Zinc

Zinc - 2011 Annual Review and Outlook

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Zinc - 2011 Annual Review and Outlook

HIGHLIGHTS

- Canada has a zinc smelting capacity of 693 000 tonnes per year (t/y) from three metallurgical facilities located across the country and produces roughly 5.4% of the world's total supply of refined zinc.

- Construction is well advanced at the Lalor mine of HudBay Minerals in the Snow Lake district of Manitoba. Hudbay announced that it would build a new concentrator at the mine rather than refurbish the existing Snow Lake concentrator. Initial zinc production is expected in the second half of 2012. Xstrata Zinc and Donner Metals are continuing with construction of the Bracemac-McLeod mine in the Matagami district of Quebec. The mine is expected to begin producing zinc in early 2013.

- Nyrstar NV purchased Breakwater Resources Ltd. in August 2011. Nyrstar now owns the Myra Falls mine in British Columbia and the Langlois development project in Quebec. This acquisition is part of Nyrstar's strategy to increase its own upstream concentrate production to provide feed to its smelters.

- Apparent zinc usage (domestic metal shipments plus imports) in Canada was 133 700 tonnes (t) in 2011, down from 140 700 t in 2010.

- Zinc prices varied within the range of US$0.81-$1.15 per pound (/lb) during the year. Overall, there was a steady price decline from US$1.10/lb in January to US$0.83/lb at the end of the year.

- Inventories of refined zinc on the London Metal Exchange (LME) increased from 710 000 t in January to 820 000 t at year-end, a 15% increase. Total global inventories, including producer stocks and metal in Shanghai Futures Exchange warehouses, reached 1.56 million tonnes (Mt), a 28% increase over 2010 levels.

- With continued uncertainty about the global economic recovery and high inventory levels, zinc prices should remain in the US$0.80-$0.95/lb range in 2012. The pace of growth in Asian demand will slow down as major infrastructure projects, mainly in China, near completion. Industrial demand in Europe and North America will continue to lag behind demand in emerging countries.

CANADIAN PRODUCTION

In 2011, Canadian mines produced 575 761 t of zinc in concentrate, compared to 609 567 t in 2010, a 5.5% decrease (Table 1). The decrease can be attributed to lower production at the Brunswick, LaRonde, and Kidd Creek mines, which was slightly offset by added production from the Bellekeno and Wolverine mines. Refined metal production for 2011 was 658 518 t, compared to 690 152 t in 2010, a 4.6% decrease. This decrease was mainly due to the lack of production at the Kidd Creek smelter in 2011. Table 3 shows zinc production and exports for the period 1988-2011.

Zinc is produced at eleven mines located in six provinces and one territory (Figure 1). In 2011, two new mines were commissioned, both in the Yukon. Zinc metal is produced from domestic and foreign concentrates at three metallurgical sites in Quebec, Manitoba, and British Columbia (Table 7). Xstrata's Timmins metallurgical plant closed in 2010. 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 2011.

Newfoundland and Labrador

The **Duck Pond** mine, owned by **Teck Resources Limited**, is located 35 kilometres (km) southeast of Buchans. It produced a total of 21 300 t of zinc in concentrate during the year (2011 Annual Report).

New Brunswick

Xstrata Zinc Canada owns the **Brunswick** zinc and lead mine located 30 km southwest of Bathurst. In 2011, the mine produced 3.1 Mt of ore grading 7.9% zinc and 3.1% lead, resulting in production of 208 995 t of zinc in concentrate, down from 214 035 t in 2010 (2011 Production Report). The mine is expected to continue operating until sometime in 2013, after which it will close permanently due to the exhaustion of reserves.

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 2011, the mine produced 54 894 t of zinc in concentrate

from 2.4 Mt of ore milled at a grade of 3.09% zinc, which was a 12% decrease from the previous year (2011 20-F Report). As the mining at LaRonde transitions from the copper-zinc-rich upper zones to the gold-rich lower orebody, zinc production in 2012 is expected to decrease to 33 000 t.

