

**JOGMEC/INSTITUTE OF METALS, MINING & METALLURGY  
METALS ECONOMY SEMINAR**

**LEAD AND ZINC –  
A CHANGE IN DYNAMICS**

**Paul White**

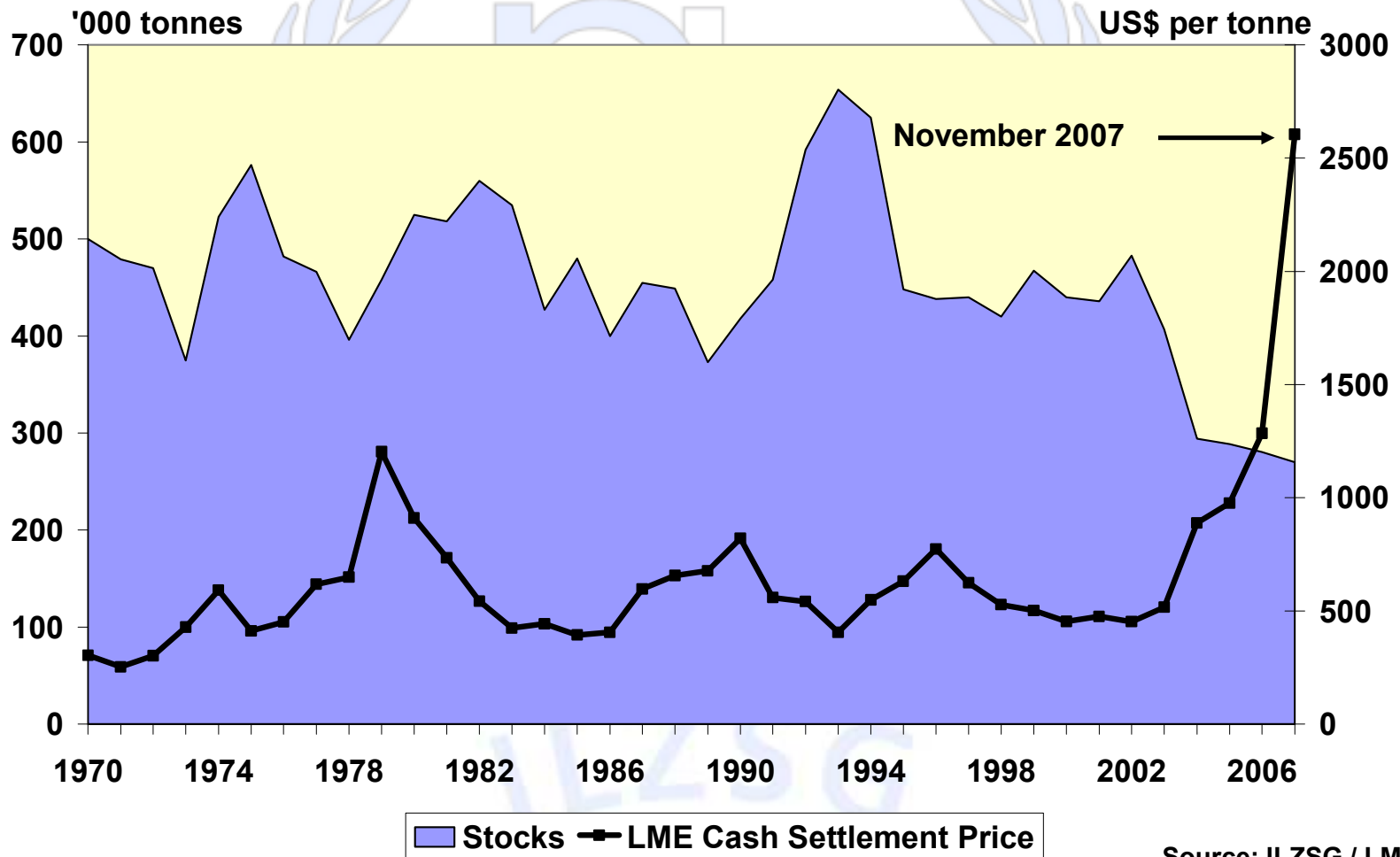
**Head of Forecasting and Statistics, ILZSG**

