

Saudi Arabia's Strategic Energy Initiative: Safeguarding Against Supply Disruptions

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Saudi Arabia's Strategic Energy Initiative

- In light of regional conflict and high oil prices, the Saudi leadership has recently issued a directive to decouple energy and foreign policy, and to remove all political considerations from oil production decisions.
- Production capacity will be increased so as to mitigate against deleterious effects of major supply disruptions from four key exporters:
 - **Iran:** Threatens to use oil as political weapon; possibility of war with US.
 - **Venezuela:** Threatens to use oil as political weapon.
 - **Nigeria:** Continuing unrest.
 - **Iraq:** Successful attacks against oil infrastructure and likelihood of civil war.
- **Phase 1:** By June 2007, Saudi Arabia is expected to have enough spare capacity to offset all Iranian exports.
- **Phase 2:** By 2009 / 2010 the goal is to satisfy global demand during a potential disruption from Iran and one of the three other major OPEC exporters (Venezuela, Nigeria or Iraq).

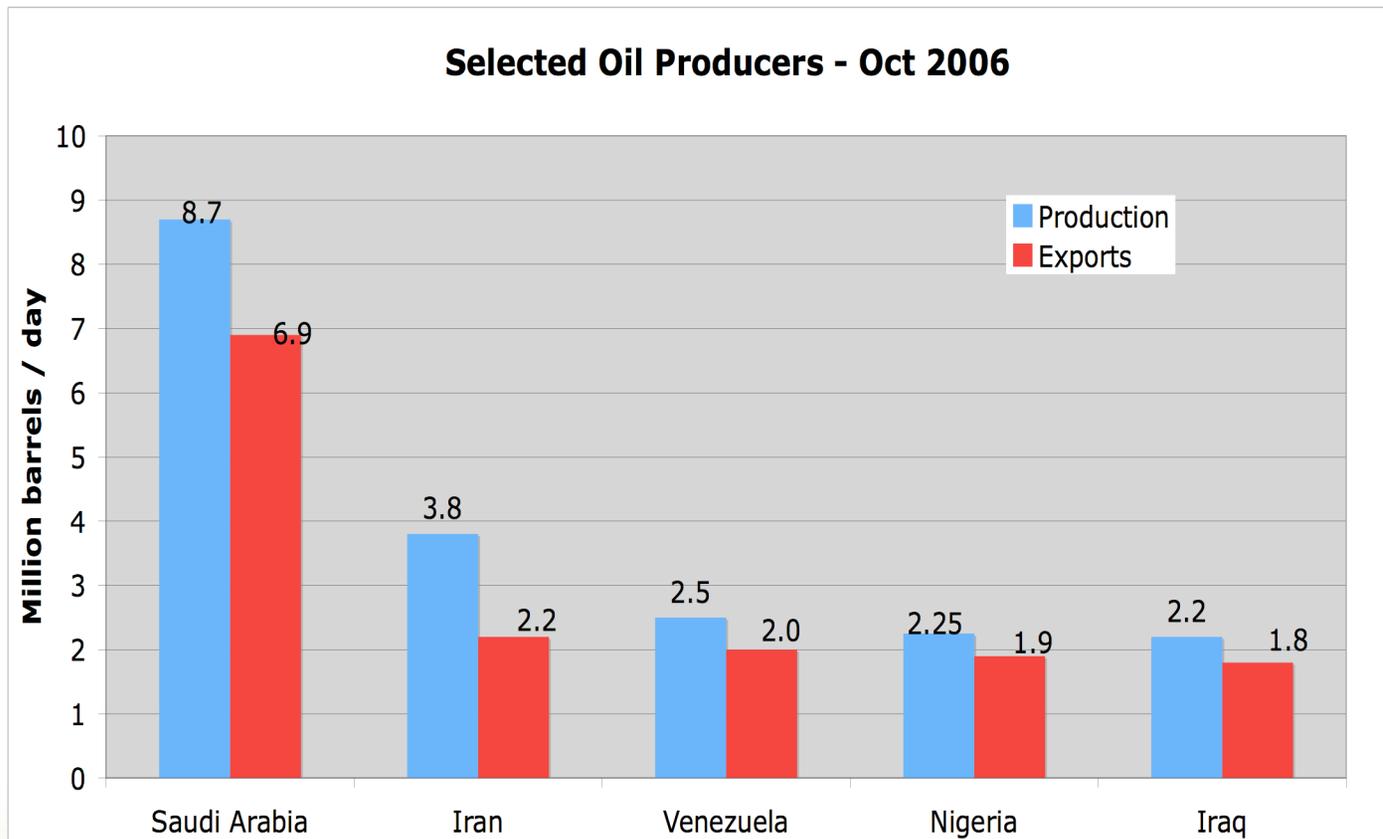
Saudi Place in Energy Market

- **The largest oil reserves in the world:** Saudi Arabia claims 25% of the world's proven reserves (260 billion barrels), and 200 billion barrels more as "possibility."
- **The world's largest production capacity, world's leading exporter, and the world's second largest oil producer*:** Saudi Arabia has a production capacity of 11.1 - 11.3 mb/d; exports 8 mb/d; and produces between 8.6 - 9.0 mb/d and 1 - 1.3 mb/d of natural gas liquids.
- **The most influential member of OPEC:** Saudi Arabia continues to play the central role in the decisions of OPEC, due to its immense reserves and influence over the other member states.
- **Largest spare capacity:** The Kingdom has a current spare capacity of 2.5 - 2.7 million b/d.

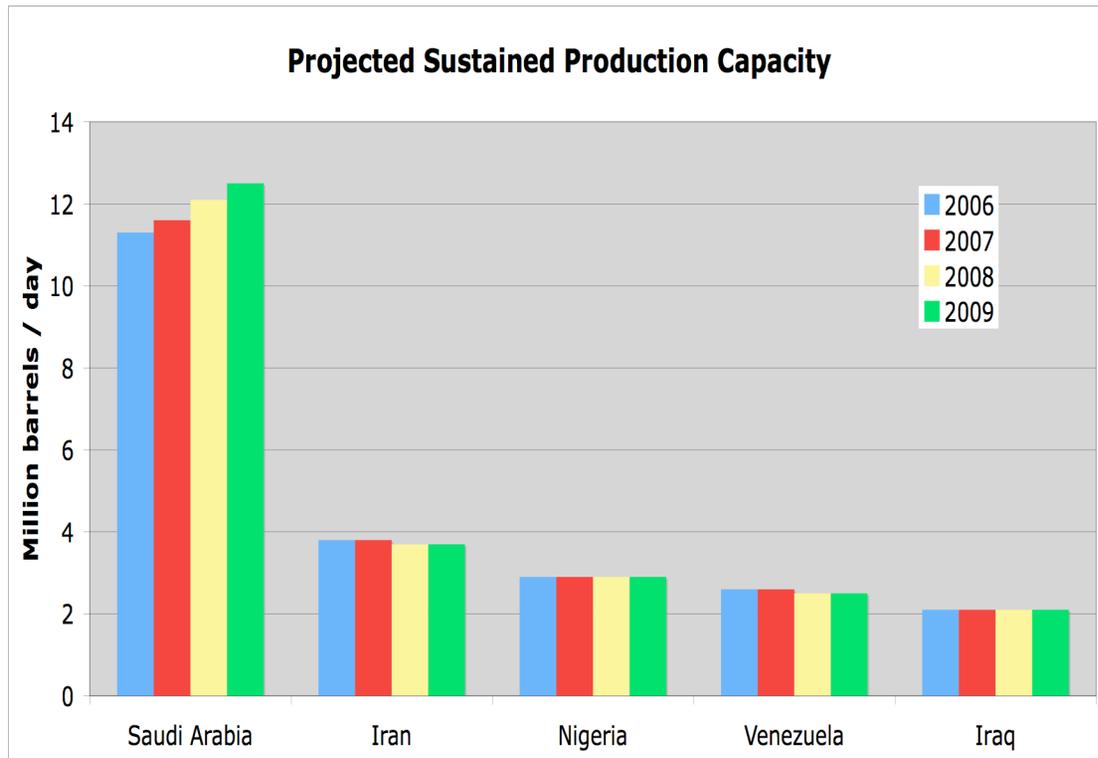
* Primary position temporarily ceded to Russia due to OPEC quota restraints.