The **Perseverance** mine at Matagami is owned by **Xstrata Zinc Canada**. Ore from the mine is processed at Xstrata's 2600-tonnes-per-day (t/d) Matagami mill. During 2011, the mine treated 1.11 Mt of ore grading 13.2% zinc, resulting in the production of 135 000 t of zinc in concentrate (2011 Production Report).

Nyrstar NV owns the **Langlois** mine located 213 km northeast of Val-d'Or. Development activities continued at the mine during 2011. Late in the year, test production was carried out to provide ore as part of the re-commissioning of the mill. Production at Langlois is expected to ramp up in the second half of 2012. The mine is expected to produce 46 000 t/y of zinc over a 10-year life.

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 and is the operator of the facility under a supply and processing agreement that expires in May 2017. The rated capacity of the plant is 280 000 t/y of refined zinc. In 2011, the plant produced 263 300 t of zinc, compared with 265 300 t of zinc produced in 2010 (2011 Annual Report).

Xstrata Zinc Canada operates the **General Smelting Company of Canada** zinc and lead foundry located at Lachine, Quebec, with an annual capacity of 27 000 t. In 2011, the plant produced 5000 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. 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 metres (9100 feet). Late in the year, the company announced the completion of the Mine D expansion, which extends mine production to 9600 feet and the mine life to at least 2018. The Kidd Creek mine produced 2.23 Mt of ore resulting in 71 500 t of zinc in concentrate in 2011 (2011 Production Report).

HudBay Minerals Inc. sold its zinc oxide production facility in Brampton to **Horsehead Corporation** based in Monaca, Pennsylvania. The Brampton facility is a large producer of zinc oxide with a production capacity of 45 000 t/y.

Manitoba

HudBay Minerals Inc. operates an integrated mining and smelting business through its wholly owned subsidiary, **Hudson Bay Mining and Smelting Co., Limited**. It operates the **777** and **Trout Lake** mines, as well as a smelter complex in Flin Flon, situated about 630 km northwest of Winnipeg. Trout Lake is expected to close in 2012 following the depletion of ore reserves. The company also owns the **Chisel North** mine in Snow Lake, located 120 km east of Flin Flon. The Chisel North mine and the Snow Lake concentrator operated throughout 2011 after being closed for part of 2010 due to poor market conditions. The Chisel North mine is expected to deplete its ore reserves sometime in 2012. The Flin Flon concentrator produced 119 200 t of zinc concentrates grading 51.2% zinc from ore mined at the 777 and Trout Lake mines. The Snow Lake concentrator produced 28 560 t of zinc concentrates at similar grades

from ore mined at the Chisel North mine (2011 Year-End Management Discussion and Analyis). In 2011, the 777 mine produced 1.49 Mt of ore grading 3.7% zinc while the Trout Lake mine produced 510 000 t of ore grading 3.5% zinc. The Chisel North mine produced 196 000 t of ore grading 8.2% zinc.

The zinc hydrometallurgical facility is situated at Flin Flon and includes an oxygen plant, a two-stage pressure leaching plant, and a four-step solution purification and electrolysis and casting plant to produce special high-grade zinc. It has an annual capacity of 118 000 t of refined zinc metal. The plant produced 107 704 t of refined zinc in 2011, up from 100 047 t in 2010. This total can be broken down to 75 814 t from HudBay concentrates and 31 890 t from purchased concentrates.

British Columbia

The **Myra Falls** zinc mine, owned and operated by **Nyrstar NV**, is located within Strathcona Provincial Park on Vancouver Island, about 65 km southwest of Campbell River. The mine produced 494 000 t of ore grading 8.0% zinc. Total production was 36 000 t of zinc in concentrate.

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 2011, production at Trail was 291 200 t of zinc, up from 278 300 t in 2010 (2011 Annual Report). Production in 2012 is expected to be in the range of 280 000-290 000 t of zinc.

