OGJ Forecasts

- Forecast & Review
  - Jan. 9, 2012, issue of Oil & Gas Journal
    - Marilyn Radler, Senior Editor-Economics
    - Alan Petzet, Chief Exploration Editor
- Midyear Forecast
  - July 2, 2012, issue of Oil & Gas Journal

MARCH 21 FORECAST & REVIEW  WEBCAST ARCHIVED AT www.ogj.com
Unique factors in 2011: Libya; Saudi + IEA didn’t compensate; Cushing bottleneck

Source: OPEC Monthly Oil Report, January 2012
OPEC spare production capacity (MMbd)

Note: Shaded area represents 2001-2011 average (2.6 million barrels per day)

Source: Short-Term Energy Outlook, February 2012
OECD oil inventories (days’ supply)

Note: Colored band represents the range between the minimum and maximum observed inventories from Jan. 2007 - Dec. 2011.

Source: Short-Term Energy Outlook, February 2012
Crude prices and...

...Dollar value:

...Equity value:

Source: OPEC Monthly Oil Report, January 2012
Global oil demand (MMbd)

90.3
+1.5%

Feb OMR:
89.9 +0.9%

Source: IEA

Non-OECD
OECD
## Changing demand forecasts*

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>IEA</strong></td>
<td>90.3</td>
<td>90.0</td>
<td>89.9</td>
</tr>
<tr>
<td></td>
<td>+1.5%</td>
<td>+1.1%</td>
<td>+0.9%</td>
</tr>
<tr>
<td><strong>EIA</strong></td>
<td>89.5</td>
<td>89.4</td>
<td>89.3</td>
</tr>
<tr>
<td></td>
<td>+1.6%</td>
<td>+1.4%</td>
<td>+1.5%</td>
</tr>
<tr>
<td><strong>OPEC</strong></td>
<td>88.9</td>
<td>88.9</td>
<td>88.8</td>
</tr>
<tr>
<td></td>
<td>+1.2%</td>
<td>+1.2%</td>
<td>+1.1%</td>
</tr>
</tbody>
</table>

*Million b/d and change from adjusted base.
Refining capacity additions, 2011-15 (MMbd)*

Total capacity additions: 6.8 MMbd

*From existing projects
Source: OPEC World Oil Outlook, 2011
Additional cumulative crude runs vs. required (MMbd)

*From existing projects
Source: OPEC World Oil Outlook, 2011
## US E. Coast, European refinery closures 2011-12

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>REFINERY</th>
<th>CAPACITY (Mbd)</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ConocoPhillips</td>
<td>Trainer, Penn.</td>
<td>185</td>
<td>Closed</td>
</tr>
<tr>
<td>LyondellBasell</td>
<td>Berre L’Etang, France</td>
<td>104</td>
<td>Closed</td>
</tr>
<tr>
<td>Tamoil</td>
<td>Cremona, Italy</td>
<td>90</td>
<td>Closed</td>
</tr>
<tr>
<td>OMV</td>
<td>Arpechim, Romania</td>
<td>70</td>
<td>Closed</td>
</tr>
<tr>
<td>Sunoco</td>
<td>Marcus Hook, Penn.</td>
<td>175</td>
<td>Closed</td>
</tr>
<tr>
<td>Petroplus</td>
<td>Reichstett, France</td>
<td>82</td>
<td>Closed</td>
</tr>
<tr>
<td>Petroplus</td>
<td>Cressier, France</td>
<td>68</td>
<td>Closing</td>
</tr>
<tr>
<td>Petroplus</td>
<td>Antwerp, Belgium</td>
<td>115</td>
<td>Closing</td>
</tr>
<tr>
<td>Petroplus</td>
<td>Petit Couronne, France</td>
<td>146</td>
<td>Closing</td>
</tr>
<tr>
<td>Sunoco</td>
<td>Philadelphia, Penn.</td>
<td>330</td>
<td>For sale</td>
</tr>
</tbody>
</table>