**27 November 2007, Tokyo**

# Presentation Outline

- Stock & Price Trends
- Main Drivers
- ILZSG Forecasts

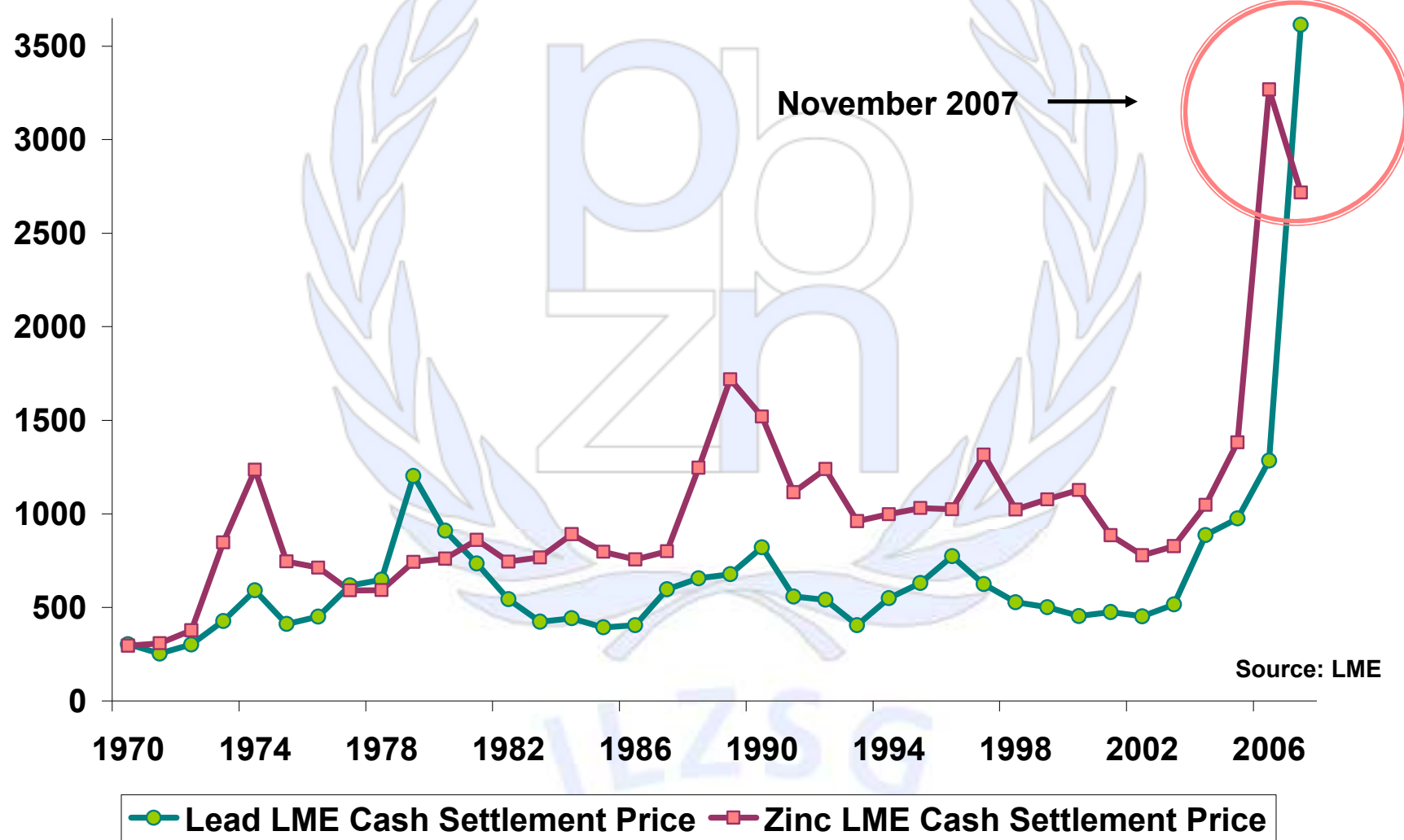
# Lead Stocks and Prices



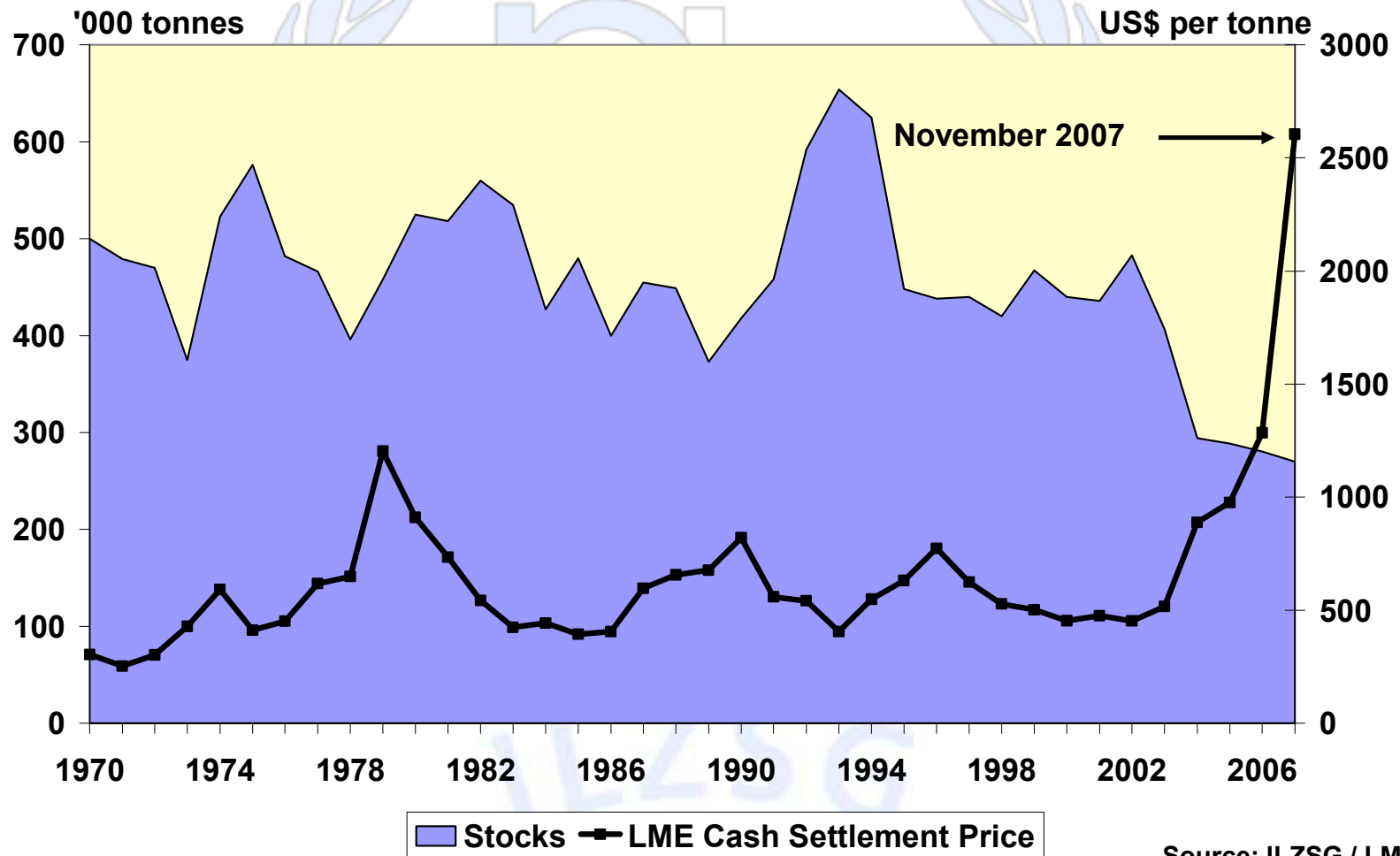
Source: ILZSG / LME

# Lead vs Zinc Prices

US\$ per tonne

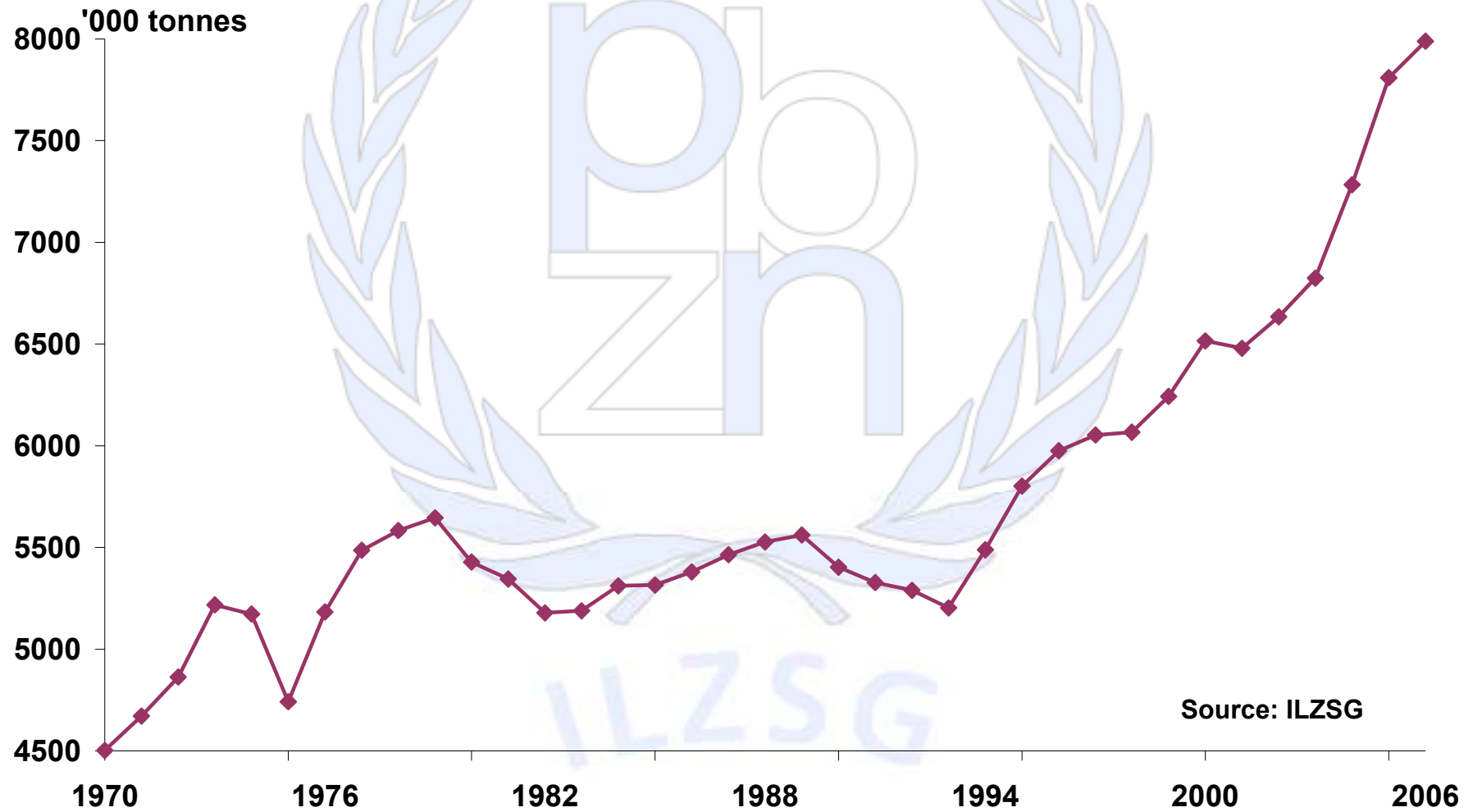


# Lead Stocks and Prices



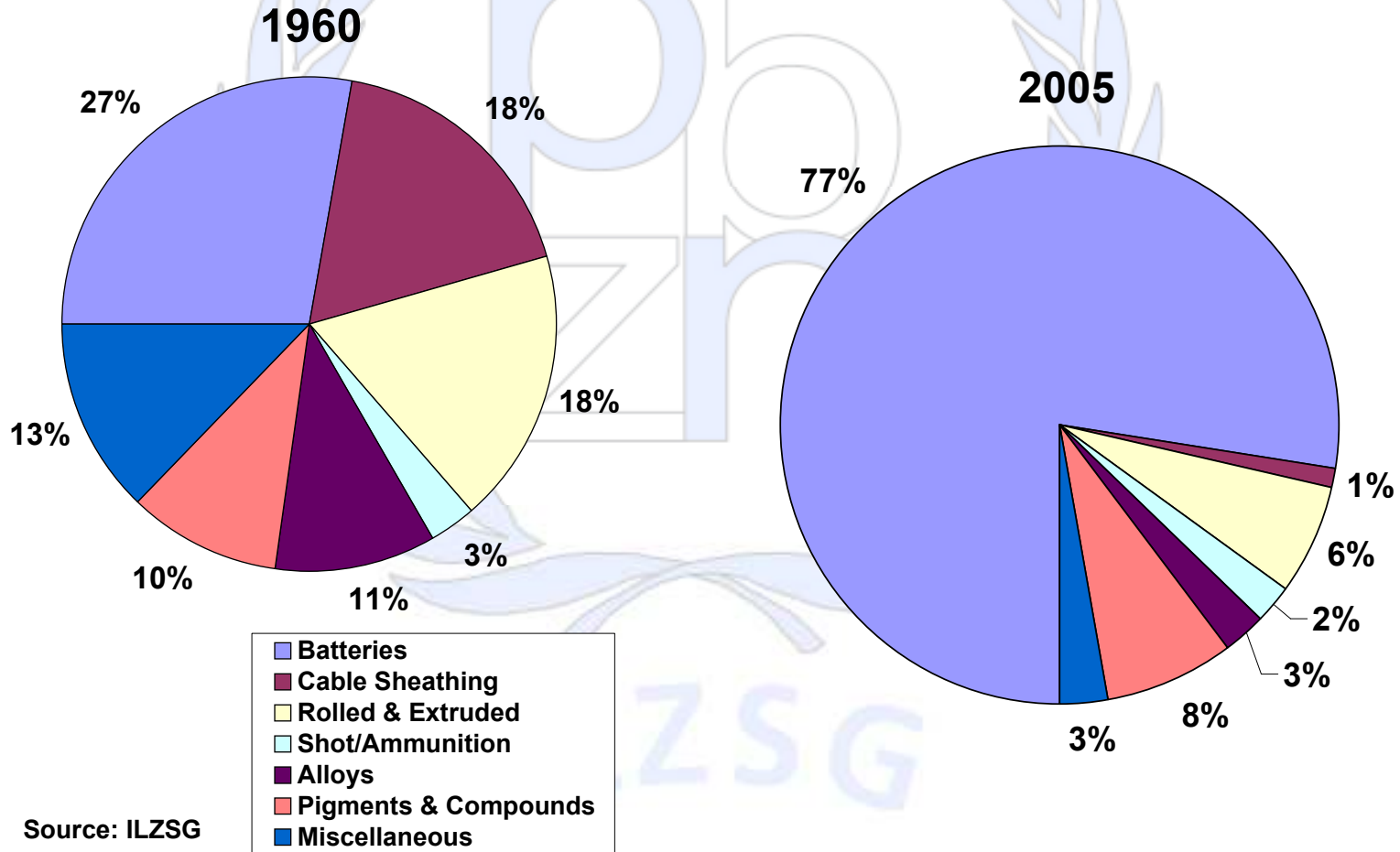
Source: ILZSG / LME

# World Lead Demand 1970 to 2006

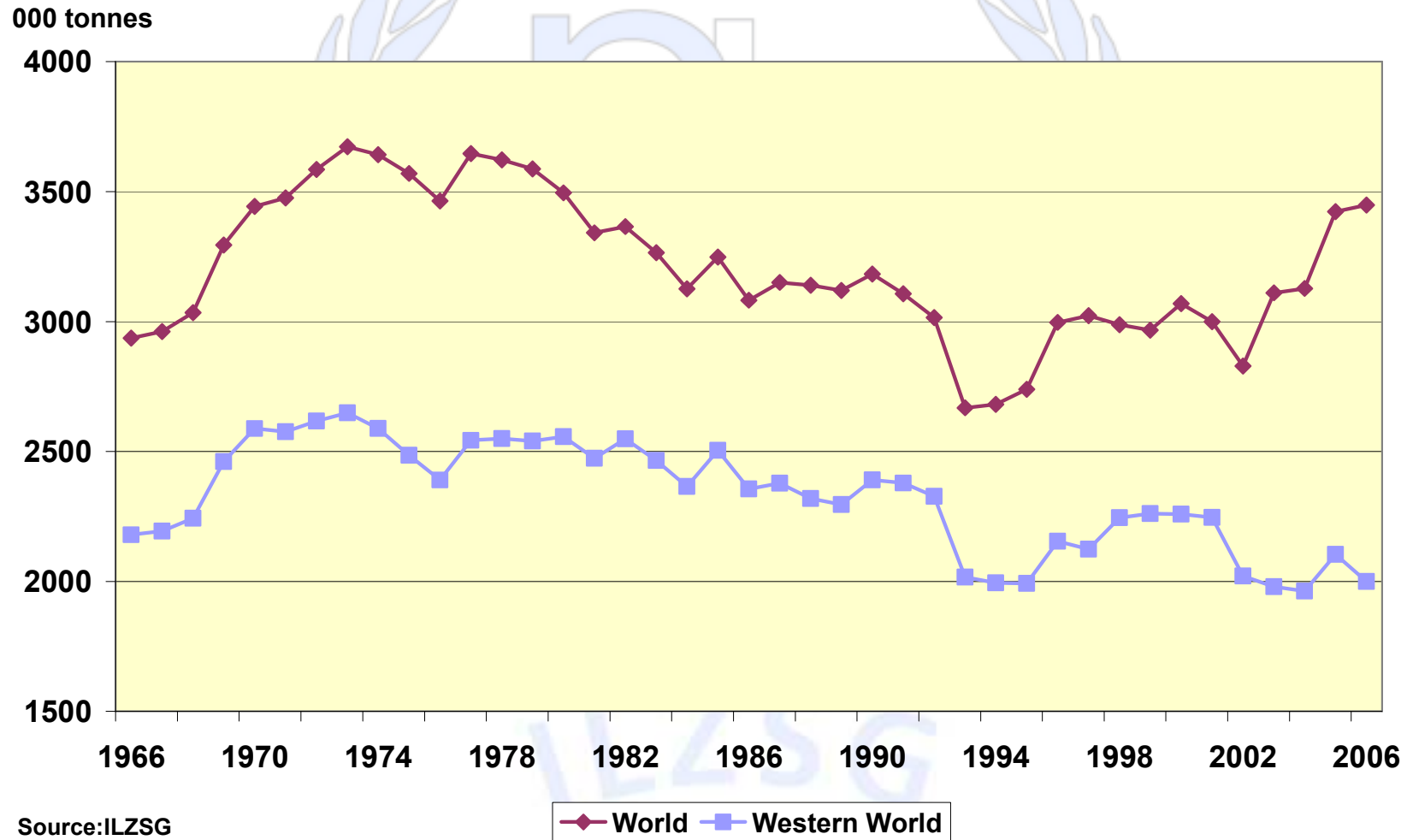


Source: ILZSG

# Lead End Uses



# Global Lead Mine Output 1960-2006





# Annual Capacity of 5 Largest Zn Mines

| 1980             |                  |            | 2006           |                  |             |
|------------------|------------------|------------|----------------|------------------|-------------|
|                  | Capacity/yr 000t |            |                | Capacity/yr 000t |             |
| Mine             | Lead             | Zinc       | Mine           | Lead             | Zinc        |
| Brunswick No. 12 | 80               | 220        | Red Dog        | 125              | 570         |
| Tara             | 42               | 220        | Century        | 55               | 500         |
| Kidd Creek       | 60               | 175        | Rampura Agucha | 40               | 400         |
| Pine Point       | 65               | 160        | Antamina       | -                | 320         |
| Anvil            | 85               | 135        | Brunswick      | 70               | 260         |
| <b>Total</b>     | <b>332</b>       | <b>910</b> | <b>Total</b>   | <b>290</b>       | <b>2050</b> |

