

# **The Sulphur Institute**

## **Sulphur in Review**

### **Webinar Presentation**

**Washington DC, USA**

**July, 2008**

# Presentation TSI Staff

- **Catherine Randazzo, President and CEO**
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# Agenda

- **The Sulphur Institute at a glance**
- **Ground rules**
- **Assumptions**
- **Sulphur Consumption: Situation and Outlook**
  - **Fertilizer**
  - **Non-Fertilizer**
- **Sulphur Production: Situation and Outlook**
  - **Elemental**
  - **Sulphur in Other Forms (SOF, mostly sulphuric acid)**
  - **Pyrites**
- **China Sulphur Status Update**
- **Sulphuric Acid Production**
- **Sulphur Balance and Inventories**
- **Trade Patterns: Sulphur and Sulphuric Acid**
- **Major Variables Impacting Sulphur Production**
- **Major Variables Impacting Sulphur Consumption**

# **Our Mission:**

**TSI is committed to being the global advocate for sulphur, representing all stakeholders actively engaged in producing, buying, selling, handling, transporting, or adding value to sulphur.**

# TSI Members

Abu Dhabi National Oil Company

Agip/KCO

BCT Chemtrade Corporation

BHP Billiton Marketing, Inc.

BP Canada Energy Company

BP Products North America, Inc.

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Canadian National Railway Company

Canadian Pacific Railway

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Sultran Ltd.

Tessenderlo Kerley, Inc.

Transammonia, Inc.

Valero Marketing and Supply Company

Zwaans van der Heuvel Tankvaart BV

# Ground rules

Questions to be submitted via email: [DMessick@sulphurinstitute.org](mailto:DMessick@sulphurinstitute.org)

- No discussion around any forward predictions
- No discussions of price
- No discussions of sulphur storage options

# Safe Harbor Statement

- Certain statements contained herein constitute “forward-looking statements” as that term is defined under the Private Securities Litigation Reform Act of 1995. Although The Sulphur Institute believes the assumptions made in connection with the forward-looking statements are reasonable, they do involve known and unknown risks, uncertainties and other factors that may cause actual results to be materially different from those contemplated or projected, forecasted, or estimated by such statements.
- These risks and uncertainties include but are not limited to the predictability of sulphur, fertilizer, energy, and agricultural commodity markets subject to competitive market pressures; changes in foreign currency and exchange rates; international trade risks including, but not limited to, changes in policy by foreign governments; changes in environmental and other governmental regulation; or adverse weather conditions.
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# Assumptions for Sulphur Outlook

- **World Population Growth: 1.1% (Source UN)**
- **World Average GDP Growth: 4.9% (Source IMF)**
  - Developed economies: 2.9%
  - Developing economies: 7.0%
- **Demand Growth for Oil/Natural Gas: (Source IEA)**
  - Oil: 1.7%
  - Gas: 2.6%



# World Sulphur Consumption: Total

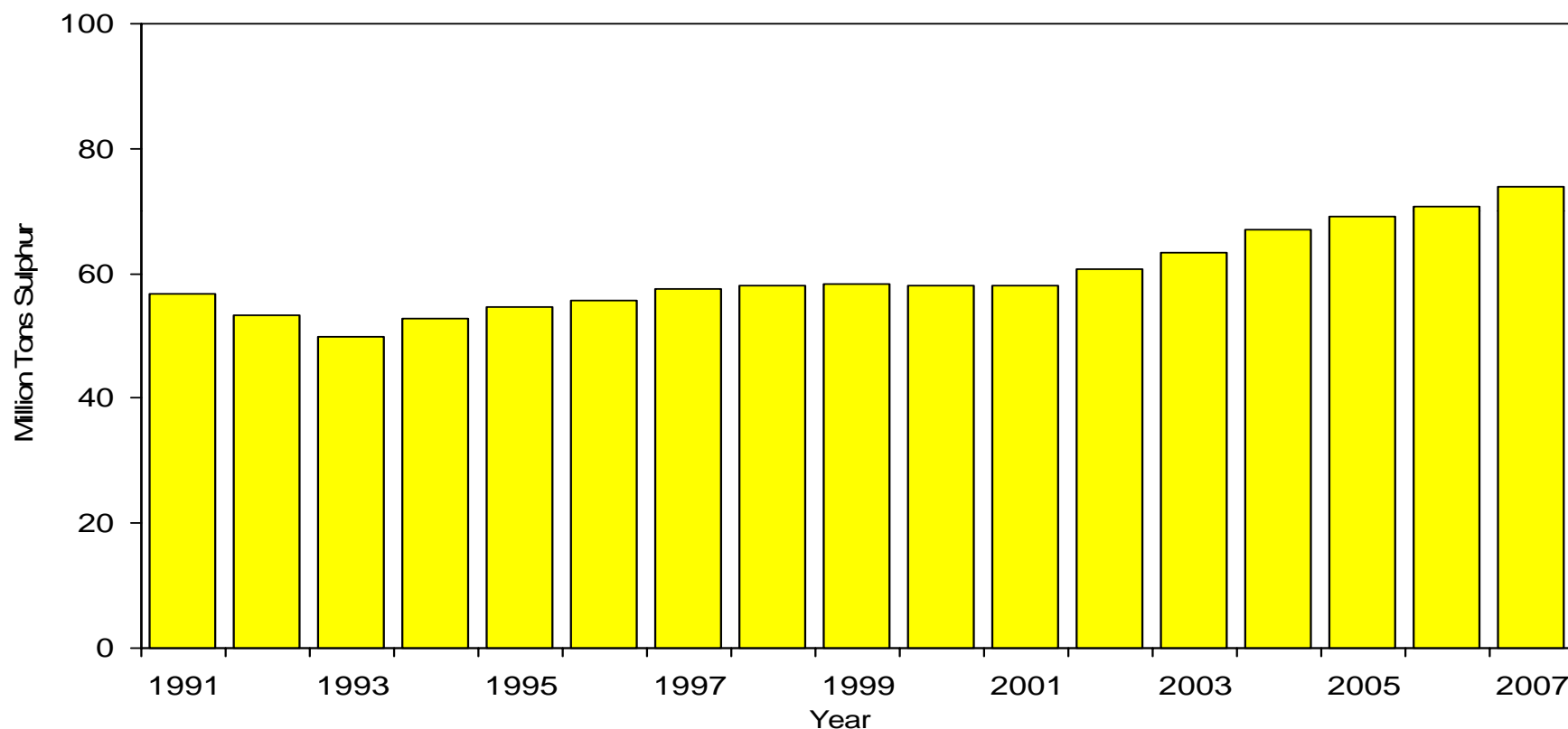
- **2006: 71 Million Metric tons (Mts, up 2.6%)**
  - 48 Mts from elemental
- **2007: 73.9 Mts**
- **Growth Regions**
  - **Phosphate Fertilizers**
    - East Asia (China)
    - Africa (Morocco, others)
    - West Asia (Saudi Arabia – Maaden)
  - **Ore Leaching, Others:**
    - Oceania (nickel leaching, some copper leaching)
    - Latin America (copper leaching)
    - East Asia (caprolactam, non-fertilizer phosphates, hydrofluoric acid, nickel leaching)
    - Africa (nickel, copper and uranium leaching)

