



## Natural Resources Canada

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### ARCHIVED - Zinc

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### Canadian Minerals Yearbook (CMY) - 2009

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#### HIGHLIGHTS

- Canada is an important producer and exporter of zinc and zinc products. Zinc metal production in Canada dates from the early 1900s when the Consolidated Mining and Smelting Company of Canada (now Teck Resources Limited) started production at a small electrolytic zinc plant at Trail, British Columbia. Today, with a smelting capacity of 843 000 t/y from four metallurgical facilities located across the country, Canada produces roughly 6.5% of the world's total supply of refined zinc.
- In November, Xstrata Copper Canada announced that it will permanently close its copper smelter and zinc metallurgical plant in Timmins, Ontario, effective May 1, 2010. This decision was taken due to a global smelting overcapacity, the difficulty in sourcing sufficient concentrates to an inland location, and higher power costs when compared with other Canadian smelters.
- Zinc prices were on a steady upward trend during the year, increasing from US\$56/lb in January to US\$1.15/lb by year-end.
- Metal inventories continued to rise, ending the year at 925 000 t, due principally to low demand in Europe and North America, and increased metal production in China. Prices should be in the US\$85¢-95¢/lb range in 2010, and industrial demand is expected to gradually increase.

ZINC - TABLE A

World Data	2007	2008	2009	2009/08
	(000 t)			(% change)
Mine production	11 136	11 690	11 377	-2.7
Refined production	11 356	11 655	11 277	-3.2
Usage (consumption)	11 310	11 437	10 832	-5.3
Refined balance	46	202	380	n.a.
Refined stocks at year-end (1)	580	764	925	n.a.

Source: International Lead and Zinc Study Group.

n.a. Not applicable.

(1) Producer, consumer, and LME.

ZINC - TABLE B

<b>Zinc Prices</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Cash (US¢/lb)	147.10	85.00	75.00
Cash (US\$/t)	3 259.90	1 874.70	1 655.10
3 months (US\$/t)	3 253.82	1 897.80	1 681.84
15 months (US\$/t)	3 011.90	1 943.46	1 742.69
27 months (US\$/t)	2 751.27	1 963.43	1 763.70

Source: International Lead and Zinc Study Group.

ZINC - TABLE C

<b>Canadian Data</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2009/08</b>
	<b>(tonnes)</b>			<b>(% change)</b>
Mine output (1)	630 485	750 502	701 828	-6.5
Zinc refined production	802 103	764 310	685 504	-10.3
Zinc domestic shipments	171 655	162 621	138 027	-15.1
Zinc refined imports	13 514	8 314	4 559	-45.2
Apparent zinc usage (2)	185 169	170 935	142 586	-16.6

Source: Natural Resources Canada.

(1) Zinc content of ores and concentrates produced. (2) Domestic shipments and imports.

## INTRODUCTION

Zinc is a relative newcomer to the group of metals discovered and used by society. While the first use of copper pre-dates recorded history and the discovery of tin goes back 5000 years, the first recovery of metallic zinc came much later. The production of metallic zinc was first described in India around 1200 A.D. By 1374, zinc was recognized as a new metal, the eighth to be discovered at that time, and a limited amount of commercial zinc production was under way. Although brass-making had developed much earlier, the zinc in brass was obtained by treating zinc ore to produce zinc vapour, which combined with granulated copper under heat. From India, zinc production was introduced to China sometime around 1600 A.D. and then began to be exported to Europe.

The first full-scale zinc smelting operation outside of Asia started in Bristol, England, about 1743. By the beginning of the 19th century, zinc production was established on the continent of Europe, notably in Belgium and parts of Eastern Europe. In the latter half of the century, large zinc industries developed rapidly in the United States and Germany.

## HISTORY OF ZINC MINING IN CANADA

Zinc production in Canada dates back to the First World War when the Consolidated Mining and Smelting Company of Canada began operating a small electrolytic zinc plant at Trail, British Columbia, to help offset a critical wartime shortage of zinc in the United Kingdom. At that time, the Consolidated Mining and Smelting Company of Canada and The Anaconda Copper Mining Company in Montana were pioneering the production of zinc in North America by the electrolytic method.

The ores used at Trail came from the Sullivan mine near Kimberley, B.C., but production was hampered because the complex lead-zinc-iron ore was difficult to treat using existing methods. In 1920, however, the differential flotation method was successfully applied to separate the Sullivan ore into a lead concentrate, a zinc concentrate, and an iron by-product. This marked the beginning of significant zinc production in Canada. Today, the Trail operations are the world's largest fully integrated lead and zinc smelting and refining complex. Owned and operated by Teck Resources Limited of Vancouver, the Trail facility has a zinc production capacity of 295 000 t/y.

In Manitoba, the discovery of significant zinc and copper ore with important quantities of gold in 1915 led to the development of the Flin Flon-Snow Lake mining camp, smelter complex, and dedicated power plant in the late 1920s. Since 1930, Hudson Bay Mining and Smelting Co. Limited, now a subsidiary of HudBay Minerals Inc., has owned and operated some 30 mines that have in turn fed the company's metallurgical complex at Flin Flon. The Flin Flon smelter and refinery complex has undergone significant capital improvements since it first commenced operations in 1930 with the introduction of zinc pressure leach technology in the early 1990s and a new tank house in 2000 that expanded zinc production capacity to 118 000 t/y.

The Kidd Creek orebody near Timmins, Ontario, was discovered in 1963 and Texasgulf Inc. began open-pit mining of the deposit in 1966. The Kidd Creek zinc plant started production in 1972. In 1983, Kidd Creek started up a zinc pressure leaching facility. The mine and plant continued operation under Falconbridge until 2006. Today, Xstrata Copper owns and operates the Kidd Creek complex with a zinc metal production capacity of 150 000 t/y.

With the discovery of significant zinc-bearing ores in the Matagami region of northern Quebec in the late 1950s and early 1960s, Noranda Inc. began looking at options to build an electrolytic zinc plant. Construction began at Valleyfield, Quebec, west of Montréal, in 1962 and Canadian Electrolytic Zinc (CEZ) was brought into production in 1963. Xstrata Zinc has a 25% interest in the CEZ refinery held through the Noranda Income Fund. The plant's capacity has increased steadily from its original 64 000 t/y at the time of opening to 280 000 t/y today.

## CANADIAN PRODUCTION FACILITIES

In 2009, Canadian mines produced 701 828 t of zinc in concentrate, compared to 750 502 t in 2008, a 6.4% decrease (Table 1). Refined metal production for 2009 was 685 504 t, compared to 764 310 t in 2008, a decrease of 10.3%. Table 4 shows zinc production and exports for the period 1988-2009.

Zinc is produced at eight mines located in six provinces (Figure 1). A small amount of zinc was produced from stockpiled ore at the Scotia mine in Nova Scotia, which closed in late 2008. During the year, three zinc mines closed, all victims of low metal prices. The trend in total Canadian zinc mine production for the period 1999-2009 is shown in Figure 2. Zinc metal is produced from domestic and foreign concentrates at four metallurgical sites in Quebec, Ontario, Manitoba, and British Columbia (Table 8). Refined zinc metal production for the period 1999-2009 is shown in Figure 3. Metal production has declined steadily since 2006. Zinc oxide is produced at one plant located in Brampton, Ontario. Statistics on exports and imports of zinc concentrates, metal, and semi-fabricated products are provided in Table 2.

The following is a summary of Canadian zinc mines and metal production facilities in operation during 2009.

### Newfoundland and Labrador

The **Duck Pond** mine, owned by **Teck Resources Limited**, is located 90 km south of Buchans. A total of 21 000 t of zinc in concentrate was produced during the year (2009 4th Quarter Report).

### Nova Scotia

The **Scotia** mine of **Acadian Mining Corporation** closed permanently in March 2009 following the processing of stockpiled ore. Acadian holds the mine through subsidiary ScoZinc Limited. During the year, the company was assessing the potential conversion of the mill in order to facilitate the processing of gold ores.

### New Brunswick

**Xstrata Zinc Canada** owns the **Brunswick** zinc and lead mine located 30 km southwest of Bathurst. In 2009, the mine produced 3.32 Mt of ore grading 8.6% zinc and 3.3% lead, up slightly from 3.31 Mt in 2008, resulting in the production of 252 416 t of zinc in concentrate, up from 242 478 t in 2008 (Production Report, December 2009). The mine is expected to close by the end of 2011 due to the depletion of ore reserves.

**Blue Note Mining Inc.** closed the **Caribou** mining operation, located 50 km west of Bathurst, in October 2008, and Blue Note Caribou Mines filed for bankruptcy in June 2009. In November 2009, it was announced that Maple Minerals Corporation had acquired certain assets at the former Caribou and Restigouche properties.

### Quebec

Zinc is produced at the **LaRonde** mine, owned by **Agnico-Eagle Mines Ltd.**; the mine is situated about 60 km west of Val-d'Or. It is a gold-silver-copper-zinc orebody comprising massive to disseminated sulphide lenses within a regional shear zone. In 2009, the mine produced 56 185 t of zinc in concentrate from 2.55 Mt of ore milled at a grade of 2.96% zinc, which was a 14% decrease from the previous year (2009 Annual Report). Zinc production at LaRonde is expected to continue to decline as the zinc-rich parts of the orebody are mined out. By 2013, the company expects to produce 12 300 t of zinc per year.

The **Perseverance** mine at Matagami, owned by **Xstrata Zinc Canada**, completed its first full year of production in 2009. The mine is accessed by ramp and the ore is being processed at Xstrata's 2600-t/d Matagami mill. During the year, the mine treated 1 011 000 t of ore at a grade of 14.4% zinc, resulting in the production of 135 708 t of zinc in concentrate (Production Report, December 2009). The mine is expected to produce about 140 000 t/y of zinc in concentrate over a five-year mine life.

**Breakwater Resources Ltd.** owns the **Langlois** mine located 213 km northeast of Val-d'Or. The mine was on care and maintenance during 2009. The company plans to spend \$4.6 million to develop two ramps that will access separate zones in the mine; however, no decision to re-open the mine has been announced.

The **CEZ** zinc hydrometallurgical plant, located in Salaberry-de-Valleyfield just west of Montréal is owned by the **Noranda Income Fund**. **Xstrata plc** owns 25% of the fund units. The rated capacity of the plant is 280 000 t/y of refined zinc. In 2009, the plant produced 228 000 t of saleable zinc from 260 420 t of cathode zinc, compared to 291 580 t of cathode zinc produced in 2008 (2009 Annual Report). The reduced production was the result of cutbacks in response to weak markets for by-product sulphuric acid.

**Xstrata Zinc Canada** operates the **General Smelting** zinc and lead foundry located at Lachine, Quebec. During 2009, the plant produced 6000 t of zinc and lead foundry products, including zinc anodes and alloys.

## Ontario

**Xstrata Copper Canada** operates the **Kidd Creek** copper-zinc mine, located about 25 km north of Timmins, as well as a copper smelter and zinc hydrometallurgical plant. The orebody was discovered in 1963 and open-pit mining commenced in 1966. Mining was later converted to underground and the mine is presently developed to a depth of 2773 m (9100 ft). The Kidd Creek mine produced 2.27 Mt of ore containing 108 100 t of zinc in concentrate in 2009 (2009 Annual Report).

The zinc hydrometallurgical plant located at Hoyle, 25 km east of Timmins, has a capacity of 150 000 t/y. In 2009, the plant produced 112 700 t of refined zinc, down from 121 000 t in 2008 (2009 Annual Report). In December, Xstrata Copper announced the permanent closure of the hydrometallurgical zinc plant, along with the copper smelter, effective May 1, 2010. The company cited global smelting overcapacity and high operating costs as reasons for the decision to close the metallurgical facility.

**HudBay Minerals Inc.** owns a zinc oxide production facility in Brampton. It is the third largest producer of zinc oxide in North America with a production capacity of 45 000 t/y. Production for 2009 was 25 107 t of zinc oxide, consuming 20 555 t of zinc metal.

## Manitoba

**HudBay Minerals Inc.** operates an integrated mining and smelting business through its wholly owned subsidiary, **Hudson Bay Mining and Smelting Co., Limited** (HBMS). It operates the **777** and **Trout Lake** mines and a smelter complex in Flin Flon, situated about 630 km northwest of Winnipeg. It also owns the **Chisel North** mine, located in Snow Lake, situated 120 km east of Flin Flon. The Chisel North mine and the Snow Lake concentrator were closed during 2009 due to continued low metal prices. In October, the company announced the restart of the mine and concentrator, expected by the second quarter of 2010. The Flin Flon concentrator produced 142 600 t of zinc concentrates from ore mined at 777 and Trout Lake. The Snow Lake concentrator produced 8646 t of zinc concentrates from ore mined at the Chisel North mine (2009 Year-End MD&A). The 777 mine produced 1.54 Mt of ore grading 4.36% zinc in 2009 while the Trout Lake mine produced 679 300 t of ore grading 3.1% zinc. The Chisel North mine produced 48 695 t of ore grading 9.2% zinc.

