



CHALLENGES FACING THE TANTALUM INDUSTRY

MINOR METALS AND RARE EARTHS 2008

3rd – 5th September 2008

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- Tantalum Industry Overview
 - Supply and Demand - Current, Historical and Forecast

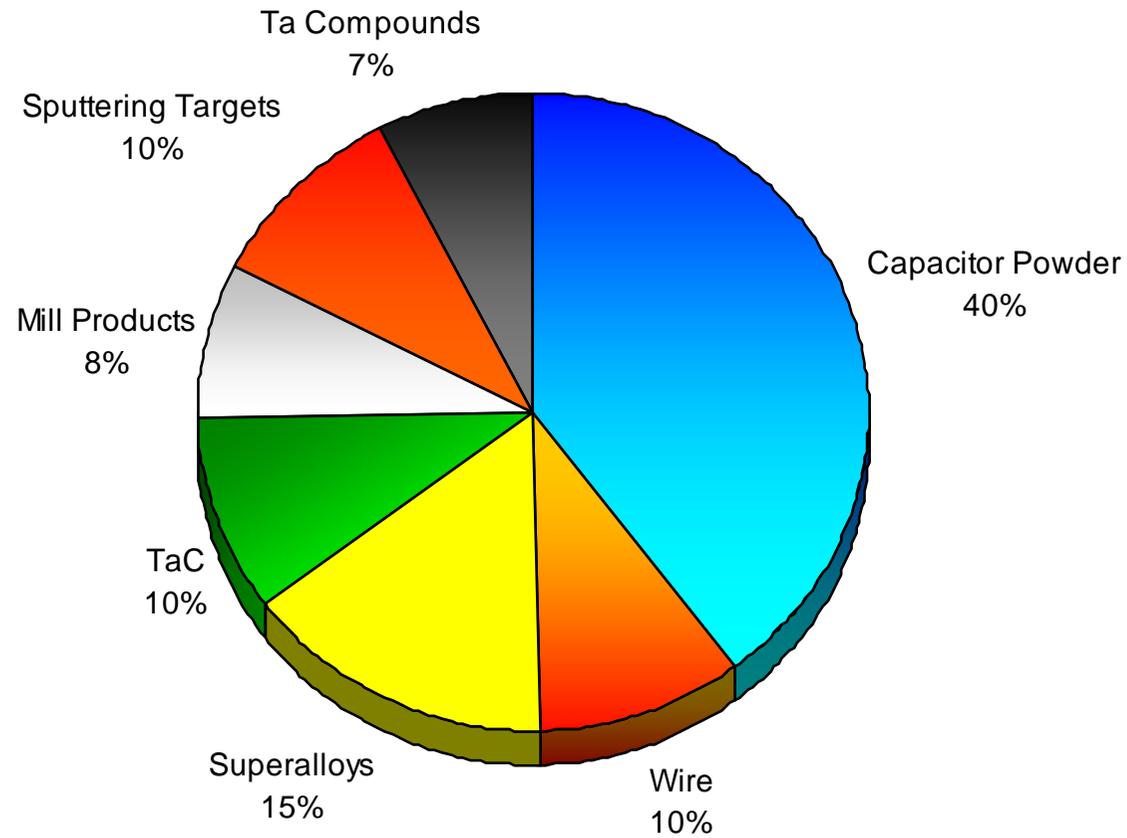
- Industry Challenges
 - Supply Chain Profitability
 - Cost Escalation and Exchange Rates
 - Tantalum Prices
 - Stability of Primary Supply
 - Safety, Health and Environmental Standards
 - Consumer Sentiment