# World Sulphur Consumption: Total

**Projections point to stronger growth:**

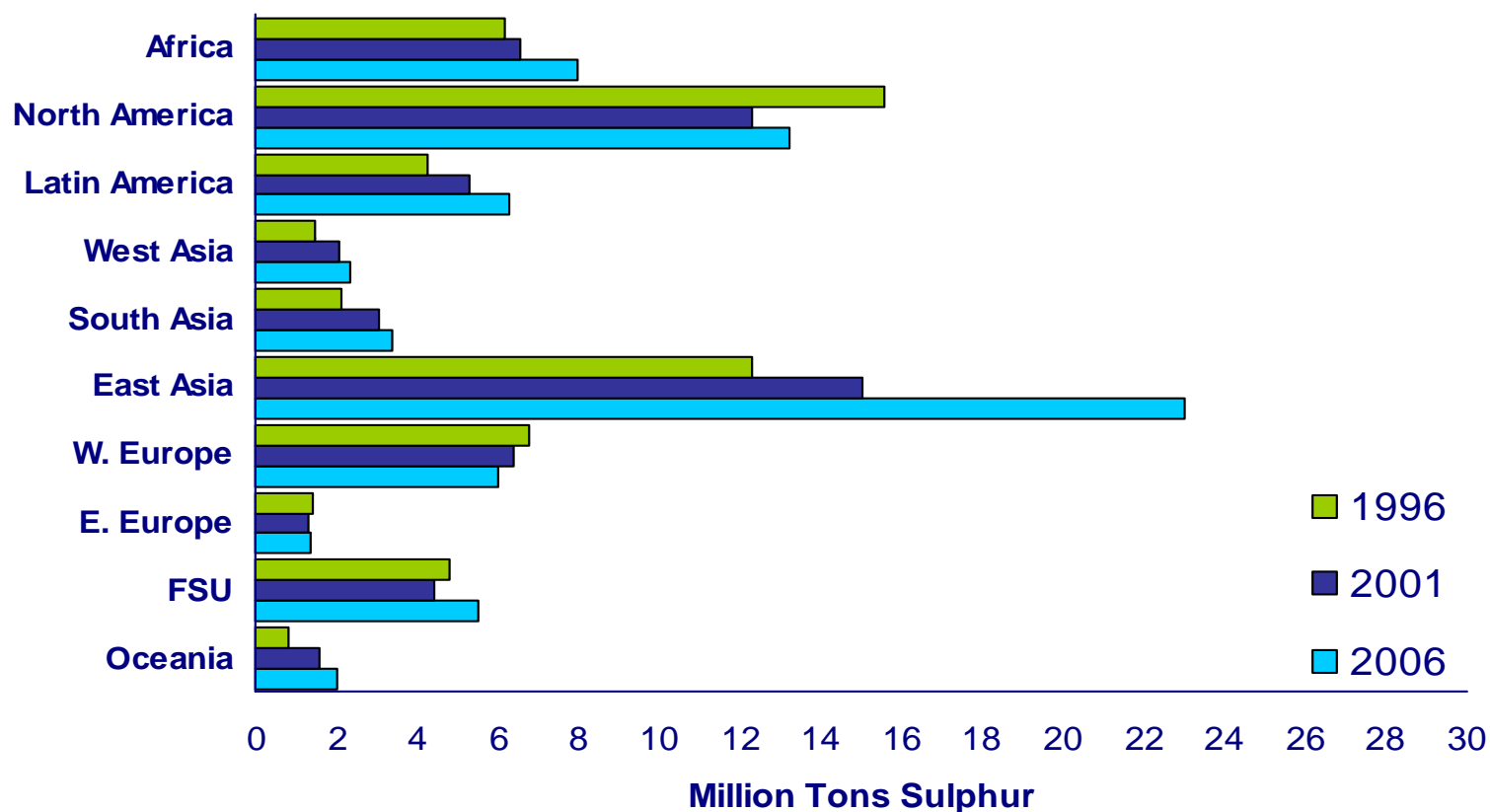
- **Stronger agricultural outlook impacts fertilizer production and consumption**
- **Economic outlook impacts metal output**
- **Stronger growth focus in developing world**
  - East Asia
  - South Asia
  - Latin America

