

SULFUR UTILIZATION PROSPECTS IN SAUDI ARABIA



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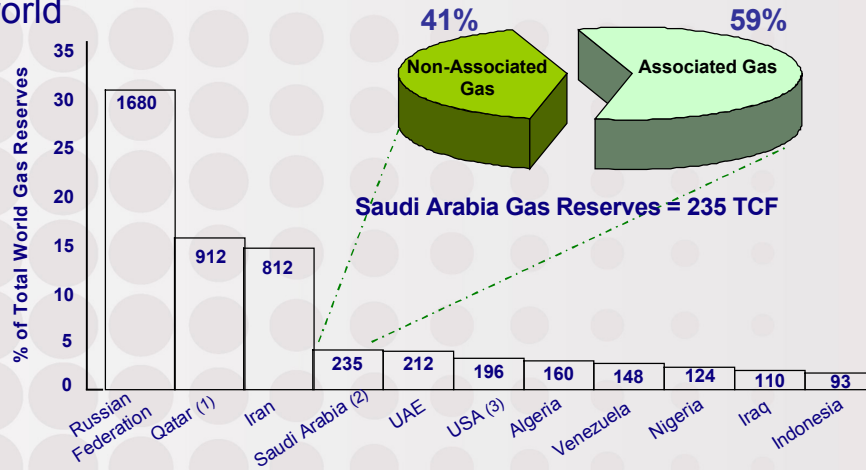
Outline

- Saudi Arabian Gas Industry
- Sulfur Production Facilities
- Sulfur Applications, Current & Future
- Saudi Aramco Initiative
- Investment Environment in Saudi Arabia
- Conclusion

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Saudi Arabia's Gas Industry

Saudi Arabia holds the fourth largest total gas reserves in the world

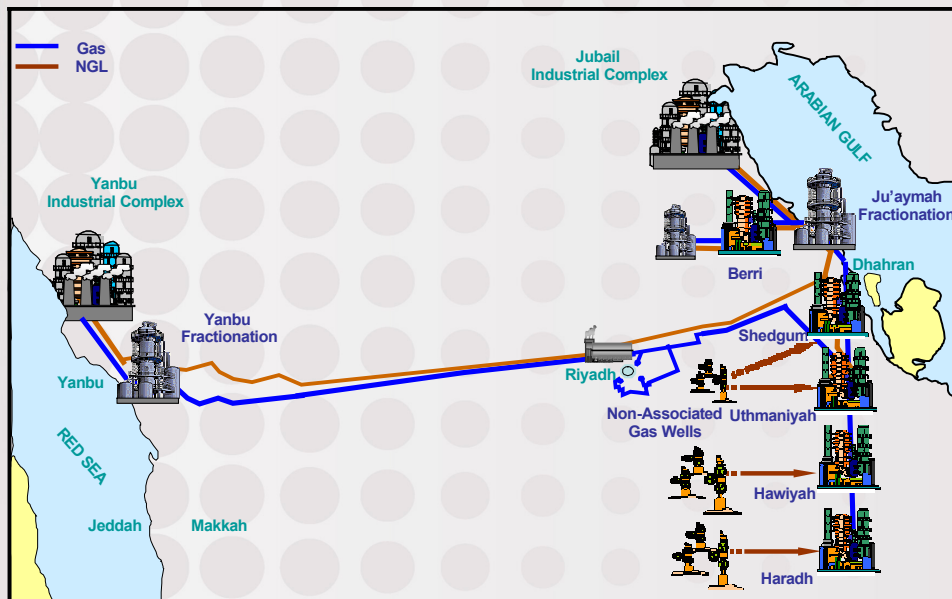


Sources: BP's "Statistical Review of World Energy" - June 2003, EIA's "2002 Oil & Gas Reserves Report", and Saudi Aramco data

- (1) Qatar Ministry of Foreign Affairs and 2002 News Articles
- (2) Kingdom of Saudi Arabia 2003 Year Reserves
- (3) EIA - 2002 Year Reserves Report
- (4) Numbers in Trillion Cubic Foot (TCF)