Yukon

Yukon Zinc Corporation continued to ramp up to full production at its **Wolverine** mine located 190 km northwest of Watson Lake. The deposit contains proven and probable reserves of 5.15 Mt grading 9.66% zinc, 0.91% copper, 1.26% lead, 281.8 grams per tonne (g/t) silver, and 1.36 g/t gold. The mill capacity is 1700 t/d and it will produce zinc, lead, and copper concentrates. Reported concentrate production for 2011 was 19 714 t at a grade of 42.3% zinc (Yukon Zinc Corporation 2011 Annual Report). Yukon Zinc Corporation is privately owned; its majority shareholder is **Jinduicheng Molybdenum Group Ltd**.

Alexco Resource Corp. began ramping up production at its **Bellekeno** silver-lead-zinc mine located in the historic Keno Hill silver district. Initial production was at a rate of 250 t/d. During the second half of 2011, the mine produced 1950 t of zinc.

CANADIAN DEVELOPMENTS

Buchans Minerals Corporation has published a preliminary economic assessment for its **Lundberg** copper-lead-zinc-silver project located at Buchans in Newfoundland and Labrador. The study outlines a conceptual 10-year open-pit mine operating at 5000 t/d. The deposit contains an inferred resource of 5.34 Mt grading 3.02% zinc and 1.25% lead. The study predicts annual production of 12 300 t of zinc and 7400 t of lead.

Selwyn Resources Ltd. has acquired the **Scotia** zinc project located 50 km north of Halifax, Nova Scotia, through the purchase of all outstanding shares of ScoZinc Limited. The Scotia mine was briefly in production as an open-pit mine during 2008-09 when it was owned by Acadian Mining Corporation. The deposit hosts measured and indicated resources of 4.46 Mt grading 3.88% zinc and 1.69% lead. Selwyn

also owns the nearby Getty deposit, which contains 5.32 Mt of measured and indicated resources grading 1.84% zinc and 1.47% lead.

In March, **Trevali Mining Corporation** acquired **Kria Resources,** owner of the **Halfmile Lake** property located 70 km southwest of Bathurst, New Brunswick. During the year, Trevali commenced ramp development at Halfmile Lake with the goal of starting production by the end of 2011. The company also signed a toll milling and concentrate offtake agreement with Xstrata Zinc Canada for the processing of ore from Halfmile Lake at the Brunswick mill. Trevali also owns the Stratmat deposit located 15 km east of Halfmile Lake.

Donner Metals Ltd. and **Xstrata Zinc Canada** are continuing with construction of the **Bracemac-McLeod** mine near Matagami, Quebec. The property is located 5 km from the 2600-t/d Matagami Lake mill complex owned by Xstrata Zinc. The mill is currently processing ore from Xstrata's Perseverance mine. A production ramp and ventilation raises are being developed with the goal of first ore production in early 2013. A feasibility study completed in 2010 states proven and probable reserves of 3.73 Mt grading 9.6% zinc, 1.26% copper, and 28.2 g/t silver, which would provide for a four-year mine life. The ore will be processed at Xstrata's Matagami mill. The annual zinc production is expected to be 90 000 t of zinc in concentrate.

Construction of the **Lalor** mine, owned by **HudBay Minerals Inc.** and located near the Chisel North mine in Snow Lake, Manitoba, is progressing well. During the year, the production ramp was completed and the ventilation shaft was commenced to allow for initial zinc production by the third quarter of 2012. The company has decided to build a new concentrator at Lalor rather than invest in the refurbishment of the existing Snow Lake concentrator. The new concentrator will have a capacity of 4500 t/d. The deposit hosts probable mineral reserves of 10.52 Mt grading 8.31% zinc, 0.64% copper, 1.55 g/t gold, and 21 g/t silver.