# World Sulphur Consumption: Total



Reference: Figure 8, Sulphur Outlook, TSI, 2008

# Regional Sulphur Consumption

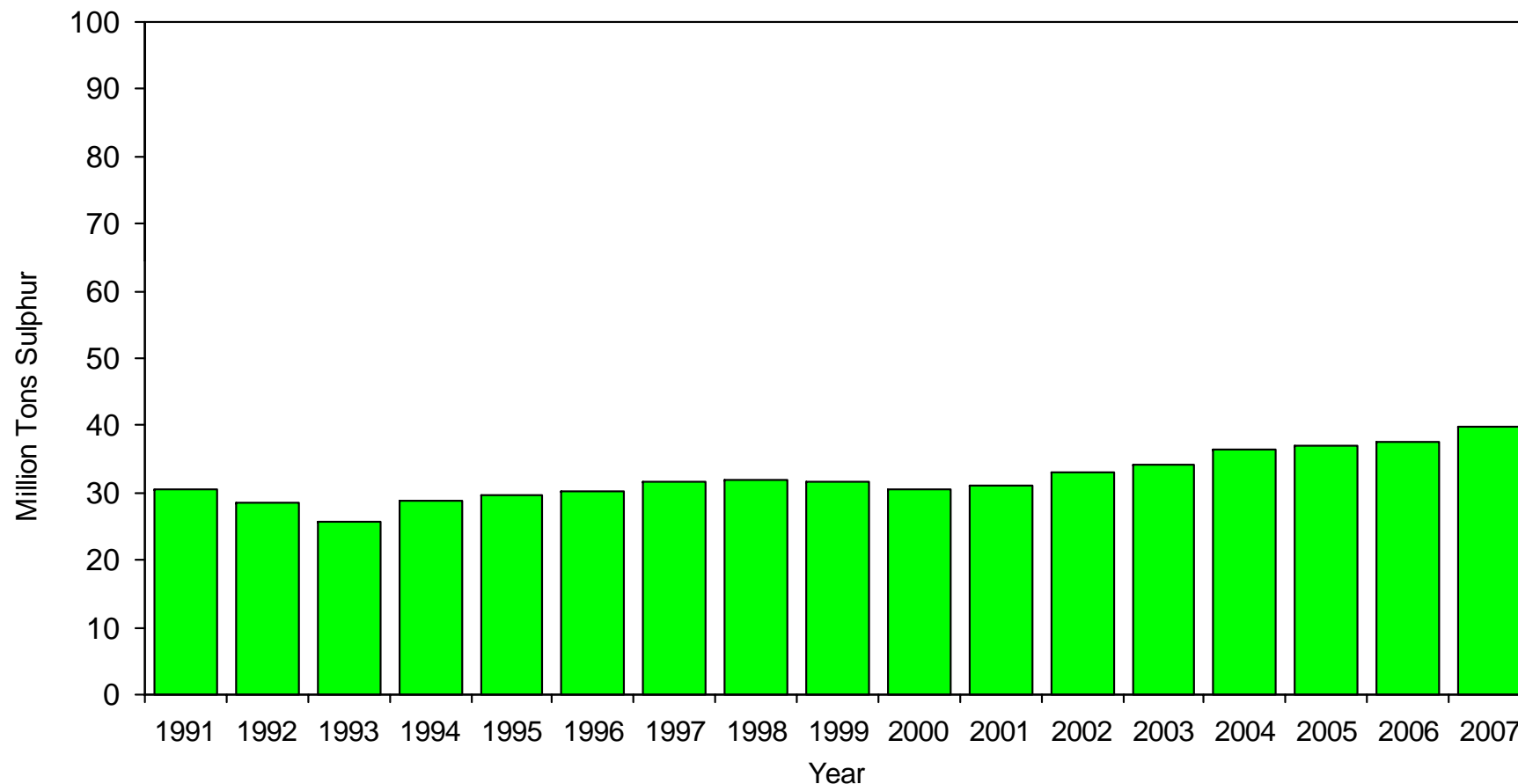


Reference: Sulphur Outlook, TSI, 2008

# Sulphur Consumption: Fertilizer

- **2006: 38 Mts (up 2.0%)**
- **2007: 39.7 Mts**
- **Fertilizer use accounts for 54% of sulphur use**
- **Growth Regions:**
  - **East Asia (may slow after 2011, mostly China)**
  - **West Asia (Maaden, largest phosphate plant, 2011-12)**
  - **Africa (Morocco, Egypt, Tunisia)**
- **Use by Category**
  - **93% Phosphates**
  - **7% Others (ammonium sulphate, potassium sulphate, elemental-sulphur fertilizers, liquid thiosulphates)**