The zinc hydrometallurgical plant is situated at Flin Flon and employs two-stage pressure leaching and electrolysis technology to produce special high grade zinc. It has an annual capacity of 118 000 t of refined zinc metal. The plant produced 106 782 t of refined zinc in 2009, down from 112 955 t in 2008. This total can be broken down to 70 577 t from HudBay concentrates and 36 205 t from purchased concentrates. The amount of purchased concentrates increased substantially due to the lack of production from the Chisel North mine.

## British Columbia

The **Myra Falls** zinc mine, owned and operated by **Breakwater Resources Ltd.**, is located within Strathcona Provincial Park on Vancouver Island, about 65 km southwest of Campbell River. Production in 2009 was 30 900 t of zinc in concentrate (down from 35 762 t in 2008) from 449 930 t of milled ore grading 7.8% zinc (2009 Financial Report). As of December 2009, the mine had proven and probable reserves of 6.3 Mt grading 5.1% zinc.

The integrated zinc and lead smelting and refining complex at **Trail**, owned by **Teck Resources Limited**, has a capacity of 295 000 t/y of refined zinc. The complex produces refined zinc and lead, as well as gold, silver, cadmium, germanium, indium, sulphuric acid, and fertilizers. In 2009, production at Trail was 240 000 t of zinc, down from 270 000 t in 2008 (2009 Annual Report). This reduced production was the result of lower monthly production during the first eight months of the year.

## RECENT DEVELOPMENTS

**Kria Resources** is considering the development of the **Halfmile Lake** property located 70 km southwest of Bathurst, New Brunswick. The deposit has an NI 43-101 resource estimate consisting of 6.26 Mt of indicated resources grading 8.13% zinc, 2.58% lead, and 30.7 g/t silver, and the company has completed a preliminary economic assessment for the project. It is considering the possibility of shipping ore to the Xstrata Brunswick mill 40 km away. **Xstrata Zinc Canada** currently owns 24% of the common shares of Kria.

**Slam Resources Ltd.** released an NI 43-101 technical report on its **Nash Creek** property located 50 km northwest of Bathurst, New Brunswick. The updated report defined indicated resources of 7.81 Mt grading 2.72% zinc and 0.55% lead, and inferred resources of 1.21 Mt grading 2.66% zinc and 0.52% lead.

**Donner Metals Ltd.** released a technical report on the resource calculation for its **Bracemac-McLeod** deposit near Matagami, Quebec. The property is located only 5 km from the 2600-t/d Matagami Lake mill complex owned by Xstrata Zinc Canada. The mill is currently processing ore from Xstrata's Perseverance mine. Indicated resources have been calculated at 3.62 Mt grading 11.52% zinc, 1.6% copper, and 31.6 g/t silver. Xstrata, as Donner's partner in the project, is in the process of completing a feasibility study. The overall objective is to supplement production from the Perseverance mine and to provide a longer-term feed source for the Matagami mill.

**HudBay Minerals Inc.** continued an aggressive drilling program at the **Lalor** project, located approximately 3 km from the company's Chisel North mine near Snow Lake, Manitoba. In December, the company released a resource update that calculated 12.3 Mt of indicated resources at 8.7% zinc, 0.66% copper, and 1.5 g/t gold, and 5.0 Mt of inferred resources at 9.39% zinc, 0.57% copper, and 1.4 g/t gold. The deposit is interpreted to consist of six stacked lenses. Recent drilling also intersected at least five lenses of gold mineralization that combined have a potential mineral resource of 10.6-12.0 Mt grading 4.3-5.2 g/t zinc and extending to a depth of 1250 m. A ramp access into the deposit from the Chisel North mine has commenced and is expected to be completed in 2011. A prefeasibility study is under way.

**Canada Zinc Metals Corp.** continues to advance its SEDEX-type **Akie** zinc-lead deposit located in central British Columbia about 280 km northwest of Mackenzie. The company has published NI 43-101 compliant inferred resources of 23.6 Mt grading 7.6% zinc and 1.5% lead (using a 5% zinc cut-off). The company expects to continue exploration of the Cardiac Creek deposit by drilling in 2010. **Tongling Nonferrous Metals Group Holdings Co. Ltd.** has acquired a 13% equity interest in Canada Zinc Metals. This deposit is in rocks similar to those that host the Cirque and Cirque South deposits located 20 km to the northwest and owned by Teck Resources Ltd. and Korea Zinc.

**Selwyn Resources Ltd.** is continuing towards a production decision and the development of an underground mine at its **Howard's Pass** zinc-lead project in east-central Yukon. This would be followed by a later expansion to open-pit mining. Initial mining would be at a rate of 8000 t/d. Annual metal output would be approximately 255 000 t of zinc and 65 000 t of lead. The company is proceeding with environmental assessment work and First Nations consultations, as well as with work permit applications for underground development activities. A high-grade mineral resource estimate for four separate deposits is 16.1 Mt grading 10.25% zinc and 4.23% lead. In December, the company announced that it had reached a joint-venture agreement with **Yunnan Chihong Zinc & Germanium Co. Ltd.** whereby Yunnan could earn a 50% interest in the project by investing \$100 million and taking the project to the feasibility stage.

The **Wolverine** mine project, located 175 km northwest of Watson Lake, Yukon, owned by **Yukon Zinc Corp.**, continues to proceed through the Yukon government regulatory approvals process. All major permits have been awarded. The deposit contains proven and probable reserves of 5.15 Mt grading 9.71% zinc, 0.93% copper, 1.26% lead, 284.2 g/t silver, and 1.36 g/t gold. Once in production at a daily rate of 1700 t, the mine is expected to produce 53 400 t of zinc in concentrate and 5860 t of lead in concentrate annually over a 10-year mine life. A tailings infrastructure construction plan was recently approved and construction activities at the site are continuing. Yukon Zinc Corp. is owned privately by **Jinduicheng Molybdenum Group Ltd.** and **Northwest Nonferrous International Investment Company Ltd.**

**Canadian Zinc Corporation** continued activities at its **Prairie Creek** zinc-lead-silver project located in the western Northwest Territories. The project is environmentally sensitive as it lies within the Nahanni River watershed and is surrounded by the recently expanded Nahanni National Park. Activities included filing reports with the Mackenzie Valley Land and Water Board and submitting applications for environmental assessment. The property consists of a partially developed mine with a 1000-t/d mill and related infrastructure. Published resources include measured and indicated resources of 5.84 Mt grading 10.7% zinc, 9.9% lead, and 161 g/t silver. Some rehabilitation work on the winter road was completed during 2009.

**Sabina Gold & Silver Corp.** released an updated preliminary economic assessment for its **Hackett River** silver-zinc deposit located in western Nunavut. It has calculated indicated resources of 43.3 Mt grading 4.65% zinc, 0.64% lead, and 144 g/t silver, and an inferred resource of 14.6 Mt grading 4.46% zinc, 0.57% lead, and 136 g/t silver. The company is proceeding with a water licence and other permits as part of the environmental assessment process. The updated economic assessment estimates metal production for the first 10 years of 166 000 t/y of zinc, 21 000 t/y of lead, and 13.6 million oz/y of silver at a milling rate of 12 000 t/d. The deposit is located 75 km from tidewater and would require a road and port to be built to supply the mine and ship concentrates.

**Minerals and Metals Group (MMG)**, a subsidiary of China's Minmetals Non-ferrous Co. Ltd., purchased the assets of Australian miner OZ Minerals in June. This purchase includes several Canadian gold and base-metal deposits, including the **Izok Lake** and **High Lake** massive sulphide deposits. The Izok Lake deposit, located 360 km north of Yellowknife, Northwest Territories, in western Nunavut, contains an indicated resource of 14.4 Mt grading 12.9% zinc, 2.5% copper, and 1.3% lead. High Lake, situated 570 km north of Yellowknife, contains an indicated resource of 14.3 Mt grading 3.5% zinc, 2.3% copper, and 76 g/t silver. MMG also owns the mill at the former Lupin gold mine located 70 km east of Izok Lake. The company completed a scoping study of the Izok Lake project in December.

## WORLD PRODUCTION

According to the International Lead and Zinc Study Group (ILZSG), world zinc mine production for 2009 was 11.37 Mt, down from 11.69 Mt in 2008, due to several mine closures in response to weak metal prices late in the year (Table 5). World refined zinc metal production was 11.28 Mt, down from 11.66 Mt in 2008, in response to reduced demand in Europe and North America (Table 6). In terms of mine production, Canada ranked fifth behind China, Peru, Australia, and the United States. The top five zinc metal-producing countries in 2009 were China, Canada, India, South Korea, and Japan. The top five zinc mining companies are Xstrata, Teck Resources, Hindustan Zinc, MMG Minmetals, and Glencore, which together account for 30% of world zinc mine production.

The top five zinc mines in terms of zinc-in-concentrate production in 2009 were: Rampura Agucha, India (591 700 t); Red Dog, Alaska (582 500 t); Antamina, Peru (456 300 t); Century, Australia (360 600 t); and Mt. Isa, Australia (273 300 t). Figure 4 shows world zinc mine production for the period 2007-09 while Figure 5 shows refined metal production for the same period. Refined metal output from China has increased 16.4% since 2007, while production in Europe has declined 19.3% over the same period.

## USES

The greatest use for zinc is as a coating for iron and steel products to make them resistant to rust and corrosion. The application of a zinc coating, known as galvanizing, is accomplished electrolytically or by hot-dip methods. Galvanizing accounts for about 60% of the worldwide use of zinc.

The most commonly galvanized products are sheet and strip steel, tube and pipe, and wire and wire rope. The automobile industry is the largest user of galvanized steel. The desire to reduce weight and improve fuel efficiency has led to the increased use of galvanized steel by the automotive industry to protect the thinner gauges of steel from corrosion. Both hot-dipped and electro-galvanized steel are used, the thicker coating of hot-dipped steel giving more corrosion protection to unexposed surfaces and the thinner coating of electro-galvanized steel providing a smoother finish for exposed, painted surfaces.

Galvanized sheet and strip steel are also widely used by the construction industry for roofing and siding, and for heating and ventilation ducts, as well as for many other applications. Nails and other building materials are often hot-dip galvanized. Zinc and zinc-aluminum thermally sprayed coatings are used for the long-term corrosion protection of large steel structures such as bridges and hydro-electric transmission towers.

Another important use of zinc, using about 16% of world supply, is in the manufacture of a vast range of die-cast products. Because it has a relatively low melting point and is very fluid, die-cast zinc is easy to pour when melted. Therefore, it is well suited to rapid, assembly-line die-casting, particularly to produce small and intricate shapes.

A major use of die castings is in the automobile industry as trim pieces, grills, door and window handles, carburetors, pumps, and other components. However, with the trend toward lighter, more energy-efficient cars, zinc demand for this purpose has declined in recent years. Other familiar zinc die castings include small electrical appliances, business machines, and other light equipment, tools, and toys.

Zinc is also an essential ingredient of brass, which is basically an alloy of copper and zinc with the proportion of zinc ranging from 5 to 40%. The zinc brasses have good physical, electrical, and thermal properties, and are corrosion resistant. They are used in plumbing, heat exchange equipment, and a wide range of decorative hardware, to name a few applications. Rolled zinc metal is a basic component in dry-cell batteries, and zinc oxide is used as a catalyst in the manufacture of rubber and as a pigment in white paint. It is also used in agricultural products, cosmetics, and medicinal products.

**Table 7** and **Figure 6** show a breakdown of worldwide zinc use by geographic region for the period 2007-09, according to data from the ILZSG. Notably, zinc consumption in China increased 17.8% in 2009, compared to an 11.5% increase in 2008, whereas zinc consumption in Europe declined by 25% in 2009. **Table 3** and **Figure 7** show a breakdown of zinc use in Canada for the period 2005-07. In **Figure 7**, other products include rolled and ribbon zinc and zinc oxides. The overall trend in total world zinc consumption for the period 1993-2009 is shown in **Figure 8**.

## HEALTH AND ENVIRONMENT

Zinc plays an important role as a micro-nutrient in the development and health of a variety of plants and animals. In humans, zinc is a key element in the function of more than 200 enzymes, for the stabilization of DNA and the expression of genes, and for the transfer of nerve signals.