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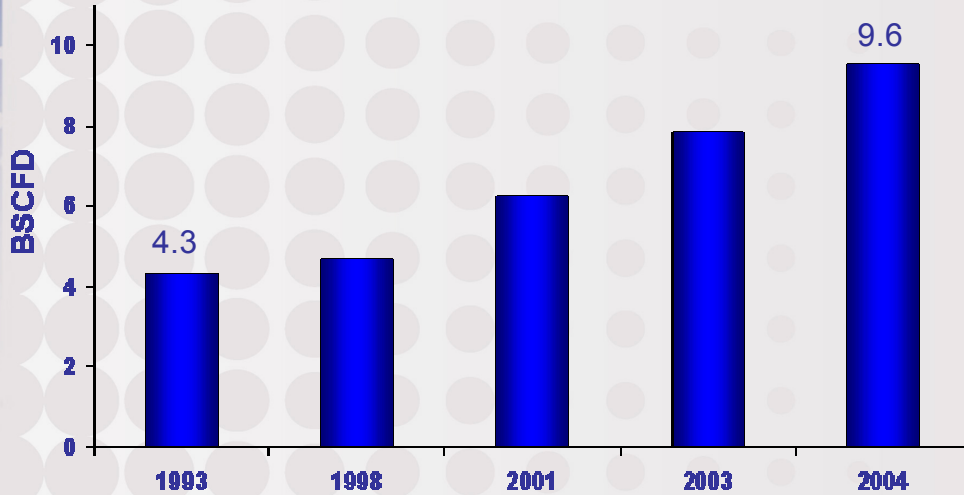
Kingdom's Master Gas System



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Raw Gas Processing in Saudi Arabia

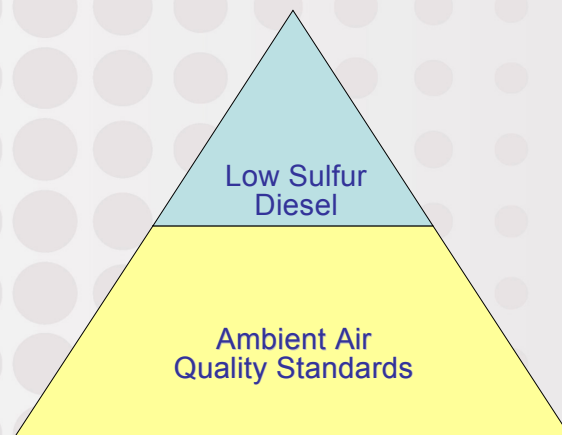
Raw gas processing capacity has doubled *in less than a decade*



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Impact of Environmental Regulations

Companies worldwide have to reduce sulfur content of end products, due to governing environmental regulations

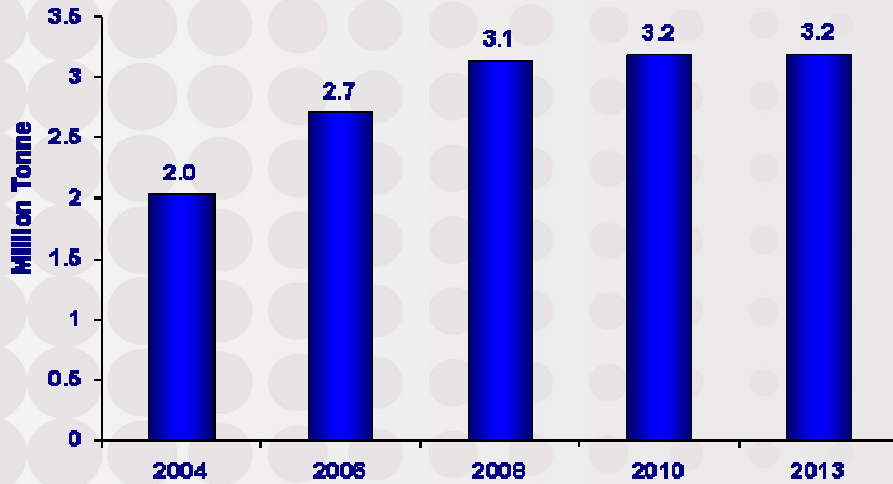


...Due to increased gas processing, and to comply with environmental standards, an additional 219,000 tonnes per year of sulfur will be captured