# Sulphur Consumption: Fertilizer

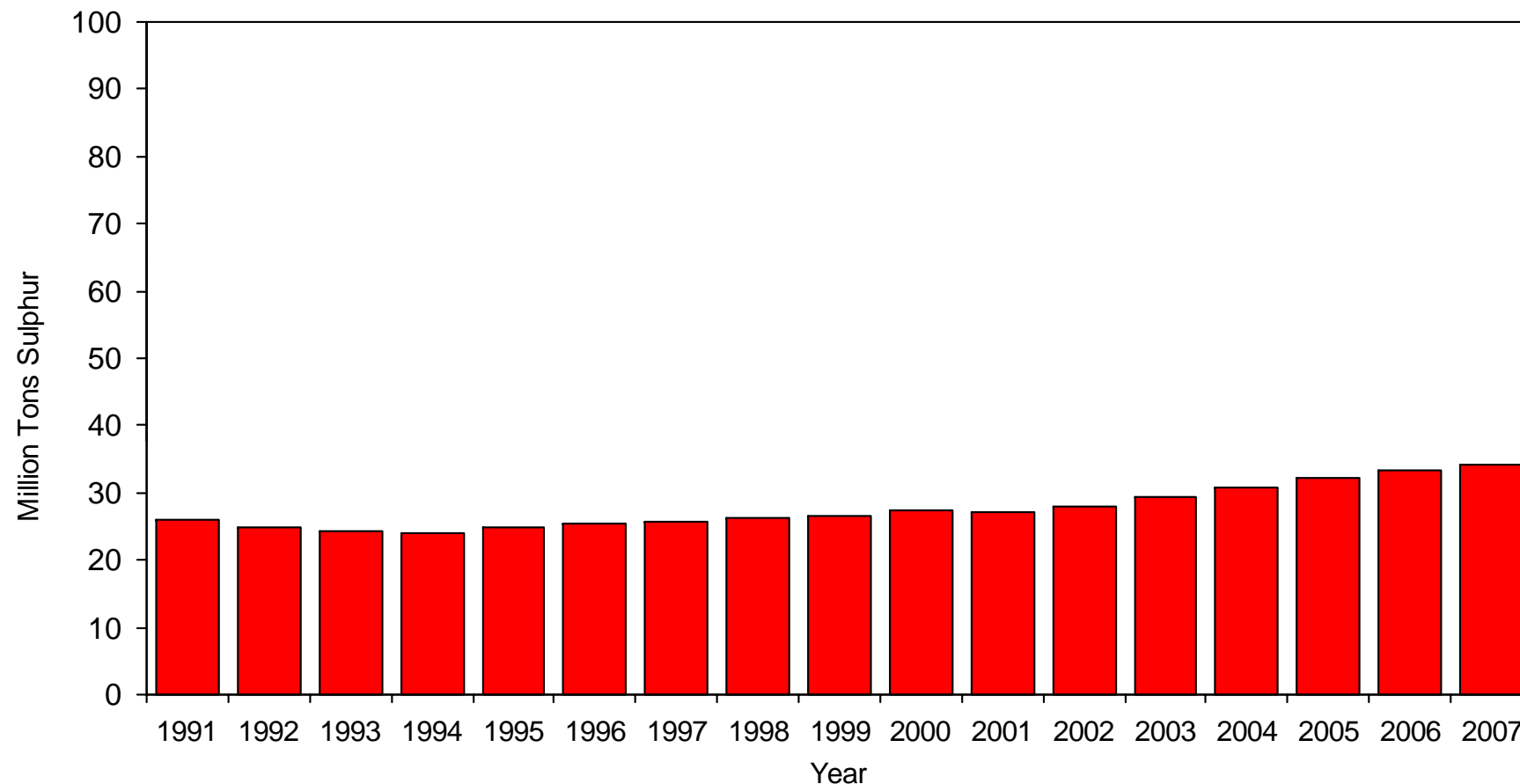


Reference: Figure 2, Sulphur Outlook, TSI, 2008

# Sulphur Consumption: Non-Fertilizer

- **2006: 33.3 Mts (up 3.3%)**
- **2007: 34.3 Mts**
- **Non-fertilizer use: 46% of total S use**
- **Growth Regions**
  - **East Asia (non-fertilizer phosphates, caprolactam, hydrofluoric, ore leaching), Oceania (ore leaching), Latin America (ore leaching), Africa (ore leaching); FSU (several)**
  - **Growth Trend to Developing Regions**
- **Major Categories**
  - **Ore Leaching**
  - **Caprolactam**
  - **Feed Phosphates**
  - **Industrial Phosphates**
  - **Hydrofluoric Acid**

# Sulphur Consumption: Non-Fertilizer



Reference: Figure 3, Sulphur Outlook, TSI, 2008



# Sulphur Production: Total

- **Two consecutive slow-growth years:**
  - **2006: 71 Mts (up 2.2%)**
  - **2007: 72.6 Mts**
- **Sluggish elemental sulphur growth offsets strong SOF growth**

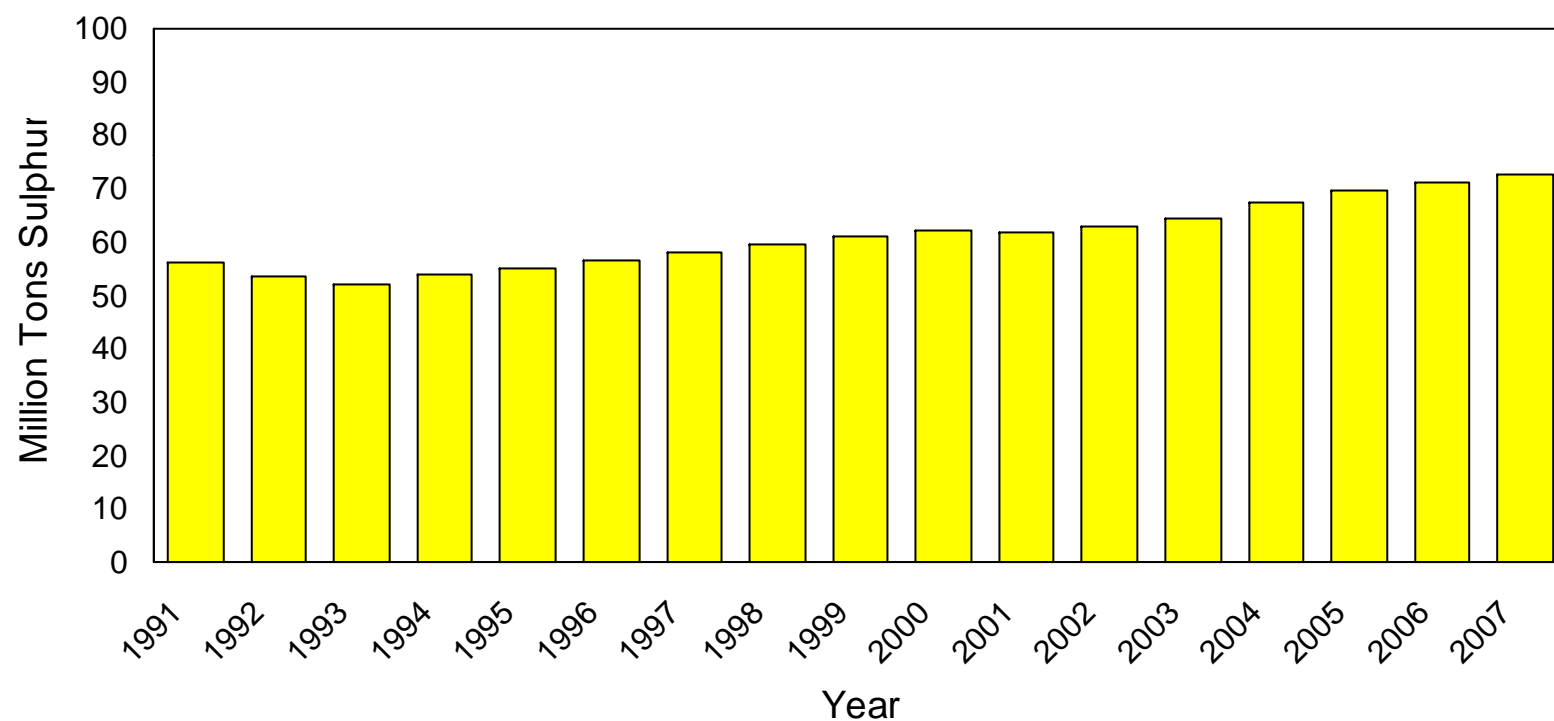
# **Sulphur Production: Total**

- **North America: largest producer**
- **2007 second consecutive year of decline**
- **United States**
  - **Refinery issues/outages**
  - **2005 hurricane season effects continue**
  - **Gas-recovered decline continues**
- **Canada**
  - **Gradual decline in gas-recovered production**
  - **More than offsets increase in oil sand output**
  - **Logistical issue of production trend north**