Selwyn Chihong Mining Ltd., joint-venture operator of the **Howard's Pass** zinc-lead project in east-central Yukon, focused work during 2011 on the Don and XY Central deposits. The joint venture envisages the development of an underground mine to exploit these deposits, which are part of a much larger system of sedimentary-exhalative deposits on the project. Selwyn filed an updated National Instrument 43-101 mineral resource report in September 2011. This report delineated indicated resources of 29.93 Mt grading 6.35% zinc and 2.69% lead in the XY Central deposit and indicated resources of 36.9 Mt grading 5.63% zinc and 2.11% lead in the Don deposit. Selwyn Chihong Mining is 50% owned by Selwyn Resources Ltd. and 50% owned by **Yunnan Chihong Zinc & Germanium Co. Ltd.** Late in the year, the company announced that a feasibility study would be completed for the Howard's Pass project, probably by mid-2012.

Canadian Zinc Corporation is advancing its **Prairie Creek** zinc-lead-silver project located in the western Northwest Territories towards a production decision. In December, the Mackenzie Valley Environmental Impact Review Board concluded that the project would not have any significant adverse impacts on the environment. The project will proceed to the regulatory phase of approvals. A technical report has outlined measured and indicated resources of 5.84 Mt grading 10.71% zinc, 9.9% lead, and 161 g/t silver, and inferred resources of 5.54 Mt grading 13.53% zinc, 11.43% lead, and 215 g/t silver. The company foresees a 1200-t/d mine that would be in operation for 14 years. At year-end, the company was completing a bulk sampling program at the site to determine the optimal treatment process for the ore.

Sabina Gold & Silver Corp. sold its **Hackett River** silver-zinc project located in western Nunavut to Xstrata Zinc Canada. Xstrata paid $50 million and has granted Sabina a silver production royalty of 22.5%

for the first 190 million ounces of payable silver and 12.5% for all payable silver production thereafter. Xstrata Zinc will also incur exploration expenditures of $50 million over four years. This purchase will no doubt expedite the advancement of Hackett River towards production. Hackett River hosts measured and indicated resources of 20.3 Mt grading 4.8% zinc, 0.70% lead, 0.3 g/t gold, and 150 g/t silver, as well as inferred resources of 41 Mt grading 4.0% zinc, 1.0% lead, and 137 g/t silver (Xstrata 2011 Reserves and Resources Report).

WORLD PRODUCTION

According to the International Lead and Zinc Study Group (ILZSG), world zinc mine production for 2011 was 12.95 Mt, up from 12.36 Mt in 2010 (Table 4). In terms of mine production, Canada ranked seventh behind China, Australia, Peru, India, the United States, and Mexico. The top five zinc mines in terms of zinc-in-concentrate production in 2011 were: Rampura Agucha, India (660 000 t); Red Dog, Alaska (572 500 t); Century, Australia (497 000 t); Mt. Isa, Australia (357 000 t); and Antamina, Peru (235 000 t). The top five zinc mining companies were Xstrata, Hindustan Zinc, China Minmetals Corp., Teck Resources, and Glencore, which together accounted for 28% of world zinc mine production.

World refined zinc production was 13.08 Mt, up from 12.83 Mt in 2010 (Table 5). The top five zinc metal-producing countries in 2011 were China, South Korea, India, Canada, and Japan. The top refined zinc producers were Nyrstar, Korea Zinc, Hindustan Zinc, Xstrata, and Votorantim, together accounting for 30% of global production. Chinese refined zinc production increased 1.1% in 2011 following increases of 20% and 9.5% in 2010 and 2009, respectively. Zinc metal production in Europe increased 2.4% in 2011 after an increase of 16.2% in 2010 and a decrease of 17% in 2009. Data for zinc use by country can be found in Table 6.

WORLD DEVELOPMENTS

Xstrata Zinc purchased a 23.6% interest in the **Pallas Green** project located near Limerick, **Ireland** from Minco plc. Xstrata is now the sole owner of the project. Pallas Green has a Joint Ore Reserves Committee (JORC) compliant inferred resource of 30 Mt grading 7.0% zinc and 1.0% lead using a 4% zinc cut-off. Xstrata is completing a prefeasibility study on the project. This property is located east of the Stonepark deposit being explored by Teck Resources and Connemara Mining.