- Facing the Challenges
 - Investing in Sustainability



TANTALUM DEMAND

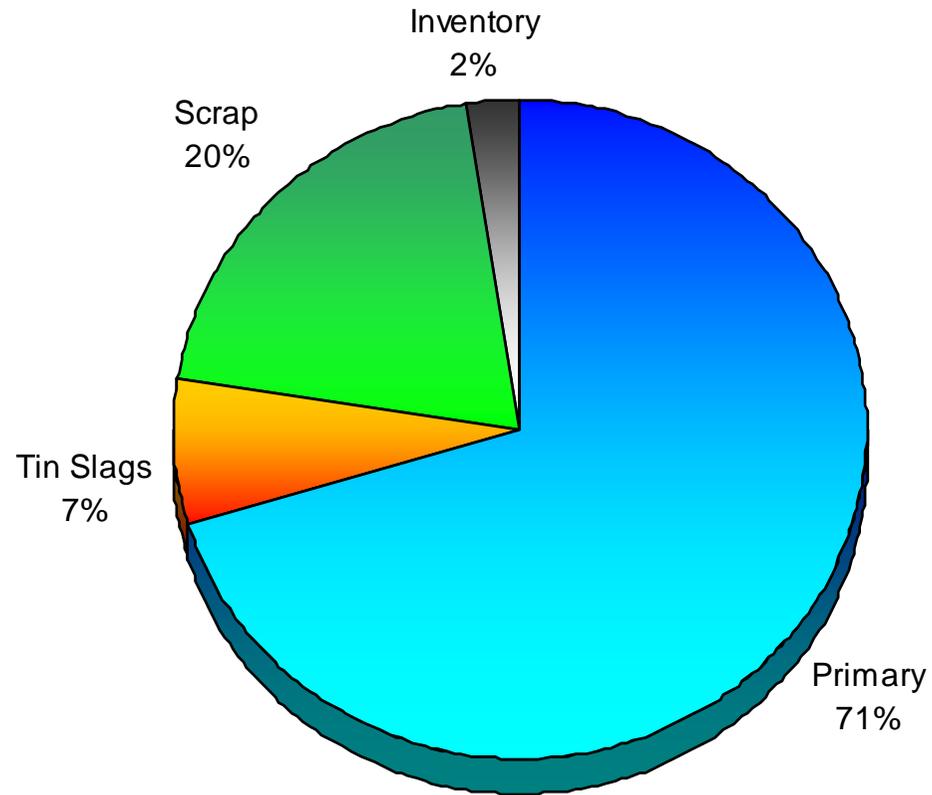
TANTALUM DEMAND (2007) – 2,000t Ta





TANTALUM SUPPLY SOURCES

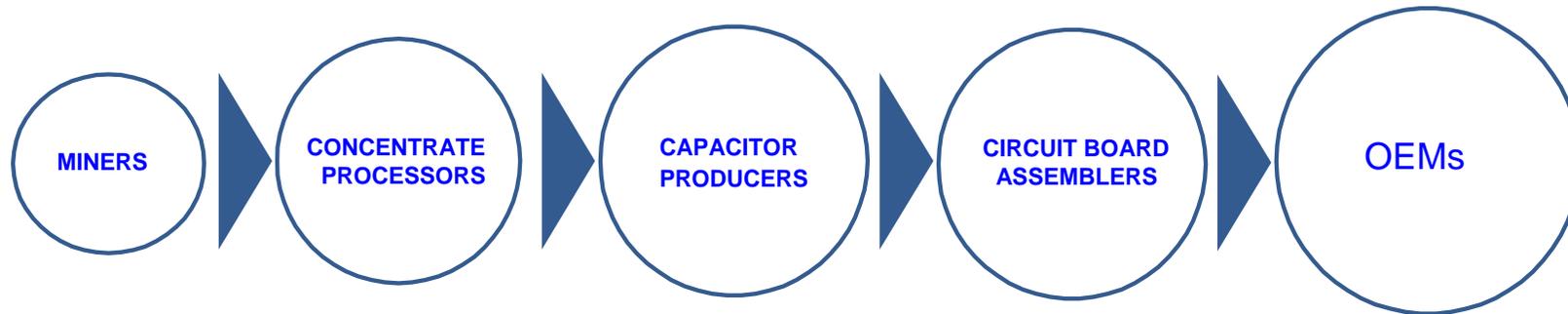
TANTALUM DEMAND 2008(f) – 6.1Mlbs Ta₂O₅





TANTALUM SUPPLY CHAIN

TANTALUM CAPACITOR POWDER SUPPLY CHAIN



- Talison
- Mibra
- TANCO
- Artisanal
- Others

- HC Starck
- Cabot
- Ningxia
- Ulba
- Others

- AVX
- Kemet
- NEC Tokin
- Vishay
- Sanyo
- Nichicon
- Hitachi
- Others

- Flextronics
- Celestica
- Sanmina-SCI
- Asustek
- Jabil
- Others

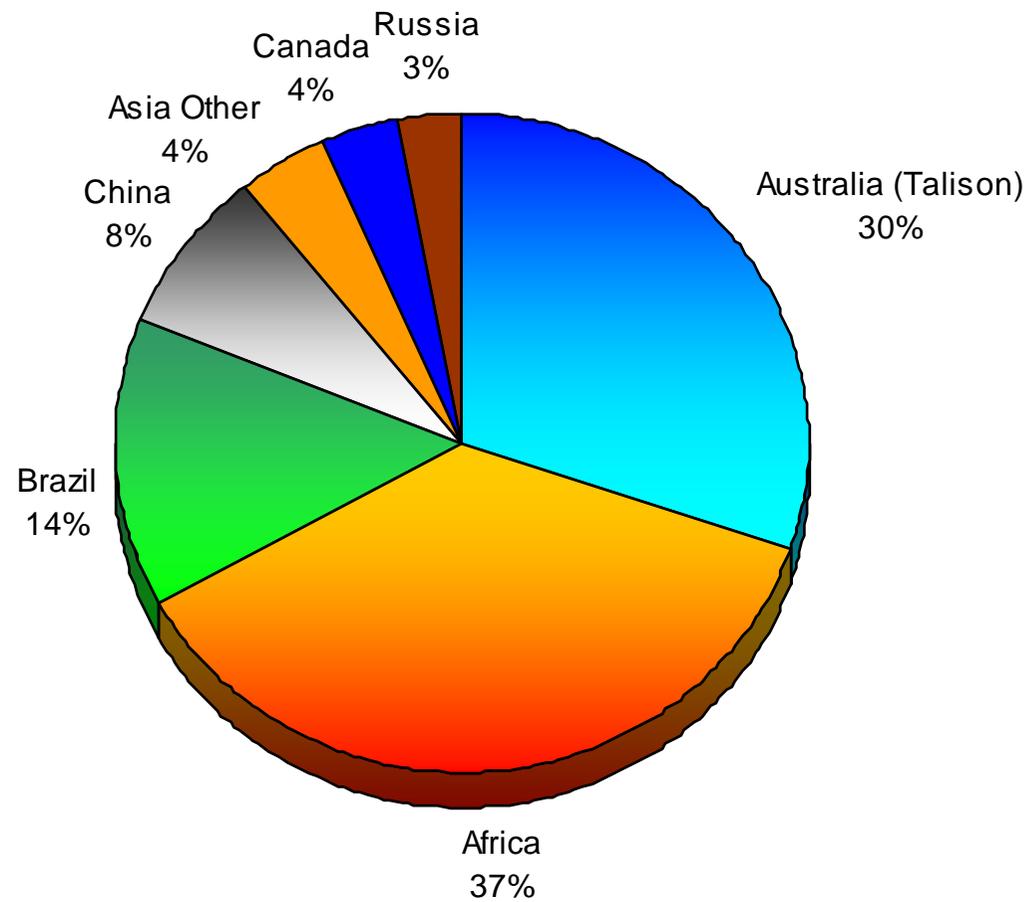
- Sony
- Toshiba
- Nokia
- Sony-Ericsson
- Motorola
- Samsung
- LG
- Sharp
- Apple
- Nortel
- Others