# Sulphur Production: Total

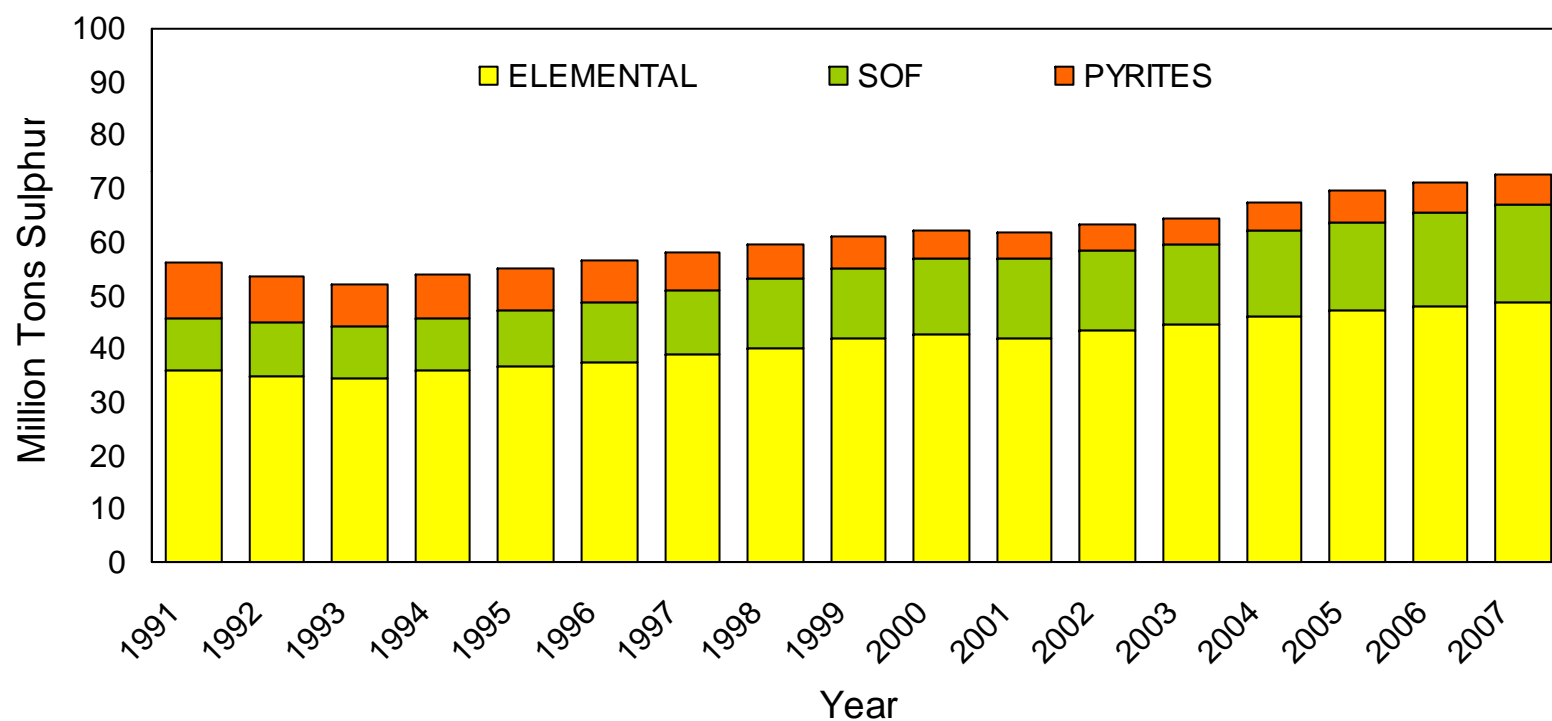
- **Growth Regions**
  - **West Asia: Gas Recovered (39% of Growth)**
  - **East Asia: Recovered and SOF (21% of Growth)**
  - **FSU: Gas Recovered (14% of Growth); delay**
  - **N. America: Oil Recovered and Oil sands (12%)**
  - **Latin America: SOF (8% of Growth)**
- **Projection Outlook stronger than in past:**
  - **Project push in West Asia, East Asia and North America**
  - **Some delays in FSU**

# Sulphur Production: Total



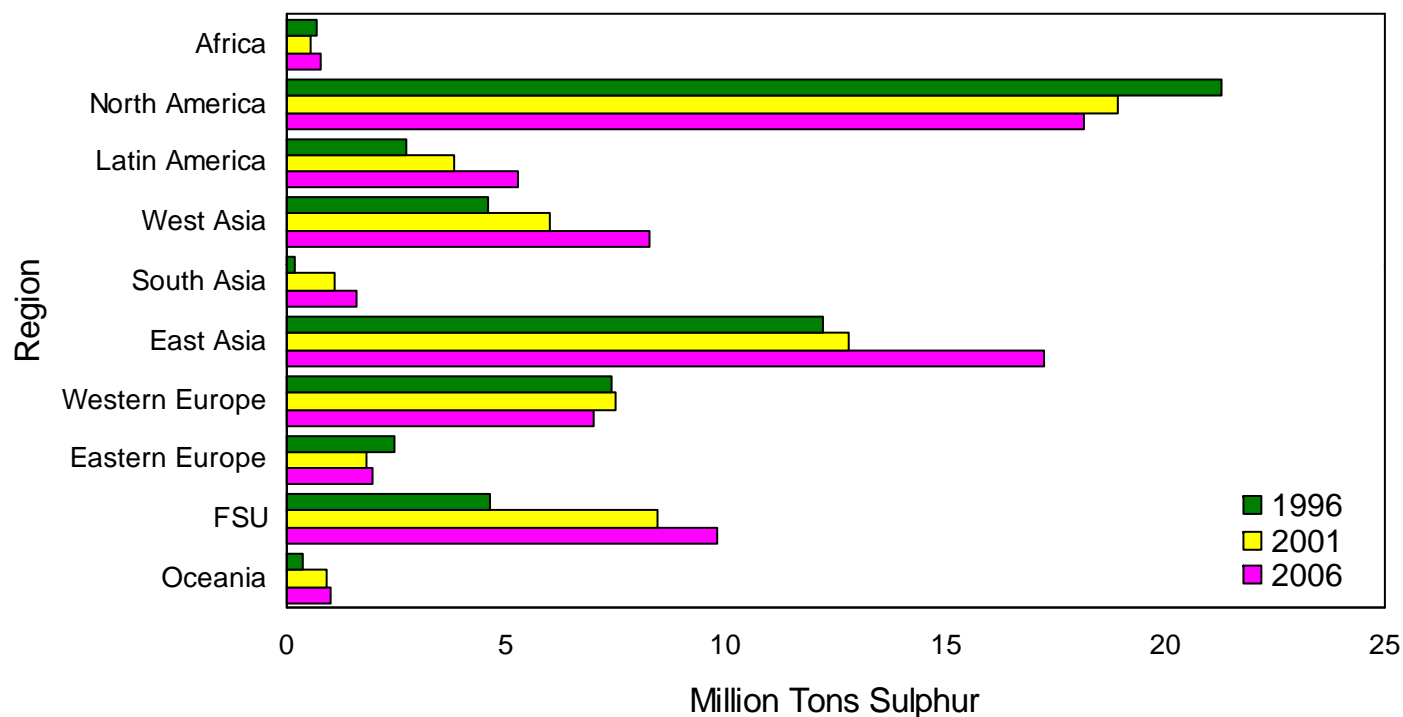
Reference: Figure 19, Sulphur Outlook, TSI, 2008