Lundin Mining completed a feasibility study on the **Lombador** zinc deposit located adjacent to the Neves-Corvo mine in **Portugal**. The study concluded that underground mining could be extended for 12 years beginning in 2014. The mining would extract 8.8 Mt of ore grading 7.9% zinc. The Lombador deposit is estimated to contain 46.1 Mt of measured and indicated resources grading 6.69% zinc.

Blackthorn Resources (39.9%) and Glencore International (50.1%) announced first ore production at their **Perkoa** zinc mine located west of Ouagadougou in **Burkina Faso**. The Government of Burkina Faso holds the remaining 10% interest. Full production is scheduled for the second half of 2012 at an annual rate of 90 000 t of contained zinc. The deposit has JORC-compliant probable reserves of 6.3 Mt grading 13.9% zinc.

Vedanta Resources plc, through its subsidiary Hindustan Zinc Ltd., completed its acquisition of the zinc assets of Anglo American plc, including the Skorpion mine in **Namibia**, the Black Mountain mine in **South Africa**, and the Lisheen mine in **Ireland**. It also acquired the Gamsberg deposit in **South Africa**, which is one of the largest undeveloped zinc deposits in the world.

Herald Resources Ltd., a business unit of PT Bumi Resources, is advancing the **Dairi** zinc-lead deposit in **Indonesia** towards production. The deposit is owned by a joint venture comprising Herald (80%) and PT Aneka Tambang (20%). It contains proven and probable reserves of 6.6 Mt grading 14.6% zinc and 8.8% lead. The mine is expected to produce 175 000 t of zinc and 60 000 t of lead annually.

ZincOx Resources continued with construction of its first zinc recycling facility in **South Korea**. The plant will be capable of producing 92 000 t of zinc concentrate and an iron by-product from 400 000 t of electric arc furnace dust with an average zinc content of 23%. The iron by-product would be pelletized and returned to a steel blast furnace. The company expects first zinc production to occur during the first half of 2012.

Minmetals Resources Limited is considering the development of the **Dugald River** zinc deposit in Queensland, **Australia**. The deposit contains total resources of 53 Mt grading 12.5% zinc, 1.9% lead, and 36 g/t silver. A feasibility study outlined a 22-year mine life producing 200 000 t/y of zinc and 25 000 t/y of lead.

Xstrata Zinc has approved construction of the **Lady Loretta** zinc-lead-silver mine located 140 km northwest of the Mt. Isa operation in Queensland, **Australia**. This underground mine would produce 126 000 t of zinc in concentrate and 40 000 t of lead in concentrate annually over a 10-year mine life beginning in 2013. The deposit contains proven and probable reserves of 12.7 Mt grading 14.2% zinc, 4.8% lead, and 84 g/t silver.

Trevali Mining Corporation, along with partner Glencore International, is constructing the **Santander** mine located in Lima Department, **Peru**. The deposit contains 5.8 Mt of indicated resources grading 3.8% zinc, 1.4% lead, and 44 g/t silver, and inferred resources of 4.8 Mt grading 5.1% zinc, 0.44% lead, and 21 g/t silver. The company anticipates production start-up in mid-2012 at an initial milling rate of 2000 t/d.

Ironbark Zinc is conducting a feasibility study on its **Citronen** project located on the north coast of **Greenland**. The Citronen deposit is a large sedimentary-exhalative (SEDEX) type deposit that contains measured and indicated resources of 34.3 Mt grading 5.3% zinc and 0.5% lead. The project could support a 3-Mt/y mine that would produce about 96 000-150 000 t/y of zinc in concentrate and 5000-13 000 t/y of lead in concentrate over a 13-year mine life. Glencore International has provided $50 million in funding in return for a concentrate offtake agreement.