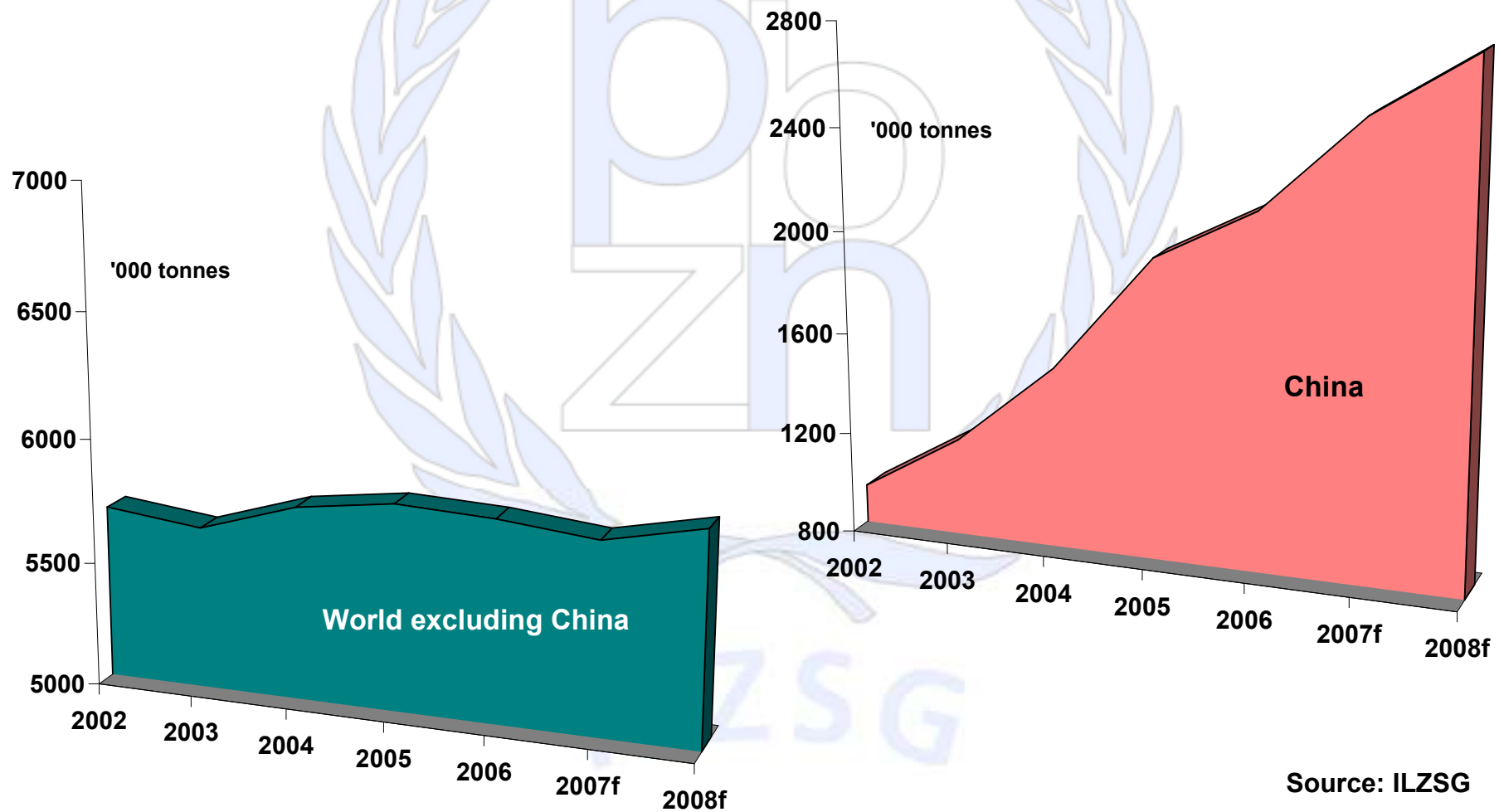
Source: ILZSG

## Major Lead Plant Closures 2003-2005

The background of the slide features a large, light blue watermark of the ILZSG logo. It consists of a laurel wreath encircling the letters 'ILZSG' in a stylized font. The 'I' and 'L' are connected, as are the 'Z' and 'S', and the 'G' is separate. The text 'ILZSG' is positioned at the bottom of the wreath.

|                                   |          |          |
|-----------------------------------|----------|----------|
| Cockle Creek, Australia           | Sep 2003 | 48,000t  |
| Noyelles Godault, France          | Jan 2003 | 190,000t |
| Titov Veles, Macedonia            | Jun 2003 | 35,000t  |
| Northfleet, UK ( <i>partial</i> ) | Dec 2003 | 70,000t  |
| Glover, USA                       | Nov 2003 | 125,000t |
| Sudamin, Germany                  | Feb 2005 | 35,000t  |

# Lead Demand Growth - China vs Rest of the World 2002-2008f



Source: ILZSG

## Chinese Lead Demand Growth

- Increased production of automotive (SLI) lead-acid original equipment and replacement batteries
- Output of industrial batteries used as back-up power in telecoms and computing sectors also rising

## E-Bikes in China

- Huge rise in popularity
- Low cost
- Zero emission
- Powered by lead-acid batteries

# Chinese E-Bike Production

## Chinese Output of Electric Bicycles by Region in 2006 (Million units)

| Province     | Output | Province  | Output      |
|--------------|--------|-----------|-------------|
| Tianjin      | 6.1    | Guangdong | 1           |
| Jiangshu     | 5      | Henan     | 0.3         |
| Zhejiang     | 3.5    | Siquan    | 0.2         |
| Shangdong    | 2.2    | Hebei     | 0.05        |
| Shanghai     | 1.6    | Guangxi   | 0.02        |
| <b>Total</b> |        |           | <b>19.5</b> |

Source: South China Normal University

## Chinese E-Bike Development

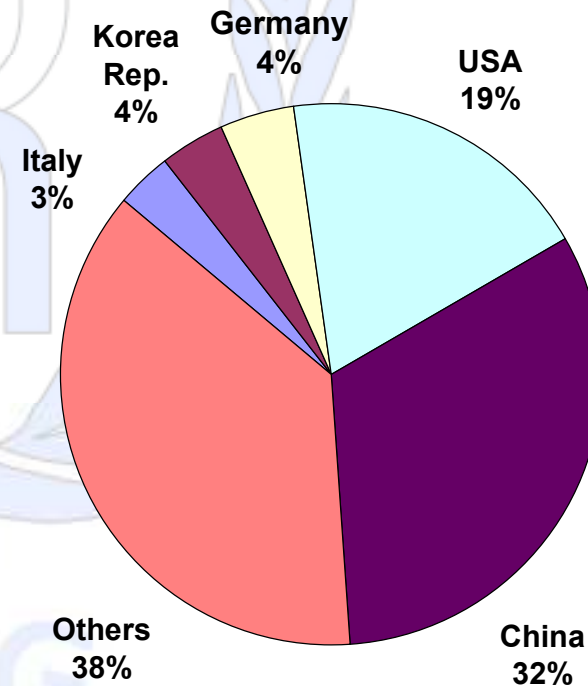
- Designs becoming more sophisticated
- Newer, more powerful models utilise 48v + 72v batteries
- E-tricycle sales rising

# World Lead Metal Usage

## Annual Change:

- 2007 +4.1%
- 2008 +4.1%

## 2008 Distribution



Source: ILZSG



## World Lead Metal Usage

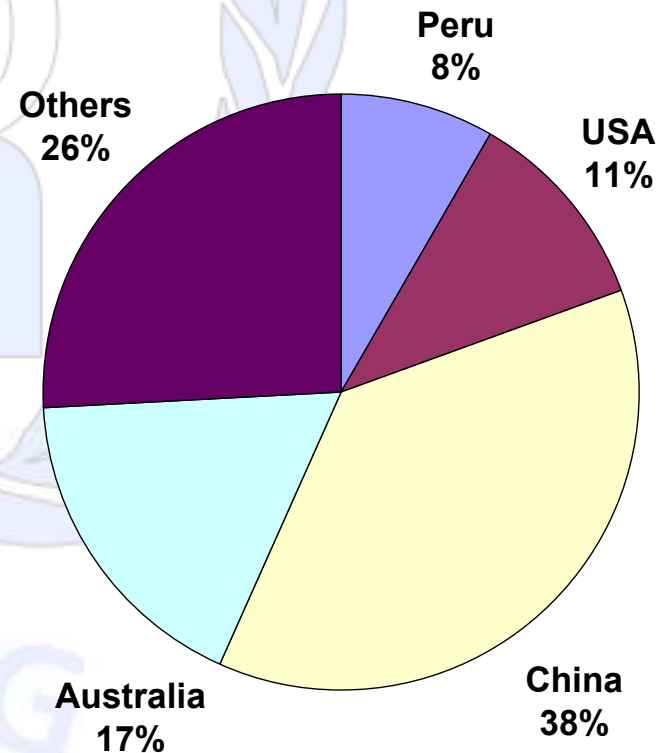
- Demand in Europe and US adversely affected by rising battery imports from lower costs regions
- In both regions usage in 2007 and 2008 is predicted to be similar to that in 2006

# World Lead Mine Output

## Annual Change:

- 2007 +5.5%
- 2008 +10.4%

## 2008 Distribution



Source: ILZSG

## World Lead Mine Output

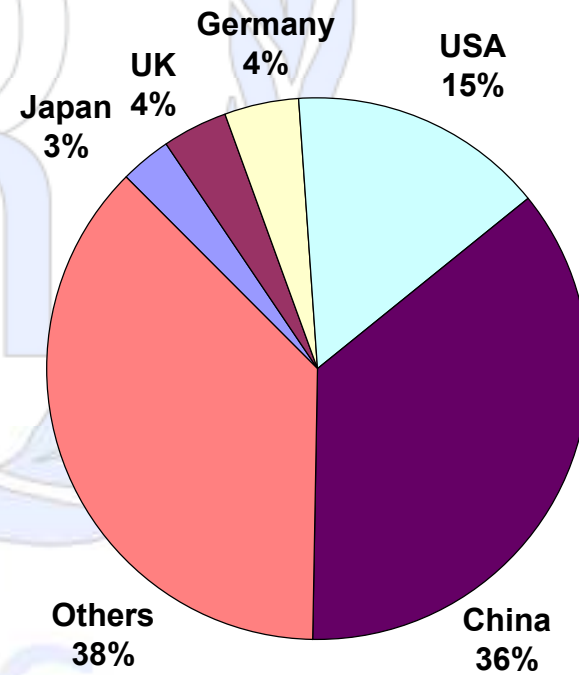
- Opening of San Cristobal, Bolivia
- Increases in China, Macedonia, Portugal, Russia, Sweden
- Australian output affected by Magellan closure