# Sulphur Production: Total By Type



Reference: Figure 20, Sulphur Outlook, TSI, 2008

# Regional Sulphur Production, All Forms



Reference: Sulphur Outlook, TSI, 2008

# Sulphur Production: Elemental

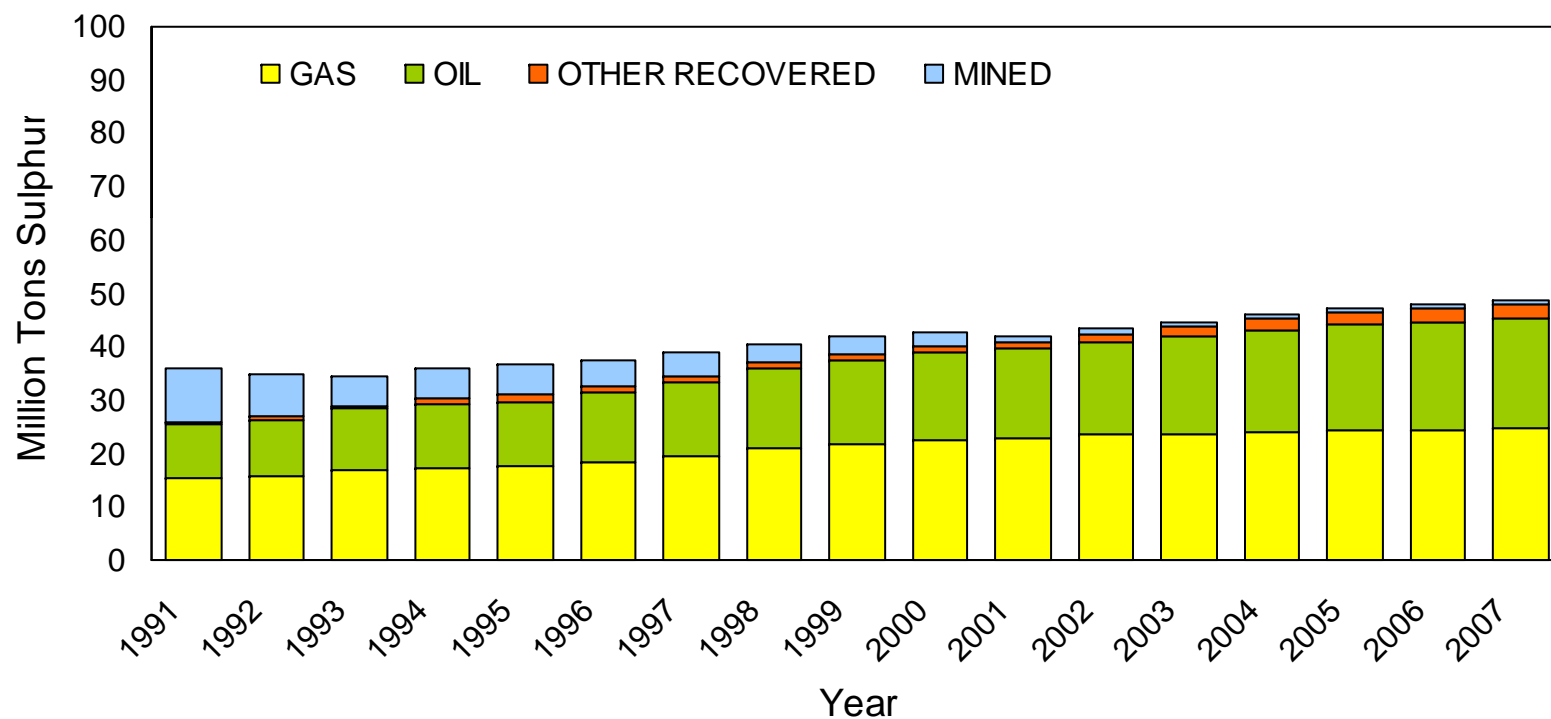
- **Two consecutive slow-growth years:**
  - **2006: 48 Mts (up only 1.3%, slowest in 5 years)**
  - **2007: 48.7 Mts**
- **Decline in North America in 2006 and 2007 (gas-recovered and oil-recovered) offsets growth other areas**
- **Increase in West Asia (gas-recovered)**
- **Increase in FSU (gas-recovered)**
- **Recovered Production: 98% of elemental sulphur**
- **Mined production (Frasch and Native): 2% of Elemental**
- **Elemental Sulphur Production: 67% of Total Production and expected to increase participation over decade**

