

A presentation from the 2009 Topical Symposium:

***Energy Security: A Global Challenge***

Hosted by:  
The Institute for National Strategic Studies  
of  
The National Defense University

29-30 September 2009

By  
**ADAM SIEMINSKI**

**INSS**



INSTITUTE FOR NATIONAL  
STRATEGIC STUDIES

Papers presented at NDU Symposia reflect original research by members of NDU as well as other scholars and specialists in national security affairs from this country and abroad. The opinions, conclusions, and recommendations expressed or implied within are those of the authors and do not necessarily reflect the views of the Department of Defense or any other agency of the Federal Government.

# Report Documentation Page

Form Approved  
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>30 SEP 2009</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2009 to 00-00-2009</b>	
4. TITLE AND SUBTITLE <b>Panel on emerging petroleum and natural gas issues</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Deutsche Bank, Theodor-Heuss- Allee 70, 60486 Frankfurt, Germany,</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES <b>2009 Topical Symposium: Energy Security: A Global Challenge, 29-30 Sep 2009, Washington DC.</b>					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>28</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

# Energy Security: A Global Challenge

## Institute for National Strategic Studies / NDU

### Panel on emerging petroleum and natural gas issues

Washington / Fort McNair      30-Sep-2009

#### Adam Sieminski

Chief Energy Economist

Deutsche Bank

[adam.sieminski@db.com](mailto:adam.sieminski@db.com)

+ 1 202 662 1624



All prices are those current at the end of the previous trading session unless otherwise indicated. Prices are sourced from local exchanges via Reuters, Bloomberg and other vendors. Data is sourced from Deutsche Bank and subject companies.

DISCLOSURES AND ANALYST CERTIFICATIONS ARE LOCATED IN APPENDIX 1.

A Passion to Perform.

# Energy Security: What's it all about?

## Churchill's Law

Safety and certainty in oil lie in variety and variety alone.

## Thatcher's Law

The unexpected happens. You had better prepare for it.

## Palmerston's Law

We have no eternal allies and no perpetual enemies. Our interests are perpetual and eternal.

Source: Deutsche Bank

## ■ Vulnerability

Rise in import quantity and balance of payments / currency issues

Disruptions / market failures

Political turmoil (MidEast, Africa, Lat.Am)

Price spikes / market pressures

Homeland infrastructure

## ■ Traditional responses to energy security *(risk management)*

Demand restraint (security of demand?)

Supply diversity

Surge production (location?)

Strategic stocks (when to use?)

International co-operation / IEA

Flexible markets (futures; technology)

# Do Speculators Threaten Energy Security?

Politicians are looking for somebody to blame



Source: Deutsche Bank

## Why Don't They Look Here?

- Extraordinarily strong global economic growth from 2002-2007.
- Constrained oil supply from key producers like Russia, Venezuela, Nigeria, Iran, Iraq and others.
- Lack of OPEC spare production capacity and untimely cutbacks by OPEC at the end of 2006 that were not reversed until late 2007.
- Subsidies on oil consumption in many rapidly growing (economy, population or both) countries in Asia and the Middle East.
- Untimely strategic petroleum reserve purchases by both China and the US in 2007 and 2008.
- US dollar depreciation.
- Lack of spare refining capacity to handle heavy sour crude oil.

# What Does the Past Tell Us About the Future?

Is the energy tank full or running on empty?



Permission granted by *The Economist* to use the cover images depicted in this document does not imply approval by *The Economist*, or any of its business units, of the editorial content in this presentation. The opinions expressed in this document are those of the author.

Copyright: *The Economist*

Used with Permission

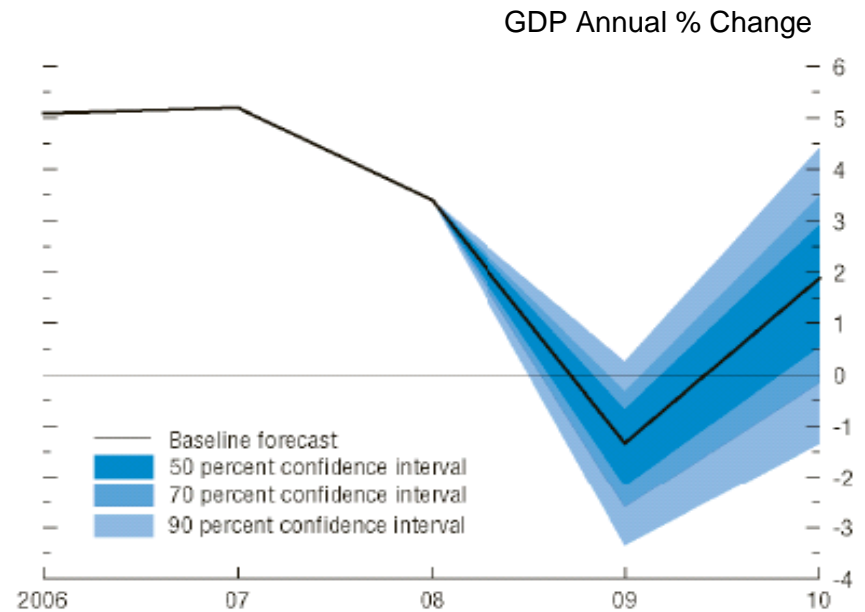
If the emerging market economies recover, world GDP could be boosted



Copyright: *The Economist*

Used with Permission

## How Low Could Economy Go?



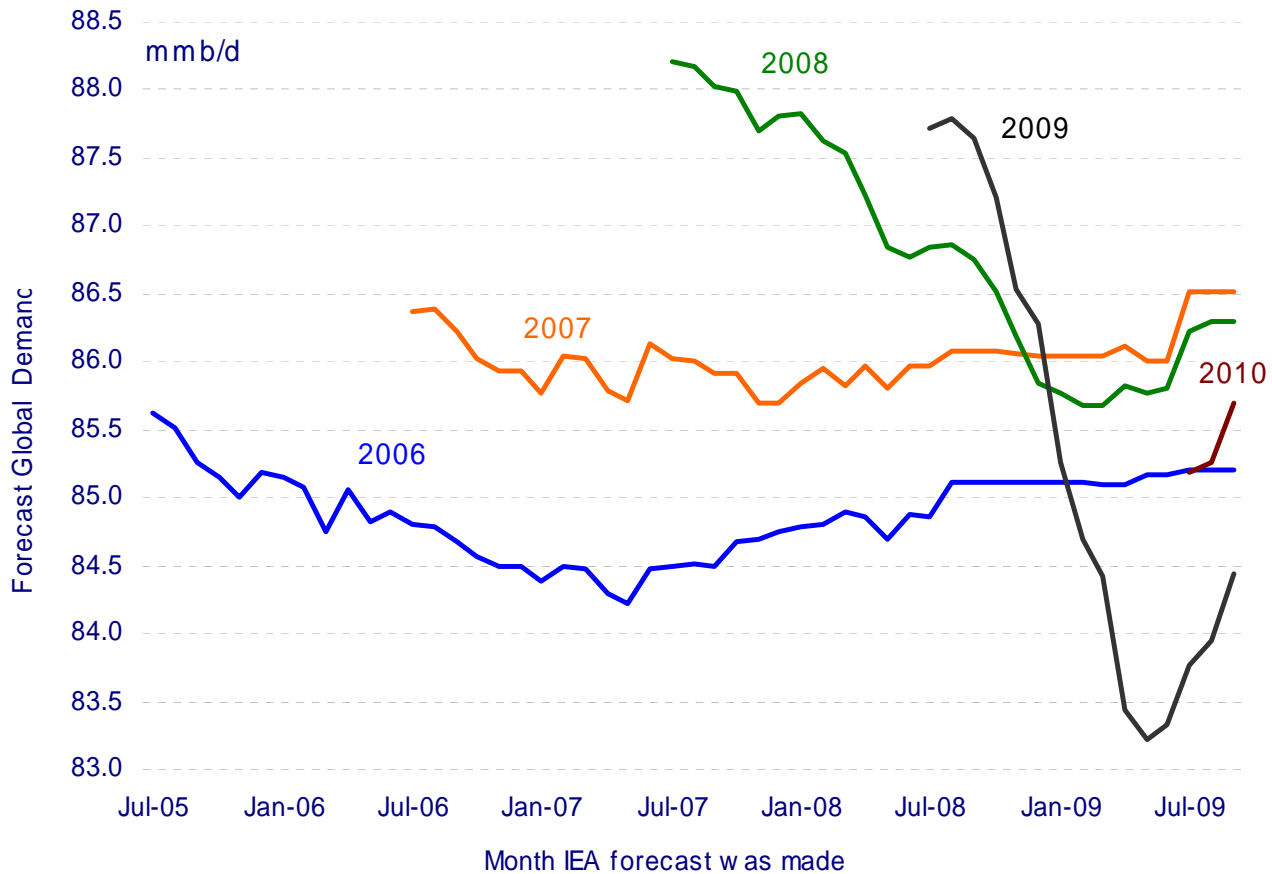
Source: International Monetary Fund, April 22, 2009

