The Geopolitics of Strategic Minerals

Dr. Kent H. Butts
Center for Strategic Leadership
U.S. Army War College
20 October 2009
Geopolitics:

“The relation of international political power to the geographic setting.”

Saul B. Cohen
Roman access Cornwall – Tin, Bronze Weapons
New World resources - Colonial empires
Bernard Baruch/Charles Leith – WW I
Paley Commission Report of 1952
Soviet cut-off of manganese & chromium
Oil embargo (OPEC) of 1973-74
1978 invasion of Zaire’s Shaba Province
National Defense Stockpile
Market dependence – enhance supply
No great nation willingly allows its standard of life and culture to be lowered and no great power accepts the risk that it will go hungry

Hjalmar Schacht,
German Minister of Economics, 1937
“The consumption of our latest reserves of chromium ore (Turkish) would have ended the war by January 1, 1946 at the very latest.”

Albert Speer
“Our aim is to gain control of the two great treasure houses on which the West depends. The energy treasure house of the Persian Gulf and the mineral treasure house of Central and Southern Africa.”

Leonid Brezhnev, Prague 1973
Proved Oil Reserves

Proved reserves at end 2005
Thousand million barrels

Source: BP Statistical Review of World Energy 2006
Strategic Minerals of Southern Africa

- DRC/Zaire: Cobalt, Coltan
- Zambia: Cobalt
- Zimbabwe: Chromium
- South Africa: Manganese, Chromium, Platinum
In almost every metal or mineral-fuel category, American consumption since the outbreak of WWI had exceeded the entire quantity of that material used anywhere in the world since the beginning of time.

– The President’s Materials Policy Commission, 1951
The US imports approximately 60% of its petroleum consumption.

The US imports over 80% of its most important strategic minerals: Chromium/PGM/Manganese/Cobalt/Rare Earth Elements.

Forty four percent of the 18 minerals on which the US is 100% import dependent are produced in China.
Minerals in Pratt & Whitney F100 Turbofan Engine

- Nickel: 4,504 Lbs.
- Titanium: 5,440 Lbs.
- Chromium: 1,485 Lbs.
- Columbium: 145 Lbs.
- Manganese: 23 Lbs.
- Cobalt: 885 Lbs.

F100-PW-229 Turbofan Engine
Rare Earth Elements (REE) in a Prius Engine and Battery

Neodymium
2.2 Lbs.

Lanthanum
22-33 Lbs.

Toyota projects U.S. sales of 100,000 in 2009, 180,000 in 2010, and world-wide sales totaling 1,000,000 cars (2010)
Depending on the place -- growing, static, or aging

2000 to 2025

*Total population in millions*

- China: 1,262.5 to 1,453.1
- India: 1,002.7 to 1,396.0
- Pakistan: 141.6 to 217.9
- Indonesia: 224.1 to 278.5
- Japan: 126.7 to 117.8
- South Korea: 47.3 to 49.37
- Russia: 146 to 128.1
Second largest GDP
World’s largest military
Nuclear weapons
Changing rapidly
Seeks regional/global leadership role
Mineral import dependent
Economic growth critical to social stability & CCP survival

Rising unemployment/urban-rural gap,
Only 21 of the 45 minerals with proven reserves in China will meet its domestic demand by 2010.

By 2020, the figure will fall to only six minerals.

http://www.domain-b.com/economy/worldeconomy/20090406_ambassador_defends.html
China’s Demand Exceeds Domestic Resource Supply

CHINA PURCHASED:

- 8.9 Percent World’s Oil (2007)
- 32 Percent World’s Aluminum and Steel (2007)
- 47 Percent of World’s Iron Ore (2007)
- 54 Percent of World’s Cement (2008)

CHINA DRIVEN PRICE INCREASES (01-08)

- Copper 547 Percent
- Iron Ore 455 Percent
- Aluminum 200 Percent

Cuba has agreed to let China’s Sinopec look for oil
Accounted for 75% of the 175 MT increase in steel consumption between 1995-2003

Consumption will be 310 MT in 2010

By 2010 must import:

- 57% iron ore
- 70% copper concentrates
- 80% alumina

World hegemony - theory

US Alliance to “Contain China” – Japan, India, Taiwan, Viet Nam, Thailand, Central Asia, South Korea

DoD budget: $553 B

PLA budget: $70 B
Sec Rumsfeld’s—China as threat

- P3 and South China Sea Incidents
- U.S. controls economic & political institutions
- Dep. Sec. Def. to World Bank
- Belgrade Embassy Bombing
Driven by economy & import dependence

Do not trust market or U.S. influence

Go Out Strategy - control source - UNOCAL

Pay high price

Unencumbered by principles

Isolate Taiwan

Backed by $ resources
ID target states

State enterprises – secure resource access

G.O.C. economic and diplomatic carrots

- Long term champion of developing world
- Debt forgiveness
- Bilateral trade agreements
- Development packages
- Awarding aid

The China National Offshore Oil Corporation (CNOOC) signed an agreement on exploitation of deep sea oil at the south China Sea with Kerr-McGee China Petroleum, 4 Feb 2005
China Investment Corporation ($300B)

Blackstone Group (U.S.) $3B stake

China Development Bank

Barclays (U.K.) $7B stake

Standard Bank $5.4B
China’s Other Mineral Partners

- **Australia** – bauxite, iron, coal, gold, copper, nickel, zinc, uranium
- **Brazil** – iron, oil, niobium
- **Peru** – copper, oil
- **Zimbabwe** – chromium, iron
- **Chile** – copper
- **Russia** – oil, gas
- **Canada** – oil, gas, uranium
- **South Africa** – chromium, iron