# World Lead Metal Output

## Annual Change:

- 2007 +3.9%
- 2008 +5.4%

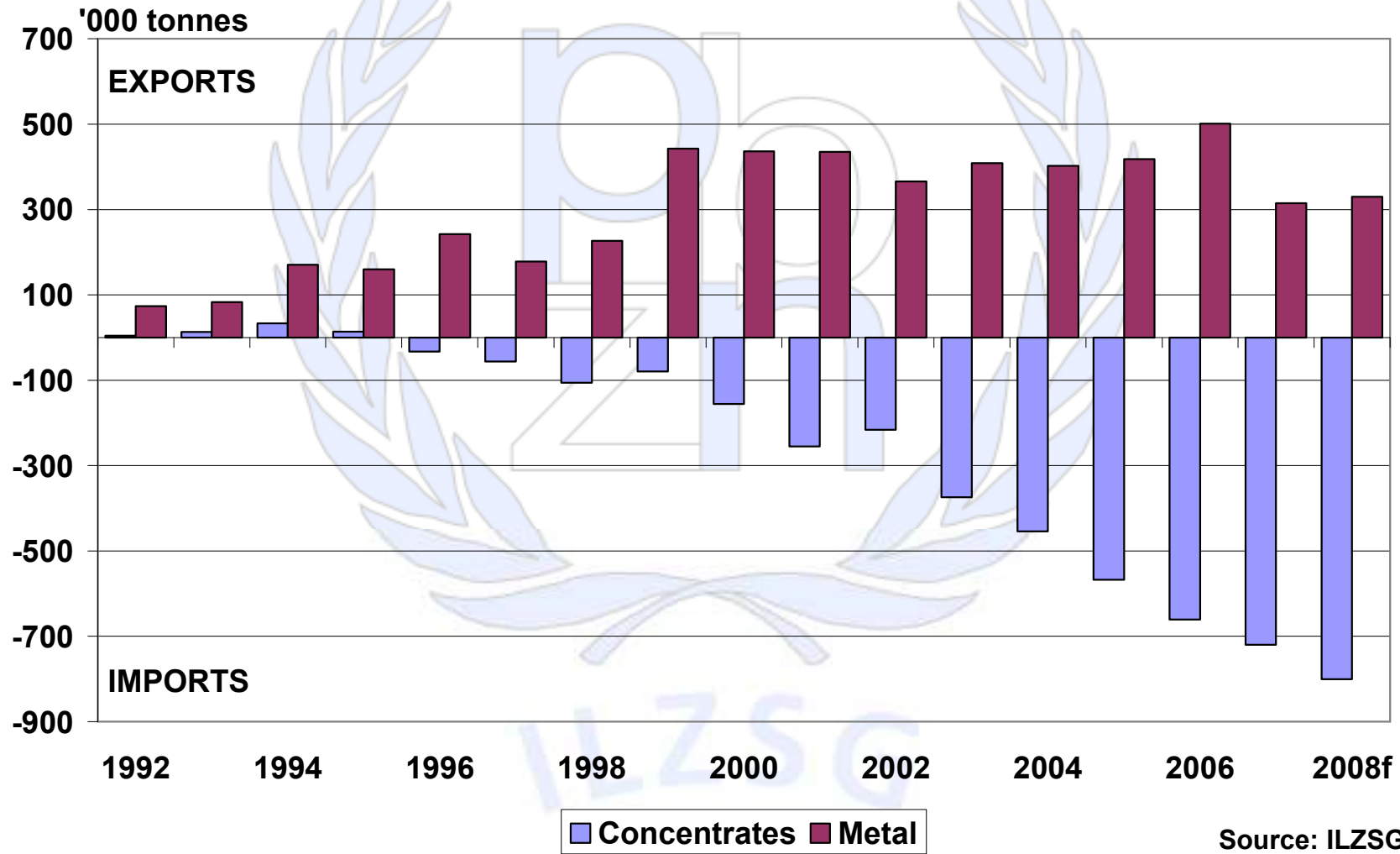
## 2008 Distribution



## World Lead Metal Output

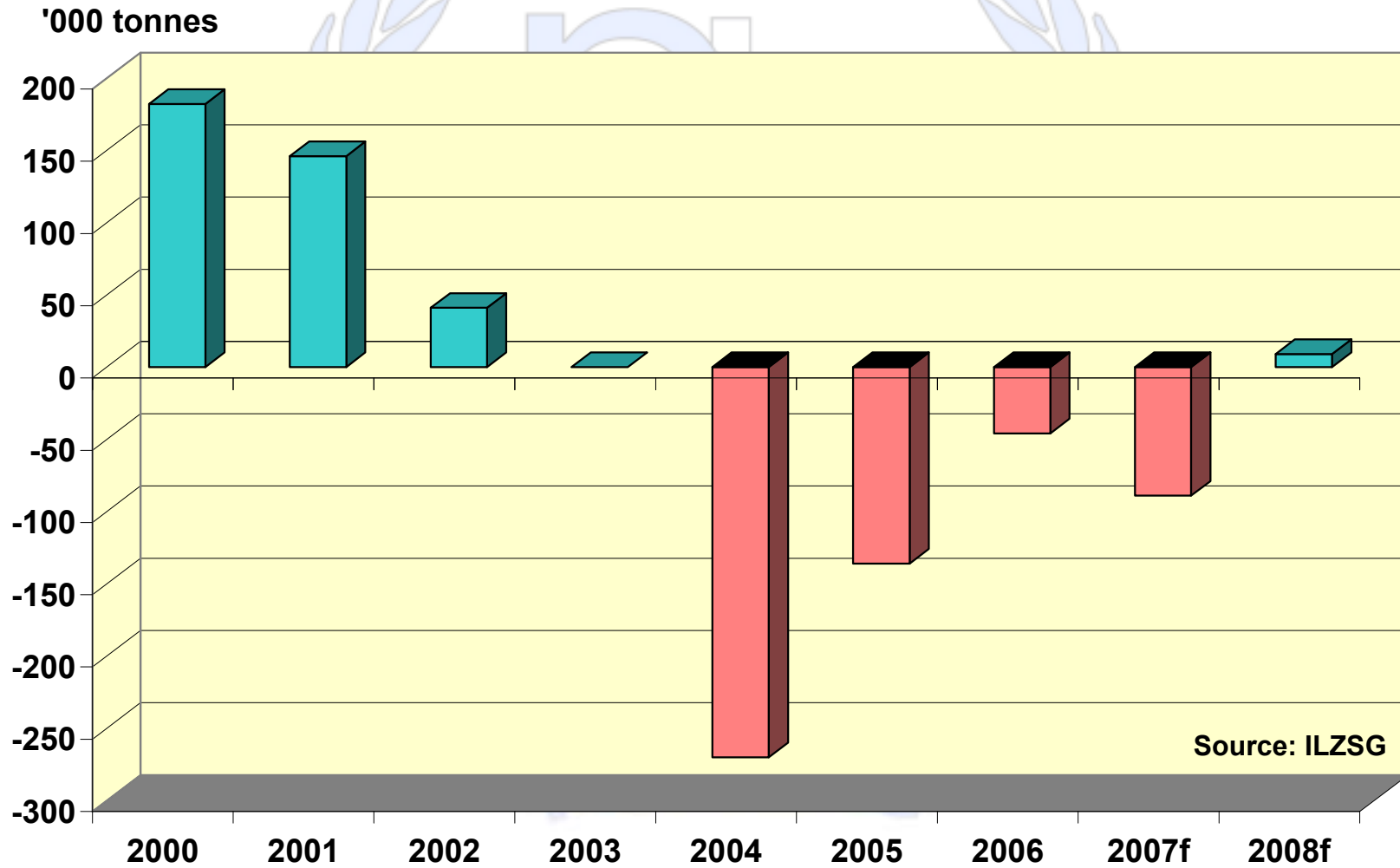
- New plants in Henan and Inner Mongolia, China
- Higher production in Canada, Russia, U.K. and U.S.