# What a Global Recession Means for Oil Demand

**Answer: Collapse**

World oil demand grows at about 1.5-2.0% less than global GDP.

If global GDP is 3% in 2009, oil demand would be expected to rise by only 1%, or about 850kb/d.



Source: IEA, DB Global Markets Research

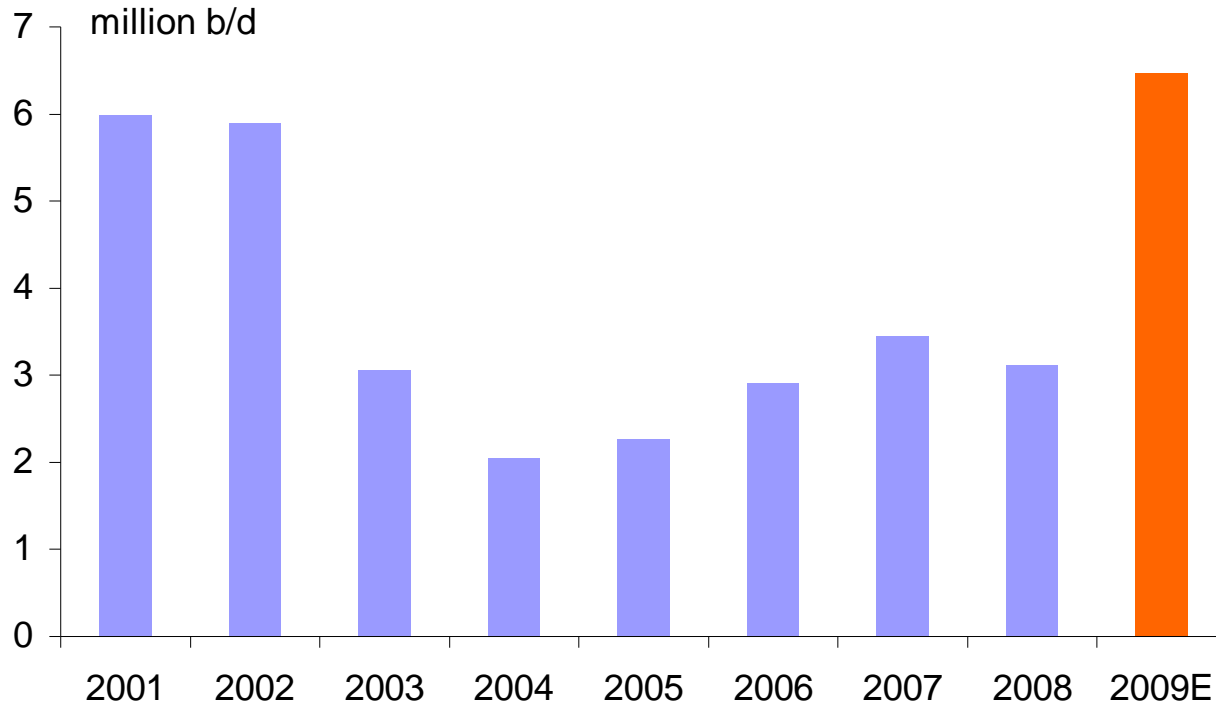


# OPEC Spare Production Has Rebuilt

As OPEC cuts quotas, spare capacity increases

The lack of spare OPEC production capacity played a strong role in the run-up in oil prices in 2003-08.

In 2009 and 2010, high spare capacity should help moderate prices.



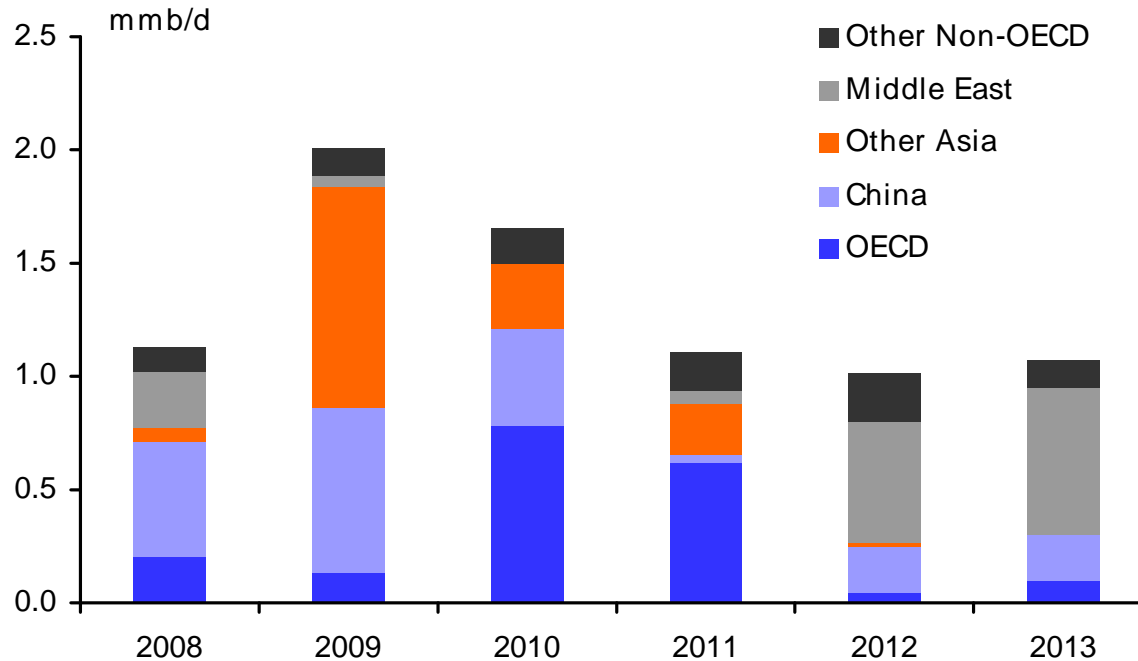
Source: IEA, DB Global Markets Research

# Refinery Capacity Additions Are Robust

Distillation capacity rising faster than demand in 2009 and 2010

The lack of spare refining capacity played a strong role in the run-up in oil prices in 2007-08.

This is reversing in 2009-10.