The human body contains 2-3 g of zinc. The recommended daily zinc intake is 10 mg for children, 12 mg for adult women, and 15 mg for adult men. Daily intake is not only dependent on food, but also on gender, age, and general health status. Growing infants, children, adolescents, women in pregnancy, and the elderly have a higher zinc requirement.

Food is the primary source of zinc for humans with only a small part coming from drinking water. Some dietary sources of zinc include red meat, nuts, poultry, and milk products. Zinc deficiency is the most common micro-nutrient deficiency affecting many agricultural areas in Asia, Africa, and the Middle East. The World Health Organization attributes 800 000 deaths worldwide each year to zinc deficiency. Zinc in fertilizers can significantly enhance the quality and yield of crops.

In 2009, the International Zinc Association, in partnership with UNICEF, launched the “Zinc Saves Kids” initiative. This campaign is a fund-raising effort in support of UNICEF’s zinc supplementation programs in Asia, Africa, and Latin America. Zinc nutritional supplements will reduce zinc deficiency in children and is an inexpensive way of treating diseases such as diarrhea and pneumonia. This program was recognized by the Clinton Global Initiative in New York in September as a global strategy that can save many lives for little money.

A separate project, launched in conjunction with the International Fertilizer Industry Association, consists of crop trials in India, Laos, China, and Thailand to demonstrate the value of using zinc-enhanced fertilizers to increase crop yields.

## INTERNATIONAL LEAD AND ZINC STUDY GROUP

The International Lead and Zinc Study Group (ILZSG) is an intergovernmental organization that regularly brings together 30 member countries in an international forum to exchange information on lead and zinc. Particular attention is given to providing regular and frequent information on supply, demand, and the outlook for lead and zinc prices and markets. The twice-yearly supply-demand and metal balance reports compiled by ILZSG with member government support are widely used in industry as a basis for determining potential price directions.

The Study Group, headquartered in Lisbon, Portugal, represents most of the world’s major lead- and zinc-producing and using nations. The Group has an extensive information-gathering and dissemination role, and acts as an effective mechanism for increasing market transparency related to the production, use, and trade of lead and zinc. The Group is also an important forum for communication among governments, among industry, and between governments and industry. It holds a general session each year in October.

More information about the Group’s activities can be obtained from its web site at [www.ilzsg.org/static/home.aspx](http://www.ilzsg.org/static/home.aspx).

## PRICES AND STOCKS

**Figure 9** shows average monthly London Metal Exchange (LME) settlement prices for the period 2005-09, along with zinc metal stocks. Total stocks, comprising producers, consumers, and LME stocks, stood at 925 000 t at the end of 2009. Producer and consumer stocks ended the year at 420 000 t, down 15% from the previous year. LME metal stocks increased substantially from 253 000 t at the end of 2008 to 489 000 t in December 2009. Monthly average settlement prices on the LME during 2009 ranged from US\$1112/t in February to US\$2376/t in December. Annual average zinc prices for 1988-2009 are shown in **Figure 10**. **Figure 11** shows the LME daily official cash settlement prices for 2009. The price started the year at US\$546/lb and ended it at US\$1.08/lb. **Table 9** shows the monthly average zinc prices for 2008 and 2009. The yearly average price dropped 11.6% from its 2008 level.

## OUTLOOK

Zinc prices recovered substantially during 2009 despite increasing metal stocks and continued weak demand in Western economies. Most analysts believe that prices will weaken in 2010 given that price response in 2009 is not tied to the fundamental supply-demand balance. Over the longer term, shortages in mine concentrate supply associated with the closure of some large producers (e.g., Brunswick and Century) due to the depletion of ore reserves will put upward pressure on prices. Fundamental demand from the galvanized steel sector should increase steadily in the next few years, which should reduce worldwide stocks to more reasonable levels.

The ILZSG predicts that global zinc mine output for 2010 will be 11.97 Mt, an 8.1% increase from the previous year, in part due to the start of production at Goldcorp's Penasquito mine in Mexico. Refined metal production, according to the ILZSG, should be 12.26 Mt, a 10% increase from 2009. The ILZSG expects that refined zinc metal usage will be 12.04 Mt in 2010, an increase of 11.9%. There is expected to be a net surplus of 227 000 t of zinc in 2010.

Zinc prices are expected to vary within the US\$1760-\$2200/t (US\$0.80-\$1.00/lb) range during 2010.

## OTHER SOURCES OF INFORMATION ON ZINC

American Galvanizers Association

[www.galvanizeit.org](http://www.galvanizeit.org)

International Zinc Association

[www.zincworld.org](http://www.zincworld.org)

London Metal Exchange

[www.lme.co.uk](http://www.lme.co.uk)

U.S. Geological Survey

<http://minerals.usgs.gov/minerals/pubs/commodity/zinc/>

World Bureau of Metal Statistics

[www.world-bureau.com](http://www.world-bureau.com)

Zinc Information Centre

[www.zincinfocentre.org](http://www.zincinfocentre.org)

North American Die Casting Association

[www.diecasting.org](http://www.diecasting.org)

International Fertilizer Industry Association

[www.fertilizer.org](http://www.fertilizer.org)

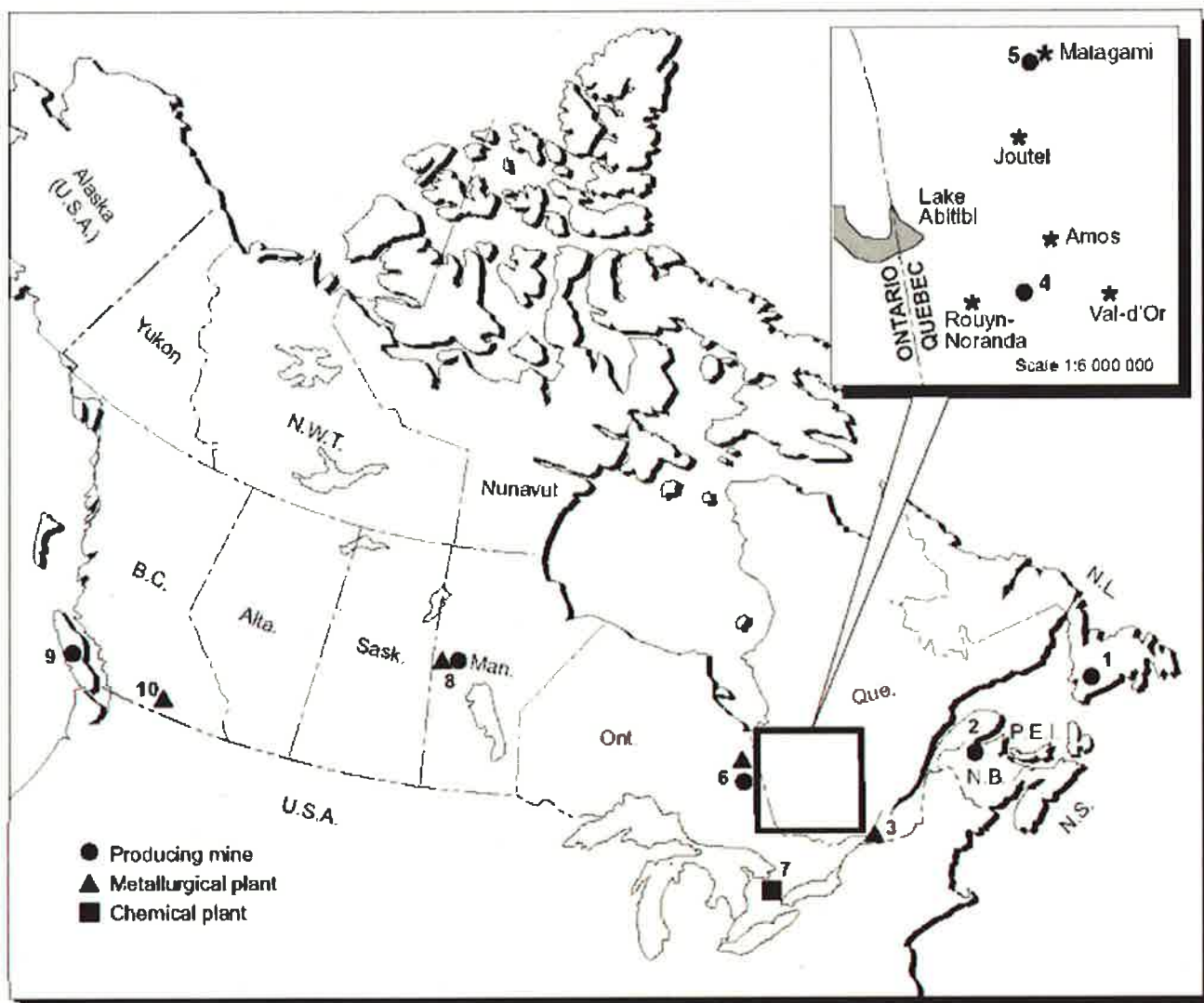
*Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to the chapter entitled "Definitions and Valuation: Mineral Production, Shipments, and Trade." (2) Information in this review was current as of May 31, 2010. (3) This and other reviews, including previous editions, are available on the Internet at [www.nrcan.gc.ca/minerals-metals/business-market/canadian-minerals-yearbook/4070](http://www.nrcan.gc.ca/minerals-metals/business-market/canadian-minerals-yearbook/4070).*

## Note to Readers

**The intent of this document is to provide general information and to elicit discussion. It is not intended as a reference, guide or suggestion to be used in trading, investment, or other commercial activities. The author and Natural Resources Canada make no warranty of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.**

**Figure 1**  
**Zinc Producers in Canada, 2009**





#### Zinc-Producing Mines

1. Duck Pond
2. Brunswick
4. LaRonde
5. Perseverance
6. Kidd Creek
8. Trout Lake
- 777
9. Myra Falls

#### Zinc Metallurgical Plants

3. Valleyfield
6. Kidd Creek
8. Flin Flon
10. Trail

#### Zinc Oxide Plants

7. Zochem

[www.teck.com](http://www.teck.com)

[www.xstrata.com](http://www.xstrata.com)

[www.agnico-eagle.com](http://www.agnico-eagle.com)

[www.xstrata.com](http://www.xstrata.com)

[www.xstrata.com](http://www.xstrata.com)

[www.hudbayminerals.com](http://www.hudbayminerals.com)



[www.hudbayminerals.com](http://www.hudbayminerals.com)  
[www.breakwater.ca](http://www.breakwater.ca)

[www.norandaincomefund.com](http://www.norandaincomefund.com)  
[www.xstrata.com](http://www.xstrata.com)  
[www.hudbayminerals.com](http://www.hudbayminerals.com)  
[www.teck.com](http://www.teck.com)

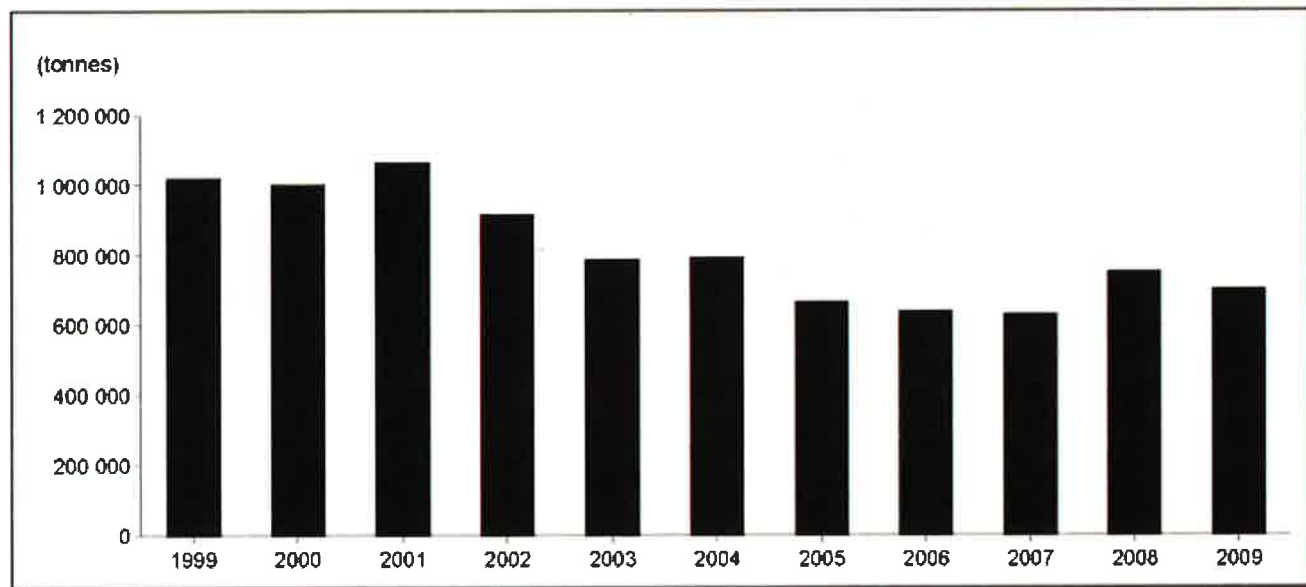
[www.zochem.com](http://www.zochem.com)

Teck Resources Limited  
Xstrata Zinc Canada  
Agnico-Eagle Mines Limited  
Xstrata Zinc Canada  
Xstrata Copper Canada  
HudBay Minerals Inc.  
HudBay Minerals Inc.  
Breakwater Resources Ltd.