# Chinese Lead Trade



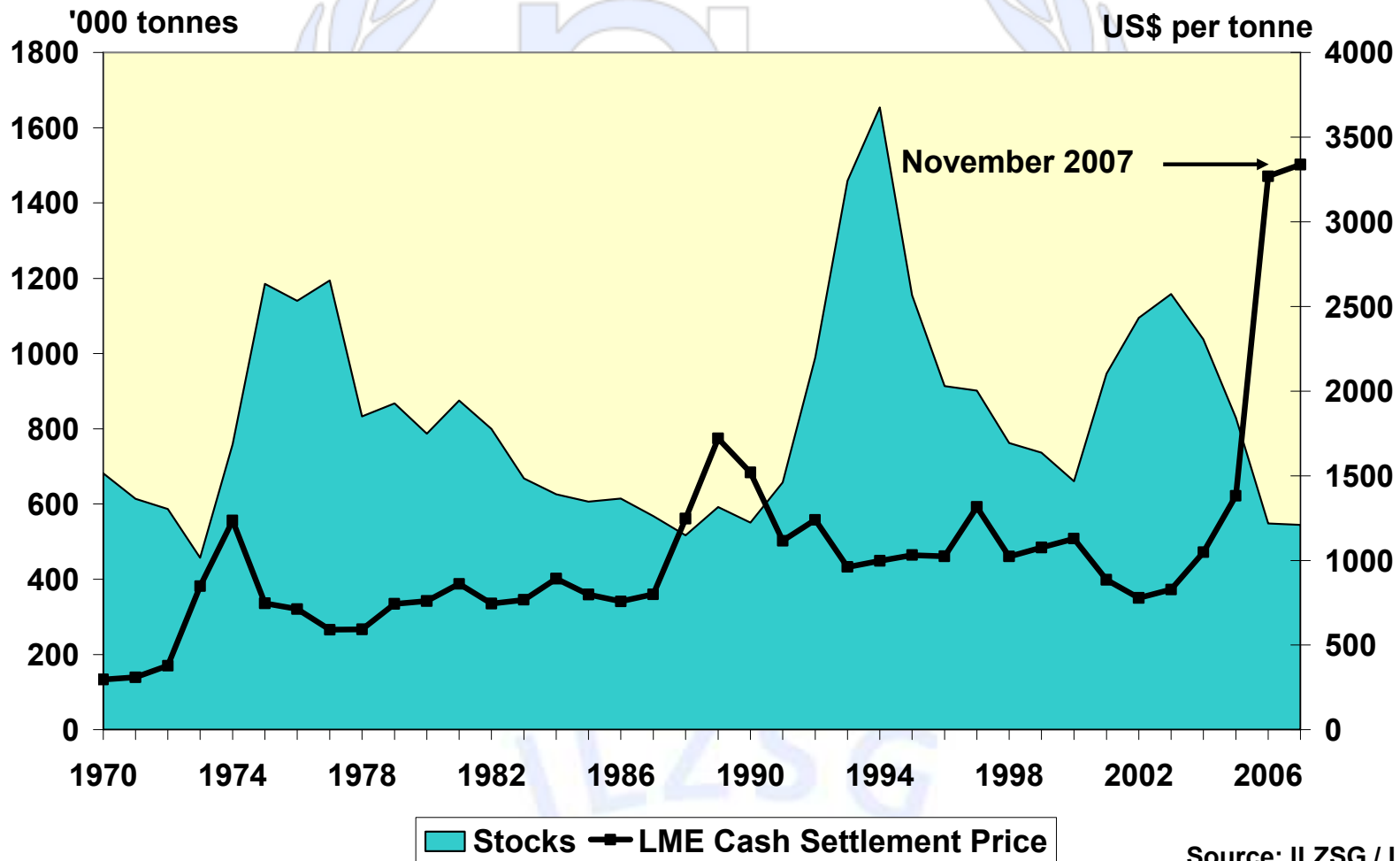
Source: ILZSG

# Lead Metal World Balance



Source: ILZSG

# Zinc Stocks and Prices

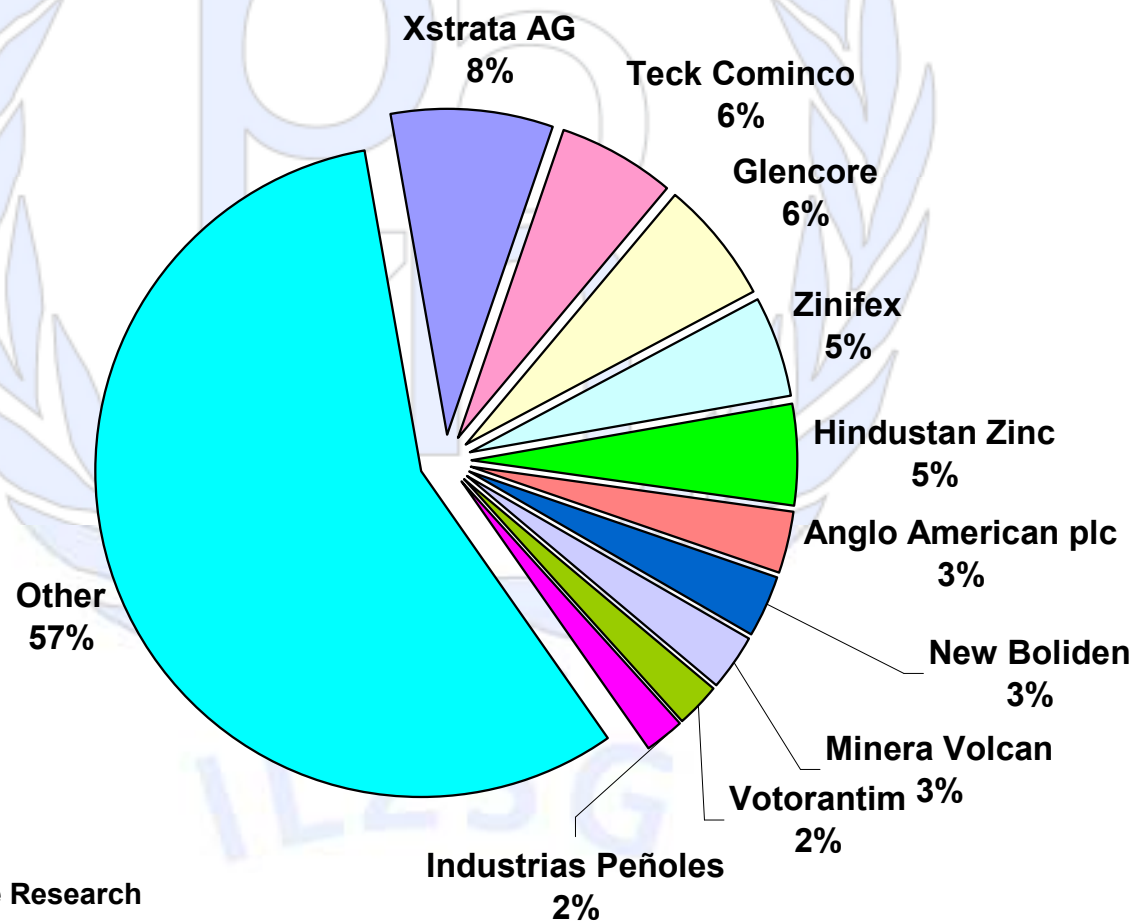


Source: ILZSG / LME



# Zinc Production Remains Fragmented

Market shares of major zinc producers, 2006

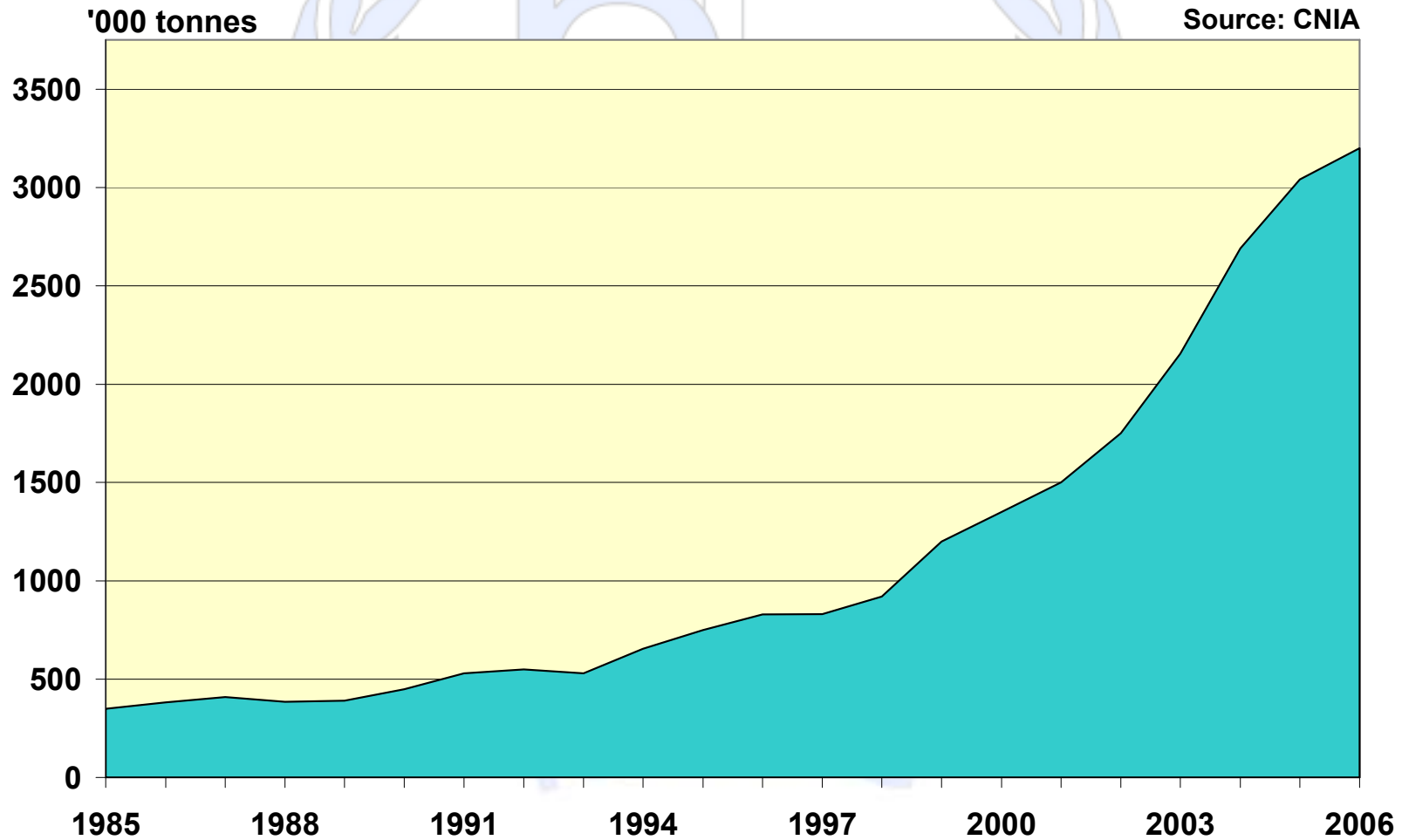


Source: Brook Hunt, Macquarie Research

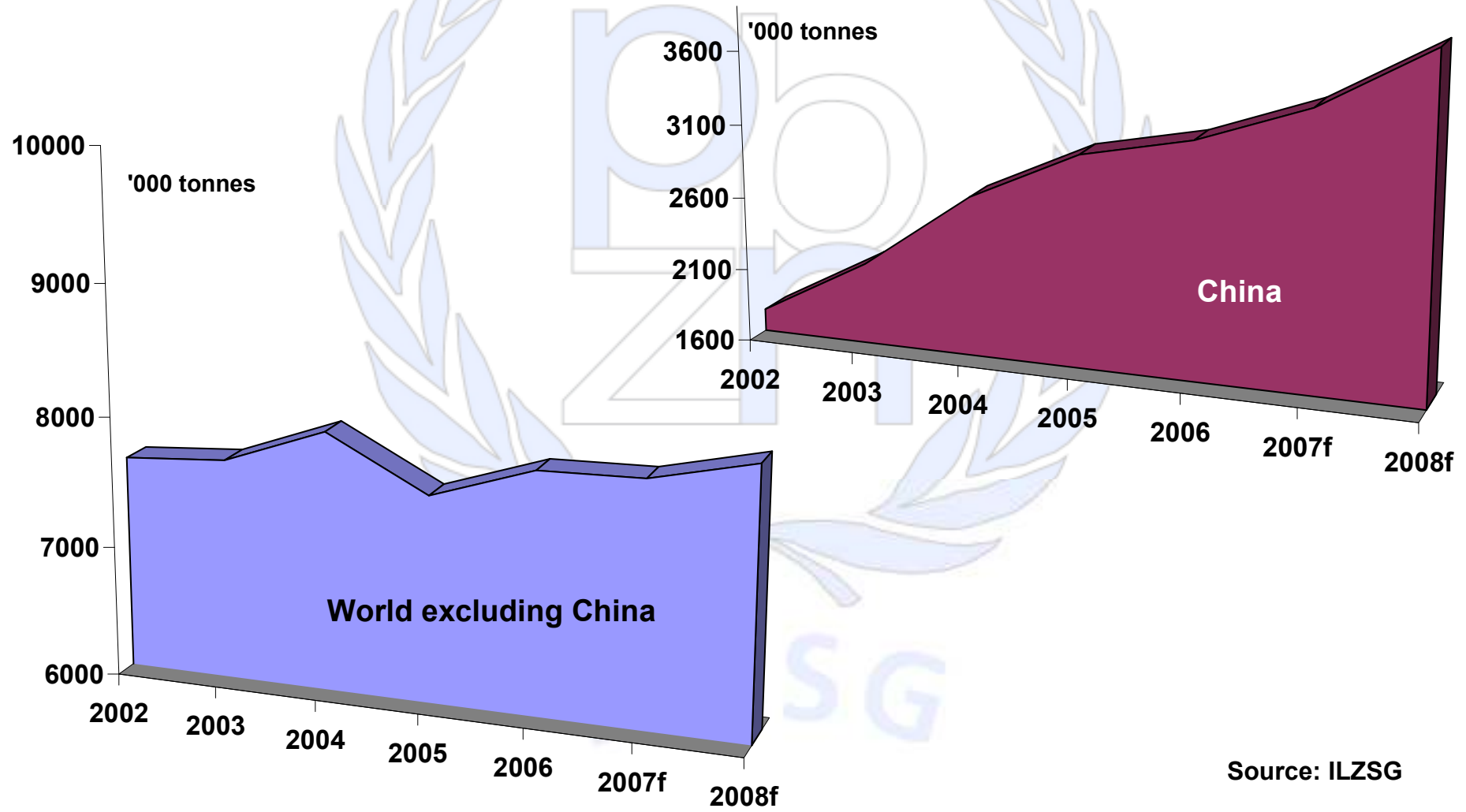
## Major Zinc Plant Closures 2003-2006

|                          |          |          |
|--------------------------|----------|----------|
| Cockle Creek, Australia  | Sep 2003 | 110,000t |
| Noyelles Godault, France | Jan 2003 | 100,000t |
| Auby, France             | Nov 2005 | 130,000t |
| Titov Veles, Macedonia   | Jun 2003 | 66,000t  |
| Avonmouth, UK            | Feb 2003 | 115,000t |
| Big River Zinc, USA      | Jun 2006 | 105,000t |
| Sudamin, Germany         | May 2005 | 100,000t |
| Porto Vesme, Italy       | Feb 2005 | 70,000t  |
| Cartegena, Spain         | May 2005 | 65,000t  |

