The Lies We’ve Been Told

October 29, 2008
Role of Oil in US Energy Policy
University of Southern Maine

“Conversations at Muskie”

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Washington, DC
www.eprinc.org
Introduction

Energy Policy Research Foundation Inc. (EPRINC), formerly the Petroleum Industry Research Foundation Inc. (PIRINC)

Founded in NY in 1944

– Moved to Washington from NYC in Feb 2007
– EPRINC brings policy analysis and industry economics to bear on current energy issues

Note: All data in this presentation are from EIA unless otherwise noted. Summary conclusions, comments, etc, are the sole responsibility of EPRINC.
Alternative Titles

• High Cost of Pandering

• What Happens when you ask the wrong questions? (yes, you get the wrong answer)

• Everything you think you know about the oil market and US energy policy is wrong
Why Did Oil Prices Climb So High?
A Series of Unfortunate Events Leading to New Expectations

Positive Expectations

- Oil development in Iraq delayed
- Outlook positive for new oil field rehabilitation
- Congress continues ban on ANWR and offshore development
- OPEC Excess Capacity remains limited
- Outlook positive for expanded output from Nigeria, Mexico, Venezuela, Russia, North Slope

Expectations Shift

- Yukos -- Kremlin taking control of Russian oil development
- Russia takes over Sakhalin II, Chavez Nationalizes Projects

Negative Expectations

- Continuing civil strife in Sudan, Nigeria
- Nigeria rebels hurt output
- Continued civil strife in Sudan, Nigeria
- OPEC Excess Capacity remains limited
- Outlook positive for expanded output from Nigeria, Mexico, Venezuela, Russia, North Slope

Graphs:

- World Oil Production (EIA)
- Expected Production (EIA 2001 Predictions)
- OPEC Excess Capacity (EIA)
- Crude Oil Price

Year:

- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008e

Production:

- Global Production, million b/d

Price:

- Crude Oil Price, $/bbl

Range:

- 70 to 95
- 0 to 140

Note: The graph illustrates the impact of various events on global oil production and prices, showing how different factors can shift expectations in the oil market.
Expectations and Reality

- September average price
- Supply/Demand relationship returning to equilibrium
- EIA 2001 price projections (on par with those of PIRA, Deutsche Bank, IEA, etc.)

Source: EIA Data and EPRINC Calculations
### A Series of Unfortunate Events, by country:

<table>
<thead>
<tr>
<th>Country</th>
<th>Positive Expectations</th>
<th>Negative Events</th>
<th>Lost Production (bpd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iraq</td>
<td>Promise of investment in oil sector after war, increased production.</td>
<td>Sustained turmoil drops output below pre-war levels</td>
<td>600,000</td>
</tr>
<tr>
<td>Nigeria</td>
<td>4 mbd expected by 2010</td>
<td>Civil strife and attacks on infrastructure, 2005-2007 saw decline to 2.1 mbd</td>
<td>500-700,000</td>
</tr>
<tr>
<td>Venezuela</td>
<td>Potential for growth after stagnation in production</td>
<td>Nationalization of oil industry, production nosedive</td>
<td>800,000</td>
</tr>
<tr>
<td>Russia</td>
<td>Projection seen at 12 mbd by 2010 after privatization of industry brought western influence, $ and new production</td>
<td>Re-nationalization leads to decreased production and investment</td>
<td>200,000</td>
</tr>
<tr>
<td>Sudan</td>
<td>Additional proven reserves and access to new fields</td>
<td>Civil strife, attacks on infrastructure, new fields remain inaccessible</td>
<td>200-250,000</td>
</tr>
<tr>
<td>Country</td>
<td>Description</td>
<td>Event Details</td>
<td>Volume</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Argentina</td>
<td>Huge production gains from 1991-2001</td>
<td>Oil industry nationalized in 2004, production and investment dropped</td>
<td>100,000</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>Production from Kashagan was expected to begin in 2005</td>
<td>Technical difficulties with some political disagreements</td>
<td>TBD</td>
</tr>
<tr>
<td>US</td>
<td>ANWR was part of Bush's energy policy when he took office in 2000</td>
<td>Currently no access to ANWR or OCS</td>
<td>up to 1,000,000</td>
</tr>
<tr>
<td>Canada (Alberta)</td>
<td>Oil sands contain 95% of Canada's 179 billion barrels of reserves</td>
<td>In 2007 new taxes and royalty rates helped to reduce lease sale revenues by 50% compared to 2006</td>
<td>TBD</td>
</tr>
<tr>
<td>Mexico</td>
<td>Production expected to reach 4 mbd by 2005</td>
<td>Production in decline since 2004. Cantarell declining and PEMEX needs funding.</td>
<td>500,000 +</td>
</tr>
</tbody>
</table>

Estimated loss of supplies to the world market, 2005-2010: 2.5-4.5 mbd
Demand Destruction Worldwide

- Global demand down slightly so far this year, OECD decline has been greater than demand growth in non-OECD countries.