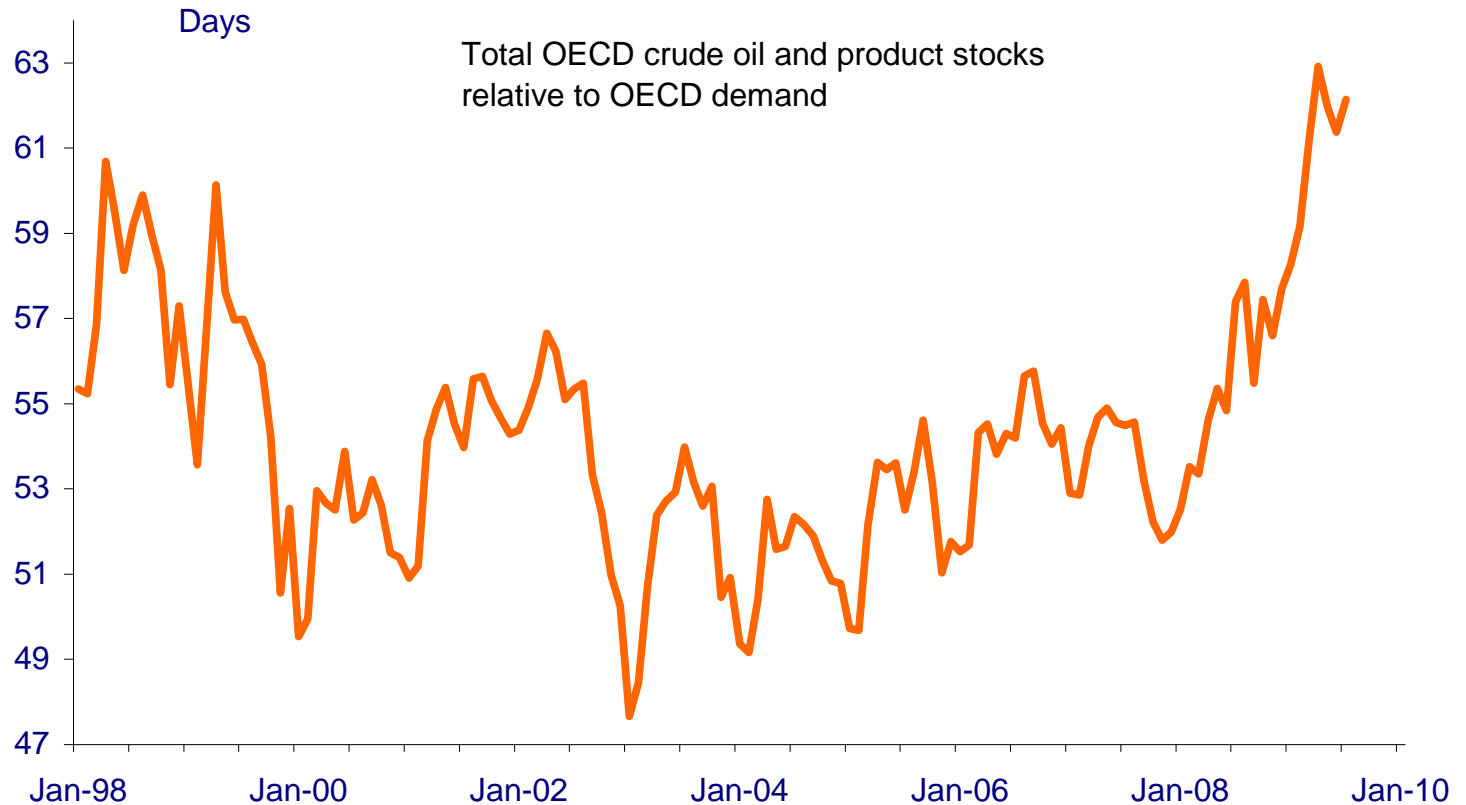


Source: IEA, DB Global Markets Research

# OECD Inventories Very High... but Peaked?

## Days forward cover of OECD crude and product stocks

Another (usual) sign of near-term weakness in the oil markets.

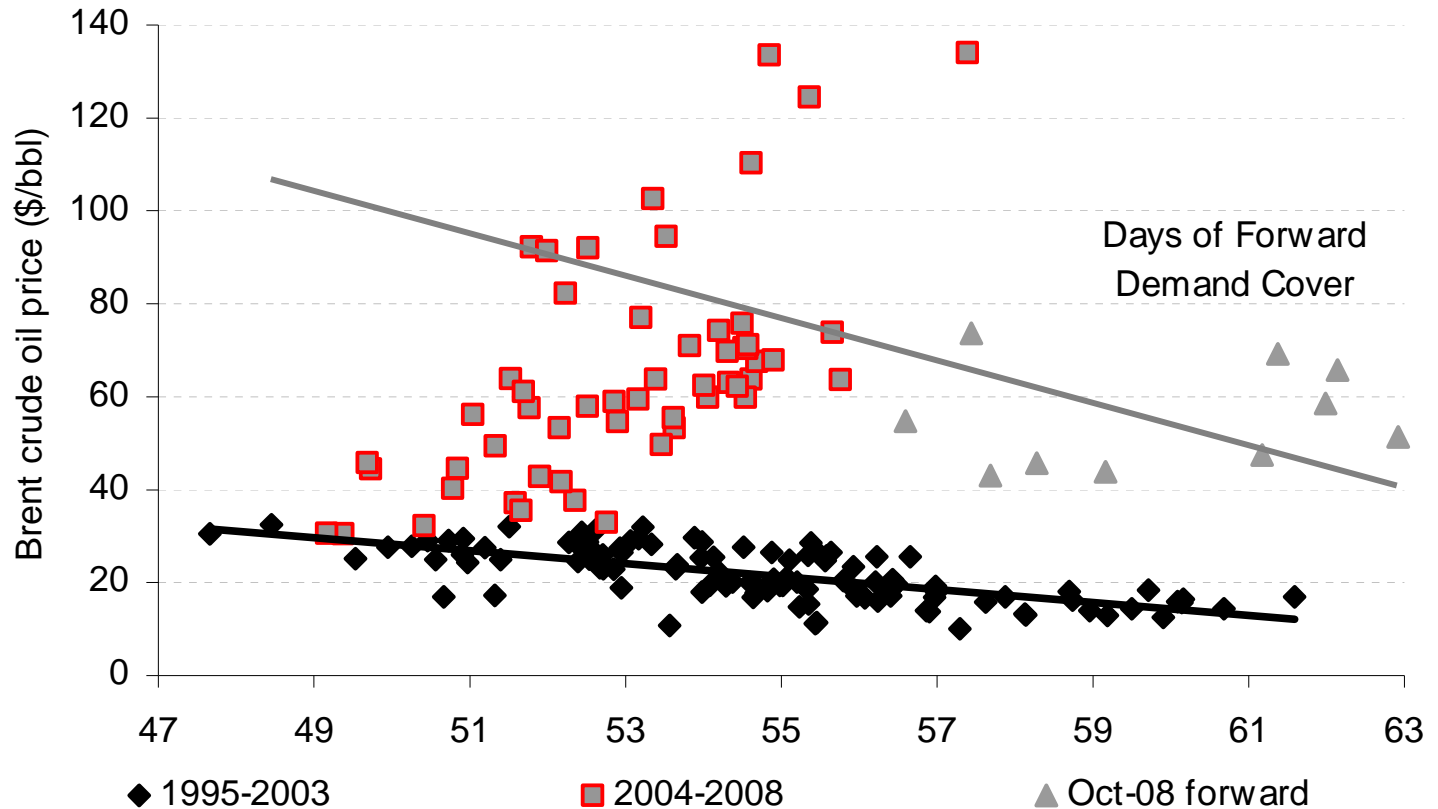


Source: IEA, DB Global Markets Research

# Price to Inventory Relationship Returning?

## Days forward cover of OECD crude and product stocks vs. oil prices

Suggests that OPEC's ability to manage prices via inventories may be improving.