Canadian Electrolytic Zinc Limited  
Xstrata Copper Canada  
HudBay Minerals Inc.  
Teck Resources Limited

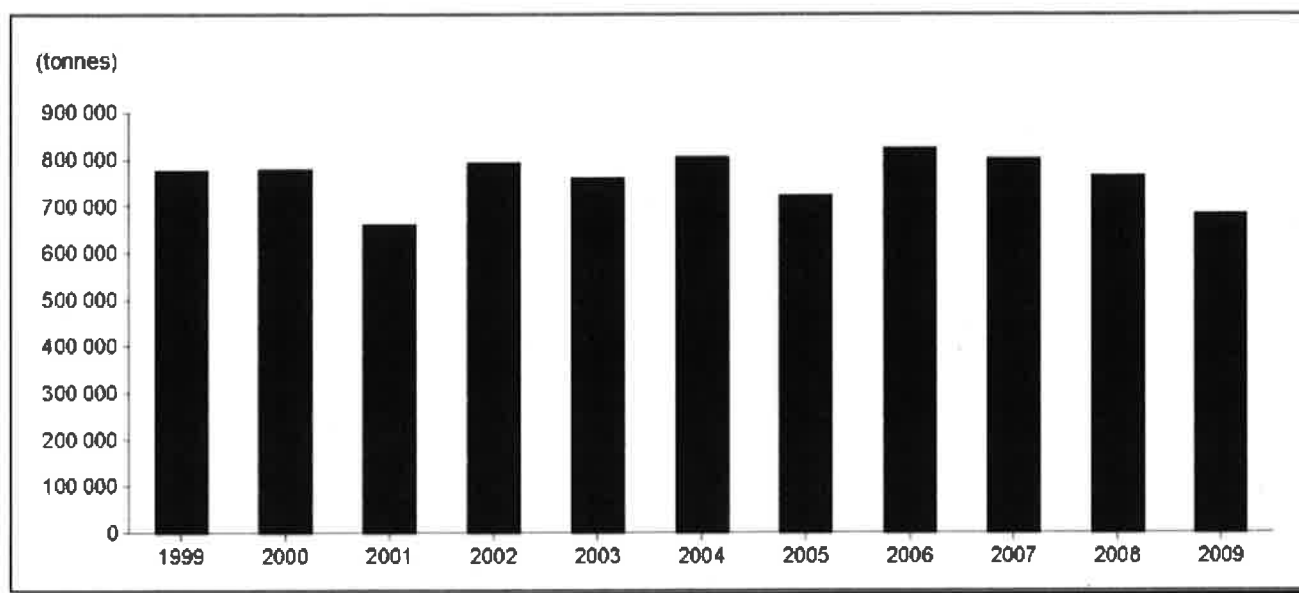
HudBay Minerals Inc.

**Figure 2**  
**Canadian Mine Production of Zinc, (1) 1999-2009**



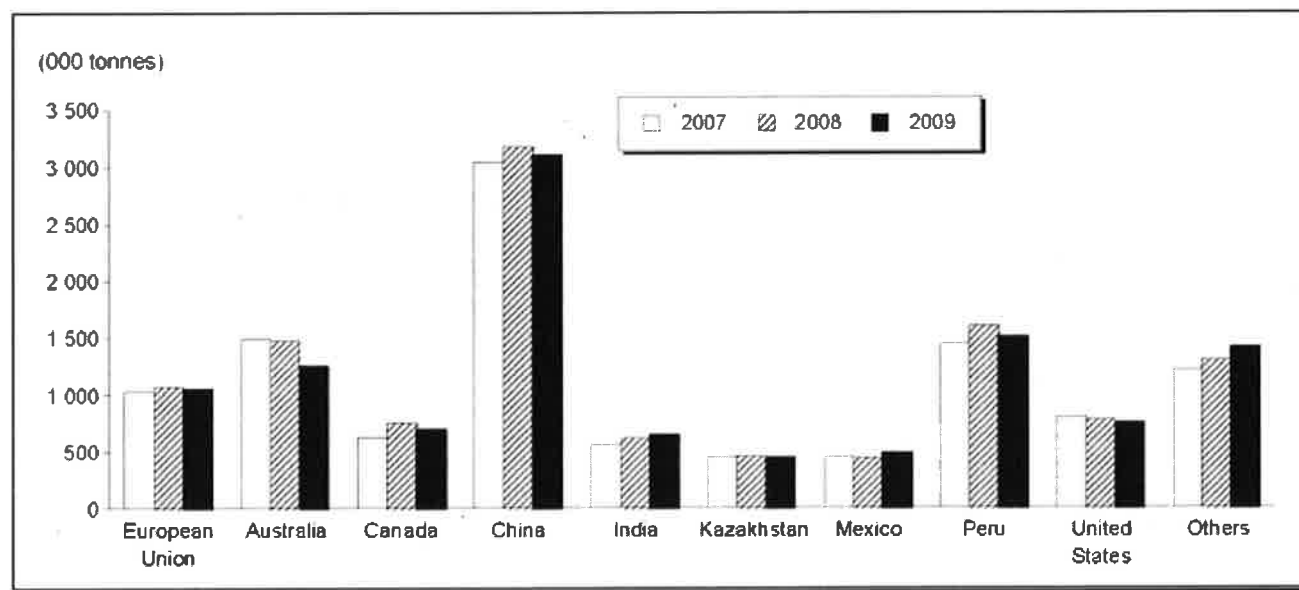
Source: Natural Resources Canada.  
(1) Zinc content of ores and concentrates produced.

**Figure 3**  
**Canadian Refined Zinc Metal Production, 1999-2009**



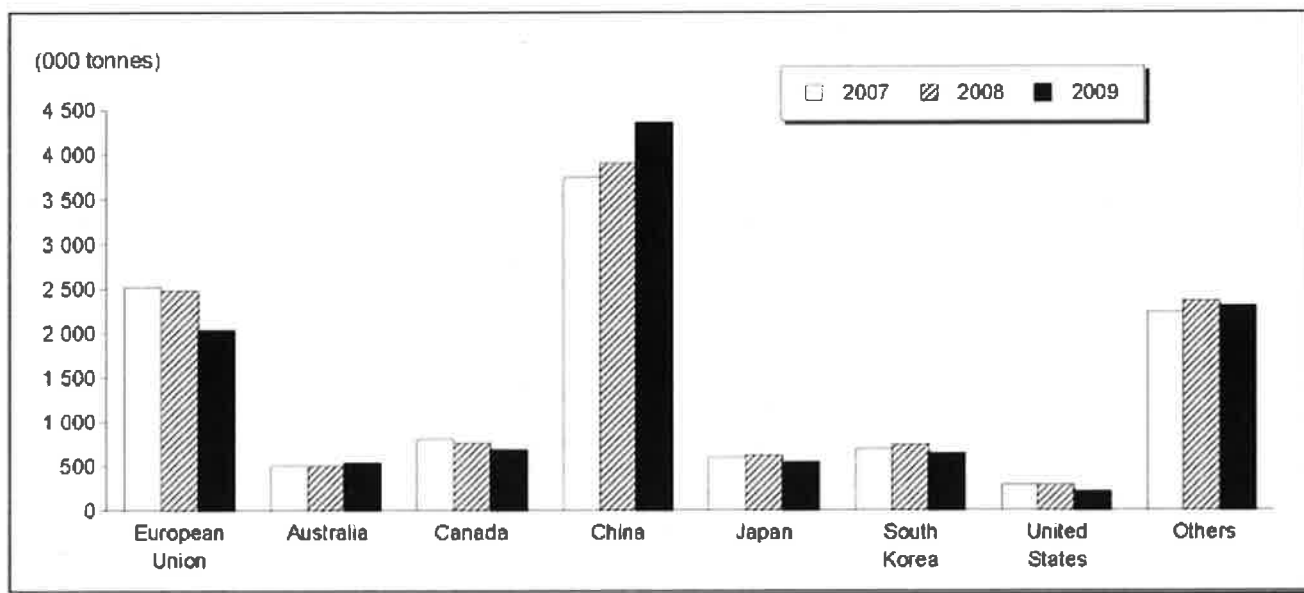
Source: Natural Resources Canada.

**Figure 4**  
**World Zinc Mine Production, 2007-09**



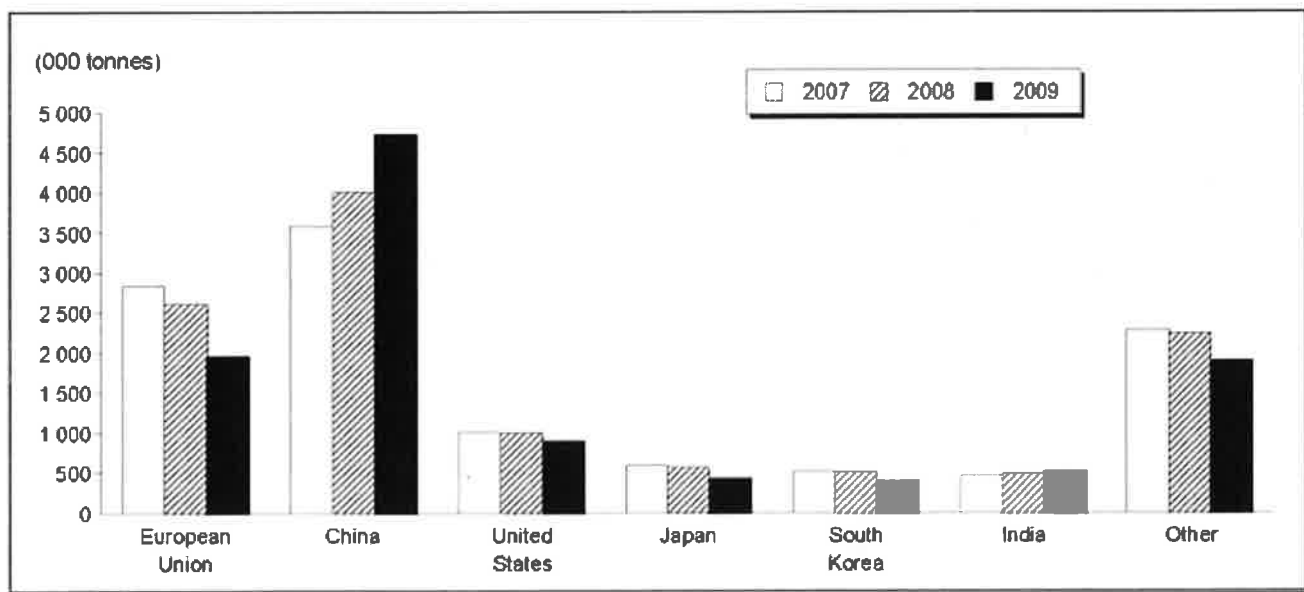
Source: International Lead and Zinc Study Group.