Source: Centre for Global Energy Studies, Weekly Outlook, Jan. 16, 2012
By early 2011, JX Group, Idemitsu, and Showa Shell had made or announced cuts totaling 600,000 b/d
- Others (TonenGeneral, Cosmo Oil) expected to cut 200,000 b/d
- Cuts might reach 1 million b/d by 2015

(Source: OPEC)
Hovensa closure

Hovensa, joint venture of Hess and PDVSA, on Jan. 18 announced closure of 350,000 b/d refinery in St. Croix, Virgin Islands.
Global oil supply (MMb/d)

Source: IEA; OGJ forecast for OPEC crude in 2012
Non-OPEC supply (MMbd)*

Source: IEA

Feb OMR:
53.6 +1.7%

*Supply increasing in regions broken out
Global biofuels projection (MMbd)

US 16 billion gal in 2016 vs. 22.25 billion gal mandate

Source: IEA
# The call on OPEC crude (MMbd)

<table>
<thead>
<tr>
<th>Demand</th>
<th>90.3</th>
<th>89.9 in Feb. OMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less non-OPEC supply</td>
<td>53.7</td>
<td></td>
</tr>
<tr>
<td>Less OPEC NGL</td>
<td>6.4</td>
<td>Avg. 2011: 5.8 (IEA)</td>
</tr>
<tr>
<td>Zero stock-change call on OPEC</td>
<td>30.2</td>
<td>29.8 updated</td>
</tr>
<tr>
<td>Less stock withdrawal (OGJ)</td>
<td>0.2</td>
<td>Avg. 1011: 0.6 (OGJ)</td>
</tr>
<tr>
<td>Equals call on OPEC crude</td>
<td>30.0</td>
<td>29.6 updated</td>
</tr>
</tbody>
</table>

Average OPEC crude production in 2011: 30 MMbd (Feb. IEA)

Quota: In Dec. 2011, OPEC agreed to hold production at 30 MMbd and let individual members adjust as necessary.

OPEC crude in January: 30.9 MMbd (Feb. IEA)

Lower demand projection implies lower need from stocks if OPEC produces 30 MMbd.

Iran?
Petroline (Saudi East-West): 5 MMbd (50% used)

Abqaiq-Yanbu NGL line (parallel to Petroline): 290 Mbd

Iraq-Ceyhan pipeline (but Strategic Pipeline in Iraq closed)

IPSA (Iraq-Saudi Arabia): 1.65 MMbd (deactivated)

Tapline (through Lebanon): 500 Mbd (deactivated)

Abu Dhabi-Fujairah: 1.5 MMbd (const.)
### Iranian embargo scenarios (MMb/d)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Likelihood</th>
<th>Loss in Iranian Exports</th>
<th>Saudi Oil Output</th>
<th>Global Spare Capacity</th>
<th>Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>No exports loss; oil moves east</td>
<td>Medium</td>
<td>0</td>
<td>9.5</td>
<td>2.9</td>
<td>Status quo</td>
</tr>
<tr>
<td>China, India don’t increase intake of Iranian crude</td>
<td>Fairly high</td>
<td>1.4</td>
<td>10.9</td>
<td>1.5</td>
<td>&gt;$130</td>
</tr>
<tr>
<td>China, India fill SPR but don’t displace other crude</td>
<td>High</td>
<td>0.5-1.4</td>
<td>10.2-10.9</td>
<td>1.5-2.4</td>
<td>&gt;$125</td>
</tr>
<tr>
<td>Iranian exports cease</td>
<td>Low</td>
<td>2.3</td>
<td>11.5</td>
<td>0.6</td>
<td>&gt;$150</td>
</tr>
</tbody>
</table>

Source: Barclays Capital Commodities Research, Jan. 13, 2012
US oil product demand (MMbd)

Feb. EIA: 2012 – 18.9 (+0.2%)

Source: EIA for 2008-10.
Source: OGJ; EIA for 2008-10
Note: Gasoline values include ethanol.
US liquids supply (MMbd)

Source: EIA for 2008-10.
US oil imports, (exports) (MMbd)

Source: EIA for 2008-10.