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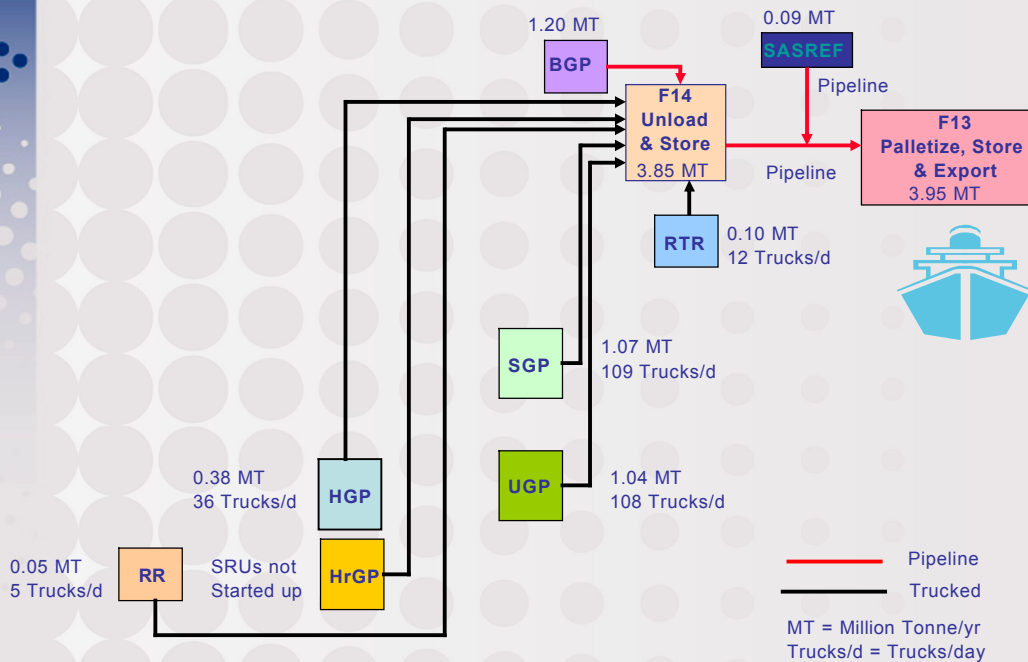
Sulfur Production in Saudi Arabia

Current sulfur production is 2 million tonnes per year



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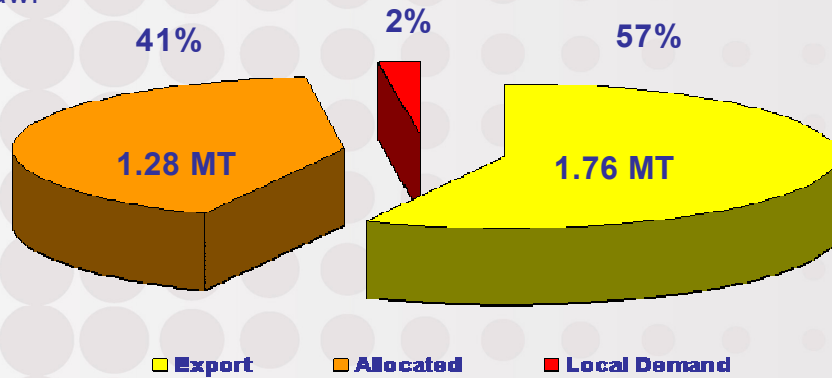
Sulfur Handling & Exporting Facilities



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Future Local Sulfur Demand

In year 2008, local demand is forecast to increase with the allocation of sulfur to Ma'aden Phosphate complex at Ras Az Zawr



...Current local demand is 60,000 tonnes per year

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MT = Million Tonne/yr

Sulfur Recap

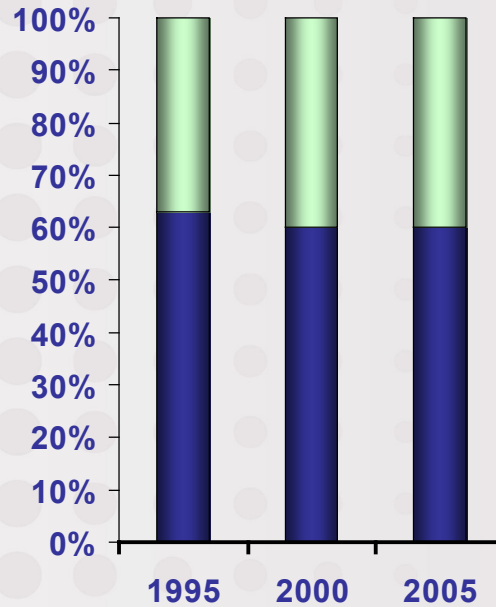
- **Production**
 - 2.0 million tonnes/year
 - 95% of Production is from gas plants
- **Local Demand**
 - 3% of current production (60,000 tonnes/year)
 - Future demand to increase with Ma'aden Phosphate Complex (1.28 million tonnes per year)
- **Sulfur Export**
 - 97% of current production (1.94 million tonnes/year)
 - Pellets produced using wet prilling process