**Figure 5**  
**World Zinc Metal Production, 2007-09**



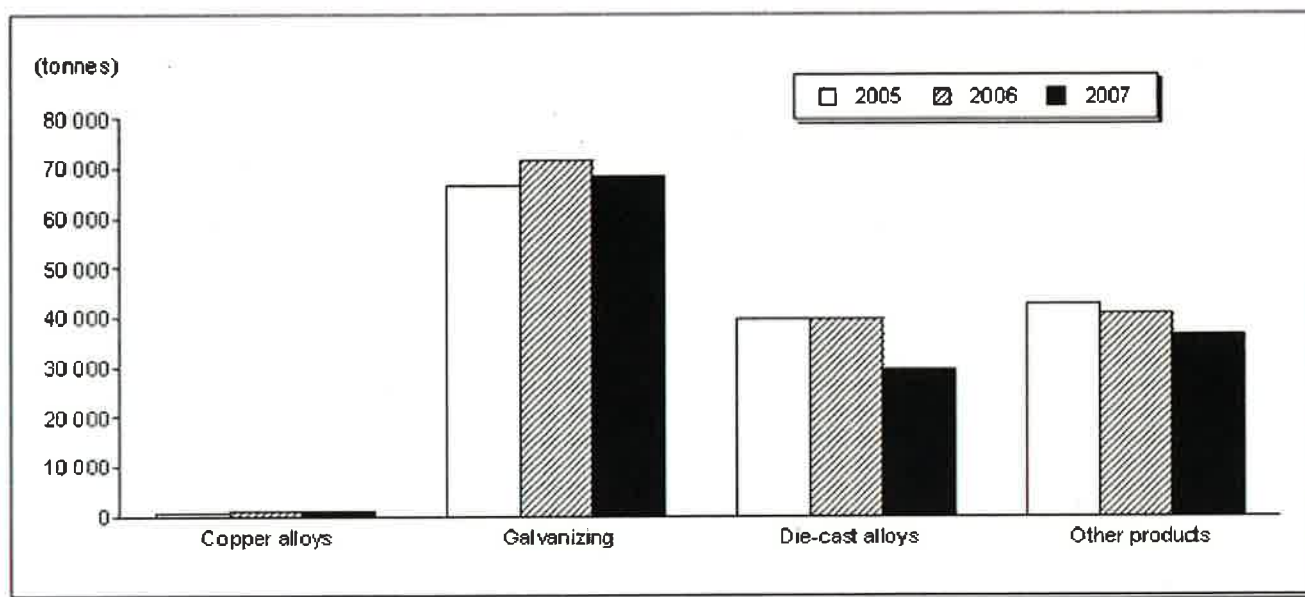
Source: International Lead and Zinc Study Group.

**Figure 6**  
**World Refined Zinc Use, 2007-09**



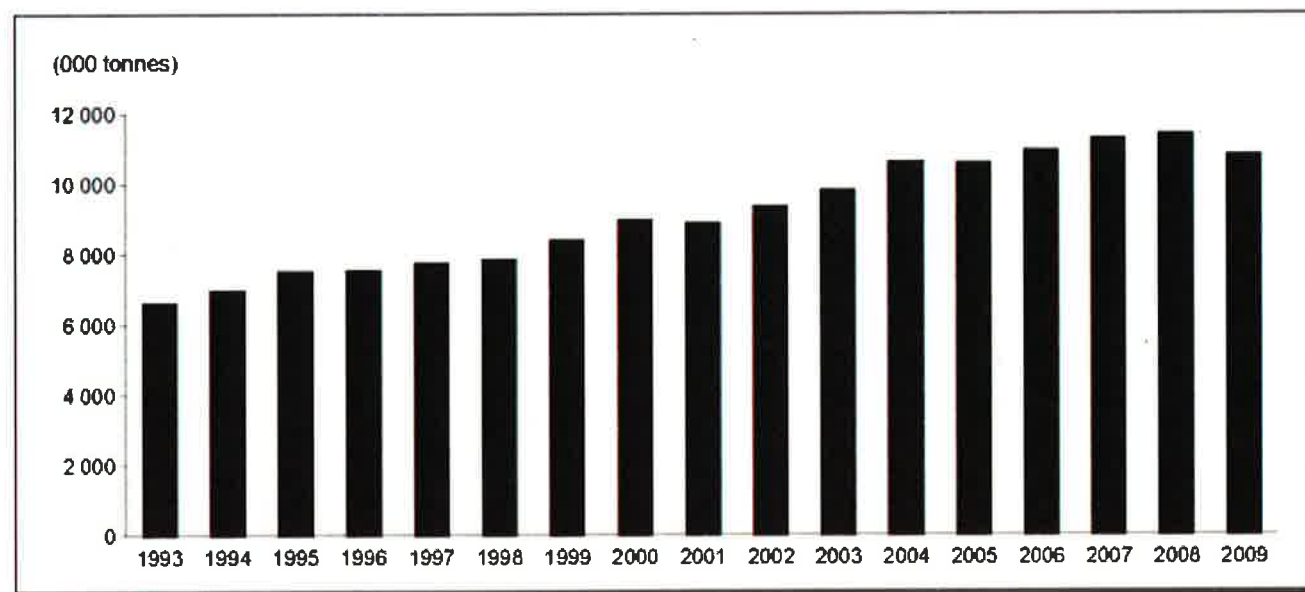
Source: International Lead and Zinc Study Group.

**Figure 7**  
**Canada, Zinc Use, 2005-07**



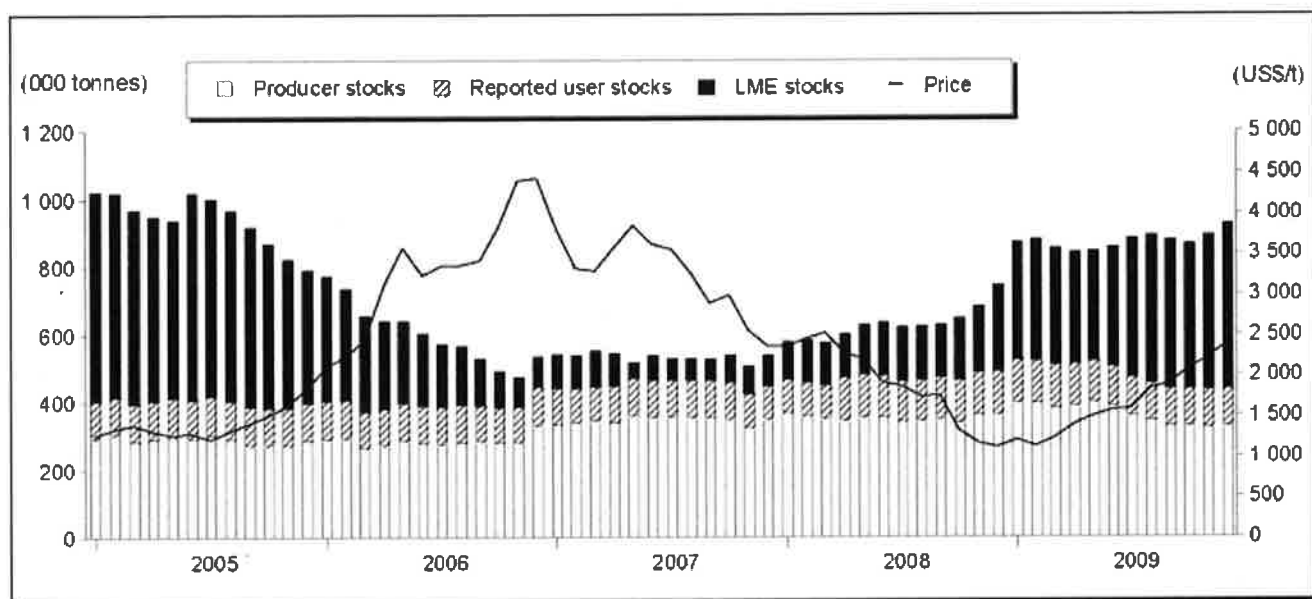
Source: Natural Resources Canada

**Figure 8**  
World Zinc Usage, 1993-2009



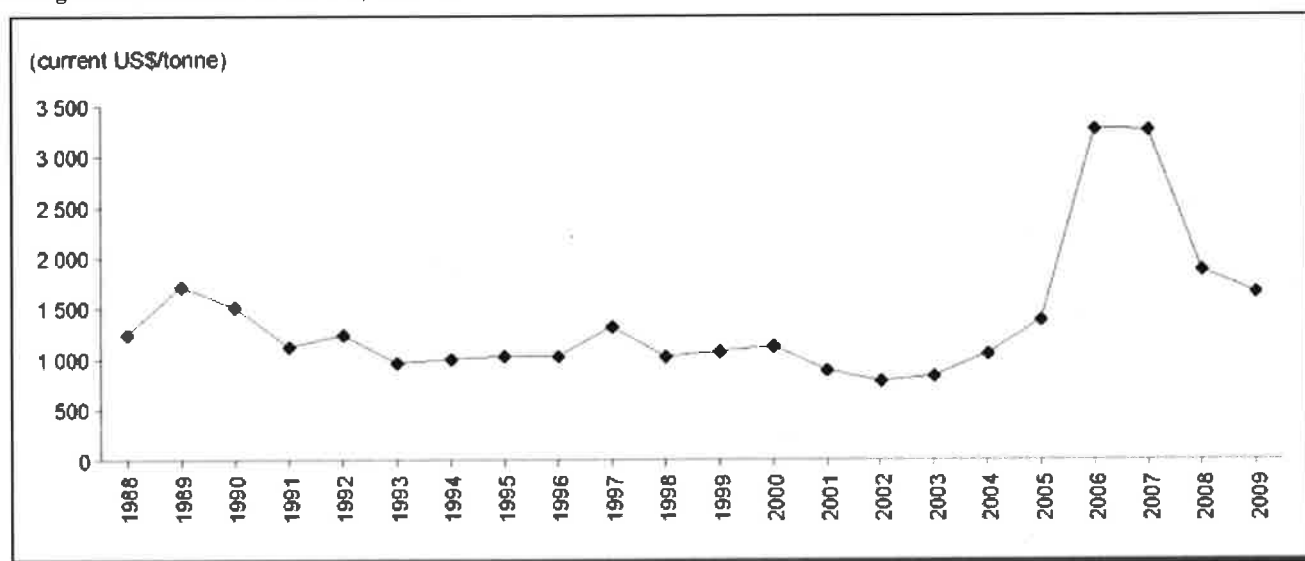
Source: International Lead and Zinc Study Group.

**Figure 9**  
Zinc Prices and Stocks, (1) 2005-09



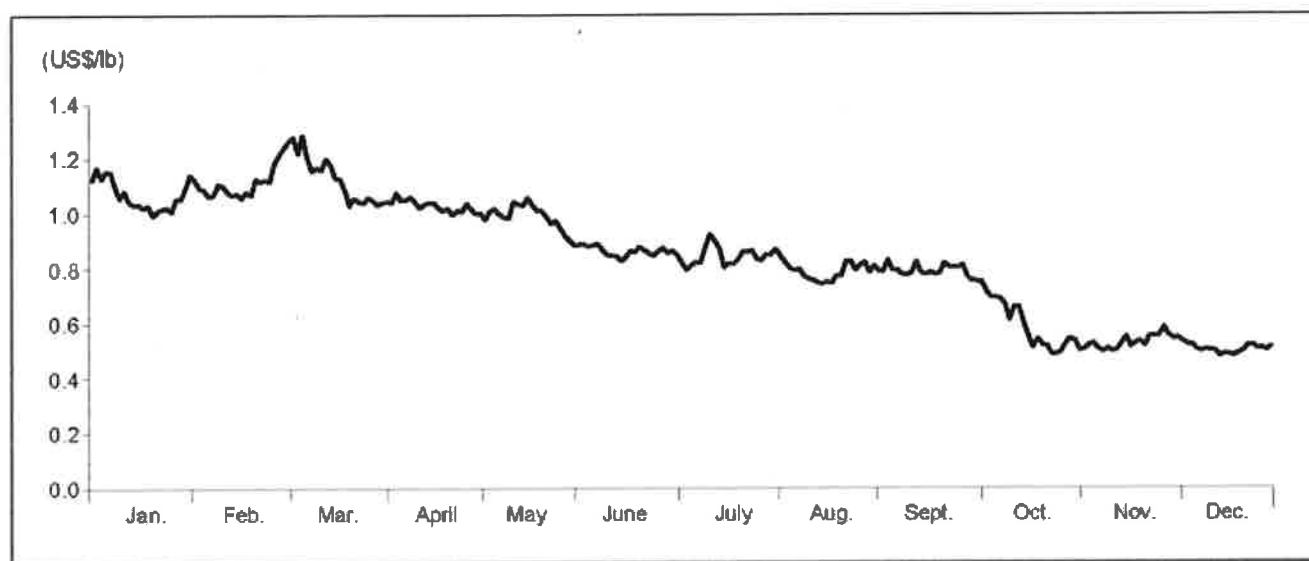
Source: International Lead and Zinc Study Group.  
 (1) LME monthly average settlement prices and reported total stocks.

**Figure 10**  
**Average Cash Settlement Zinc Prices, 1988-2009**



Source: International Lead and Zinc Study Group.

**Figure 11**  
**LME Daily Official Cash Settlement Prices, 2009**



Source: International Lead and Zinc Study Group.