Production & Exports of Selected Oil Producers

(Excludes Natural Gas Liquids & Refined Products Exports)



Projected Sustained Production Capacity of Selected Crude Producers



- Only Saudi Arabia has means to increase production capacity.
- Iran and Venezuela lack capital for expansion, face increasing domestic demand, and their political environments precludes foreign investment.
- Iraq lacks capital, security, and stability necessary for capacity expansion.
- Nigeria faces energy security concerns that have shut in between 650,000 to 700,000 b/d of potential production capacity.

Expedited Crude Production Expansion to 2009

Oil Field	Grade	New Capacity (b/d)	New Date
Abu Safah & Qatif	Arab Light & Extra Light	500,000	online
Haradh	Arab Light	300,000	online
Khursaniyah	Arab Light	500,000	June, 2007
Shaybah	Arab Extra Light	200,000	April, 2008
Nuayyim	Arab Sweet Light	100,000	Feb, 2009
Khoreis	Arab Light	1.2 million	March, 2009
Total		2.80 million	2004-2009

11,000,000 b/d	Estimated sustainable capacity in March 2006
+ 2,300,000 b/d	Estimated increase in capacity 2006-09
- 800,000 b/d	Estimated natural production decline 2005-09
≈ 12,500,000 b/d	Estimated sustainable capacity in August 2009

Expedited Production Schedule

- **Abu Safah & Qatif:** Upgrade completed late 2004 at cost of \$4 billion.
 - In January 2004: 300,000 b/d.
 - In March 2005: produced additional 500,000 b/d (for total of 800,000 b/d).
- **Haradh:** Expansion estimated to cost \$1.5 billion.
 - In January 2004: 170,000 b/d.
 - April 2006: 300,000 b/d came on stream.
- **Khursaniyah:** \$4 billion to June 2007.*
 - In January 2004: 50,000 b/d.
 - By June 2007 to reach 500,000 b/d.
- *Continued...*

* Cost may increase due to expedited timetable.

Expedited Production Schedule (cont.)

- **Shaybah:** Expansion estimated to cost \$500 million.*
 - Current production: 500,000 b/d.
 - By April 2008: 200,000 b/d will come on stream.
- **Nuayyim:** \$350 million expansion project has begun.*
 - Currently offline.
 - By Feb 2009: will increase to 100,000 million b/d.
- **Khoreis:** \$8 - \$9 billion expansion project has begun.*
 - Current production: 50 -100,000 b/d.
 - By March 2009: expected to increase to 1.2 million b/d.

* Cost may increase due to expedited timetable.

Production Expansion Post 2009

Oil Field	Grade	New Capacity (b/d)	Date
Shaybah	Arab Extra Light	300,000	2010
Neutral Zone*	Arab Heavy	300,000	2010
Munifa	Arab Heavy	900,000	2011
Total		1.5 million	2009-2011