# Chinese Zinc Consumption 1985-2006

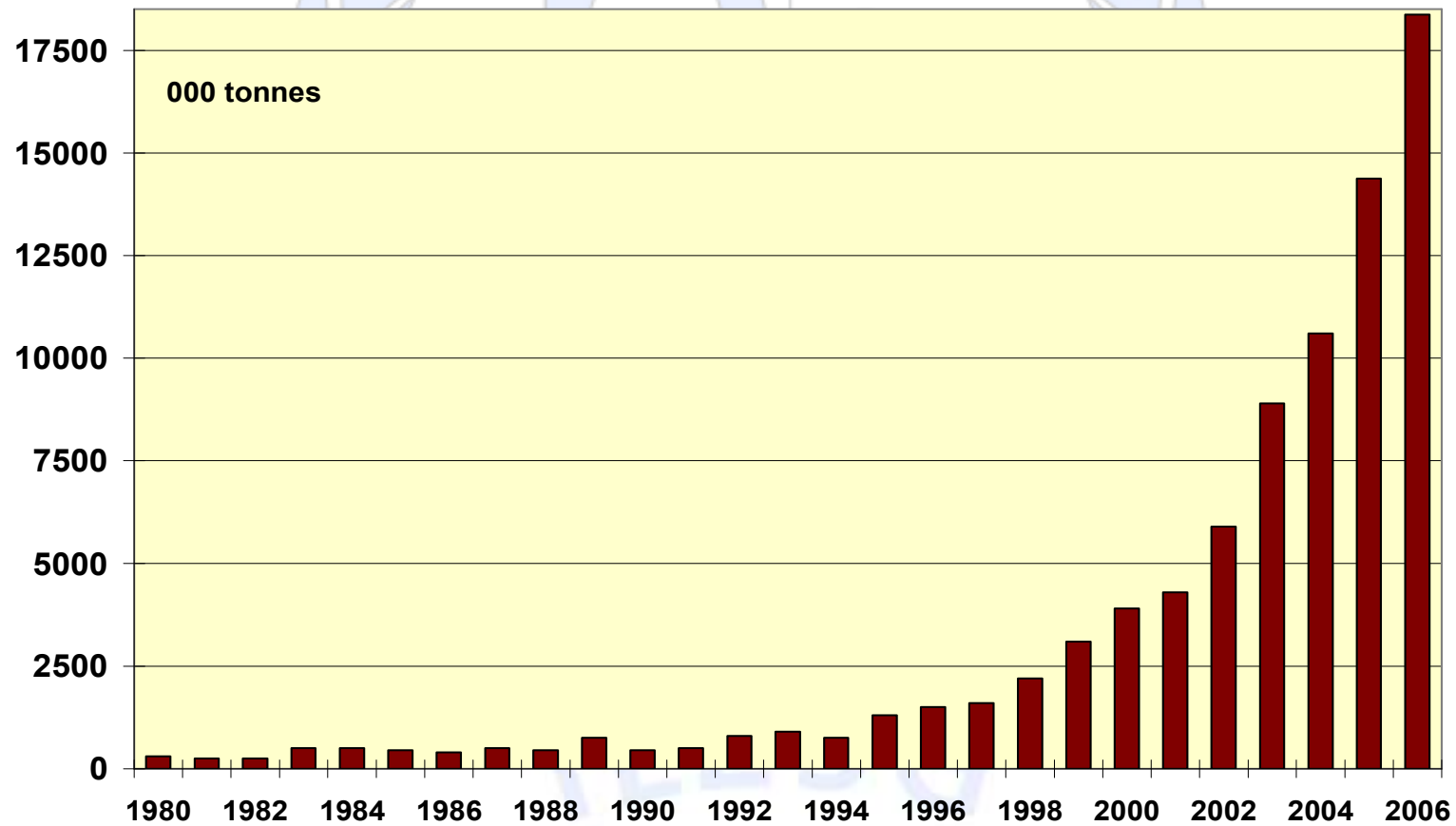


# Zinc Demand Growth - China vs Rest of the World 2002-2008f



Source: ILZSG

# Apparent Consumption of Galvanized Steel in China



Source: China Metals

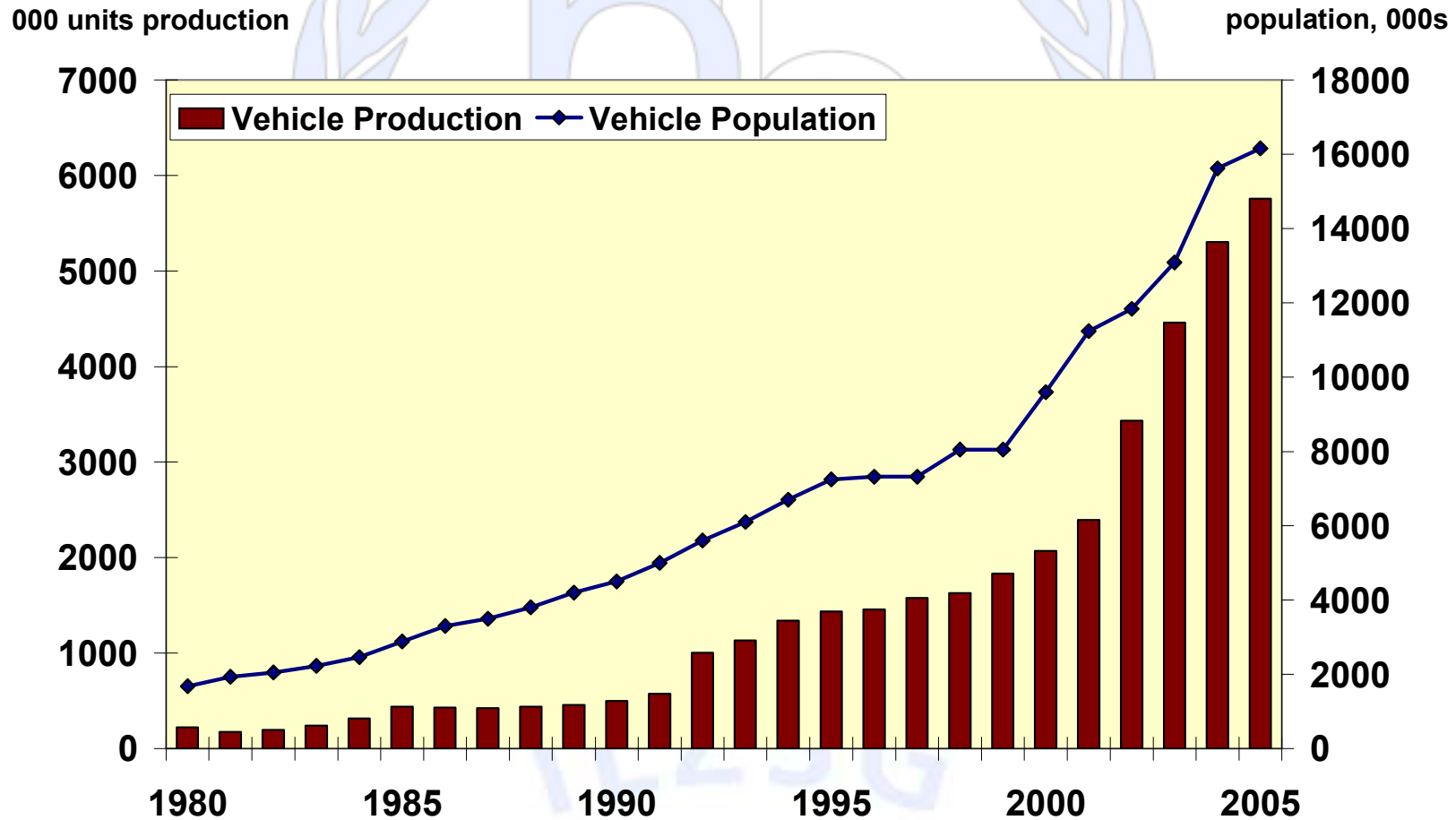
# China's Infrastructure Requirements

|                         | <b>USA</b>    | <b>CHINA</b> |
|-------------------------|---------------|--------------|
| Per million people      |               |              |
| <b>Motorways (km)</b>   | <b>21,862</b> | <b>1,080</b> |
| <b>Roads (km)</b>       | <b>14,157</b> | <b>242</b>   |
| <b>Railways (km)</b>    | <b>780</b>    | <b>54</b>    |
| Per 000 km <sup>2</sup> |               |              |
| <b>Motorways (km)</b>   | <b>699</b>    | <b>150</b>   |
| <b>Roads (km)</b>       | <b>453</b>    | <b>34</b>    |
| <b>Railways (km)</b>    | <b>25</b>     | <b>8</b>     |

## Other Indicators Confirm Fast Pace of Growth

- In terms of floor space construction activity has doubled in past 5 years
- Housing starts have risen by  $\frac{1}{3}$
- 2008 Olympics in Beijing
- 2010 World Exposition in Shanghai
- Production of fridge freezers rising by 15% per year
- Production of air conditioning units rising by 30% per year