2008 world consumption has declined 200,000 bpd from 2007.

2008 OECD consumption declined 1.5 mbd from 2007.
World Oil Production - Significant Post-2006 Growth

What’s Happened Since 2007?

2+ mbd swing in 5 quarters

Source: EIA Data, EPRINC Calculations: All Figures Indexed to 2007

Supply Since Q1 2007
Consumption Since Q1 2007
$/bbl Change Since Q1 2007

Recent Production Declines - 1997-2008

Russian declines to continue, some had expected 12 mbd by 2010

Note recovery - 2004-2008
Some Production Bright Spots

Other Notable Gains (mbd)
2007 Average -> July, 2008:
  Iran: 0.1
  U.S.: 0.25
  UAE: 0.1
  Sudan: 0.06
  Total: 0.51 mbd
.....Led by OPEC Production

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter</th>
<th>Production (mbd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>2004</td>
<td>Q1</td>
<td>31</td>
</tr>
<tr>
<td>2005</td>
<td>Q2</td>
<td>34</td>
</tr>
<tr>
<td>2006</td>
<td>Q3</td>
<td>35</td>
</tr>
<tr>
<td>2006</td>
<td>Q4</td>
<td>36</td>
</tr>
<tr>
<td>2007</td>
<td>Q1</td>
<td>36</td>
</tr>
<tr>
<td>2007</td>
<td>Q2</td>
<td>37</td>
</tr>
<tr>
<td>2007</td>
<td>Q3</td>
<td>37</td>
</tr>
<tr>
<td>2007</td>
<td>Q4</td>
<td>38</td>
</tr>
<tr>
<td>2008</td>
<td>Q1</td>
<td>38</td>
</tr>
<tr>
<td>2008</td>
<td>Q2</td>
<td>39</td>
</tr>
<tr>
<td>2008</td>
<td>Jul</td>
<td>39</td>
</tr>
</tbody>
</table>
What About Peak Oil

The Wrong Question!!!
The Peak Oil Problem:
New Supplies Will Be More Expensive, but We Are Not Running Out of Oil

"One thing is clear: the era of easy oil is over. What we all do next will determine how well we meet the energy needs of the entire world in this century and beyond."
- David J O'Reilly, Chairman & CEO, Chevron Corporation, July 2005
### San Joaquin Valley
Testing Hubbert-Method Predictions for Reserves and Production
(Billions of Barrels)

<table>
<thead>
<tr>
<th></th>
<th>1964</th>
<th>1982</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative Discoveries</td>
<td>7.7</td>
<td>11.8</td>
<td>16.1</td>
</tr>
<tr>
<td>Percent Attributable to 1915</td>
<td>49%</td>
<td>69%</td>
<td>76%</td>
</tr>
<tr>
<td>Cumulative production as of</td>
<td>8.0-9.5</td>
<td>11.9-12.1</td>
<td>16.1-16.2</td>
</tr>
<tr>
<td>Year 2000 production projected in: (mb/d)</td>
<td>44-112</td>
<td>189</td>
<td>597(actual)</td>
</tr>
</tbody>
</table>

## Permian Basin

Testing Hubbert-Method Predictions for Reserves and Production

(Billions of Barrels)

<table>
<thead>
<tr>
<th></th>
<th>1964</th>
<th>1982</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulative</td>
<td>17.6</td>
<td>27.9</td>
<td>35.2</td>
</tr>
<tr>
<td>Discoveries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td>85%</td>
<td>86%</td>
<td>84%</td>
</tr>
<tr>
<td>Attributable to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative</td>
<td>19-27.5</td>
<td>28.5-30.5</td>
<td>35.8-37.5</td>
</tr>
<tr>
<td>production as of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2000</td>
<td>162-479</td>
<td>326-479</td>
<td>910(actual)</td>
</tr>
<tr>
<td>production</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>projected in:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mb/d)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: EPRINC, October 2006. *Does the Hubbert Method Provide a Reliable Means for Predicting Future Oil Production*, Richard Nehring, October 2006,
How Not to Transition to the Fuels of the Future

Big Oil, Ethanol and Offshore Leasing
In 2007 the Federal Government received $9.4 billion from oil and gas revenues royalties. In 2008 royalties expected to be greater due to higher crude prices.