- Acer
- Dell
- IBM
- Compaq
- Intel
- Matsushita
- Canon
- HP
- Cisco



PRIMARY PRODUCTION

TANTALUM PRIMARY PRODUCTION 2008(f) – 4.3Mlbs Ta₂O₅





WODGINA PROCESSING FACILITIES





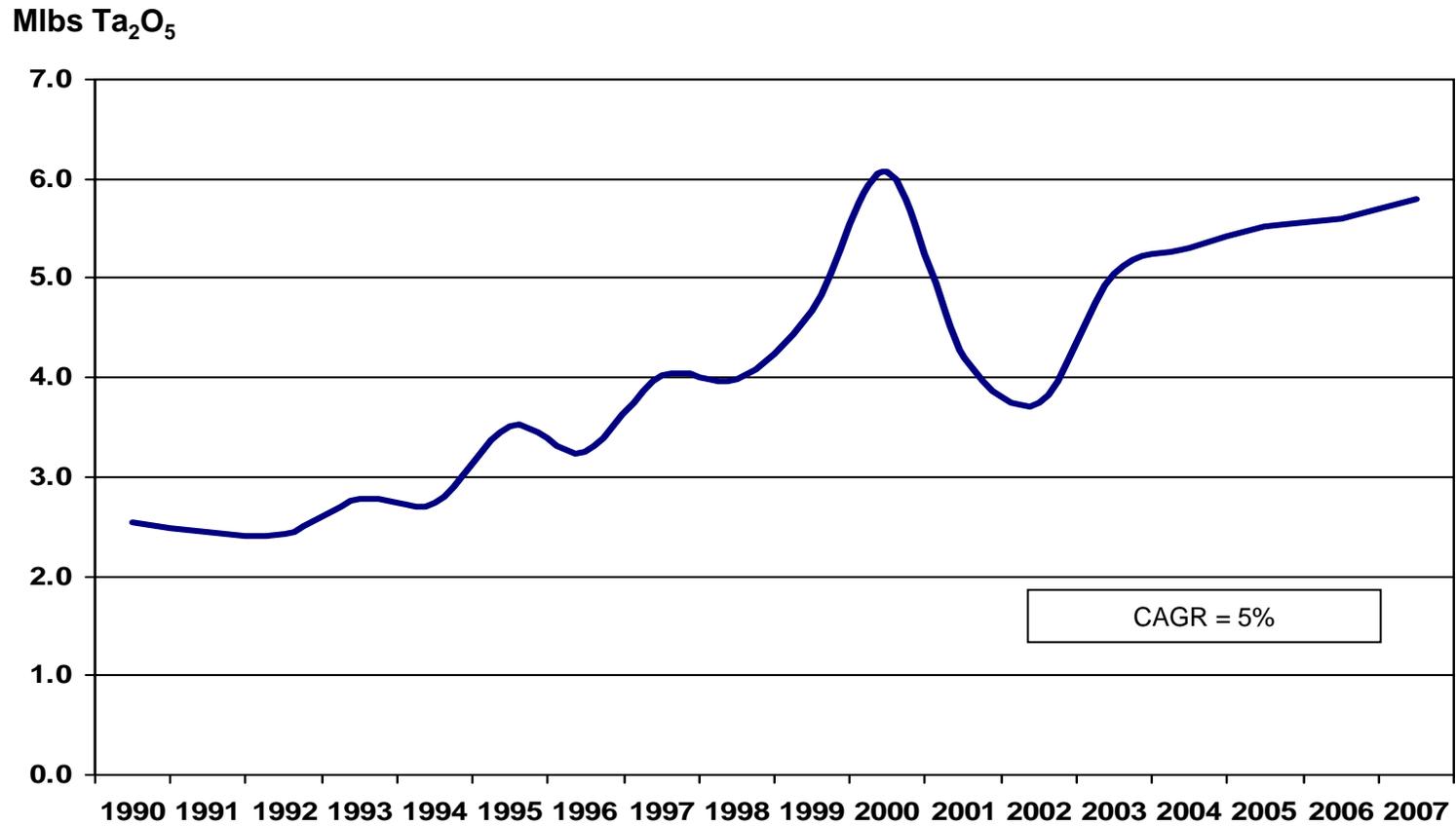
GREENBUSHES PROCESSING FACILITIES





HISTORICAL DEMAND

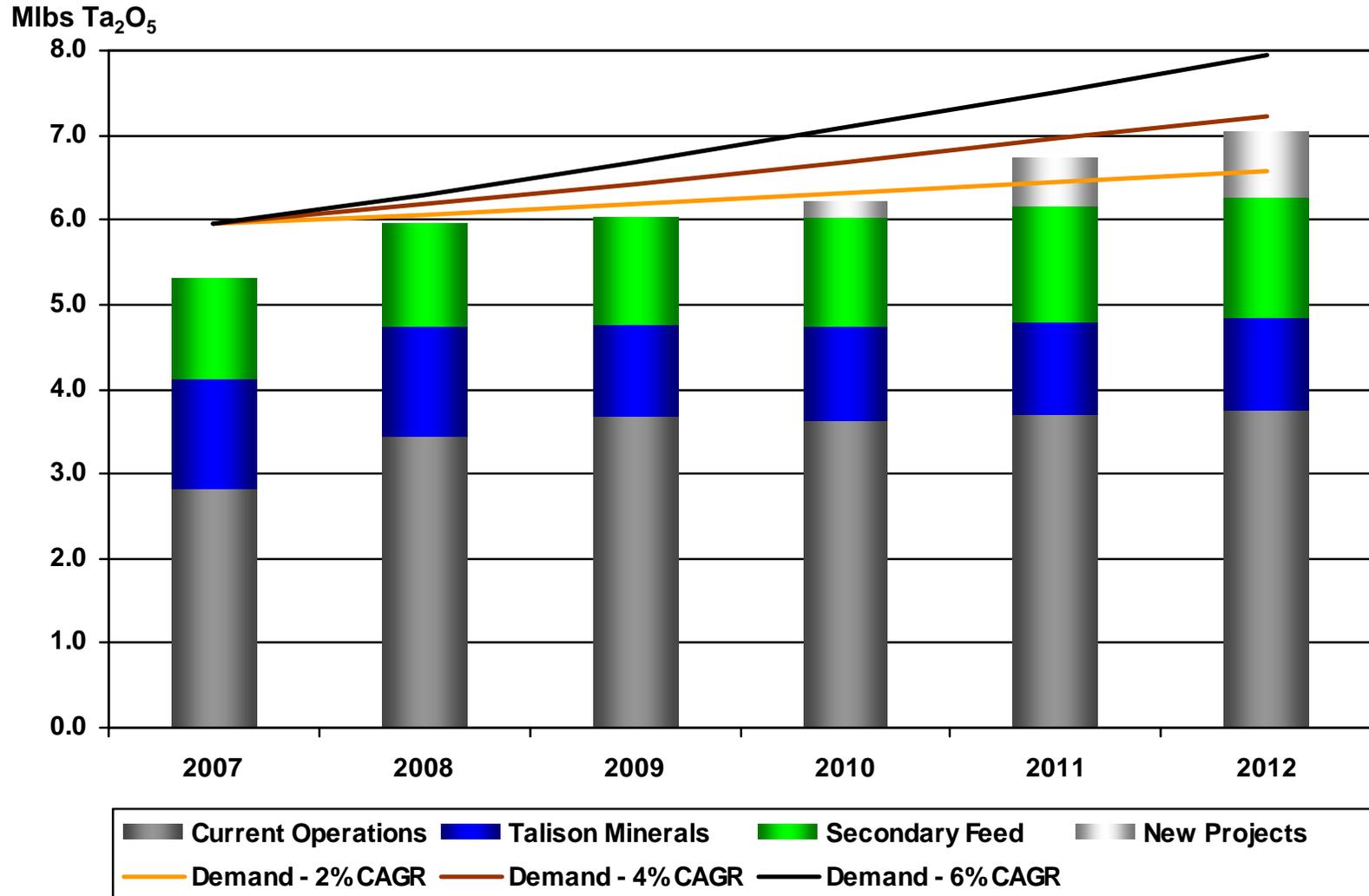
TANTALUM MARKET DEMAND