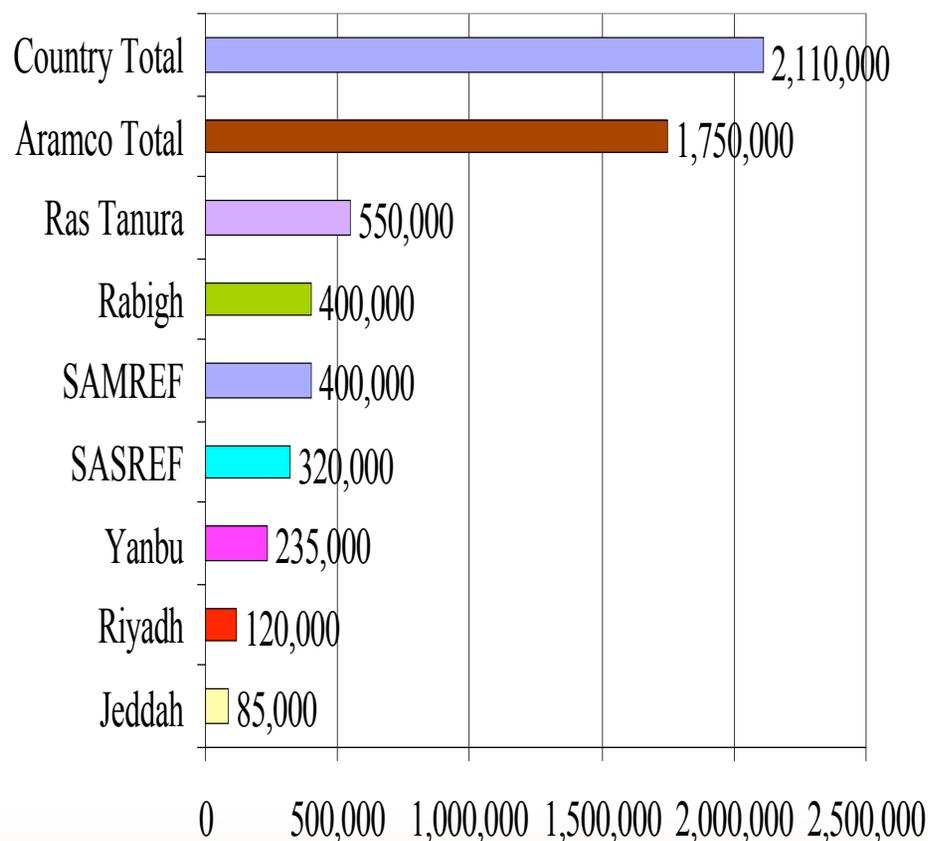
12,500,000 b/d	Estimated sustainable capacity in August 2009
+ 1,500,000 b/d	Estimated increase in capacity 2009 - 2011
- 500,000 b/d	Estimated natural production decline 2009 - 2011
≈ 13,500,000 b/d	Estimated sustainable capacity by 2011

* Project not confirmed, but highly likely considering current energy initiative.

Production Upgrades Post 2009

- **Shaybah:** Upgrade to cost \$800 million.
 - Current production at 500,000 b/d.
 - Includes a third and final increase of 300,000 b/d by 2010.
 - Decision to proceed has been confirmed.
- **Neutral Zone:** Upgrade to cost \$400 million.
 - Current production (Saudi side) at 285,000 b/d.
 - Would add 300,000 b/d by 2010.
 - Decision to proceed with development expected soon.
- **Munifa:** \$6 - \$7 billion to bring project online.
 - Currently offline.
 - Would add 900,000 b/d in production by 2011.
 - Decision to bring online has been approved and project is moving forward.

Saudi Refining Capacity



Source: Saudi Aramco

Saudi National Security Assessment Project

- Saudi Arabia has 8 refineries, with a combined crude throughput capacity of roughly 2.1 million b/d, and about 1.75 million b/d of overseas refining capacity.
- The Kingdom plans to upgrade and expand the Rabigh refinery by 425,000 b/d.
- The Kingdom will expand its refining capacity in North America, building 2 new domestic and 3 new overseas refineries in next 5 years.