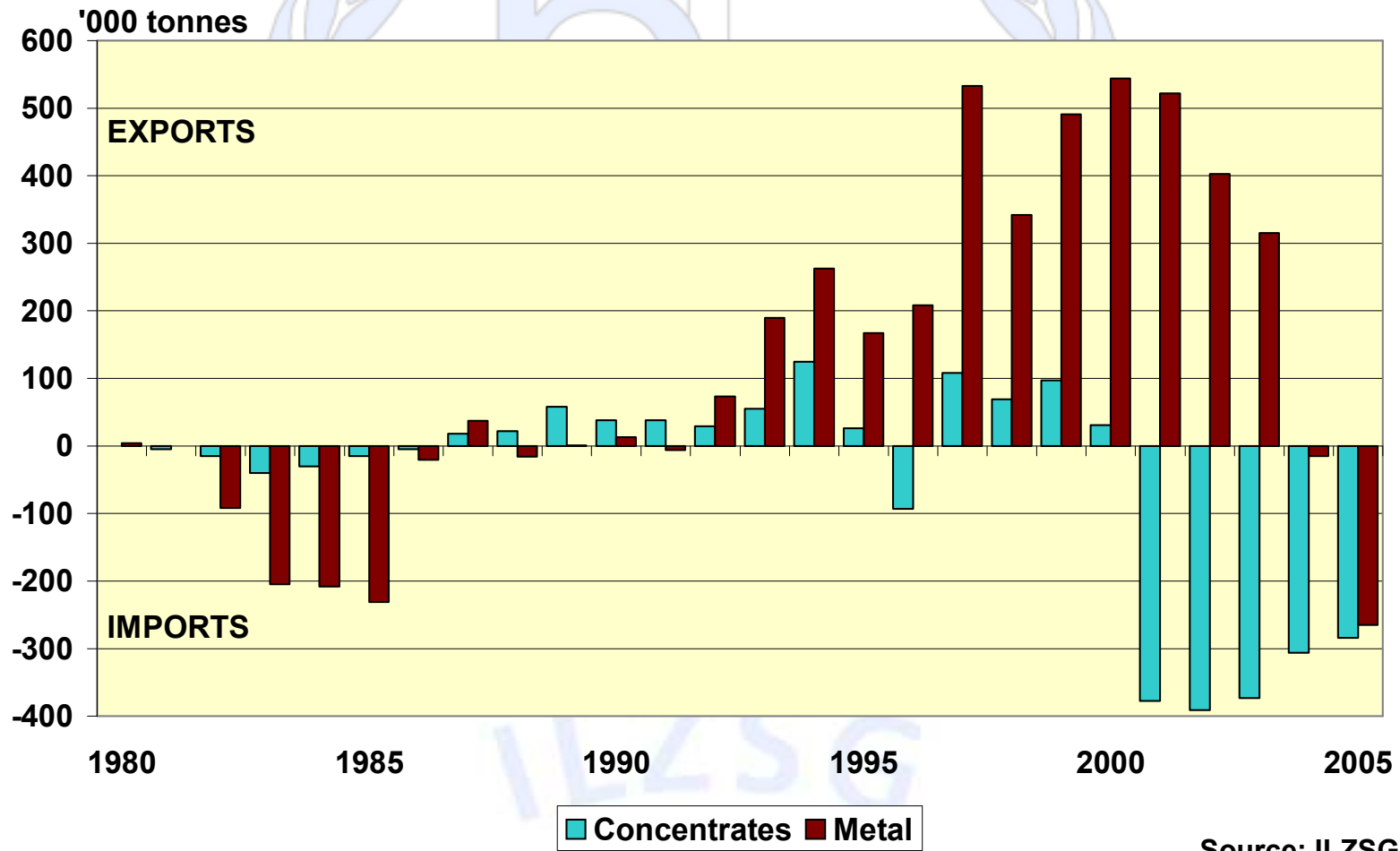
# Chinese Vehicle Population and Production 1980-2005



Source: China National Automotive Industry Corp/SMMT



# Reversal in Chinese Zinc Trade 1980-2005



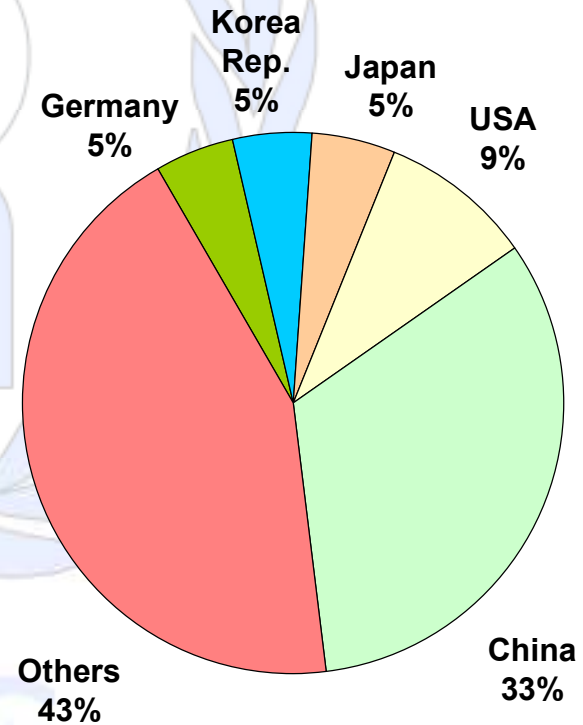
Source: ILZSG

# World Zinc Metal Usage

## Annual Change:

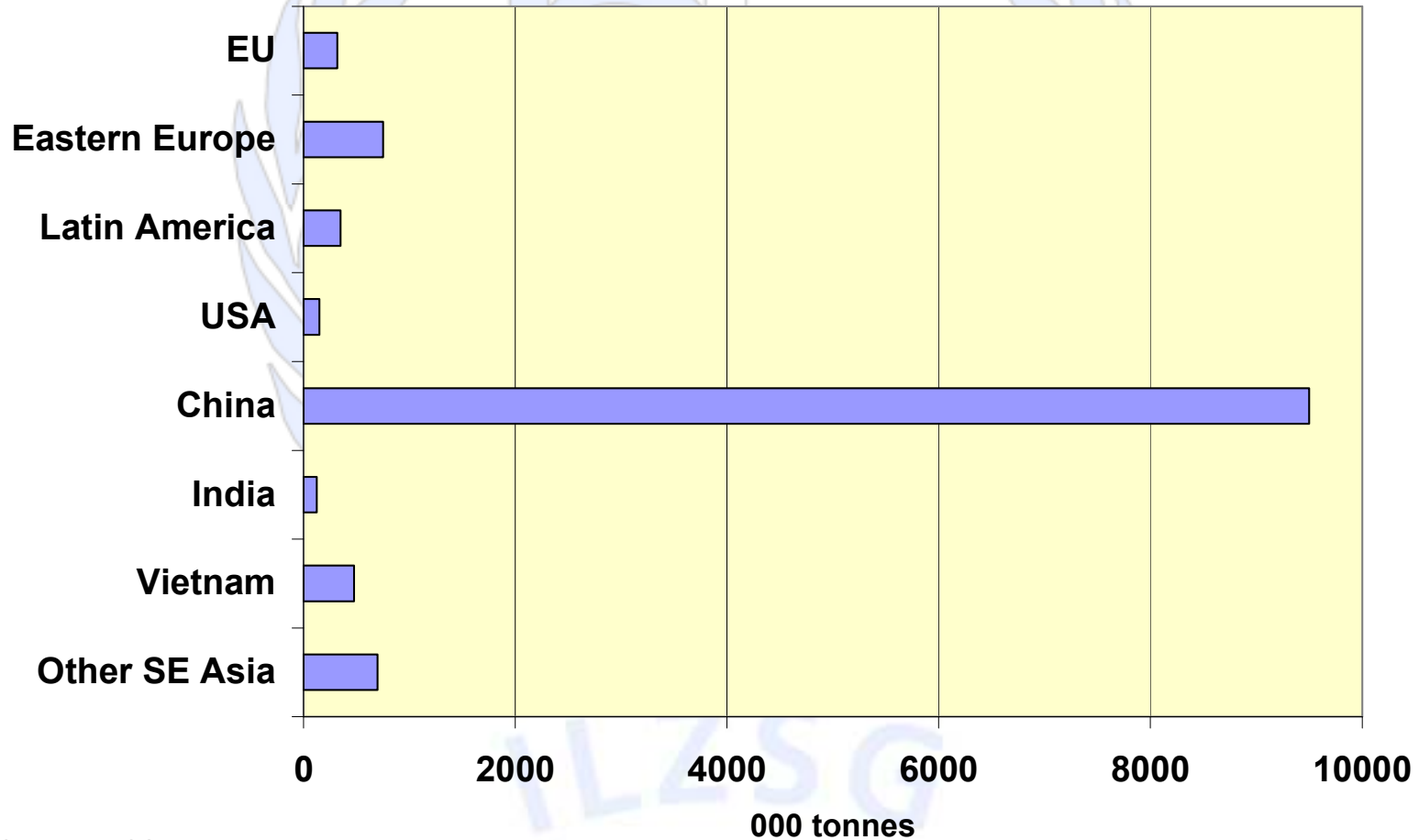
- 2007 +3.0 %
- 2008 +5.1 %

## 2008 Distribution



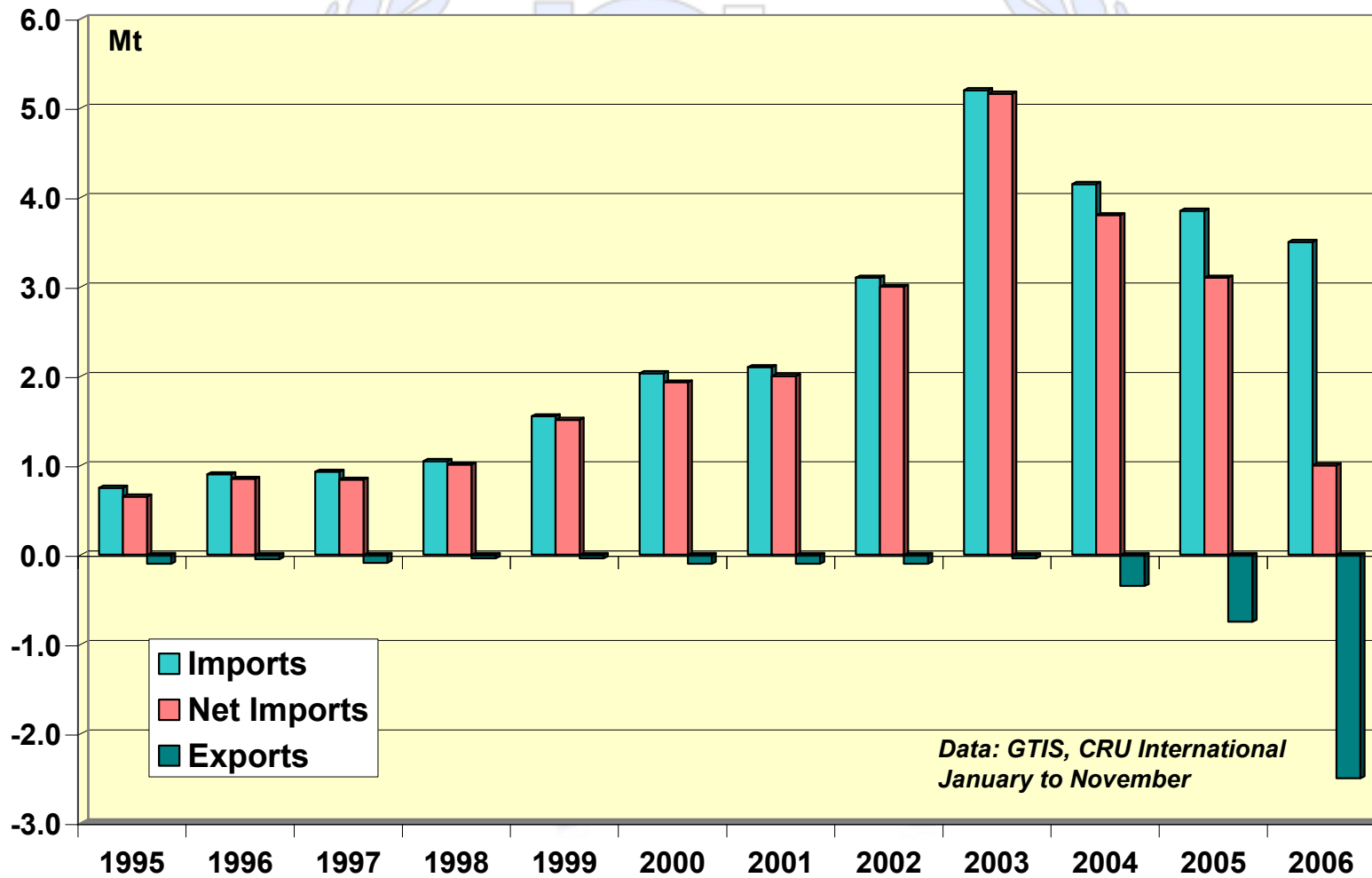
Source: ILZSG

# Planned New Galvanized Sheet Projects



Source:ILZSG

# Chinese Trade in Galvanized Sheet



## World Zinc Metal Usage

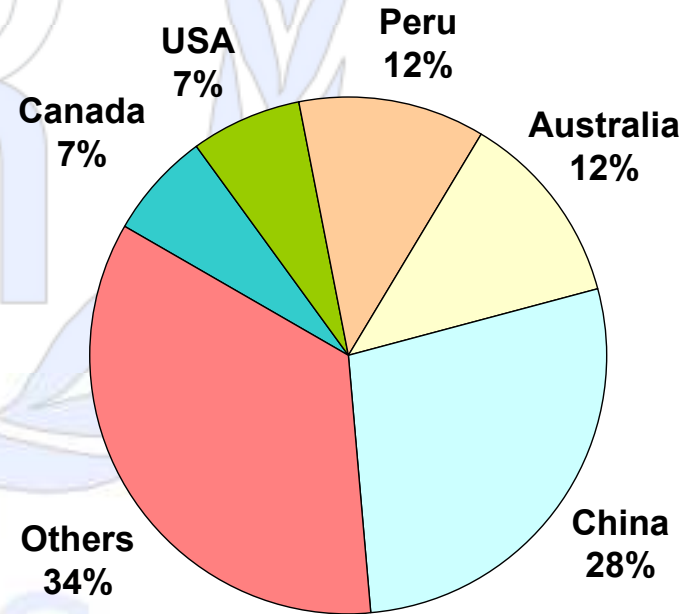
- US demand to fall by 1.9% in 2007 and remain stable in 2008
- European usage to rise by 1.3% in 2007 and 2.6% in 2008