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Global Sulfur Applications

Non-Fertilizer
(40-30%)

Fertilizer
(60-70%)



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Source: USGS

Sulfur Applications in Saudi Arabia

Fertilizer

Non-Fertilizer

Current Applications:

- Saudi Arabian Fertilizer Company
- National Est. For Agriculture & Industry

Future Applications:

- DAP; Saudi Arabian Mining Company
- Promote Sulfur Fertilizers (Plant Nutrient Sulfur – PNS)

Current Applications:

- Soap/Detergents; Modern Industries Company
- Acid; Raez Co. & National Co. of Sulphur

Future Applications:

- Sulfur Asphalt Roads
- Paint & Pigments, Rubber, Metallurgical

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Future Sulfur Applications in Saudi Arabia

Fertilizer

Future Application:

- **Promote Sulfur Fertilizers (Plant Nutrient Sulfur – PNS)**
 - Sulfur is secondary macronutrient for crop growth compared to primary macronutrients NPK
 - Plant growth is suboptimal even with primary macronutrients N, P & K
 - TSI projects PNS global deficit to reach 12 million tonnes by 2010
 - Asia & Africa projected PNS deficit to reach 7 million tonnes by 2010
 - Average of 15-20% crop production increase due to applying PNS

...Untapped market for PNS represents a major opportunity for increased fertilizer sales

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Source: The sulfur Institute & Marsulex Inc. Peter Reineck

Future Sulfur Applications In Saudi Arabia

Non-Fertilizer

Future Application:

- **Sulfur Asphalt Roads**
 - Joint effort with Ministry of Transportation & Saudi Aramco
 - Completed laboratory tests at KFUPM
 - Actual 3 year trial to commence in October 2004
 - 1 Kilometer trial road section
 - Could potentially utilize 550,000 tonne per year of sulfur if implemented (mix is 70% Asphalt, 30% SEAM)
 - Sulfur asphalt roads are stronger and resistant to high local temperatures
 - Resist rutting in the roads

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Sulfur Applications Recap

- Globally more 60% of the sulfur is used in fertilizers
- Producing **sulfur fertilizers** for optimal plant growth could potential utilize 12 million tonnes per year of sulfur globally
- **Sulfur asphalt** roads for high strength and high temperature resistant roads could potential utilize 550,000 tonnes per year of sulfur locally
- Currently limited sulfur applications exist globally

...thus Saudi Aramco is pursuing new markets and innovative proposals for sulfur utilization through its recently established New Business Development organization

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New Business Development Organization

Mission is to:

- Leverage Saudi Aramco's resources
- Encourage 3rd party investment in Saudi Arabia
- Develop new venture with third parties
- Act as partner or catalyst
- Be the single point of contact for 3rd parties with new business proposals

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Investment Environment in Saudi Arabia

- Predictable trends for investments due to prominent position in the world's oil and gas industry, coupled with competitive pricing
- Strategic location to both European and Asian markets
- Growing domestic/regional demand due to increasing population
- Established industrial parks with room to grow
- Availability of local professionals and labor
- Abundant liquidity in the financial markets seeking investment opportunities
- Reliable and competitively priced feedstock and energy

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Government Support for Private Investments

- Passage of Foreign Direct Investment Law
- Establishment of SAGIA
- Restructuring of Electricity and Telecommunication Sectors
- Reduction of Import Tariffs
- No Currency Restrictions
- No Import Barriers
- Free Movement of Capital

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Conclusion

- Ample sulfur is available for utilization
- Sulfur utilization in Saudi Arabia is only 2% currently and will increase in 2008 to 43%
- Sulfur fertilizers could potentially utilize 12 million tonnes per year of sulfur globally
- Sulfur asphalt roads could potentially utilize 550,000 tonnes per year of sulfur locally
- Saudi Aramco's New Business Development is looking for innovative proposals for developing new markets for sulfur utilization in Saudi Arabia
- Saudi Arabia offers an excellent investment environment