# **Sulphur Production: Elemental**

- **Growth Regions**
  - **West Asia: Gas Recovered/Oil Recovered**
  - **East Asia: Gas Recovered/Oil Recovered**
  - **North America: Oil Recovered and Oil sands**
  - **FSU: Gas Recovered**
  - **South Asia: Oil Recovered**
- **Projection Outlook stronger than in past:**
  - **Souring of Oil/Gas fields**
  - **Stricter fuel regulations (land/marine)**
  - **Strong demand push for Oil/Gas**



# Sulphur Production: Elemental



Reference: Sulphur Outlook, TSI, 2008

# Sulphur Production: SOF

- **Two consecutive strong-growth years:**
  - **2006: 17.6 Mts Sulphur Equivalent (up 6.6%)**
  - **2007: 18.4 Mts**
- **Strong non-ferrous metals markets**
- **Stricter environmental regulations**
- **Regional Growth:**
  - **East Asia**
  - **Latin America**

# Sulphur Production: Pyrites

- **2006: 5.5 Mts Sulphur Equivalent (down 2.8%)**
- **2007: 5.6 Mts – local resilience to decline in China**
- **Only important in China (92% of world total)**
- **Remaining areas in decline**
- **Long-term decline: cost and environmental considerations**
- **Near-term increase likely**

# China Sulphur Status

- **China Sulphur Imports in 2007 a record 9.7 Mts**
- **Imports in 2008 expected to decline:**
  - **Unfavorable sulphur market conditions impact phosphate and other end uses**
  - **Phosphate fertilizer export restrictions**
  - **Phosphate fertilizer price market controls**
  - **Earthquake Sichuan May 2008**
- **Pyrites production an alternative source of sulphur, favored due to current market conditions**

# Sulphuric Acid Production

- **2006: 188.3 Mts (up 2.8%)**
- **2007: 194.8 Mts**
- **By Source:**
  - **64% Elemental Sulphur burning**
  - **29% Smelter acid**
  - **7% Pyrites**
- **By Region:**
  - **East Asia**
  - **North America**

# Sulphur Balance\*

Region/Year	2003	2004	2005	2006	2007
World	1.2	0.2	0.2	0	-0.7
W. Asia	4.7	5.0	5.8	6.0	6.5
N. America	5.1	5.3	4.4	5.1	4.4
FSU	4.3	4.3	4.3	4.3	4.5
Africa	-6.4	-7.1	-7.0	-6.8	-7.1
E. Asia	-4.3	-4.4	-4.9	-6.0	-6.4
Oceania	-0.8	-0.9	-0.9	-1.0	-1.1

\*Million tons sulphur- represents absolute difference between total sulphur production and consumption for period; Reference: Table 3, Sulphur Outlook, TSI, 2008