Net product exports:
- 60 Mbd in 2011;
- 520 Mbd in 2012
US total gas consumption (tcf)

Source: EIA for 2008-10.
US gas imports, (exports) (tcf)


Source: EIA for 2008-10.
US marketed gas production (tcf)

Source: EIA for 2008-10.
US shale plays

May 2009

May 2011
WTI crude vs. Henry Hub gas

WTI ($/bbl)

- Historical spot price
- EIA price forecast
- NYMEX futures price
- 95% NYMEX futures price upper confidence interval
- 95% NYMEX futures price lower confidence interval

Source: Short-Term Energy Outlook, February 2012

HH gas ($/MMbtu)

- Historical spot price
- EIA price forecast
- NYMEX futures price
- 95% NYMEX futures price upper confidence interval
- 95% NYMEX futures price lower confidence interval

Source: Short-Term Energy Outlook, February 2012

EIA February projection for 2012 average: $100/bbl

EIA February projection for 2012 average: $3.35/MMbtu

Oil ($/bbl) to gas ($/MMbtu) ratio: 30:1
The shift to oil drilling (rig count)

Source: Baker Hughes, Deutsche Bank

Baker Hughes rig count

- 2008: 2,010
- 2009: 1,871
- 2010: 1,871
- 2011: 2,010
- 2012F: 2,010

Legend: Rigs
### US well completions summary

<table>
<thead>
<tr>
<th></th>
<th>2011E</th>
<th>2012F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploratory wells</td>
<td>2,231</td>
<td>2,312</td>
</tr>
<tr>
<td>Field wells</td>
<td>43,960</td>
<td>45,888</td>
</tr>
<tr>
<td>Total wells</td>
<td>46,177</td>
<td>48,200 (+4.4%)</td>
</tr>
<tr>
<td>Total footage</td>
<td>315 million</td>
<td>336 million (+6.7%)</td>
</tr>
</tbody>
</table>

- Shale, other tight formations stimulate drilling.
- Shift from dry gas to wet gas and oil.
- Gulf of Mexico recovering slowly.
- Footage growing due to long laterals onshore and ultradeep drilling offshore.
## IEA’s US tight oil projection (Mbd)

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Williston</td>
<td>270</td>
<td>400</td>
<td>580</td>
<td>730</td>
<td>800</td>
<td>840</td>
<td>880</td>
</tr>
<tr>
<td>Barnett</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>E. Ford</td>
<td>30</td>
<td>100</td>
<td>140</td>
<td>200</td>
<td>260</td>
<td>340</td>
<td>390</td>
</tr>
<tr>
<td>Monterey</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>Niobrara</td>
<td>30</td>
<td>40</td>
<td>60</td>
<td>70</td>
<td>90</td>
<td>100</td>
<td>120</td>
</tr>
<tr>
<td>Utica</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>50</td>
<td>90</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
<td>50</td>
<td>50</td>
<td>80</td>
<td>80</td>
<td>110</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td><strong>380</strong></td>
<td><strong>620</strong></td>
<td><strong>870</strong></td>
<td><strong>1,140</strong></td>
<td><strong>1,320</strong></td>
<td><strong>1,530</strong></td>
<td><strong>1,700</strong></td>
</tr>
</tbody>
</table>

NGL, condensate production to grow by 600 Mbd to 2.7 MMbd over period.

Source: Update of IEA Midterm Outlook, December 2011 OMR.
DB says bigger factor in coal-to-gas switching by power generators will be Cross-State air Pollution Rule beginning 2012 if not blocked by courts.

Note: CAPP = Central Appalachian coal
Main oil price factors: demand, Iran
All oil demand growth is outside OECD
Refining capacity following demand growth, inclined toward surplus
US refining compartmentalizing
Unconventional plays reshaping US supply
US gas needs new markets
US energy politics needs repair