Source: IEA, DB Global Markets Research

## What is the shifting dollar doing to commodities and oil?

The dollar-oil regression is not perfect, but traders like it...

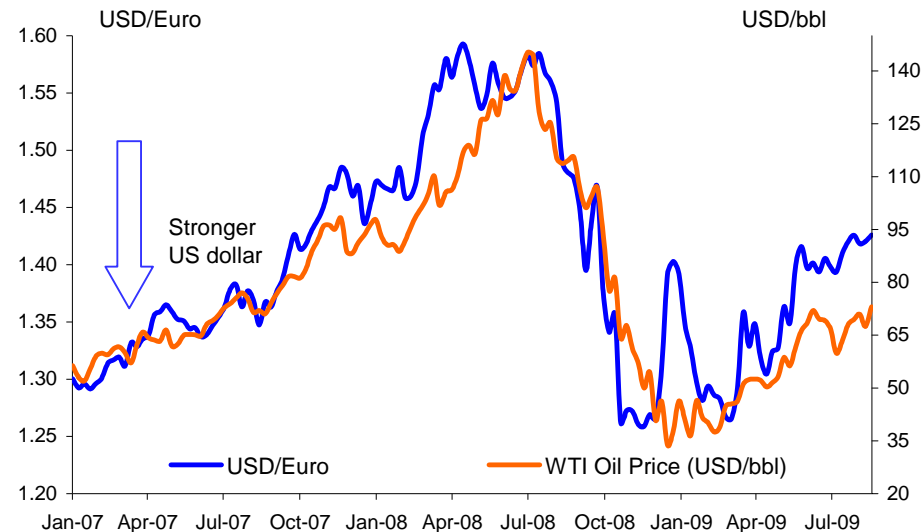
...and a recent study by the IMF says that gold and oil are sensitive to movements in the dollar.



Copyright: *The Economist*

Used with Permission

### Oil Climbs as the Dollar Flames Out then reverses ...then climbs again



- According to the IMF, in the long run, a 1% depreciation in the US dollar is associated with increases for gold and oil prices of more than 1%.
- In the short run, the elasticity is close to 1, but higher for gold than for crude oil, says the IMF.
- We believe the relationship between oil prices and the US dollar is highly unstable. However, the EURUSD at 1.50 implies triple-digit oil.

Source: Nymex, Bloomberg, DB Global Markets Research

Stock market ( the economy ) pulled oil down from Jul-08, then up from Mar-09

Looking ahead to late 2010, we wonder if there could be a setback.

Household buying power may still be constrained.

Capital spending may be crimped by an excess capacity.

Residential investment may be hamstrung by more foreclosures.

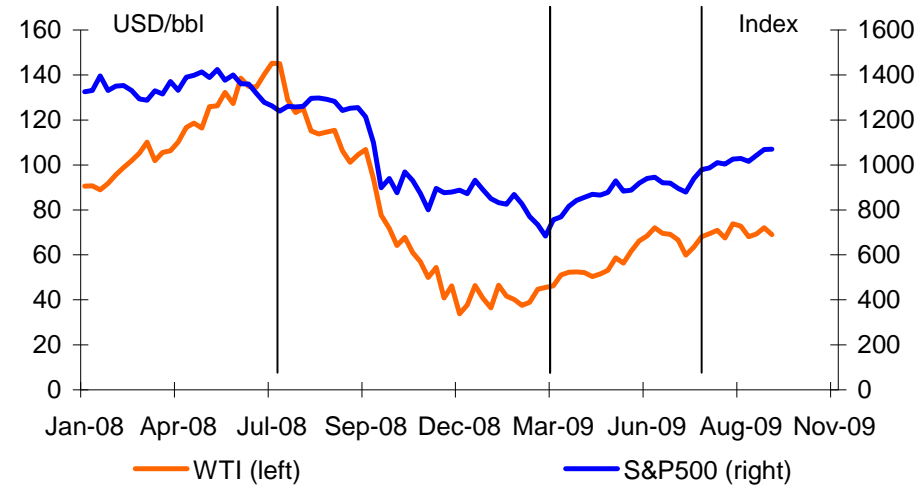
Spending on commercial structures has only recently turned downward.



Copyright: *The Economist*

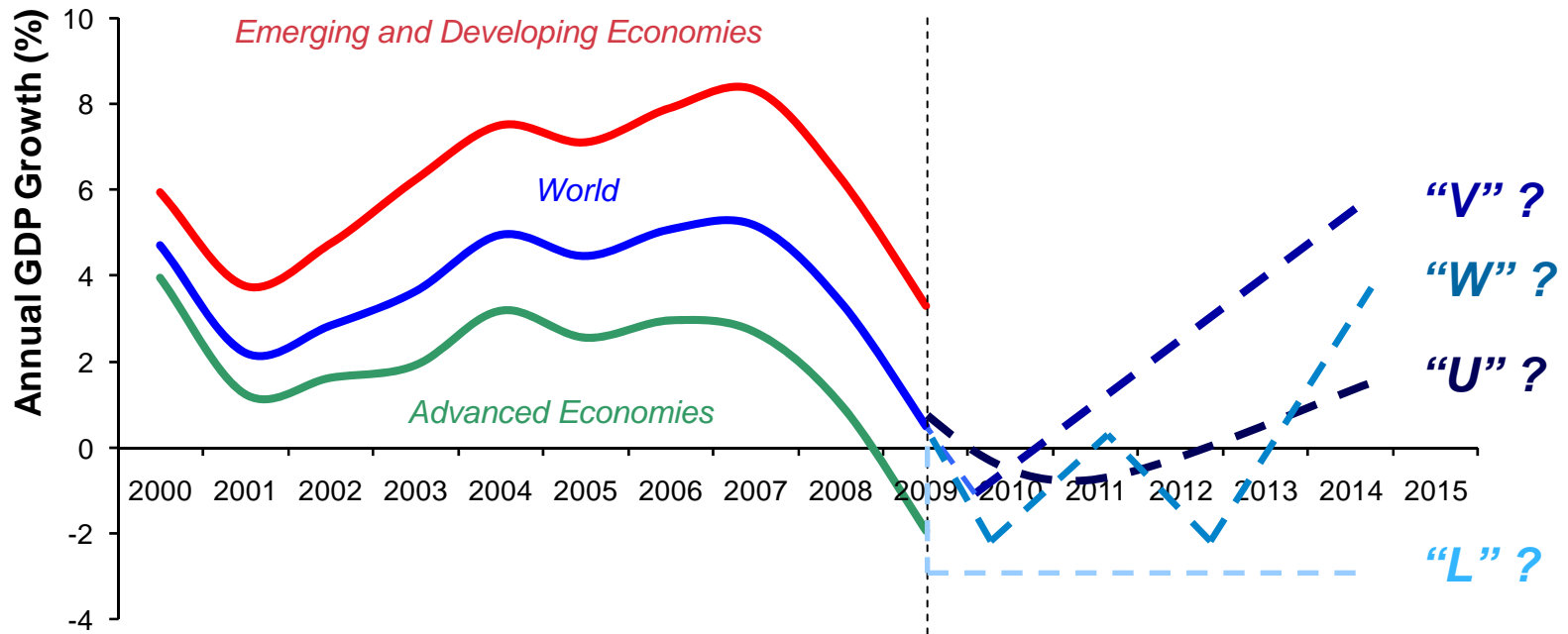
Used with Permission

### WTI Crude Oil and the S&P500



- The relationship between the S&P 500 and oil is usually inverse.
- From July 2008 to the start of March 2009, the two moved in parallel.
- From July 2009, the relationship is back to the more traditional inverse correlation.

