IMPACTS OF NORTH AMERICA CRUDE SUPPLY GROWTH ON SPR EFFECTIVENESS

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The Future of the Strategic Petroleum Reserve
Center for Strategic & International Studies, Washington, DC
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Specialists in:

- Oil sector national and international developments
- Strategic issues in U.S. and global refining, markets & logistics
- Analysis of North America crude logistics developments
- Disrupted markets, 6+ studies of real and hypothetical disruptions
Recent US oriented projects:

- 2010 DOE, 2011 DOS, 2013 New DOS Keystone XL Assessments:
  - Alternative pipeline & rail logistics for Canadian and US crude oils

- EnSys North America Infrastructure Review (monthly)
  - Highlights and database on pipeline, rail and marine developments in Canada and USA – crude, NGL/condensate/diluent, products
  - Logistics balances: Cushing, Western Canada, Rail, Bakken

- 2014 API US Crude Oil Exports analysis
  - Impacts of allowing exports on oil trade, refining, pricing, US economy

- 2005 study (with Intek) for DOE OSPR of a range of hypothetical disruptions in 2015
  - Strategic Petroleum Reserve Crude Compatibility Study, Dec 2005
Disruptions analyzed in 2005 still apply
• Multiple elements in total disruption impact

<table>
<thead>
<tr>
<th>Disruption</th>
<th>PG wide + Military</th>
<th>Saudi</th>
<th>W Africa</th>
<th>Venezuela</th>
<th>GC Offshore Hurricane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration months</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>3</td>
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<tr>
<td>Total Crude/NGL Loss</td>
<td>(8.14)</td>
<td>(9.05)</td>
<td>(2.77)</td>
<td>(3.78)</td>
<td>(1.52)</td>
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<tr>
<td>Offsets</td>
<td>6.10</td>
<td>6.61</td>
<td>2.69</td>
<td>3.63</td>
<td>1.52</td>
</tr>
<tr>
<td>- OPEC Surge Production</td>
<td>0.00</td>
<td>0.69</td>
<td>0.69</td>
<td>0.63</td>
<td>0.00</td>
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<tr>
<td>- Govt. Stock Draw (IEA &amp; Others)</td>
<td>2.31</td>
<td>1.50</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>- Govt. Stock Draw (SPR)</td>
<td>3.79</td>
<td>4.42</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
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<tr>
<td>Net Supply Disruption</td>
<td>(2.04)</td>
<td>(2.44)</td>
<td>(0.08)</td>
<td>(0.15)</td>
<td>0.00</td>
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<tr>
<td>Jet Fuel</td>
<td>0.34</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>- Military Demand Increase</td>
<td>0.70</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>- Civilian Demand Loss</td>
<td>(0.36)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Demand Cuts</td>
<td>(1.88)</td>
<td>(1.94)</td>
<td>(0.08)</td>
<td>(0.15)</td>
<td>0.00</td>
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<tr>
<td>- Disrupted Region(s)</td>
<td>(1.62)</td>
<td>(1.10)</td>
<td>(0.08)</td>
<td>(0.15)</td>
<td>0.00</td>
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<tr>
<td>- Rest of World</td>
<td>(0.26)</td>
<td>(0.84)</td>
<td>0.00</td>
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<tr>
<td>Product Offsets</td>
<td>(0.50)</td>
<td>(0.50)</td>
<td>0.00</td>
<td>0.00</td>
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<td>- SPR Reserves</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>- Foreign Reserves</td>
<td>(0.50)</td>
<td>(0.50)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Net Demand Reduction</td>
<td>(2.04)</td>
<td>(2.44)</td>
<td>(0.08)</td>
<td>(0.15)</td>
<td>0.00</td>
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<tr>
<td>Refining Loss</td>
<td>(2.90)</td>
<td>(1.56)</td>
<td>(0.40)</td>
<td>(1.15)</td>
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</table>
Rising US & Canadian production and lower US demand / increased biofuels have dramatically reduced crude oil import dependency

• Vs 2005 study projections for 2015:
  • 12.74 mb/d projected imports drop to 7.34 mb/d (2014)
  • Canada imports higher, Africa almost gone
  • Middle East halved (3.6 -> 1.8), Venezuela to 1/3 (2.2 -> 0.7)
  • Vulnerability of PADD2 gone, PADDs 1, 3 reduced, PADD5 higher
Far reaching implications for SPR draw to effectively impact US and global markets

- **Logistics capacity**
  - SPR crude draw increases flows to/in GC i.e. SPR flows are *incremental* (see QER); only partially replace lost imports
  - Of a 4 mb/d draw, potentially > 1 mb/d would need to go to PADDs 1 and 5
  - Implications for distribution, dock and vessel capacity – also shipping time to PADD5

- **Volume, imports displacement**
  - Total Africa+ME+Ven crude imports are now at 2.8 mb/d and total non-Canadian at 4.5 mb/d
  - Therefore a 4 mb/d SPR draw would displace / redirect onto international markets potentially >> 1 mb/d of non-disrupted imports
Far reaching implications for SPR draw to effectively impact US and global markets

- **Crude quality / mix / exports**
  - The bulk of crude imports into PADDs 3 and 5 are now in the 15 – 30 API range. PADD3 heavies especially difficult to back out
  - SPR Sweet (37.5% of Reserve) is at 35.2-37 API, Sour at 30.8-33.3
  - Difficult to see a market in US for SPR Sweet given today’s ample domestic production (unless mix changed)
    - Better fit with Europe, Asia 34-35 API crude slates
  - Implication is for SPR draw to have maximum impact on global markets and prices need to be able to export up to 1.5 mb/d Sweet
Far reaching implications for SPR draw to effectively impact US and global markets

• **SPR size / draw rate / make-up**
  • Given the new situation is current SPR size and draw rate needed?
    • Primary impact of SPR draw is to reduce damage to US economy (and others around the world) by placing oil into world markets thereby reducing *international* and hence US oil prices
    • As such, ability to place 4+ mb/d into world oil markets arguably still warranted
      • Larger world economy / trade, high oil price spikes
      • But it needs to be able to get there (logistics, regulatory)
  • Growing refining export capacity in Middle East means a gradual shift from export of crude to export of product, i.e. potential rising product dependency
    • Increases risk of refining capacity loss and, together with hurricane damage potential & time lag to get SPR crude to PADD5, arguably consideration for product reserves / commercial holdings
THANK YOU!

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