain top.
- It looks ugly.
- But "we", too, can get the to Promised Post-Peak Oil Land.

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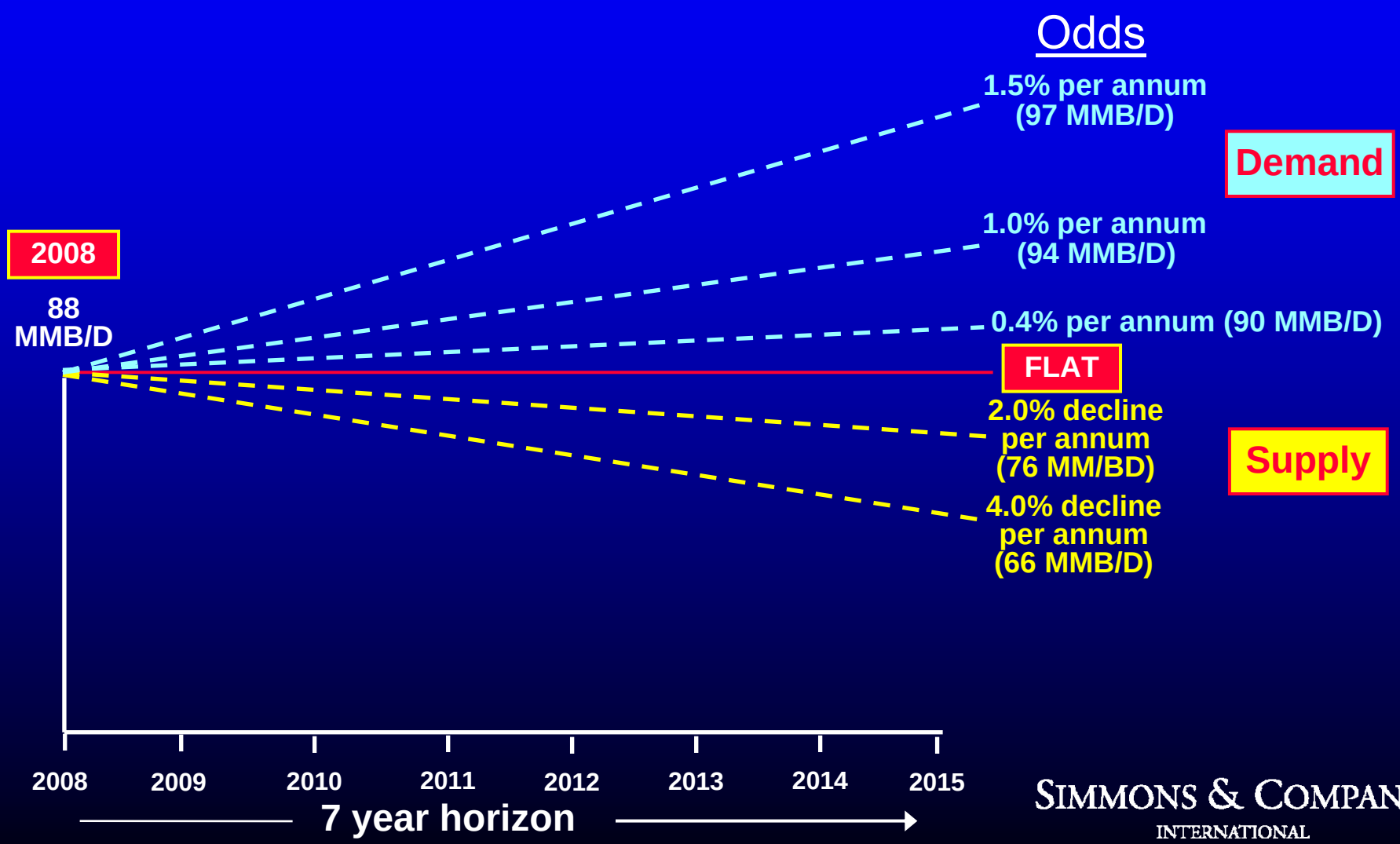
The Path Through A Mine Field (Or "Decision Making Under Uncertainty")