FY 2007 lease sales raised over $3 billion. MMS offshore lease sales thus far in 2008 have generated high bids of over $9 billion.

Does not include state revenues, delay rental fees, etc.

Source: MMS
All estimates from the EIA’s 2008 Annual Energy Outlook. EIA estimates assume EISA2007 biofuel production levels are met.
# Gulf of Mexico Deepwater Frontier Exploration and Production Timeline

**Individual Prospect: 5,000' Water Depth, 30,000' Drilling Depth**

<table>
<thead>
<tr>
<th>Cost (millions)</th>
<th>Cumulative Cost (millions)</th>
<th>Activity</th>
<th>Lease Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1-5</td>
<td>$1-5</td>
<td>Acquire 2D and 3D seismic and evaluate geological, geophysical and engineering data to identify leads/drilling ideas.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prepare bids for lease sale.</td>
<td></td>
</tr>
<tr>
<td>$10-200</td>
<td>$11-205</td>
<td>Lease sale - sealed competitive bidding process.</td>
<td>Lease Sale</td>
</tr>
<tr>
<td>$1-2</td>
<td>$12-207</td>
<td>High bid leases awarded (10 year term). Cumulative annual lease rentals.</td>
<td></td>
</tr>
<tr>
<td>$5-10</td>
<td>$17-217</td>
<td>Acquire and interpret 3D and other data to turn ideas into drillable prospects.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Find partners to share costs to drill exploratory well.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Perform shallow hazard, archeological and other regulatory permitting requirements to obtain Federal approval to drill.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contract a rig to drill.</td>
<td></td>
</tr>
<tr>
<td>$100-150</td>
<td>$117-367</td>
<td>Drill exploration well.</td>
<td>Discovery</td>
</tr>
<tr>
<td>$40-60</td>
<td>$157-427</td>
<td>Drill sidetrack to exploration well.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Evaluate results.</td>
<td></td>
</tr>
<tr>
<td>$100-300</td>
<td>$257-727</td>
<td>If encouraging, drill appraisal/delineation well(s) and sidetrack(s).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Evaluate well results, formulate plan of development for discovery.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prepare and file permits for development, wait for approvals.</td>
<td></td>
</tr>
<tr>
<td>$1,000-5,000</td>
<td>$1,300-5,700</td>
<td>Sanction commerciality, build and install facility, drill and complete producing wells to achieve production.</td>
<td>1st Production</td>
</tr>
</tbody>
</table>

**Legend:**
- Preleasing evaluation
- Lease Term
- Exploration Phase
- Development Phase
US Ethanol Consumption:
2006 - Present

Mandate requirement assumes 750 million gallons per month for 12 months to reach the 9 billion gallon mandate for 2008.

Source: Renewable Fuels Association
Cost of Ethanol Subsidies

- $7 billion per year (Economist, 2007)
  - About $1.90/gallon.
- More than 200 types of subsidies
  - $11.2bn+ since 2005 on tax breaks for companies that blend ethanol into petrol (Financial Times)
  - Billions of dollars of subsidies for ethanol producers
- Tariff on ethanol imports
  - Aimed at preventing imports from Brazil
  - 54 cents/gallon

Source: The Economist, Financial Times
EPRINC

Ethanol’s Share of Crude Products and Gasoline

- U.S. Finished Motor Gasoline Product Supplied (Thousand Barrels per Day)
- U.S. Crude Oil and Petroleum Products Product Supplied (Thousand Barrels per Day)
- Ethanol Share of Finished Motor Gasoline (%)
- Ethanol Share of Crude Oil and Petroleum Products (%)

Oil’s Tax Bill

Income Taxes Paid in 2006: Oil Companies vs. The Bottom 75% of Individual Taxpayers

- Oil Company Income Taxes Paid in 2006: $138B
- Income Taxes Paid by the Bottom 75% in 2006 (estimate): $136B

Source: API
Are We Using Too Much Oil?
Oil Intensity of GDP

Source: International Monetary Fund and International Energy Agency. GDP is real GDP for each country in billions of 2000 U.S. dollars.