Saudi Refining Expansion Program

Increases capacity from about 3.9 million to over 6.0 million b/d by 2011. Includes:

- **MOTIVA Enterprises (Texas):** In partnership with SHELL, expansion to increase from 235,000 to 600,000 b/d. (Cost: \$4 to \$5 Billion; Aramco owns 50%.)
- **Fujian Refinery Project (China):** With SINOPEC and EXXONMOBIL, to increase to 230,000 b/d. (Cost: \$3.5 to \$4 Billion; Aramco owns 25%.)
- **Qingdao Refinery Project (China):** With SINOPEC adds 200,000 b/d. (Cost: \$1.2 to \$1.5 Billion; Aramco to own 25%.)
- **Rabigh Refinery Expansion:** With SUMITOMO, to increase from 400,000 to 825,000 b/d. (Cost: \$9.8 Billion; Aramco owns 50%.)
- **Yanbu Export Refinery:** With CONOCO-PHILLIPS, adds 400,000 b/d. (Cost: \$6 Billion; Aramco owns 50%.)
- **Jubail Expansion Refinery:** With TOTAL, adds 400,000 b/d. (Cost: \$6 Billion; Aramco owns 50%.)

Saudi Oil Export Operations

- Two thirds of Saudi oil is exported through the Abqaiq Processing Facility (the remaining 1/3 through Yanbu in the Western region).
- The export terminal of Ras Tanura (with 6 - 6.5 mb/d capacity, the world's largest offshore oil loading facility) and Ras al-Ju'aymah (3 -3.5 mb/d) are on the Persian Gulf; Yanbu (5 - 5.5 mb/d) is on the Red Sea.
- Total export capacity is 13.5 -15 mb/d.
- Saudi Arabia's key pipeline is the 5 mb/d East-West Crude Oil Pipeline (Petroline).
- Petroline has been expanded in part to maintain Yanbu as a strategic alternative to Ras Tanura's port facilities in the event that exports are blocked in Persian Gulf.
- Plans include the possible construction of an additional pipeline that would terminate in Rabigh, thus allowing the Kingdom to switch most of its exports from the Persian Gulf to the Red Sea.

Water Cut in Saudi Oil Fields

- Aramco's current water cut (the ratio of water produced from a well compared to the volume of total liquids) is about 29%.
- The water cut in Ghawar, the world's largest field, which has a sustained production capacity of 5 mb/d has declined from a peak of 35% to just 32% because of advances in technology and continual improvements in field management. If past years are any indication, this trend will continue.
- Saudi Aramco can afford to employ a conservative approach (“peripheral water injection”) in its fields because of its large oil reserves base and the flexibility afforded by a large number of development opportunities.

Saudi Oil Field Depletion Rates

- The Kingdom's average state of reserve depletion for all its fields is approximately 29%.
- The oldest field, Abqaiq, is 74% depleted, and the world's largest field, Ghawar, has produced just under 50% of its reserves. By contrast, Shaybah, one of the Kingdom's youngest fields, has 95% of its proven reserves remaining.
- Without “maintain potential” drilling to make up for production, Saudi oil fields would have a natural decline rate of a hypothetical 8%. As Saudi Aramco has an extensive drilling program with a budget running in the billions of dollars, this decline is mitigated to a number close to 2%.
- These depletion rates are well below industry averages, due primarily to enhanced recovery technologies and successful “maintain potential” drilling operations.

Nawaf Obaid

Managing Director

Nawaf Obaid is currently the Managing Director of the Saudi National Security Assessment Project, a government consultancy based in Riyadh. He is also the private Security & Energy Advisor to HRH Prince Turki Al Faisal, the Saudi Ambassador to the US.

He is the author of *The Oil Kingdom at 100: Petroleum Policymaking in Saudi Arabia* (Washington Institute for Near East Policy, 2000). He is also an Adjunct Fellow in the Office of the Arleigh Burke Chair in Strategy at the Center for Strategic & International Studies (CSIS) in Washington DC where co-authored with, Anthony Cordesman, *National Security in Saudi Arabia: Threats, Responses, and Challenges* (Praeger & CSIS Publications, September 30, 2005).

He has a BSFS from Georgetown University's School of Foreign Service, an MA in Public Policy from Harvard University's Kennedy School of Government, and completed doctoral courses at the Massachusetts Institute of Technology's Security Studies Program.