# Sulphur Trade Patterns

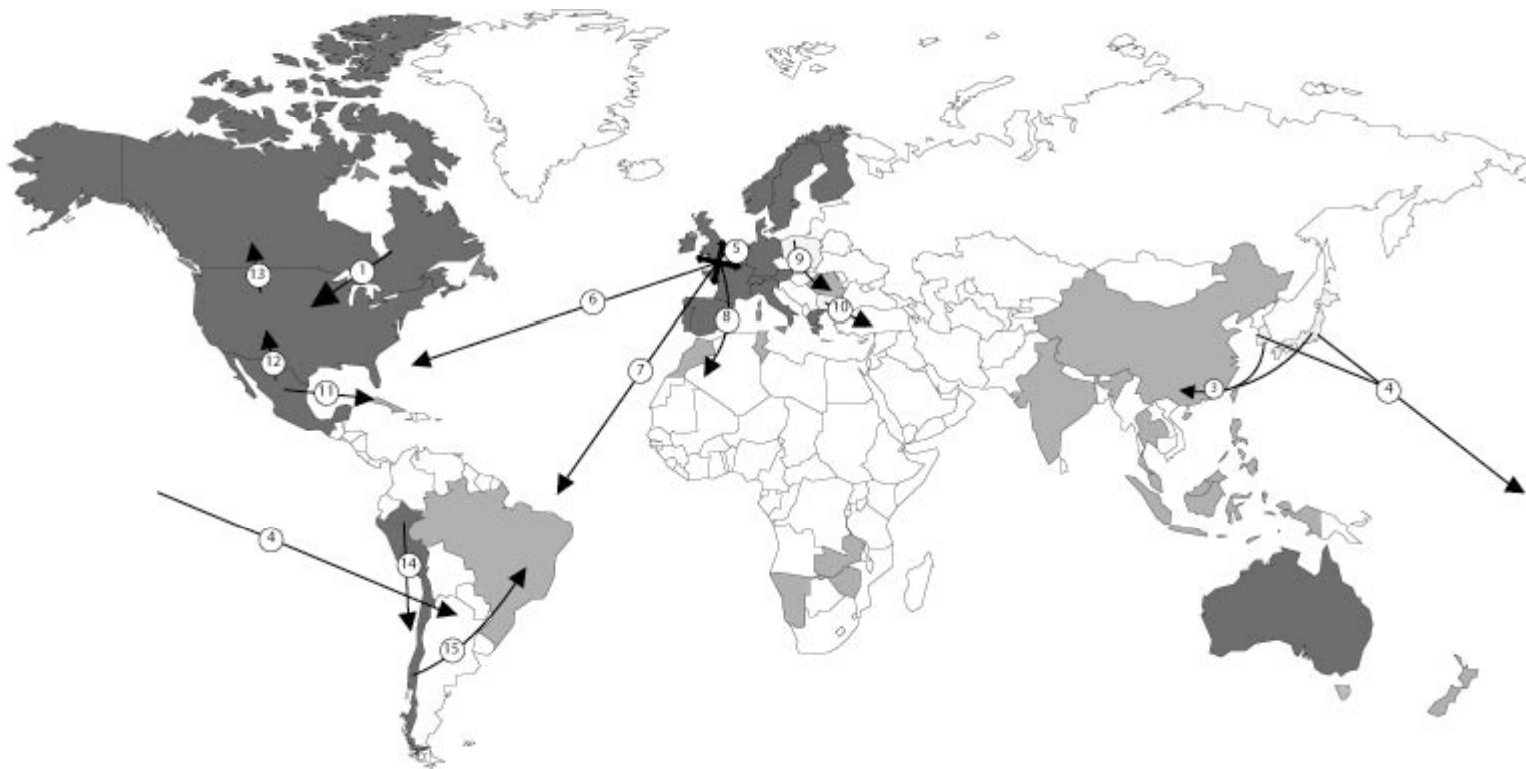


Major bilateral trades: 1:Canada-China; 2: Canada-USA 3: Russia-Morocco

Reference: Map 1, Sulphur Outlook, TSI, 2008

Source: Based on information provided by IFA, Natural Resources Canada

# Sulphuric Acid Trade Patterns



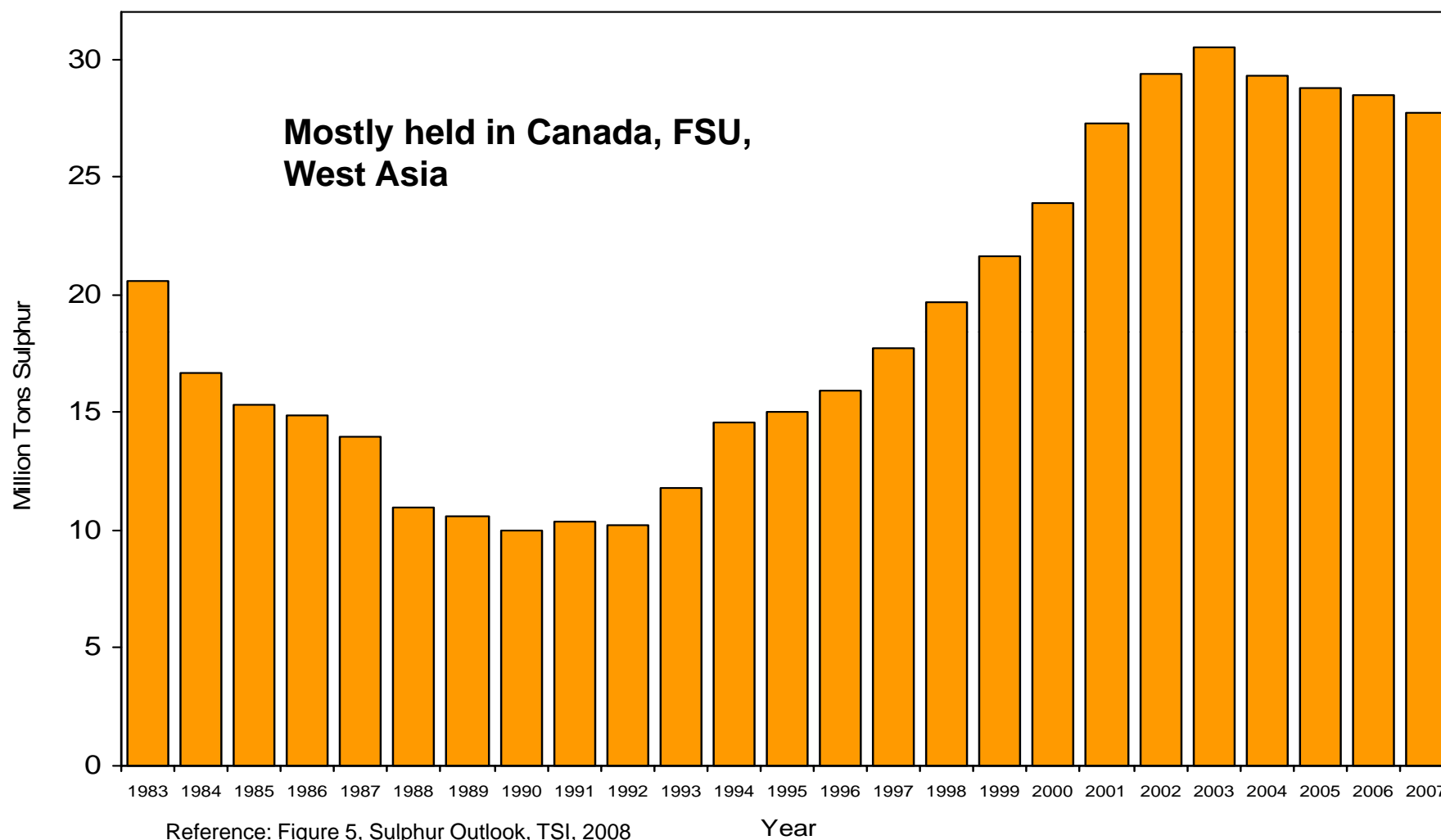
Major bilateral trades: 1:Canada-USA; 2:S. Korea-China 3: Japan-China

Reference: Map 2, Sulphur Outlook, TSI, 2008

Source: Based on information provided by IFA, Natural Resources Canada



# Sulphur Inventories



# **Sulphur Market**

## **Variables/Uncertainties:Production**

**Ranked by Order of Magnitude**

- West Asia Gas Recovered**
- US Oil Recovered**
- Canada Oil Sands**
- Canada Gas Recovered**
- China Recovered**
- Kazakhstan Recovered**
- Marine Fuel Desulphurization**
- Clean Coal/Petcoke**

# **Sulphur Market**

## **Variables/Uncertainties:Consumption**

**Ranked by Order of Magnitude**

- Global Phosphate Demand**
- China Sulphur Use**
- FSU Sulphur Use**
- Metallurgical Processing**
- Plant Nutrient Sulphur**
- Biofuels**
- Sulphur Construction Materials**

# **TSI's Sulphur World Symposium 2009**

## **March 30th – April 1st, 2009**

### **Madrid, Spain**

**Participants will learn about global and regional events shaping the world's sulphur markets from international specialists directly involved in the business. The program will focus on critical issues facing sulphur markets including:**

- **New sulphur supply and demand developments**
  - **Transportation, logistics and handling**
  - **Environment, health and safety**
  - **Emerging uses**

**Watch your email for TSI's symposium brochure and additional information about the venue and program.**

**Call for Papers to be Released Shortly**

**Mark Your Calendars!**

# Questions?

•For Questions regarding this Webinar,  
please contact:

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•Email: [DMessick@sulphurinstitute.org](mailto:DMessick@sulphurinstitute.org)

•Ordering information for Sulphur  
Outlook to be included in Press Kit

# Thank You