#### TARIFFS

Item No.	Description	Canada		United States		EU	Japan
		MFN	GPT	USA	Canada	Conventional Rate	WTO (2)
2603.00.30	Copper ores and concentrates: zinc content	Free	Free	Free	Free	Free	Free
2607.00.30	Lead ores and concentrates: zinc content	Free	Free	Free	Free	Free	Free
2608.00.30	Zinc ores and concentrates: zinc content	Free	Free	Free	Free	Free	Free
2616.10.30	Precious metal ores and concentrates: silver ores and concentrates: zinc content	Free	Free	Free	Free	Free	Free
2617.90	Other ores and concentrates: other	Free	Free	Free	Free	Free	Free
2620.11	Slag, ash and residues (other than from the manufacture of iron or steel) containing metals, arsenic or their compounds: containing mainly zinc: hard zinc spelter	Free	Free	Free	Free	Free	Free
2620.19	Slag, ash and residues (other than from the manufacture of iron or steel) containing metals, arsenic or their compounds: containing mainly zinc: other	Free	Free	Free	Free	Free	Free
2817.00	Zinc oxide; zinc peroxide	Free-5.5%	Free	Free	Free	5.5%	4.3%
2827.39.40	Chlorides, chloride oxides and chloride hydroxides; bromides and bromide oxides; iodides and iodide oxides: other chlorides: other: of zinc	Free	Free	Free	Free	5.5%	3.9%
2837.19.00.30		Free	Free	Free	Free	5.5%	3.3%



	Cyanides, cyanide oxides and complex cyanides: cyanides and cyanide oxides: other						
2836.99	Carbonates; peroxocarbonates (percarbonates); commercial ammonium carbonate containing ammonium carbonate: other: other	Free-3.5%	Free-3%	Free	Free	3.7-5.5%	3.3%
2842.90	Other salts of inorganic acids or peroxyacids (including aluminosilicates whether or not chemically defined), other than azides: other	Free-3%	Free	Free	Free	5.3-5.5%	3.3%
32.06	Other colouring mattes; preparations as specified in note 3 to this chapter of the Canadian <i>Customs Tariff</i> , other than those of heading 32.03, 32.04 or 32.05; inorganic products of a kind used as luminophorous, whether or not chemically defined						
3206.42	Other colouring mattes and other preparations: lithopone and other pigments and preparations based on zinc sulphide	Free-2%	Free	Free	Free	6.5%	3.9%-2.6%
3206.49.89	Other colouring mattes and other preparations; other	Free-6.5%	Free-3%	Free	Free	6.5%	2.5%-2.6%
7901.11	Unwrought zinc: zinc, not alloyed: containing by weight 99.99% or more of zinc	Free	Free	Free	Free	2.5%	Free-4.30yen/kg
7901.12	Unwrought zinc: zinc, not alloyed: containing by weight less than 99.99% of zinc	Free	Free	Free	Free	2.5%	Free-4.30yen/kg
7901.20	Unwrought zinc: zinc alloys	Free	Free	Free	Free	2.5%	Free-4.30yen/kg
7902.00	Zinc waste and scrap	Free	Free	Free	Free	Free	Free
7903.10	Zinc dust, powders and flakes: zinc dust	Free	Free	Free	Free	2.5%	3%
7903.90	Zinc dust, powders and flakes: other	Free	Free	Free	Free	2.5%	3%
7904.00	Zinc bars, rods, profiles and wire	Free	Free	Free	Free	5%	3%
7905.00	Zinc plates, sheets, strip and foil	Free	Free	Free	Free	5%	3%
7907.00	Other articles of zinc	Free-3%	Free-3%	Free	Free	5%	3%
8506.60	Primary cells and primary batteries: air-zinc	7%	5%	Free	Free	4.7%	Free

Sources: Canadian *Customs Tariff*, effective January 2010, Canada Border Services Agency; *Harmonized Tariff Schedule of the United States*, 2010; *Official Journal of the European Union* (Tariff Information), October 31, 2009 edition; *Customs Tariff Schedules of Japan*, 2010. GPT General Preferential Tariff; MFN Most Favoured Nation; WTO World Trade Organization.

(1) The customs duties applicable to imported goods originating in countries that are Contracting Parties to the General Agreement on Tariffs and Trade or with which the European Community has concluded agreements containing the most-favoured-nation tariff clause shall be the conventional duties shown in column 3 of the Schedule of Duties. (2) WTO rate is shown; lower tariff rates may apply circumstantially.

TABLE 1. CANADA, TOTAL ZINC PRODUCTION BY PROVINCE, 2007-09

		2007		2008		2009 (p)	
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
PRODUCTION	(All Forms) (1)						
	Newfoundland and Labrador	16 593	57 812	18 940	37 842	19 502	36 039
	Nova Scotia	4 934	17 188	13 852	27 676	—	—

New Brunswick	244 251	850 969	262 994	525 461	248 768	459 723
Quebec	102 883	358 444	164 759	329 189	194 081	358 661
Ontario	89 700	312 513	110 726	221 231	105 992	195 874
Manitoba	105 602	367 916	98 299	196 402	76 748	141 830
British Columbia	30 151	105 047	35 209	70 348	27 288	50 428
<b>Total</b>	<b>594 113</b>	<b>2 069 890</b>	<b>704 780</b>	<b>1 408 149</b>	<b>672 379</b>	<b>1 242 556</b>
Mine output (2)	630 485	..	750 502	..	701 828	..
Refined (3)	802 103	..	764 310	..	685 504	..

Sources: Natural Resources Canada; Statistics Canada.

– Nil; . . Not available; (p) Preliminary.

(1) New refined zinc produced from domestic primary materials (concentrates, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export. (2) Zinc content of ores and concentrates produced. (3) Refined zinc produced from domestic and imported ores.

Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, ZINC TRADE, 2007-09

		2007		2008		2009	
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
<b>EXPORTS</b>							
2603.00.30	Zinc content in copper						
	India	1	2	–	–	–	–
2607.00.30	Zinc content in lead						
	United States	31	12	–	–	–	–
	China	–	–	50	221	–	–
	<b>Total</b>	<b>31</b>	<b>12</b>	<b>50</b>	<b>221</b>	<b>–</b>	<b>–</b>
2608.00.30	Zinc content in zinc ores and concentrates						
	China	–	–	31 238	39 914	94 936	83 571
	Norway	9 375	21 935	35 364	40 872	39 960	36 026
	Spain	33 944	84 164	46 531	36 171	45 596	35 792
	Belgium	35 671	105 840	69 484	90 160	15 083	16 143
	South Korea	11 432	19 815	23 692	19 887	12 016	14 236
	Japan	17 199	38 365	9 116	10 047	8 865	10 056
	Other countries	21 390	60 232	65 798	81 080	10 362	11 732
	<b>Total</b>	<b>129 011</b>	<b>330 351</b>	<b>281 223</b>	<b>318 131</b>	<b>226 818</b>	<b>207 556</b>
2617.90	Other ores and concentrates: other						
	China	39	15	764	1 211	255	148
	Australia	–	–	–	–	1	1
	Other countries	56	66	18	11	–	–
	<b>Total</b>	<b>95</b>	<b>81</b>	<b>782</b>	<b>1 222</b>	<b>256</b>	<b>149</b>
2620.11	Ash and residues containing hard zinc spelter						
	Norway	–	–	–	–	40	49
	Germany	–	–	432	305	48	39
	Israel	–	–	–	–	11	31

	Belgium	—	—	26	21	6	16
	<b>Total</b>	—	—	<b>458</b>	<b>326</b>	<b>105</b>	<b>135</b>
2620.19	Ash and residues containing mainly zinc, n.e.s.						
	United States	11 631	14 642	8 293	7 725	6 621	5 920
	Malaysia	379	658	190	309	288	398
	India	—	—	23	41	182	180
	Other countries	325	569	338	422	—	—
	<b>Total</b>	<b>12 335</b>	<b>15 869</b>	<b>8 844</b>	<b>8 497</b>	<b>7 091</b>	<b>6 498</b>
2817.00	Zinc oxide; zinc peroxide						
	United States	47 510	169 966	40 404	97 099	33 450	62 803
	Brazil	1 368	3 631	1 100	2 924	948	2 599
	Egypt	761	1 790	545	1 433	441	1 423
	Sweden	496	1 447	421	1 042	362	973
	United Kingdom	466	962	810	2 332	291	768
	Denmark	54	140	340	861	285	739
	Other countries	4 478	9 642	3 333	10 229	1 180	3 092
	<b>Total</b>	<b>55 133</b>	<b>187 578</b>	<b>46 953</b>	<b>115 920</b>	<b>36 957</b>	<b>72 397</b>
2827.39	Other chlorides: other						
	Japan	5	241	1	1 329	4	3 955
	United States	732	309	1 623	1 516	3 024	3 417
	Philippines	164	7 760	347	13 701	2	2 128
	Other countries	49	30	23	16	18	14
	<b>Total</b>	<b>950</b>	<b>8 340</b>	<b>1 994</b>	<b>16 562</b>	<b>3 048</b>	<b>9 514</b>
2836.99	Carbonates; peroxocarbonates (percarbonates); commercial ammonium carbonate containing ammonium carbamate: other: other						
	United Kingdom	7	28	18	94	35	517
	United States	60	366	19	268	24	385
	South Korea	3	28	5	50	10	120
	Other countries	—	—	19	415	5	99
	<b>Total</b>	<b>70</b>	<b>422</b>	<b>61</b>	<b>827</b>	<b>74</b>	<b>1 121</b>
3206.42	Lithopone and other pigments and preparations based on zinc sulphide						
	United States	—	—	1	3	—	—
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc						
	United States	442 871	1 451 127	356 412	784 917	383 017	677 869
	Taiwan	2 721	10 497	4 393	9 596	6 219	11 332
	China	—	—	—	—	5 186	9 270
	India	—	—	—	—	4 464	8 435
	Hong Kong	2 401	8 507	2 044	4 405	3 314	5 652
	Malaysia	4 766	16 606	4 017	7 018	2 676	4 406
	Japan	3 979	14 956	2 618	5 614	1 550	3 086

	North Korea	—	—	2 647	5 158	1 816	2 846
	Philippines	1 379	6 576	1 415	3 251	1 020	1 743
	Other countries	13 076	46 450	6 264	14 799	422	802
	<b>Total</b>	<b>471 193</b>	<b>1 554 719</b>	<b>379 810</b>	<b>834 758</b>	<b>409 684</b>	<b>725 441</b>
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc						
	United States	119 727	415 704	206 419	457 317	168 183	316 747
	Malaysia	2 598	10 069	4 898	10 748	7 894	15 458
	Taiwan	207	909	1 759	3 898	3 187	5 701
	Philippines	2 562	9 674	1 387	3 199	1 031	1 889
	Vietnam	434	1 290	41	104	827	1 787
	Indonesia	1 744	6 647	1 601	3 434	597	1 081
	Other countries	12 506	48 178	3 554	6 434	573	1 030
	<b>Total</b>	<b>139 778</b>	<b>492 471</b>	<b>219 659</b>	<b>485 134</b>	<b>182 292</b>	<b>343 693</b>
7901.20	Zinc alloys, unwrought						
	China	1	3	4 584	10 277	4 784	10 285
	Hong Kong	—	—	2 991	7 141	3 581	7 413
	Thailand	—	—	1 025	2 232	797	1 568
	Other countries	885	3 473	699	1 654	600	1 254
	<b>Total</b>	<b>886</b>	<b>3 476</b>	<b>9 299</b>	<b>21 304</b>	<b>9 762</b>	<b>20 520</b>
7902.00	Zinc waste and scrap						
	United States	12 839	19 979	10 631	12 729	4 505	4 718
	India	415	981	259	345	652	610
	Netherlands	—	—	195	360	168	287
	China	49	74	44	75	141	185
	Malaysia	—	—	100	140	102	126
	Australia	—	—	—	—	81	126
	Other countries	57	156	89	135	42	61
	<b>Total</b>	<b>13 360</b>	<b>21 190</b>	<b>11 318</b>	<b>13 784</b>	<b>5 691</b>	<b>6 113</b>
7903.10	Zinc dust						
	United States	6 057	29 570	6 951	21 307	3 717	10 319
	Italy	166	746	126	399	52	187
	Other countries	183	636	86	281	15	41
	<b>Total</b>	<b>6 406</b>	<b>30 952</b>	<b>7 163</b>	<b>21 987</b>	<b>3 784</b>	<b>10 557</b>
7903.90	Zinc powders and flakes						
	United States	11 946	58 582	10 595	28 780	5 157	9 234
	Hong Kong	136	792	108	431	86	369
	Belgium	738	2 744	510	1 100	183	280
	China	41	159	29	115	24	106
	Other countries	194	677	154	393	14	39