Source Historical Values: TIC

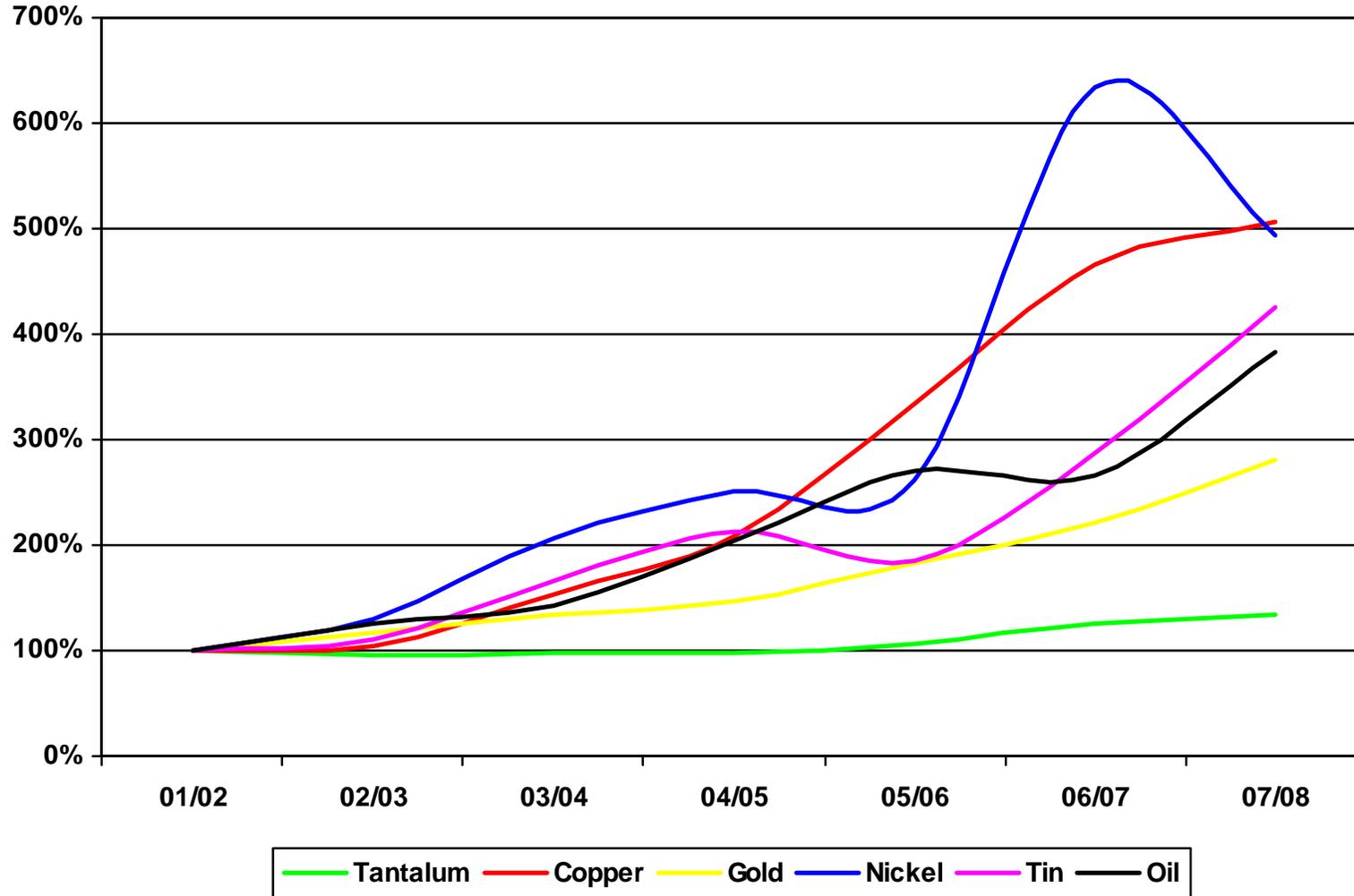


FORECAST SUPPLY/DEMAND



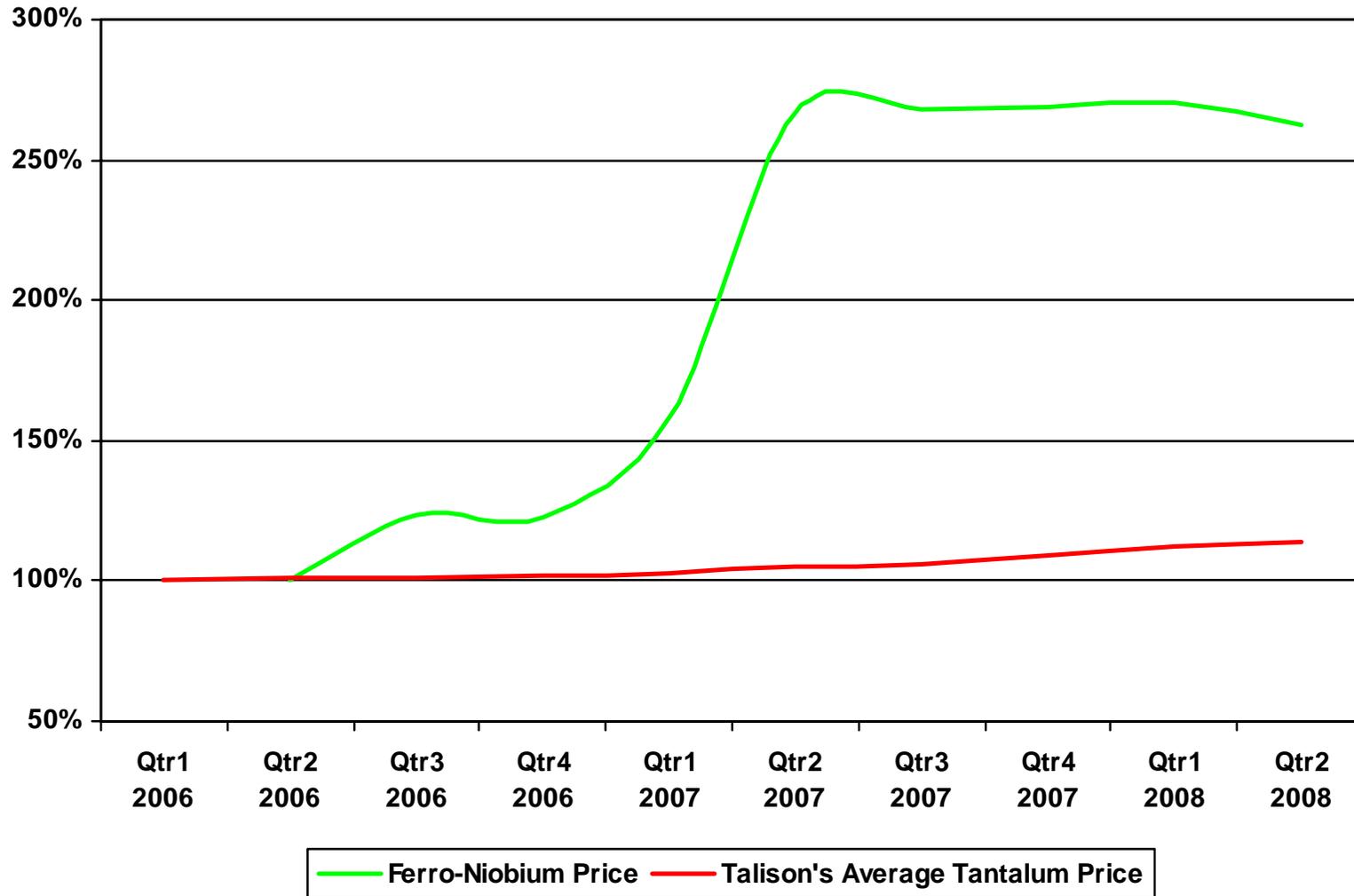


COMMODITY PRICES - US\$ INDEX





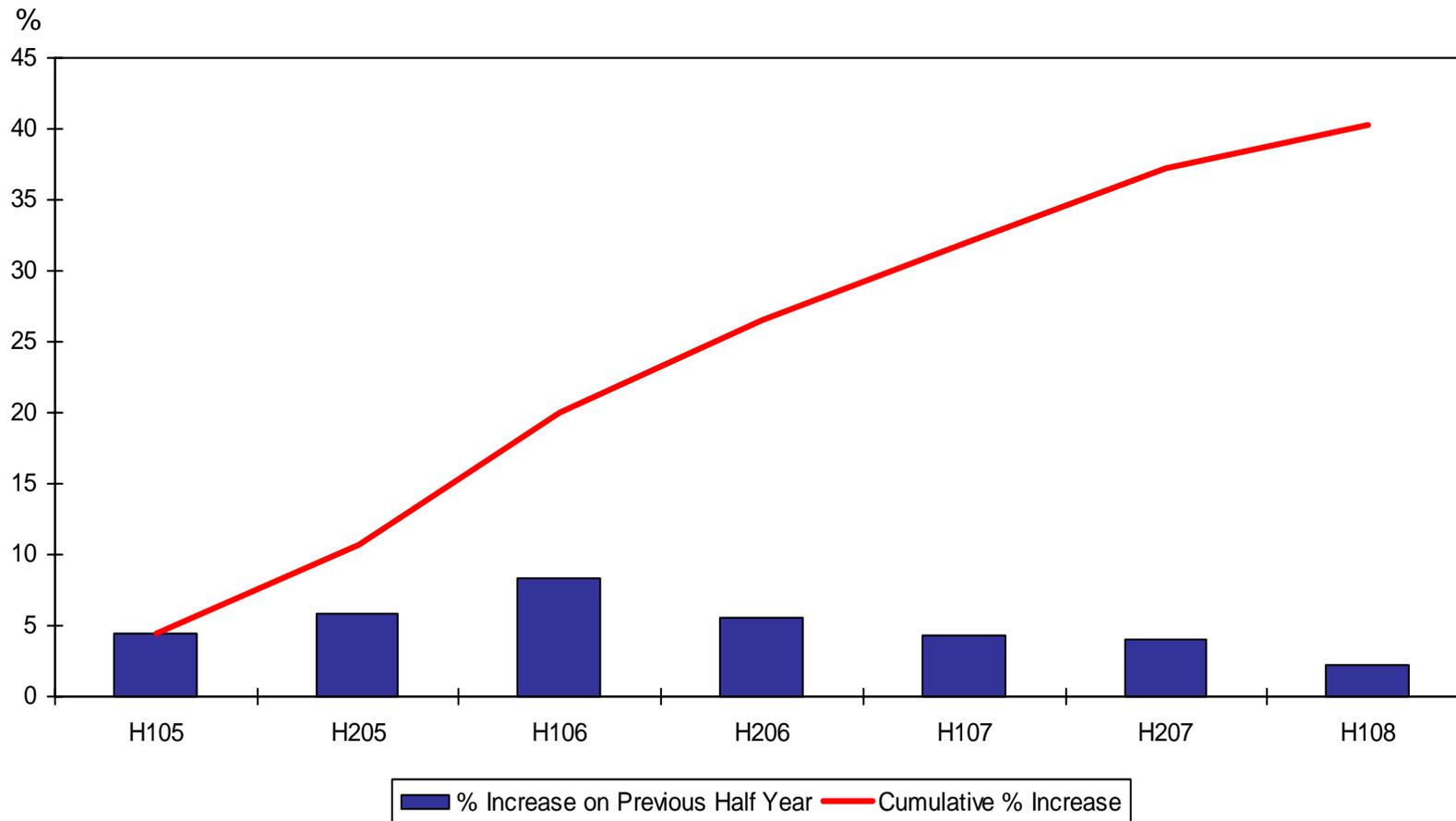
Ta AND Nb PRICES – US\$ INDEX





MINING INDUSTRY COST ESCALATION

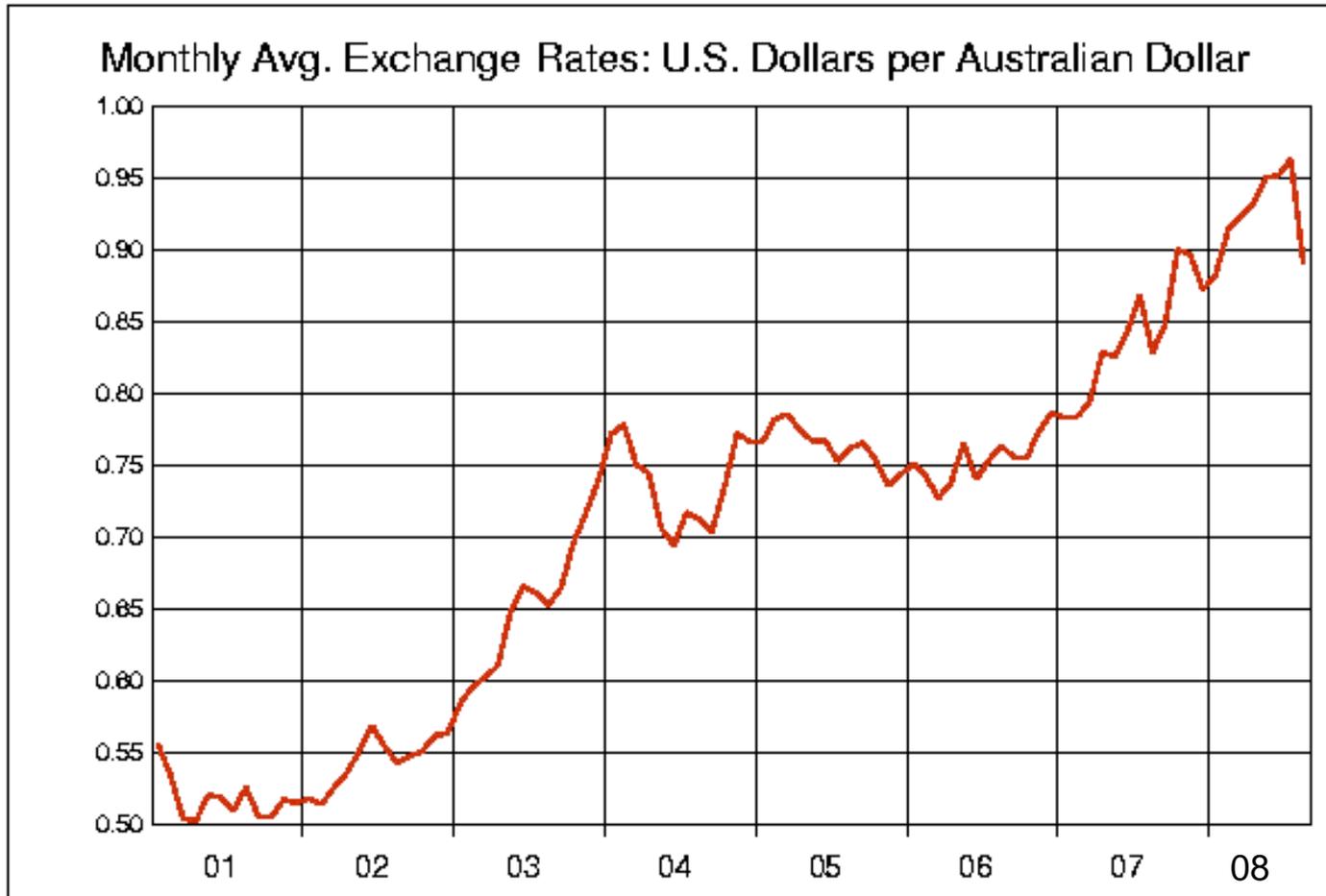
BHP Billiton Cost Increases



Source: The Australian Financial Review



FOREIGN EXCHANGE RATE



Source: PACIFIC Exchange Rate Service



OTHER INDUSTRY CHALLENGES

- Tantalum mining is concentrated in a limited number of locations around the world
- Mining and mineral extraction is not universally undertaken in accordance with recognised legal, ethical, safety and environmental standards
- Significant quantities of tantalum feedstock are being transported internationally without compliant packaging and documentation
- There is increasing pressure from consumers for the electronics industry to demonstrate that its products are based upon “ethical” and “green” inputs