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Summation Of Odds

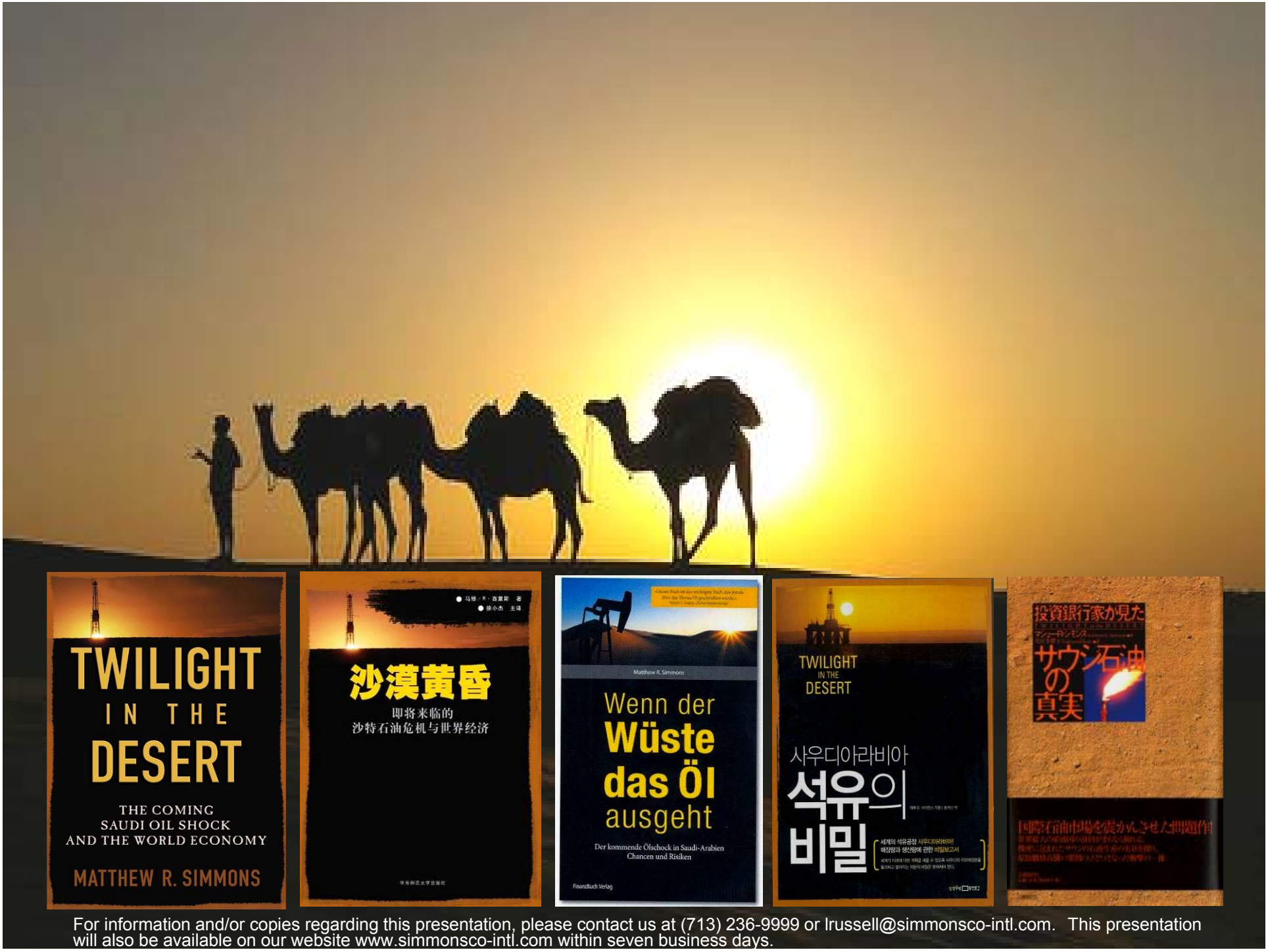
- Flat demand and flat supply = “best case?”
- 1% demand growth + 2% production decline = “most likely?”
- 1.5% demand growth + 4% decline = “shortages ahead?”
- None represent “worst case.”

THIS ISSUE IS THE MOST SERIOUS RISK TO SUSTAINING THE 21ST CENTURY.

Peak Oil Is Extremely Real And Extremely Risky

- There is nothing fuzzy when oil demand outstrips faltering supply.
- It creates a clash between energy haves and have nots.
- It can lead to social chaos and war.
- Ignoring the risk or hiding behind secret undisclosed supply data could be a colossal mistake.

Peak Oil risk is THE definable event of 21st Century's sustainability.



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