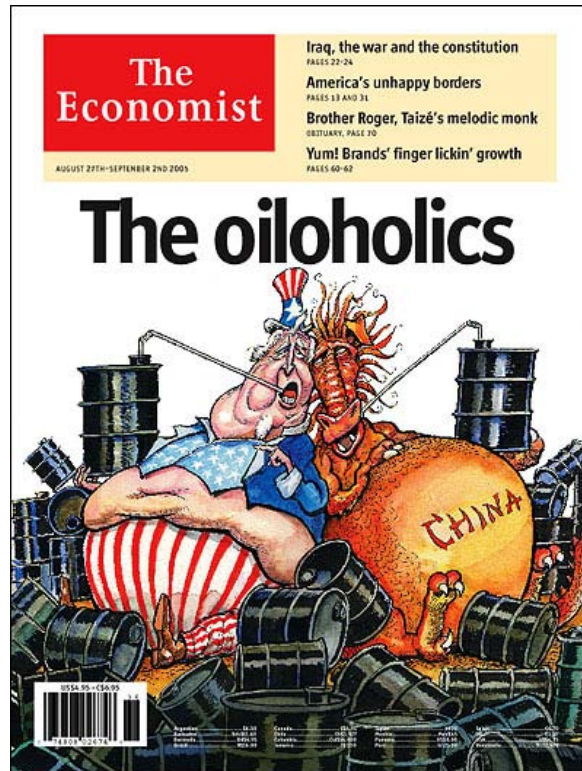
# The Shape of the Economic Recovery Matters



Source: CSIS, IMF, Deutsche Bank

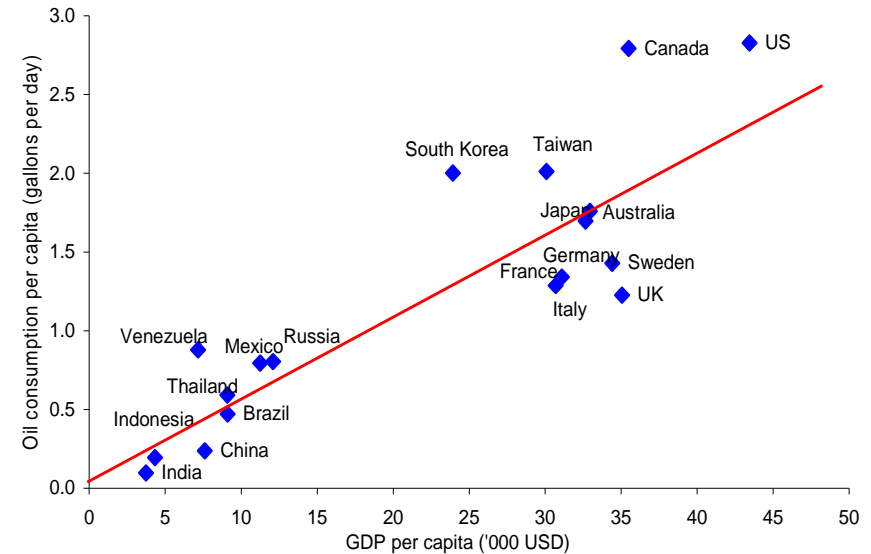
## A theme that does not go away easily

Twenty five years ago, South Korea and Taiwan were where China and India are now.



Copyright: *The Economist*  
Used with Permission

### Per Capita Oil Consumption Relative to GDP



Source: IMF, IEA DB Global Markets Research

## Outlook

- One third of the world's population is just entering the middle class and want the oil-consuming lifestyle that goes with that.



## Not enough of a good thing?

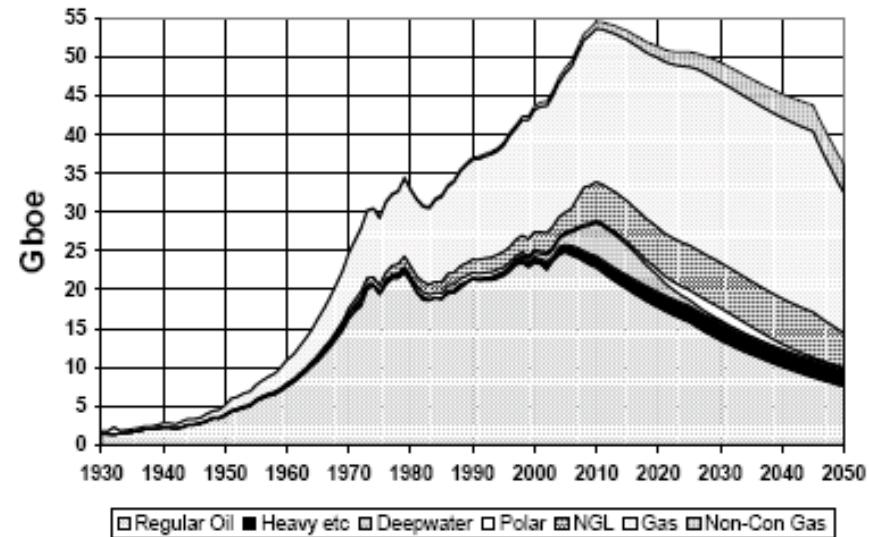
Some analysts think that global oil production will peak within the next few years.



Copyright: *The Economist*

Used with Permission

### Peak Oil and Peak Gas

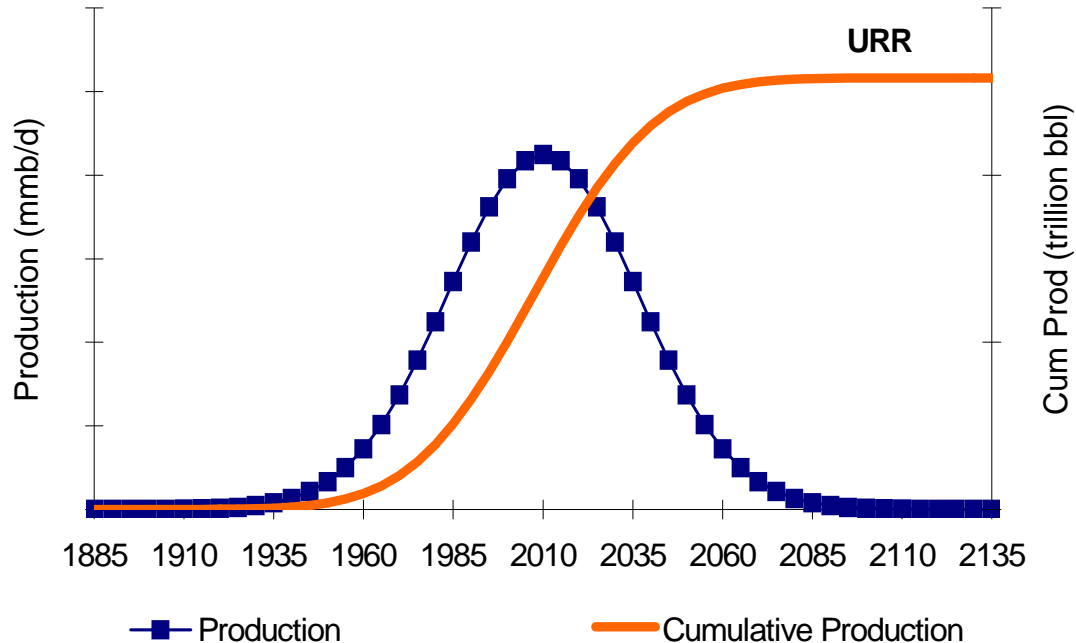


Source: Association for the Study of Peak Oil

# Are We Running Out?

## Hubbert Peak Curve (Idealized)

“...doomsayers  
hard at work  
fanning the flames  
of hopelessness  
and pessimism”  
Leonardo Maugeri



### “Peak Oil” Theory

(1) requires a “final” estimate of the level of ultimately recoverable reserves (URR)... but URR estimates have been rising.