	<b>Total</b>	<b>13 055</b>	<b>62 954</b>	<b>11 396</b>	<b>30 819</b>	<b>5 464</b>	<b>10 028</b>
7904.00	Zinc bars, rods, profiles and wire						
	United States	169	751	60	498	33	269
	Thailand	26	93	8	28	6	22
	Poland	2	6	4	15	3	10
	Other countries	94	199	32	123	3	16
	<b>Total</b>	<b>291</b>	<b>1 049</b>	<b>104</b>	<b>664</b>	<b>45</b>	<b>317</b>
7905.00	Zinc plates, sheets, strip and foil						
	Spain	—	—	—	—	17	46
	United States	6	61	...	7	...	4
	Afghanistan	—	—	—	—	1	3
	Other countries	3	13	3	17	—	—
	<b>Total</b>	<b>9</b>	<b>74</b>	<b>3</b>	<b>24</b>	<b>18</b>	<b>53</b>
7907.00	Other articles of zinc						
	United States	3 869	33 588	2 971	27 240	1 526	16 221
	Norway	—	—	...	1	47	242
	France	1	3	...	1	40	210
	Thailand	...	...	8	46	9	60
	India	—	—	2	7	26	30
	Mexico	6	60	7	38	3	17
	Ireland	1	3	6	29	3	16
	Trinidad and Tobago	1	3	2	5	5	12
	Other countries	238	706	1 068	2 708	12	65
	<b>Total</b>	<b>4 116</b>	<b>34 363</b>	<b>4 064</b>	<b>30 075</b>	<b>1 671</b>	<b>16 873</b>
<b>Total exports</b>		<b>846 720</b>	<b>2 743 903</b>	<b>983 182</b>	<b>1 900 258</b>	<b>892 760</b>	<b>1 430 965</b>
<b>IMPORTS</b>							
2603.00.00.30	Zinc content in copper ores and concentrates						
	Germany	...	1	—	—	—	—
	United States	1	2	—	—	—	—
	<b>Total</b>	<b>1</b>	<b>3</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>
2607.00.00.30	Zinc content in lead ores and concentrates						
	United States	2 539	6 590	454	969	67	227
2608.00.00.30	Zinc content in zinc ores and concentrates						
	United States	194 535	551 559	210 099	282 803	232 842	163 071
	Peru	66 436	199 438	71 129	50 895	41 127	33 971
	Mexico	1	2	—	—	7 848	12 136
	Bolivia	—	—	5 268	7 661	10 038	10 786
	Spain	—	—	—	—	5 012	3 045

	Chile	9 094	20 480	9 178	13 591	1 758	2 613
	Saint Lucia	—	—	—	—	1 541	1 180
	Other countries	12136	27687	41	29	...	...
	<b>Total</b>	<b>282 202</b>	<b>799 166</b>	<b>295 715</b>	<b>354 979</b>	<b>300 166</b>	<b>226 802</b>
2617.90.00.90	Other ores and concentrates: other: other						
	Belgium	—	—	1 116	360	5	564
	United States	865	245	3 429	419	2 031	431
	Turkey	519	318	232	120	176	119
	Germany	8	2	3	15	176	53
	China	2	9	19	7	45	17
	Chile	1	...	18	2	29	12
	Panama	...	...	62	9	26	11
	Senegal	24	3	54	10	40	10
	Other countries	353	322	322	112	87	23
	<b>Total</b>	<b>1 772</b>	<b>899</b>	<b>5 255</b>	<b>1 054</b>	<b>2 615</b>	<b>1 240</b>
2620.11	Ash and residues containing hard zinc spelter						
	United States	...	...	...	...	1	1
2620.19	Ash and residues containing mainly zinc, n.e.s.						
	United States	8 424	2 040	6 606	1 127	3 623	397
	Other countries	...	...	...	...	...	...
	<b>Total</b>	<b>8 424</b>	<b>2 040</b>	<b>6 606</b>	<b>1 127</b>	<b>3 623</b>	<b>397</b>
2817.00	Zinc oxide; zinc peroxide						
	United States	5 827	20 180	6 255	14 552	5 041	8 109
	Mexico	3 619	8 971	2 454	5 268	2 198	3 680
	Turkey	175	391	975	2 095	399	565
	Netherlands	1	4	100	203	238	351
	Belgium	...	136	—	—	102	142
	Canada	...	1	2	5	27	109
	Other countries	58	238	99	362	35	147
	<b>Total</b>	<b>9 680</b>	<b>29 918</b>	<b>9 885</b>	<b>22 485</b>	<b>8 040</b>	<b>13 103</b>
2827.39.40.00	Other chlorides: other: of zinc						
	United States	803	1 347	652	1 029	774	1 276
	China	380	805	22	24	156	316
	Belgium	54	153	74	185	44	122
	Spain	—	—	10	19	51	103
	Other countries	1	5	1	22	2	19
	<b>Total</b>	<b>1 238</b>	<b>2 310</b>	<b>759</b>	<b>1 279</b>	<b>1 027</b>	<b>1 836</b>
2827.39.90.90	Other: other chlorides: other						
	United States	...	3 963	...	5 023	...	6 008



	China	..	18	..	122	..	384
	United Kingdom	..	1	..	223	..	213
	France	..	39	..	213	..	126
	Belgium	..	268	..	85	..	116
	Other countries	..	6 877	..	598	..	139
	<b>Total</b>	..	<b>11 166</b>	..	<b>6 264</b>	..	<b>6 986</b>
2836.99.10.90	Other: bismuth carbonate; other						
	United States	6 469	2 219	5 013	1 923	1 146	803
	Mexico	387	150	382	150	391	220
	Germany	175	118	135	82	101	60
	Other countries	44	89	23	56	8	56
	<b>Total</b>	<b>7 075</b>	<b>2 576</b>	<b>5 553</b>	<b>2 211</b>	<b>1 646</b>	<b>1 139</b>
2837.19.00.30	Zinc cyanide						
	United States	3	13	1	7	5	26
	United Kingdom	...	...	—	—	...	...
	<b>Total</b>	<b>3</b>	<b>13</b>	<b>1</b>	<b>7</b>	<b>5</b>	<b>26</b>
2842.90.99.10	Other: other: ammonium zinc chloride (zinc ammonium chloride)						
	United States	400	292	237	173	355	259
	Spain	—	—	121	88	115	84
	Belgium	144	105	170	124	60	44
	Italy	3	2	16	12	4	3
	Austria	—	—	—	—	...	...
	<b>Total</b>	<b>547</b>	<b>399</b>	<b>544</b>	<b>397</b>	<b>534</b>	<b>390</b>
3206.42.10	Lithopone and other pigments and preparations based on zinc sulphide, for use in the manufacture of acrylonitrile-butadiene-styrene copolymers						
	Germany	—	—	50	53	42	44
	United States	—	—	...	...	—	—
	<b>Total</b>	<b>—</b>	<b>—</b>	<b>50</b>	<b>53</b>	<b>42</b>	<b>44</b>
3206.42.90	Pigments based on zinc sulphide						
	China	17	19	1	1	12	14
	United States	263	318	144	175	6	7
	Italy	49	54	54	63	5	5
	Portugal	—	—	—	—	2	3
	Germany	22	26	51	53	1	2
	Other countries	76	80	24	25	—	—
	<b>Total</b>	<b>427</b>	<b>497</b>	<b>274</b>	<b>317</b>	<b>26</b>	<b>31</b>
3206.49.89	Pigments and preparations based on zinc oxide						
	United States	236	402	3 699	4 920	360	478
	Belgium	182	242	107	142	149	198
	France	15	20	2	2	10	13

	Germany	38	51	1	2	1	2
	Other countries	16	22	10	14	—	—
	<b>Total</b>	<b>487</b>	<b>737</b>	<b>3 819</b>	<b>5 080</b>	<b>520</b>	<b>691</b>
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc						
	United States	457	1 835	704	1 270	773	1 451
	Norway	—	—	—	—	58	225
	Canada	411	655	297	531	6	14
	Finland	2	7	1	3	4	11
	Other countries	22	52	2	4	...	...
	<b>Total</b>	<b>892</b>	<b>2 549</b>	<b>1 004</b>	<b>1 808</b>	<b>841</b>	<b>1 701</b>
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc						
	United States	259	575	248	624	125	301
	Other countries	2	3	110	211	—	—
	<b>Total</b>	<b>261</b>	<b>578</b>	<b>358</b>	<b>835</b>	<b>125</b>	<b>301</b>
7901.20	Zinc alloys, unwrought						
	United States	12 352	49 345	6 934	18 336	3 592	7 901
	Other countries	8	31	18	42	1	6
	<b>Total</b>	<b>12 360</b>	<b>49 376</b>	<b>6 952</b>	<b>18 378</b>	<b>3 593</b>	<b>7 907</b>
7902.00	Zinc waste and scrap						
	United States	915	1 430	284	571	128	154
	Canada	...	...	2	5	1	2
	<b>Total</b>	<b>915</b>	<b>1 430</b>	<b>286</b>	<b>576</b>	<b>129</b>	<b>156</b>
7903.10	Zinc dust						
	Belgium	2 759	11 828	735	3 202	1 574	4 629
	United States	538	3 313	404	2 043	403	1 321
	Canada	...	21	1	17	3	8
	China	32	160	20	68	...	1
	Other countries	...	1	6	32	...	...
	<b>Total</b>	<b>3 329</b>	<b>15 323</b>	<b>1 166</b>	<b>5 362</b>	<b>1 980</b>	<b>5 959</b>
7903.90	Zinc powders and flakes						
	United States	621	1 395	189	707	179	568
	China	...	...	2	9	6	23
	Germany	49	176	17	76	3	15
	Switzerland	1	2	3	10	3	9
	Other countries	...	1	9	25	2	5
	<b>Total</b>	<b>671</b>	<b>1 574</b>	<b>220</b>	<b>827</b>	<b>193</b>	<b>620</b>
7904.00	Zinc bars, rods, profiles and wire						
	United States	831	2 656	817	2 141	704	1 790
	China	640	1 957	449	1 913	200	816

	Finland	86	431	59	206	144	493
	India	42	150	48	170	58	209
	Other countries	38	134	19	62	18	74
	<b>Total</b>	<b>1 637</b>	<b>5 328</b>	<b>1 392</b>	<b>4 492</b>	<b>1 124</b>	<b>3 382</b>
7905.00	Zinc plates, sheets, strip and foil						
	France	430	1 948	238	1 274	269	1 607
	Germany	93	501	195	963	193	770
	United States	320	1 228	249	1 002	137	570
	Netherlands	10	46	13	59	46	328
	China	18	80	62	300	48	263
	Italy	—	—	...	6	9	102
	Other countries	22	87	10	42	1	6
	<b>Total</b>	<b>893</b>	<b>3 890</b>	<b>767</b>	<b>3 646</b>	<b>703</b>	<b>3 646</b>
7907.00	Other articles of zinc						
	China	1 507	8 363	1 276	8 744	985	7 120
	United States	3 162	14 902	2 088	9 726	1 773	7 078
	Mexico	1 369	1 501	437	3 012	296	2 490
	Taiwan	469	2 692	559	2 637	496	1 771
	India	924	1 895	264	2 135	181	1 757
	Canada	3 038	1 926	247	1 238	146	1 005
	Germany	46	235	58	648	35	441
	France	8	43	48	269	63	399
	United Kingdom	67	353	13	410	15	284
	Vietnam	46	217	154	464	23	151
	Malaysia	32	145	43	212	27	149
	Other countries	64	643	155	1 001	33	332
	<b>Total</b>	<b>10 732</b>	<b>32 915</b>	<b>5 342</b>	<b>30 496</b>	<b>4 073</b>	<b>22 977</b>
		<b>(number)</b>	<b>(\$000)</b>	<b>(number)</b>	<b>(\$000)</b>	<b>(number)</b>	<b>(\$000)</b>
8506.60	Primary cells and batteries, air-zinc						
	United States	3 210 914	3 199	3 286 292	3 214	3 386 232	5 789
	Germany	2 303 583	1 650	1 843 762	2 842	3 331 755	4 612
	Indonesia	240	...	26 149	18	93 760	616
	United Kingdom	1 503 945	980	190 981	159	182 098	235
	China	514 532	294	294 568	198	235 778	234
	South Korea	196 933	63	159 454	63	70 757	37
	Australia	7 474	23	8 386	33	8 750	31
	Switzerland	30 896	22	94 672	28	38 633	13
	Japan	1 849	1	11 272	11	7 416	12
	Other countries	187 653	65	35 652	21	3 720	10

<b>Total</b>	<b>7 958 019</b>	<b>6 297</b>	<b>5 951 188</b>	<b>6 587</b>	<b>7 358 899</b>	<b>11 589</b>
<b>Total imports</b>	<b>..</b>	<b>975 574</b>	<b>..</b>	<b>469 229</b>	<b>..</b>	<b>311 151</b>

Sources: Natural Resources Canada; Statistics Canada.