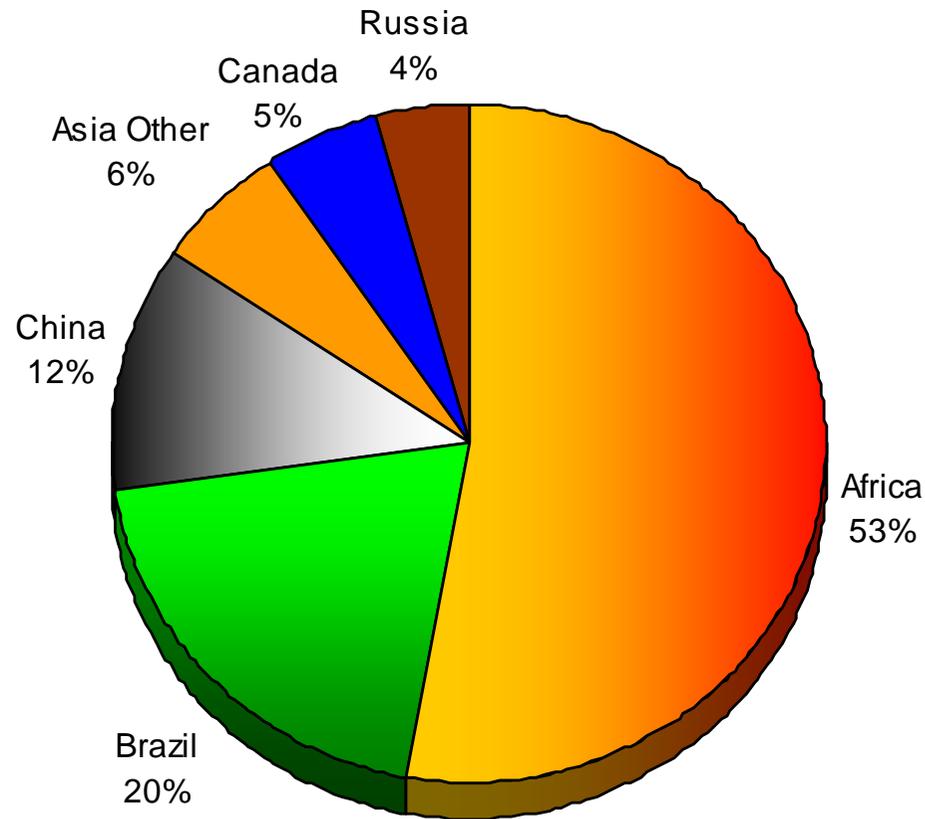
MAJOR PRIMARY TANTALUM PRODUCERS





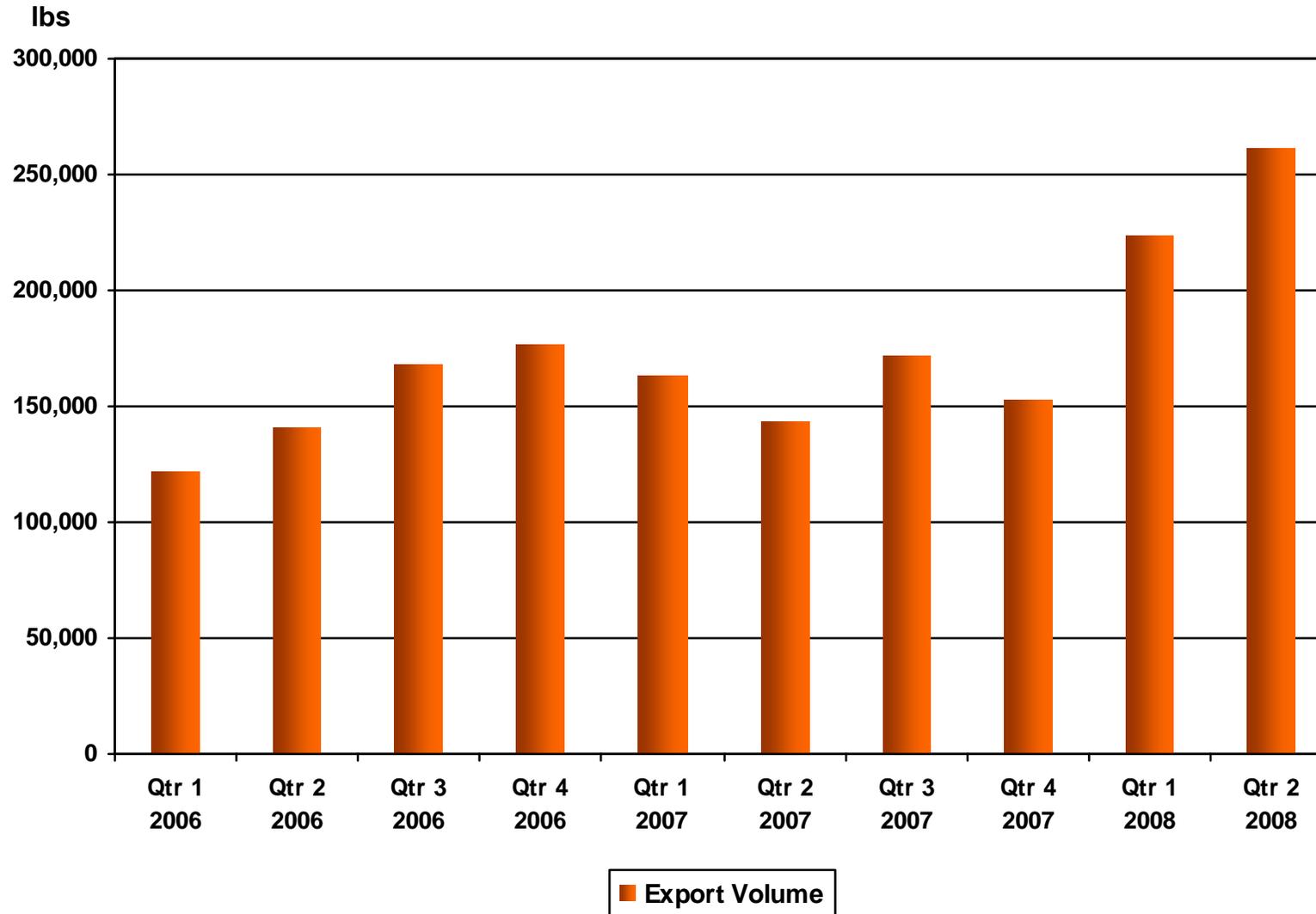
PRIMARY PRODUCTION EXCLUDING TALISON

TANTALUM PRIMARY PRODUCTION 2008(f) – 3.0Mlbs Ta₂O₅





ESTIMATED Ta₂O₅ EXPORTS FROM CENTRAL AFRICA





ARTISANAL MINING IN CENTRAL AFRICA



ARTISANAL MINING IN NORTH KIVU, DRC



© *Nicholas Garrett*



INTERNATIONAL TRANSPORT

- Post mining and upgrading, most tantalum mineral concentrates will be class 7 “radioactive” ($> \sim 0.095\% \text{U}_3\text{O}_8$) for the purposes of international transport
- Indications are significant quantities of Class 7 tantalum bearing minerals are shipped without compliant packaging and documentation
- This practice contravenes:
 - International Maritime Dangerous Goods (IMDG) Code
 - International Aviation Transport Authority (IATA) Dangerous Goods Regulations



SUSTAINABLE DEVELOPMENT

- The Bruntland Commission's definition of sustainable development is:

“development that meets the needs of the present without compromising the ability of future generations to meet their own needs”
(Our Common Future, Brundtland 1987)

- In the mining and metals sector, this means that investments in minerals projects should be financially profitable, technically appropriate, environmentally sound and socially responsible



INDUSTRY ACCOUNTABILITY

➤ **ICMM Principles**

- To implement and maintain ethical business practices and sound systems of corporate governance
- To uphold fundamental human rights and respect cultures, customs and values in dealings with employees and others who are affected by ICMM member activities
- To seek continual improvement in health, safety and environmental performance
- To facilitate and encourage responsible product design, use, re-use, recycling and disposal of products