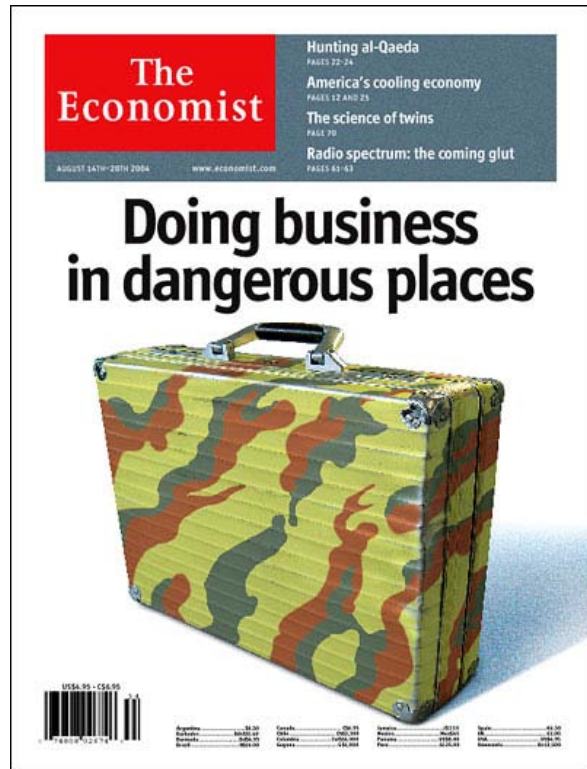
(2) assumes that once half of the world’s reserves have been used up, production must fall... but that point keeps moving ahead in time.

## Outlook

- Dr. M. King Hubbert, a geologist for Shell and the USGS in the early 1960s, used a bell curve to correctly predict the 1972 peak in US oil production. A number of followers have attempted to extend Hubbert’s methodology to forecast a world oil peak this decade.
- Hubbert models do not account for changes in technology, costs, prices, or politics - all of which can have a huge impact on the actual shape of the production curve. Hubbert peak oil models assume a symmetric curve to determine the year and amount of peak production.
- Increases in subsoil knowledge, the spread of technological progress, and the advancement of drilling – along with political decisions and oil price changes – have shown time and again that peak production can be increased and delayed, so the decline phase of the bell curve can be shifted to the right.

Most of the growth in oil production is NOT coming from vacation spots

Many experienced international oil companies say that instability is more of a problem than “dangerous places”.



Copyright: *The Economist*

Used with Permission

## Oil Supply (mmb/d)

	1990	2000	2010E
Saudi Arabia	7.15	9.01	10.73
Russia	10.12	6.52	9.90
United States	7.36	8.08	7.89
Iran	3.13	3.76	4.43
China	2.77	3.23	3.73
Canada	1.34	2.72	3.50
Nigeria	1.81	2.16	2.92
Iraq	2.03	2.58	2.91
Brazil	0.63	1.45	2.85
Kuwait	1.25	2.16	2.82
Venezuela	2.25	3.22	2.81
Mexico	2.55	3.45	2.81
UAE	2.39	2.62	2.78
Norway	1.62	3.35	2.33
Algeria	1.34	1.44	2.02
Kazakhstan	0.43	0.72	1.90
Libya	1.37	1.47	1.76
Angola	0.48	0.75	1.70
Qatar	0.44	0.86	1.54
United Kingdom	1.83	2.70	1.33
Azerbaijan	0.24	0.29	1.30

Source: IEA, DB Global Markets Research

## Nuclear Weapons Controversy

Iran is the 4<sup>th</sup> largest oil producer in the world...

..and the 5<sup>th</sup> largest exporter.



Copyright: *The Economist*

Used with Permission

## Top World Oil Net Exporters (kb/d)

Rank	Country	Exports
1	Saudi Arabia	8,038
2	Russia	7,054
3	United Arab Emirates	2,507
4	Norway	2,361
<b>5</b>	<b>Iran</b>	<b>2,326</b>
6	Kuwait	2,291
7	Nigeria	2,082
8	Venezuela	1,960
9	Algeria	1,907
10	Angola	1,711
11	Libya	1,584
12	Iraq	1,501
13	Mexico	1,361
14	Kazakhstan	1,213
15	Canada	1,116

Source: US DOE/EIA, 2007 rankings

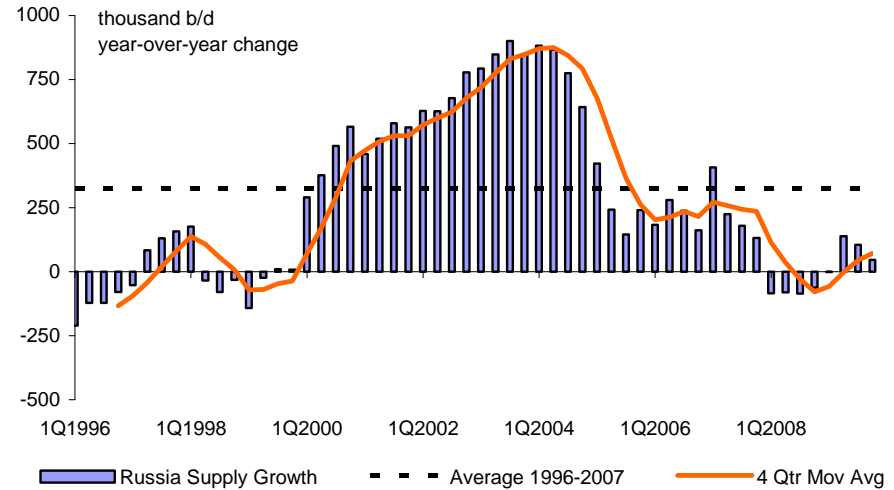
## Russian production declines for the first time in a decade in 2008

Putin's policies in his first term worked but in his second term were a disaster for oil output.



Copyright: *The Economist*  
Used with Permission

### Russian Oil Production Growth



- The Russian government's policy of hostility to its own oil entrepreneurs, growing disdain for foreign capital, and desire to maximize taxes regardless of the impact on capital investment brought an end to the growth in production that characterized President's Putin's first term (2000-2004).
- Although "peak oil" proponents are citing the development as proof that global production is faltering because of geological constraints, we see the situation as offering strong evidence that oil production problems are being driven more by "above the ground" problems.