Rolling mill at an iron and steel plant in Anshan, Liaoning province, China.
## China: Production

<table>
<thead>
<tr>
<th>COMMODITY</th>
<th>2007 PRODUCTION</th>
<th>VALUE ($ BILLION)</th>
<th>WORLD RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>482 Mt</td>
<td>$390.4B</td>
<td>1</td>
</tr>
<tr>
<td>Aluminum</td>
<td>12 Mt</td>
<td>$33B</td>
<td>1</td>
</tr>
<tr>
<td>Iron Ore</td>
<td>600 Mt</td>
<td>$37.8B</td>
<td>1</td>
</tr>
<tr>
<td>Zinc</td>
<td>2.8 Mt</td>
<td>$9.3B</td>
<td>2</td>
</tr>
<tr>
<td>Copper</td>
<td>920,000 t</td>
<td>$6.8B</td>
<td>4</td>
</tr>
<tr>
<td>Lead</td>
<td>1.32 Mt</td>
<td>$3.17B</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: CSL Center for Strategic Leadership

### China: Key Minerals

<table>
<thead>
<tr>
<th>COMMODITY</th>
<th>2007 PRODUCTION</th>
<th>VALUE ($ BILLION)</th>
<th>WORLD RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>80,000 t</td>
<td>$3.0B</td>
<td>8</td>
</tr>
<tr>
<td>Cement</td>
<td>1.3 Bt</td>
<td>$1.32B</td>
<td>1</td>
</tr>
<tr>
<td>Bauxite</td>
<td>32 Mt</td>
<td>$0.86B</td>
<td>2</td>
</tr>
<tr>
<td>Yttrium</td>
<td>8,800 t</td>
<td>$0.75B</td>
<td>1</td>
</tr>
<tr>
<td>Antimony</td>
<td>110,000 t</td>
<td>$0.63B</td>
<td>1</td>
</tr>
<tr>
<td>Rare earths</td>
<td>120,000 t</td>
<td>$0.05B</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mineral commodity</th>
<th>Percent of imports to U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony</td>
<td>79%</td>
</tr>
<tr>
<td>Barite</td>
<td>90%</td>
</tr>
<tr>
<td>Fluorspar</td>
<td>65%</td>
</tr>
<tr>
<td>Indium</td>
<td>49%</td>
</tr>
<tr>
<td>Magnesium compounds</td>
<td>68%</td>
</tr>
<tr>
<td>Rare earths</td>
<td>67%</td>
</tr>
<tr>
<td>Tungsten</td>
<td>47%</td>
</tr>
<tr>
<td>Yttrium</td>
<td>88%</td>
</tr>
</tbody>
</table>
Implied Threats

- Population Growth
- Resources Scarcity
- Environmental Security
- Migration
- Failed states
- Economic Conditions
Global Map of Food Security

Food Security Index (FSI)

- ✓ Extreme risk (0-2.5)
- ✓ High risk (2.5-5.0)
- ✓ Medium risk (5.0-7.5)
- ✓ Low risk (7.5-10)
- ◾ No data

http://maps.maplecroft.com/loadmap?template=min&issueID=210&close=y
Projected Water Scarcity in 2025

Note: Indicates countries that will import more than 10% of their cereal consumption in 2025.
Climate Change

CLIMATE change may have a graver effect on Africa than any other continent, if the predictions of the most recent report by the UN's Intergovernmental Panel on Climate Change hold true. It predicts a minimum increase in temperature of 2.5°C by 2030, and dry areas will expand. Around 600,000 square kilometers of cultivable land may be ruined. Rising sea levels would threaten coastal infrastructure in Egypt, Senegal and the Gulf of Guinea, an important oil-producing region. Another study by the University of Pretoria estimates that $25 billion may be lost in crop failure because of rising temperatures.

China- “Go Out Strategy” 1999

European Commission “EU Raw Materials Strategy” 2008

Japan- “Strategy for Ensuring Stable Supplies of Rare Metals” 2009

United States ?
Four Pillars for Securing Rare Metals:

- Securing Overseas Resources
- Recycling
- Development of Alternative Materials
- Stockpiling
The Commission’s critical raw materials strategy... based on 3 major pillars:

- Access to raw materials on world markets at undistorted conditions
- The right framework to foster sustainable supply of raw materials from EU sources
- Increase resource efficiency and promoting recycling in the EU
“The overall objective of a national materials policy for the United States should be to insure an adequate and dependable flow of materials at the lowest cost consistent with the welfare of friendly nations.”

Paley Commission Report 1952

WILLIAM PALEY, 1901–1990
What are the implications of China’s mineral policy for U.S. National Security Interests?

Win – Win Situation

Or

Zero Sum Game

?
Common Interests

- Sea Lines of Communication (SLOCs)
- Regional stability
- Reasonable raw material prices
- Terrorism
- Defense
- Diplomacy
- Development
- Private Sector
Develop a National Plan for Strategic and Critical Resources.

Revitalize the National Defense Stockpile.

Include Strategic Minerals as a Vital Interest of the NSS.
- Priority in QDR and National Defense Strategy
- Salient Objective of Diplomacy and Development - QDDR
- Include the Private Sector in Strategy
- Make Strategic Minerals an Intelligence Community Priority

Strategic Communication to Congress, Public: Why Important!

Energy and Climate Change Strategy Should Include: Recycling; Substitution; Reuse; Remanufacture
Questions?

Dr. Kent H. Butts
Director, National Security Issues
Center for Strategic Leadership
U.S. Army War College
Carlisle, Pennsylvania, USA
717 245 3728