# World Zinc Mine Output

## Annual Change:

- 2007 +7.4%
- 2008 +9.5%

## 2008 Distribution



## World Zinc Mine Output

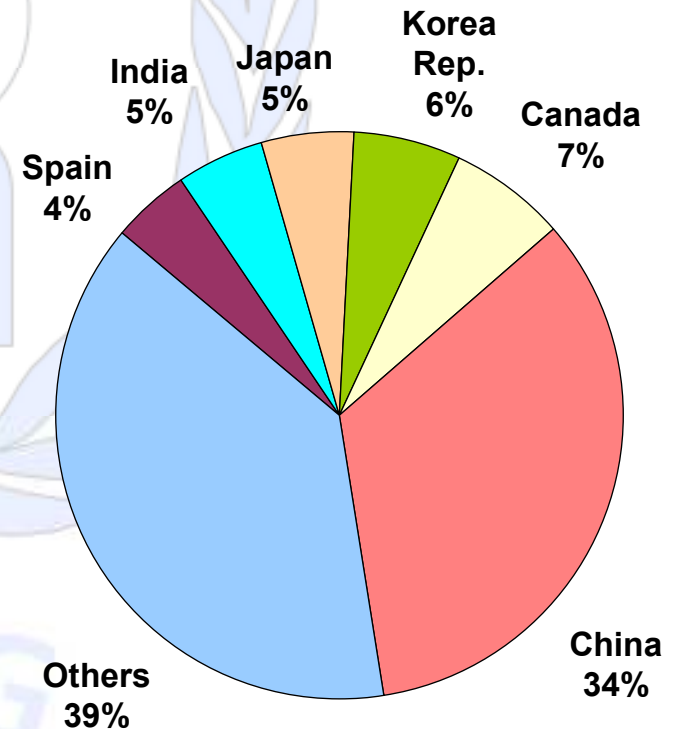
- San Cristobal in Bolivia is 8<sup>th</sup> largest zinc mine in world
- Number of new operations in Australia and Canada in 2007 and 2008
- Higher output at Antamina, Peru
- Increases in China, Brazil, India, Ireland, Kazakhstan, Macedonia, Mexico, Portugal, U.S. and others

# World Zinc Metal Output

## Annual Change:

- 2007 +5.9%
- 2008 +7.8%

## 2008 Distribution

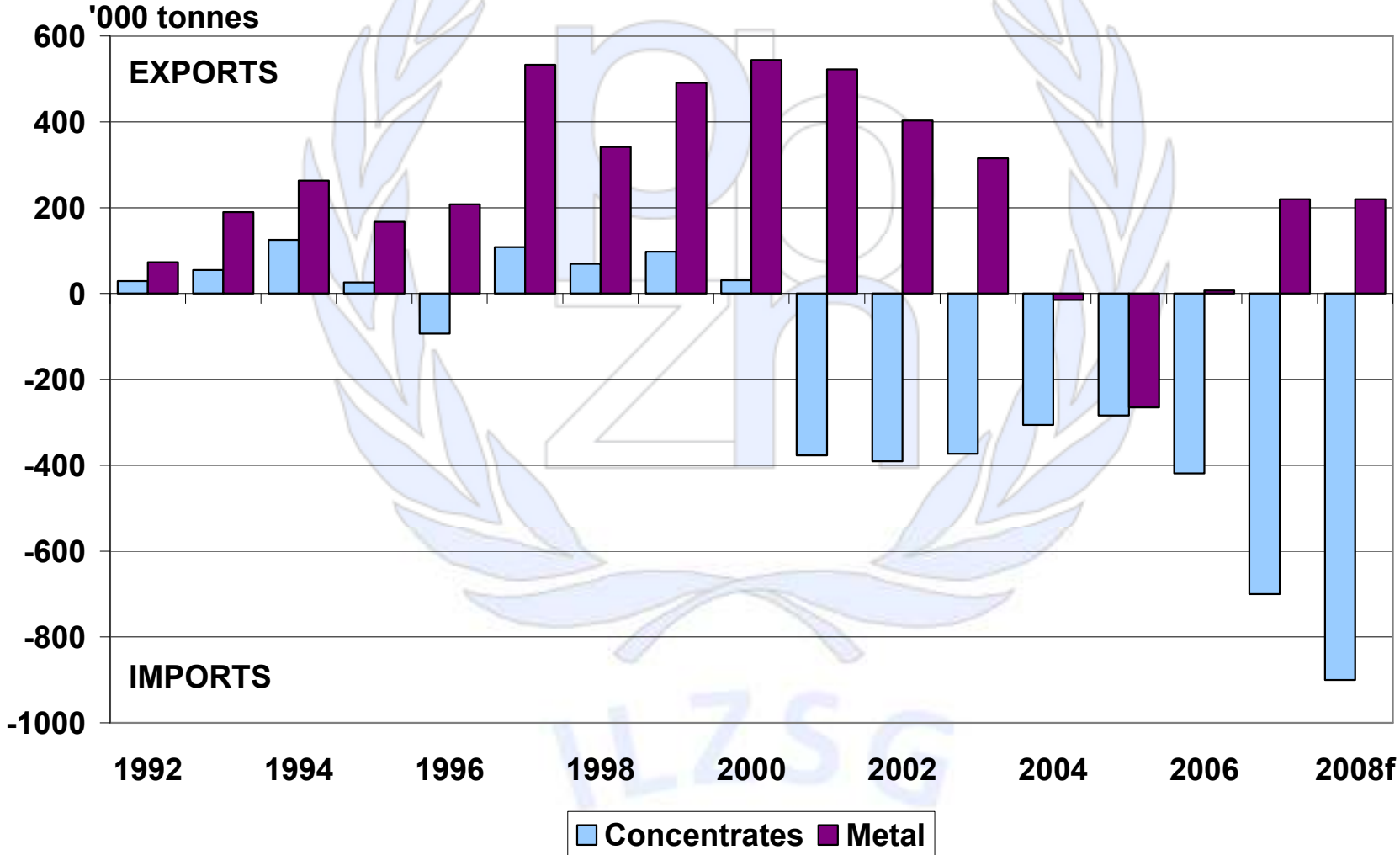




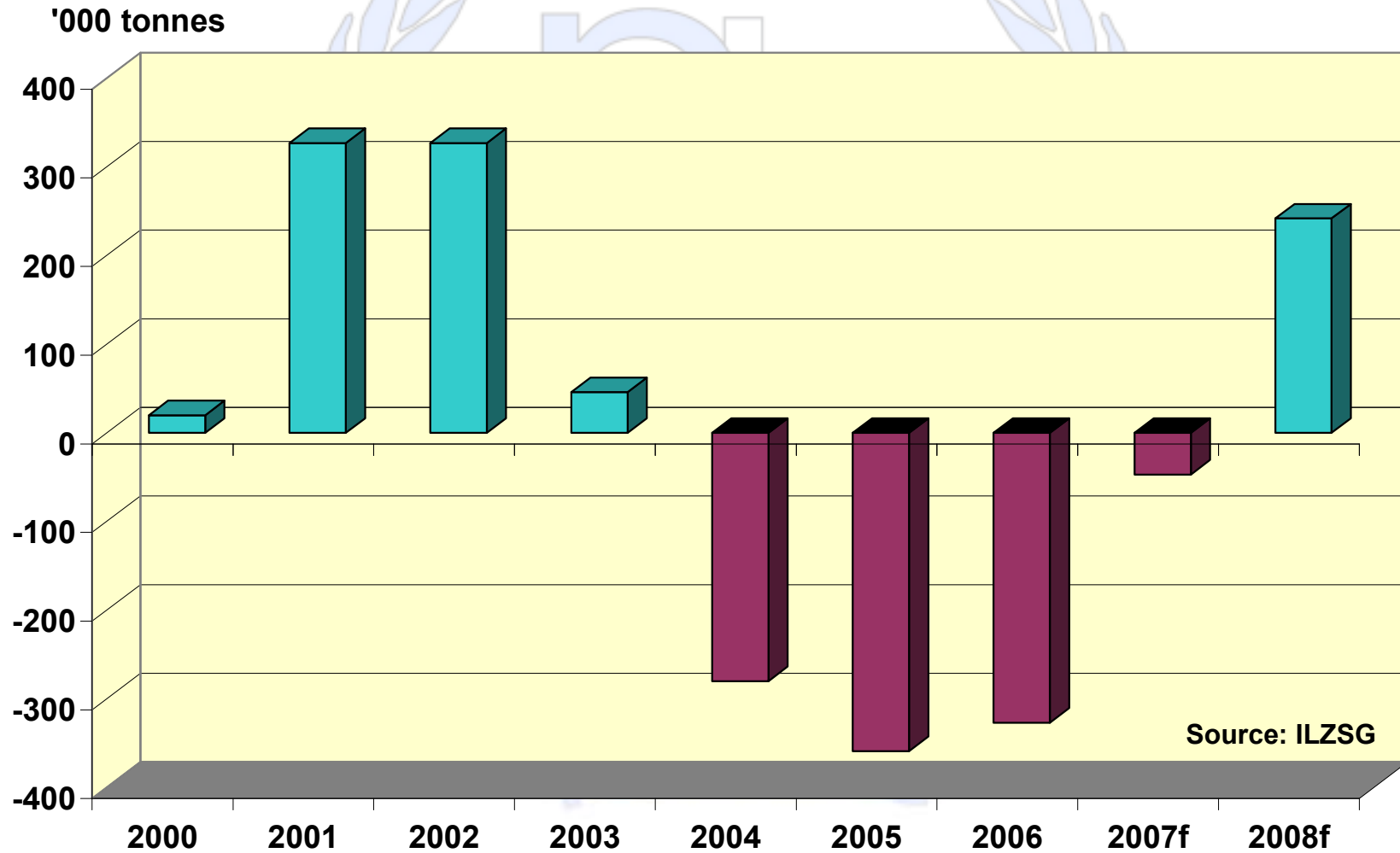
## World Zinc Metal Output

- 2nd 170mt plant to open at Chanderiya, India
- Higher European output
- Modified Big River Zinc in U.S. to reopen in 2008
- Increases in Australia, Kazakhstan, Korea, Mexico and Thailand

# Chinese Zinc Trade



# Zinc Metal World Balance



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