Source: IEA, DB Global Markets Research



# What to Do About Global Warming

Global Warming (Nov 2000)



Copyright: *The Economist*  
Used with Permission

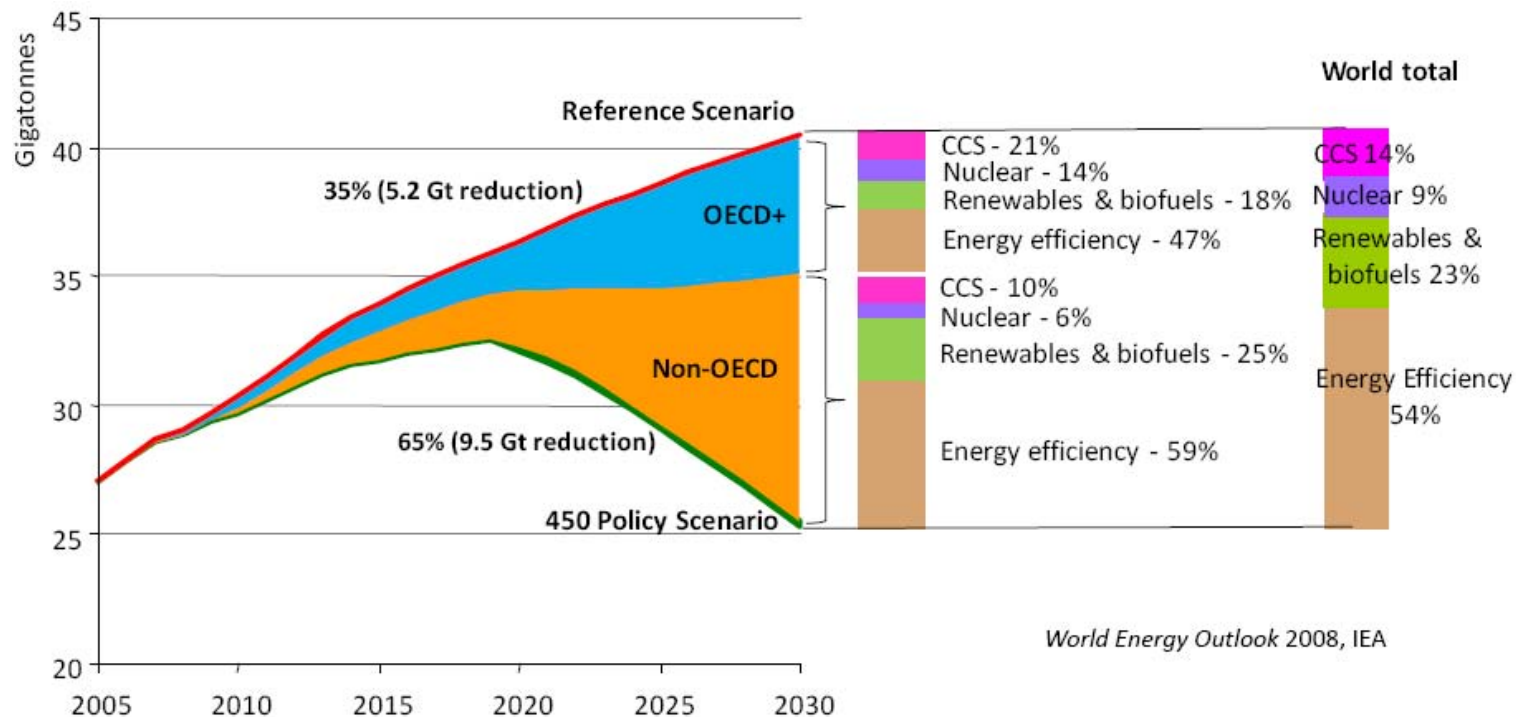
Greening Up (Jan 2007)



Copyright: *The Economist*  
Used with Permission

# Achieving the IEA's 450ppm Scenario

To hold CO2 in the atmosphere to 450ppm requires a 25gt/yr emission limit



## Outlook

- Efficiency gains and deployment of existing low-carbon energy account for most of the savings
- OECD and Non-OECD countries must both work towards reducing CO2 emissions
- The scale of effort required is substantial

# Getting Rid of CO2 Requires Concentrated Effort

## Technology

Each option would save one gigatonne of CO2 per year



### Nuclear

Build 130 new nuclear power plants each 1GW in size in lieu of new coal-fired power plants without CO2 capture and storage to supplement the circa 450 nuclear plants globally



### Coal-Fired Generation

Build 320 new zero-emission 500MW coal-fired power plants in lieu of coal-fired plants without CO2 capture and storage (none exist now)



### CO2 Capture In Forestry

Convert to new forest a barren area about the size of Spain, 2.5 times the total land area of the state of Washington, or equivalent to 100 million acres



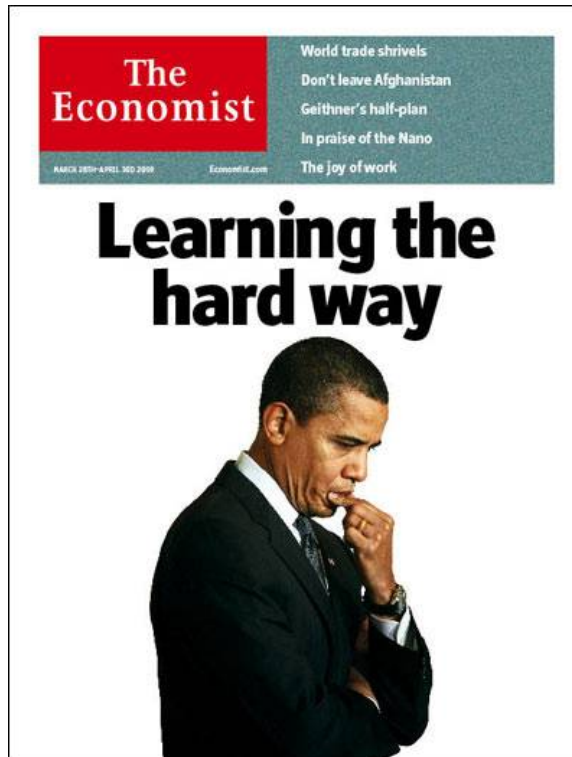
### Improved Efficiency

Deploy 290 million new cars at 40mpg instead of new cars at 20mpg and assuming 12,000 miles per year

Source: DOE Climate Change Technology Program, <http://www.climatechange.gov/stratplan/final/index.htm>



## Energy policy under the Obama administration



Copyright: *The Economist*

*Used with Permission*

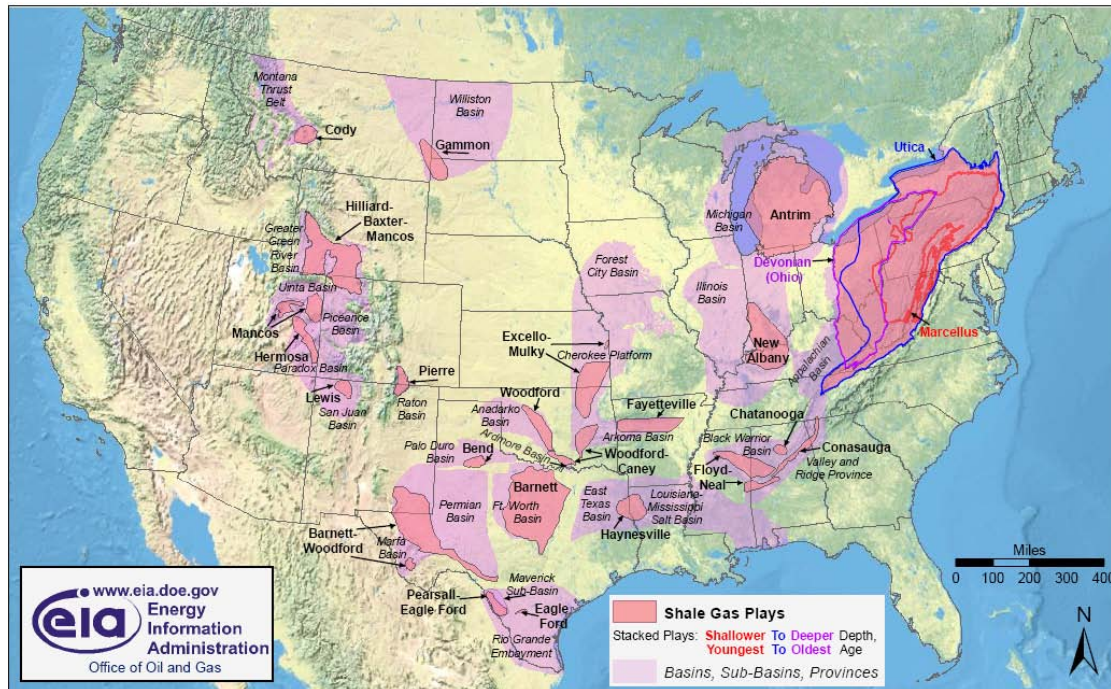
## Policy Directions

- Longer-term policies strongly tied to climate change and alternative fuel proposals
- Infrastructure spending to create jobs
- Oil/gas taxation components implemented via changes in less visible accounting (LIFO to FIFO) and other such tax rules
- New regulations on energy trading activity
- Nuclear power supported, but not enthusiastically
- Renewable energy and electric autos receive strong backing, and renewable portfolio standards and “smart grid” improvements for electric utilities