INDUSTRY CODES OF CONDUCT

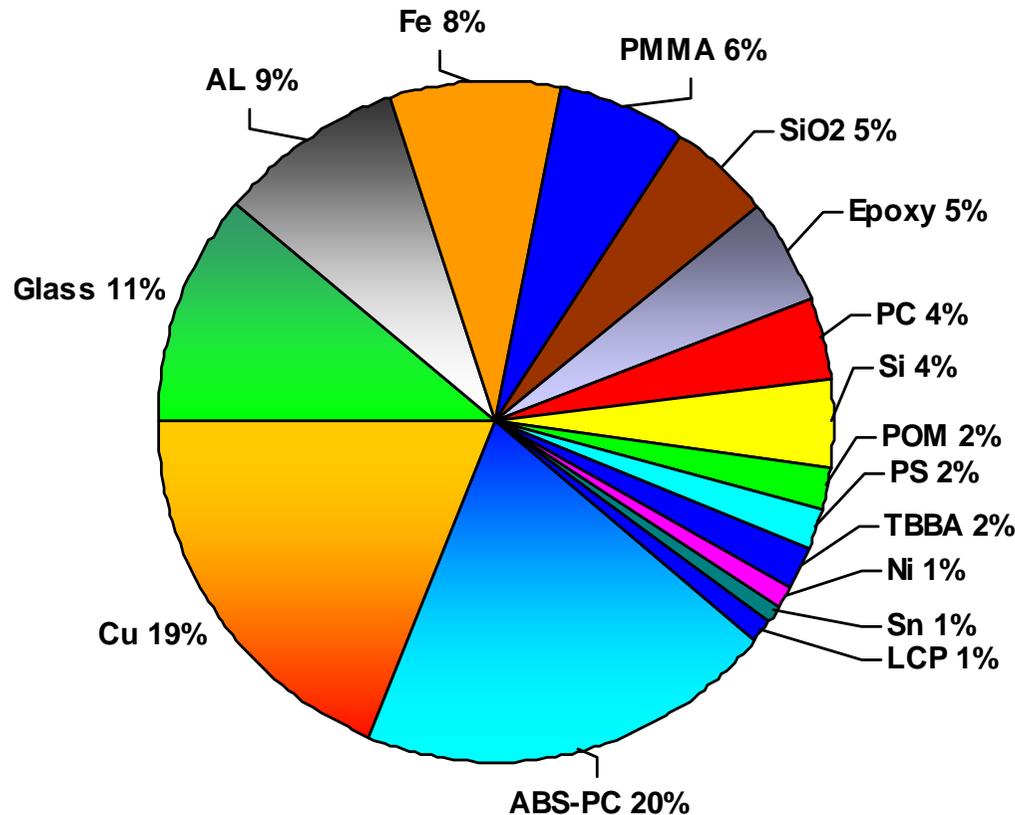
➤ **EICC Code of Conduct**

- Working conditions in the electronics industry supply chain should be safe
- Workers should be treated with respect and dignity
- Manufacturing processes should be environmentally responsible

➤ **Green Lead and the CRJP**

- Developing product stewardship programs including systems of certification

TYPICAL COMPOSITION OF A MOBILE PHONE

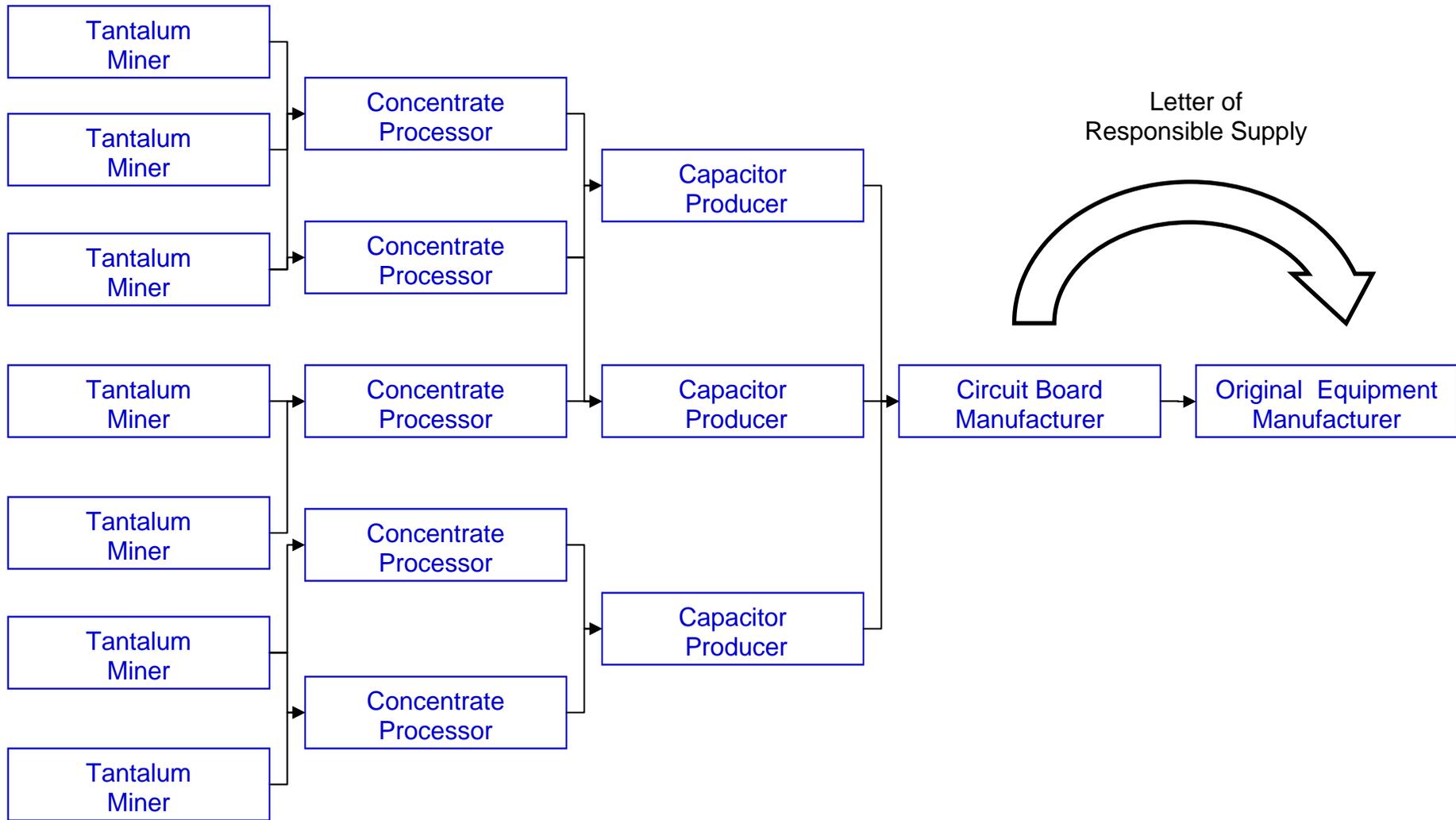


ABS-PC	Acrylonitrile Butadiene Styrene/Polycarbonate
Cu	Copper
Al	Aluminium
Fe	Iron
PMMA	Polymethyl Methacrylate
SiO2	Silicon Dioxide
Epoxy	Epoxy Polymer
PC	Polycarbonate
Si	Silicon
POM	Polyoxymethylene
PS	Polystyrene
TBBA	Tetrabromobisphenol A
Ni	Nickel
Sn	Tin
LCP	Liquid Crystal Polymer
PET	Polyethylene Terephthalate

Source: Nokia



TANTALUM CHAIN OF CUSTODY



➤ **The Challenges**

- There is exploitation in the tantalum industry supply chain
- There is a need for more ethical and responsible environmental, health, safety and labour standards
- There is a need for investment in raw materials production capacity to satisfy forecast levels of demand
- There is a need for mineral and metal producers to achieve more sustainable returns

➤ **The Task at Hand**

- To engage more actively in corporate social responsibility programs and extend supply chain management to include the sourcing and mining of metals
- To adopt principles and industry codes of conduct that support sustainable development
- To give priority to suppliers and mining companies that adhere to these principles and codes of conduct
- To give more consideration to quality, reliability and sustainability factors



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