Source: CFTC Interim Report on Crude Oil, June 2008
Cost to consumers.....

PAYING MORE FOR HEAT

Consumers are expected to pay record prices for heating this winter. Projected average household expenditures and percentage change from 2007-08 costs:

<table>
<thead>
<tr>
<th>Expenditures</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating oil $2,644</td>
<td>▲ 36.3%</td>
</tr>
<tr>
<td>Natural gas $1,059</td>
<td>▲ 23.8%</td>
</tr>
<tr>
<td>Electricity $939</td>
<td>▲ 9.4%</td>
</tr>
</tbody>
</table>

Source: Energy Information Administration

Shaded areas indicate recessions.

Bureau of Economic Analysis, via Haver Analytics

Source: New York Times, USA Today
Oil Prices by Currency

Exchange Value of the Dollar
Index, Jan. 2002 = 100

Oil Prices in Several Currencies
Index, Jan. 2002 = 100

Source: Federal Reserve Board. The measure of the dollar is the broad nominal index, and the oil price is spot West Texas Intermediate crude oil.

Source: CFTC Interim Report on Crude Oil, June 2008
Role of the $\$

July 1, 2008 – October 8, 2008:

Dollar  
\[ +\ 7.4\% \]

Crude Oil  
\[ -\ 36.9\% \]

Sources: Federal Reserve, EIA  
Prices for WTI
Slides for Q's and A's
World Oil Consumption

World Oil Consumption

Million barrels per day

Total Consumption

Annual Growth

Million barrels per day

2001 2002 2003 2004 2005 2006 2007 2008 2009

China
United States
Other Countries

Short-Term Energy Outlook, September 2008
World Oil Consumption

- **China**: 2.44
- **Saudi Arabia**: 0.71
- **India**: 0.46
- **Iran**: 0.39
- **United States**: 0.37
- **Brazil**: 0.31
- **Russia**: 0.26
- **Iraq**: 0.20
- **Canada**: 0.15
- **Singapore**: 0.15

Source: Energy Information Administration

Source: CFTC Interim Report on Crude Oil, June 2008
Why You Should Stop Worrying About Peak Oil

• You’ll never get the right answer
• Put your effort into something useful, such as the backstop price
• Congress has already decided that any alternative fuel, no matter how expensive, is worth supporting as an alternative to petroleum
After summer price rally, demand is currently off, in part due to worldwide economic difficulties.

- Worldwide economic downturn has removed some crude demand from the market
- EIA has again revised down 2008 crude demand growth – now only +300,000 bbl/d in 2008 over 2007, which is 350,000 bpd lower than last month’s forecast, which itself was a downward revision of earlier estimates.
- OECD Consumption to decline 1.1 mmbbl/d in 2008.

However, though some crude supply has rebounded, supply will remain tight.

- OPEC has cut production in hopes of maintaining high prices
World GDP vs. Oil Production

Source: Federal Reserve Board and International Energy Agency. World GDP aggregate weighted by world oil consumption shares.

Source: CFTC Interim Report on Crude Oil, June 2008
Operable Refiners and Capacity

Source: EIA Data
U.S. Total Gasoline Imports

Source: EIA Data

Source: EIA Data
Profitability in Refining and Marketing – 2007-2008
(with year-over-year change)

Net Income for Refining and Marketing

<table>
<thead>
<tr>
<th>Quarter</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Q2</td>
<td>12</td>
<td>-54.98%</td>
</tr>
<tr>
<td>Q3</td>
<td>4.6</td>
<td>-46.07%</td>
</tr>
<tr>
<td>Q4</td>
<td>2.7</td>
<td>-70.88%</td>
</tr>
<tr>
<td>Q1</td>
<td>2</td>
<td>-86.30%</td>
</tr>
<tr>
<td>Q2</td>
<td>1.7</td>
<td></td>
</tr>
</tbody>
</table>

Source: EIA Data and EPRINC Calculations
Refiner Margins vs. ROI

Source: EIA Data
U.S. Retail Prices: Gasoline vs. Diesel
2006 - 2008

Source: http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_dcus_nus_w.htm