Source: DB Global Markets Research

# Shale Gas in the US... an unrecognized CO2 option?

## Major US shale basins



## Outlook

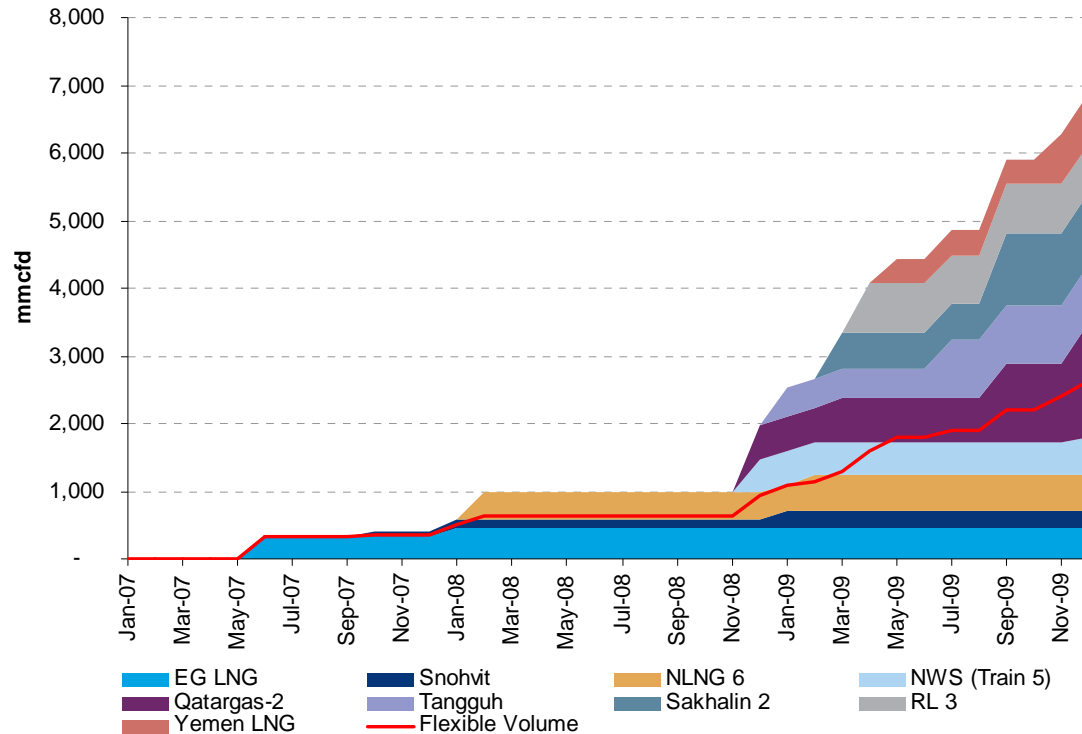
- Independent natural gas producers are increasingly optimistic about their ability to develop shale plays around the US.
- The Barnett shale in Texas has been a huge success. DOE's gas supply models may be underestimating the potential strength of domestic production.
- If the industry is successful in conveying the "supply security" message, natural gas could receive favorable treatment from Washington policymakers, but this will take time and effort

Source: DOE/EIA, DB Global Markets Research

# Wave of New LNG Projects in the Pacific Basin

LNG security risks are likely to grow over time.

## Projects delayed are about to surge onto global markets



Source: Wood Mackenzie, DB Global Markets Research

## Outlook

- Many Pacific Basin projects are starting up considerably later than originally expected
- As production ramps up then Asia will become more self sufficient
- This suggests a substantial drop in cargoes moving from Atlantic to Pacific

# Appendix 1 – Certification and Disclaimer

## Analyst Certification

The views expressed in this report accurately reflect the personal views of the undersigned lead analyst. In addition, the undersigned lead analyst has not and will not receive any compensation for providing a specific recommendation or view in this report. Adam Sieminski

## Global Disclaimer

Investing in and/or trading commodities involves significant risk and may not be suitable for everyone. Participants in commodities transactions may incur risks from several factors, including changes in supply and demand of the commodity that can lead to large fluctuations in price. The use of leverage magnifies this risk. Readers must make their own investing and trading decisions using their own independent advisors as they believe necessary and based upon their specific objectives and financial situation. Past performance is not necessarily indicative of future results. Deutsche Bank makes no representation as to the accuracy or completeness of the information in this report. Deutsche Bank may buy or sell proprietary positions based on information contained in this report. Deutsche Bank has no obligation to update, modify or amend this report or to otherwise notify a reader thereof. This report is provided for information purposes only. It is not to be construed as an offer to buy or sell any financial instruments or to participate in any particular trading strategy.

Unless governing law provides otherwise, all transactions should be executed through the Deutsche Bank entity in the investor's home jurisdiction. In the U.S. this report is approved and/or distributed by Deutsche Bank Securities Inc., a member of the NYSE, the NASD, NFA and SIPC. In Germany this report is approved and/or communicated by Deutsche Bank AG Frankfurt authorised by Bundesanstalt für Finanzdienstleistungsaufsicht. In the United Kingdom this report is approved and/or communicated by Deutsche Bank AG London, a member of the London Stock Exchange and regulated by the Financial Services Authority for the conduct of investment business in the UK and authorised by Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin). This report is distributed in Hong Kong by Deutsche Bank AG, Hong Kong Branch, in Korea by Deutsche Securities Korea Co. and in Singapore by Deutsche Bank AG, Singapore Branch. In Japan this report is approved and/or distributed by Deutsche Securities Inc. This report may not be reproduced, distributed or published by any person for any purpose without Deutsche Bank's prior written consent. Please cite source when quoting.

Copyright © 2009 Deutsche Bank AG

# Appendix 1 - Regulatory Disclosures

## Country-Specific Disclosures

**Australia:** This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act.

**EU countries:** Disclosures relating to our obligations under MiFiD can be found at <http://globalmarkets.db.com/riskdisclosures>.

**Japan:** Disclosures under the Financial Instruments and Exchange Law: Company name - Deutsche Securities Inc. Registration number - Registered as a financial instruments dealer by the Head of the Kanto Local Finance Bureau (Kinsho) No. 117. Member of associations: JSDA, The Financial Futures Association of Japan. Commissions and risks involved in stock transactions - for stock transactions, we charge stock commissions and consumption tax by multiplying the transaction amount by the commission rate agreed with each customer. Stock transactions can lead to losses as a result of share price fluctuations and other factors. Transactions in foreign stocks can lead to additional losses stemming from foreign exchange fluctuations.

**New Zealand:** This research is not intended for, and should not be given to, "members of the public" within the meaning of the New Zealand Securities Market Act 1988.

**Russia:** This information, interpretation and opinions submitted herein are not in the context of, and do not constitute, any appraisal or evaluation activity requiring a license in the Russian Federation.