– Nil; .. Not available; ... Amount too small to be expressed.

Notes: HS Code change from 2827.36 to 2827.39.40 as of 2007. HS Code change from 2833.26 to 2827.39.40 and 2833.29.00.90 as of 2007. HS Code change from 7906.00 to 7907.00.20 and 7907.00.20.30 as of 2007. Numbers may not add to totals due to rounding.

TABLE 3. ZINC USE IN CANADA, 2005-07

TABLE 5: ZINC USE IN CANADA, 2005-07

	2005			2006			2007		
	Primary	Secondary	Total	Primary	Secondary	Total	Primary	Secondary	Total
	(tonnes)								
Zinc used (1,2) for or in the production of:									
Copper alloys (brass, bronze, etc.)	x	x	714	x	x	873	x	x	918
Electroplating	x	x	576	x	x	533	x	x	553
Galvanizing:									
electro	x	x	1 174	x	x	1 393	x	x	1 276
hot dip	x	x	64 792	x	x	69 688	x	x	66 595
Zinc die-cast alloys	x	x	39 659	x	x	39 541	x	x	29 218
Other products (including rolled and ribbon zinc, zinc oxides)	x	x	42 743	x	x	40 705	x	x	36 405
<b>Total</b>	<b>147 992</b>	<b>1 666</b>	<b>149 658</b>	<b>149 798</b>	<b>2 934</b>	<b>152 732</b>	<b>132 866</b>	<b>2 100</b>	<b>134 966</b>
User stocks, year-end	9 585	24	9 609	16 571	237	16 808	11 245	114	11 358

Sources: Natural Resources Canada; Statistics Canada.

x Confidential.

(1) User survey does not represent all Canadian users and is therefore consistently less than the apparent quantity used. (2) Due to confidentiality in some end-use categories, a breakdown of primary and recycled sources is not provided in order to be consistent.

Note: Numbers may not add to totals due to rounding.

TABLE 4. CANADA, ZINC PRODUCTION AND EXPORTS, (1) 1988-2009

	Production			Exports	
	All Forms (2)	Refined (3)	In Ores and Concentrates	Refined	Total
1988	1 370 000	703 206	816 885	551 521	1 368 406
1989	1 272 854	669 677	614 223	495 060	1 109 283
1990	1 179 372	591 786	716 185	452 251	1 168 436
1991	1 083 008	660 552	566 815	520 508	1 087 323
1992	1 195 736	671 702	678 172	509 744	1 187 916
1993	990 727	659 881	455 953	493 265	949 218
1994	976 309	690 965	450 320	551 168	1 001 488
1995	1 094 703	720 346	609 575	533 179	1 142 754
1996	1 162 720	716 467	670 790	581 608	1 252 398
1997	1 026 864	703 798	489 697	546 965	1 036 662

1998	991 584	745 131	425 340	576 925	1 002 265
1999	963 321	776 927	327 662	610 792	938 454
2000	935 713	779 892	318 752	602 626	921 378
2001	1 012 048	661 172	419 164	495 184	914 348
2002	923 931	793 410	409 343	598 251	1 007 594
2003	757 307	761 199	257 877	590 555	848 432
2004	734 035	805 438	228 181	614 060	842 241
2005	618 844	724 035	178 099	527 304	705 403
2006	601 481	824 464	109 426	626 965	736 391
2007	594 113	802 103	129 044	610 970	740 014
2008	704 780	764 310	281 274	599 469	880 743
2009 (p)	672 379	685 504	226 817	591 978	818 795

Sources: Natural Resources Canada; Statistics Canada.

(p) Preliminary.

(1) Beginning in 1988, exports are based on the new Harmonized System and may not be in complete accordance with previous method of reporting. Ores and concentrates include HS classes 2608.00.30, 2603.00.30, 2607.00.30 and 2616.10.30. Refined production includes HS classes 7901.11 and 7901.12. (2) New refined zinc produced from domestic primary materials (concentrate, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export. (3) Refined zinc produced from domestic and imported ores.

TABLE 5. WORLD MINE PRODUCTION OF ZINC, 2004-09

	2004	2005	2006	2007	2008	2009 (p)
(000 tonnes)						
<b>EUROPE</b>						
Finland	37	41	36	39	28	27
Ireland	438	429	426	401	398	384
Poland	148	136	127	124	132	104
Russia	162	186	178	177	204	243
Spain	—	—	—	—	—	15
Sweden	199	216	210	214	188	195
Others	37	32	50	79	121	89
Subtotal	1 021	1 040	1 027	1 034	1 071	1 057
<b>AFRICA</b>						
Morocco	87	128	95	51	48	46
Namibia	202	232	208	196	204	220
South Africa	32	32	34	31	29	25
Others	36	22	3	3	3	3
Subtotal	357	414	340	281	284	294
<b>OCEANIA</b>						
Australia	1 298	1 329	1 338	1 498	1 479	1 253
<b>AMERICAS</b>						
Bolivia	146	159	173	194	384	440
Brazil	165	171	173	194	173	166

Canada	791	667	638	630	716	702
Mexico	462	476	469	452	442	485
Peru	1 209	1 202	1 202	1 444	1 603	1 509
United States	739	720	727	803	779	750
Others	96	4	121	117	125	122
Subtotal	3 608	3 496	3 503	3 834	4 222	4 174
<b>ASIA</b>						
China	2 391	2 547	2 844	3 048	3 186	3 117
India	340	446	503	558	616	645
Iran	135	167	166	75	86	115
Japan	48	41	7	—	—	—
Kazakhstan	404	405	410	446	459	444
Mongolia	—	11	55	77	72	70
North Korea	62	65	85	95	48	40
Thailand	40	43	42	42	35	35
Turkey	39	56	59	71	74	76
Others	49	62	119	154	58	57
Subtotal	3 508	3 832	4 235	4 489	4 634	4 599
<b>Total world</b>	<b>9 792</b>	<b>10 110</b>	<b>10 443</b>	<b>11 136</b>	<b>11 690</b>	<b>11 377</b>

Source: International Lead and Zinc Study Group.

— Nil; (p) Preliminary.

TABLE 6. WORLD ZINC METAL PRODUCTION, (1) 2004-09

	2004	2005	2006	2007	2008	2009 (p)
(000 tonnes)						
<b>EUROPE</b>						
Belgium	257	222	238	240	239	26
Finland	285	282	282	306	298	291
France	260	209	120	125	118	150
Germany	358	335	317	295	292	152
Italy	118	121	109	102	107	110
Netherlands	225	228	238	219	241	221
Norway	139	148	161	157	145	141
Poland	154	137	134	142	143	140
Russia	241	211	248	263	263	202
Spain	523	500	507	509	466	510
Others	161	166	154	158	164	88
Subtotal	2 721	2 559	2 508	2 516	2 476	2 031
<b>AFRICA</b>						
Algeria	30	37	33	27	31	29



Namibia	119	133	134	150	145	150
South Africa	105	104	90	101	82	86
Zambia	2	—	—	1	2	—
Subtotal	257	274	257	279	260	265
<b>AMERICAS</b>						
Argentina	35	41	43	43	31	33
Brazil	266	267	272	265	249	210
Canada	805	723	824	802	764	686
Mexico	337	336	285	320	321	323
Peru	196	164	175	162	190	149
United States	354	350	269	279	286	204
Subtotal	1 993	1 881	1 868	1 871	1 841	1 605
<b>ASIA</b>						
China	2 720	2 776	3 163	3 743	3 913	4 357
India	272	302	415	459	606	678
Iran	96	140	139	125	110	115
Japan	635	638	614	598	616	541
Kazakhstan	323	357	365	358	366	328
South Korea	669	647	667	691	739	636
Thailand	103	93	84	99	102	104
Others	94	99	108	114	127	91
Subtotal	4 912	5 052	5 555	6 187	6 579	6 850
<b>OCEANIA</b>						
Australia	474	457	466	502	499	526
<b>Total world</b>	<b>10 357</b>	<b>10 228</b>	<b>10 654</b>	<b>11 355</b>	<b>11 655</b>	<b>11 277</b>

Source: International Lead and Zinc Study Group.

— Nil; (p) Preliminary.

(1) Total production by smelters and refineries of zinc in marketable form or used directly for alloying, including production on toll in the reporting country, regardless of the type of source material from which it is produced, i.e., whether ores, concentrates, residues, slag, or scrap. Remelted zinc and zinc dusts are excluded.

TABLE 7. ZINC USE, (1) BY COUNTRY AND BY REGION, 2004-09

	2004	2005	2006	2007	2008	2009 (p)
(000 tonnes)						
<b>EUROPE</b>						
Belgium	365	345	360	387	382	300
France	298	275	285	275	252	218
Germany	514	511	564	535	527	370
Italy	389	395	313	398	318	218
Netherlands	..	115	116	117	105	78
Russia	163	171	199	207	195	148

Spain	248	216	225	225	210	151
United Kingdom	185	175	172	174	158	115
Others	668	481	552	532	473	368
Subtotal	2 830	2 684	2 786	2 850	2 620	1 966
<b>AFRICA</b>						
South Africa	96	103	99	108	100	86
Others	97	101	100	102	99	85
Subtotal	193	204	199	210	199	171
<b>OCEANIA</b>						
Australia	250	239	255	202	182	157
New Zealand	13	14	12	12	11	10
Subtotal	263	253	267	214	193	167
<b>AMERICAS</b>						
Brazil	239	222	238	248	248	162
Canada	189	175	181	173	134	140
Mexico	240	244	250	250	247	200
United States	1 251	1 077	1 153	1 016	1 003	898
Others	204	186	200	196	227	169
Subtotal	2 123	1 904	2 022	1 883	1 859	1 569
<b>ASIA</b>						
China	2 690	3 041	3 115	3 597	4 015	4 730
India	362	394	430	455	485	515
Japan	623	602	594	588	564	434
South Korea	445	501	534	512	504	393
Taiwan	342	306	282	226	220	189
Thailand	129	117	104	105	111	93
Turkey	144	142	136	137	128	123
Others	512	495	502	533	539	482
Subtotal	5 247	5 598	5 697	6 153	6 566	6 959
<b>Total world</b>	<b>10 657</b>	<b>10 641</b>	<b>10 971</b>	<b>11 310</b>	<b>11 437</b>	<b>10 832</b>

Source: International Lead and Zinc Study Group.

.. Not available; (p) Preliminary.

(1) Total refined zinc use, including zinc used directly for the production of zinc alloys, regardless of the type of source material from which it is produced, i.e., ores, concentrates, residues, slags, or scrap. Remelted zinc and zinc dusts are excluded.

TABLE 8. CANADA, ZINC METAL CAPACITY, 2009

Company and Location	Annual Rated Capacity
	(000 tonnes of slab zinc)
<b>PRIMARY</b>	
Canadian Electrolytic Zinc Limited Salaberry-de-Valleyfield, Quebec	280

Xstrata Zinc Canada Timmins, Ontario	150
HudBay Minerals Inc. Flin Flon, Manitoba	118
Teck Cominco Limited Trail, British Columbia	295
<b>Total primary, Canada</b>	<b>843</b>

Source: Natural Resources Canada.

TABLE 9. MONTHLY AVERAGE ZINC  
PRICES, 2008 AND 2009

<b>LME Special High Grade Settlement</b>	
<b>(US\$/t)</b>	
<b>2008</b>	
January	2 340.1
February	2 438.1
March	2 511.5
April	2 263.8
May	2 182.1
June	1 894.5
July	1 852.4
August	1 723.3
September	1 735.5
October	1 302.1
November	1 152.6
December	1 100.6
<b>Yearly average</b>	<b>1 874.7</b>
<b>2009</b>	
January	1 187.4
February	1 112.1
March	1 216.8
April	1 378.9
May	1 483.8
June	1 557.3
July	1 578.6
August	1 821.7
September	1 884.0
October	2 071.6
November	2 193.4
December	2 376.0
<b>Yearly average</b>	<b>1 655.1</b>

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Source: International Lead and Zinc Study Group.

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