MARKETS AND PRICES

Figure 2 shows average monthly LME settlement prices for the period 2007-11, along with zinc metal stocks. Total stocks, comprising producers, consumers, and LME stocks, stood at 1 322 000 t at the end of 2011, an increase of 207 000 t. Producer and consumer stocks ended the year at 502 000 t, up 21% from the previous year. LME metal stocks increased substantially from 701 000 t at the end of 2010 to 820 000 t in December 2011.

Monthly average settlement prices on the LME during 2011 decreased from US$2371/t in January to US$1916/t in December. Figure 3 shows the trend of the LME daily official cash settlement price for 2011. The price started the year at US$1.09/lb and ended it at US$0.83/lb, a decrease of 24%. Table 8 lists the monthly average zinc prices for 2010 and 2011.

TRADE

Total exports of zinc and zinc products from Canada were valued at $1.689 billion in 2011, compared to $1.737 billion in 2010. Imports were valued at $435 million, compared to $386 million in 2010. Canadian smelters imported 210 000 t of zinc in concentrates, compared to 216 000 t the previous year. Concentrates were imported mainly from the United States, Bolivia, Mexico, and Peru. Smelters exported 481 000 t of refined metal in 2011, compared to 547 000 t in 2010. Zinc metal was exported primarily to the United States with minor amounts shipped to Taiwan, Hong Kong, and Malaysia.

OUTLOOK

Zinc production from Canadian mines is expected to decrease in 2013-14. Newly started mines, including Wolverine and Bellekeno, should ramp up to full production. New production is expected at Langlois, Bracemac-McLeod, and Lalor. This will be offset by the closure of the Trout Lake, Chisel North, Perseverance, and large Brunswick mines. The decrease is estimated at 130 000 t.

As zinc is primarily used in galvanizing for the construction and automotive sectors, the strength of the global economy is directly linked to zinc demand. During 2011 and 2012, western economies have been very sluggish due to persistent concerns over the sovereign debt in Europe and a lack of consumer demand. The U.S. real estate market still has not recovered from the 2008 recession and job growth remains a concern. The growing Asian economies, particularly China and India, will not expand at double-digit rates. Growth rates in China will likely be reduced to the 6-8% range.

According to data supplied by the ILZSG, world zinc mine production is expected to increase 4.8% to 13.37 Mt in 2012 due to increases in output that include expansions in China, India, Kazakhstan, Mexico, and Russia. Refined metal production is expected to increase to 13.48 Mt with these increases occurring in China, India, and South Korea. World zinc demand in 2012 is estimated at 13.4 Mt, an increase of 3.9% over 2011. A slight surplus of metal is expected in the range of 135 000 t.

Zinc prices declined 20% in 2011. Zinc stocks continued to increase and the ILZSG predicts another increase in stocks in 2012. As long as global stocks remain high and world smelters do not curb production, this will put downward pressure on prices given that demand is not likely to improve in the near term. It is expected that zinc prices will remain below US$1.00/lb in 2012 and 2013. Once some large mines begin to close in 2014-15, a lack of concentrates may reduce smelter production and cause stocks to be drawn down, assuming the global economy recovers. This scenario would be more conducive to an improvement in prices.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to the document entitled "Definitions and Valuation: Mineral Production, Shipments, and Trade." (2) Information in this review was current as of June 30, 2012. (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.

Zinc - Other Information

INTRODUCTION TO ZINC

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, British Columbia, 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 tonnes per year (t/y).

In Manitoba, the discovery in 1915 of significant zinc and copper ore with important quantities of gold 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 its 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 operating 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.

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, with 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, representing 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.

HEALTH AND THE 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 grams of zinc. The recommended daily zinc intake is 10 milligrams (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 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.

OTHER SOURCES OF INFORMATION

American Galvanizers Association	www.galvanizeit.org
International Zinc Association	www.zincworld.org
London Metal Exchange	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
Zinc Information Centre	www.zincinfocentre.org
North American Die Casting Association	www.diecasting.org
International Fertilizer Industry Association	www.fertilizer.org

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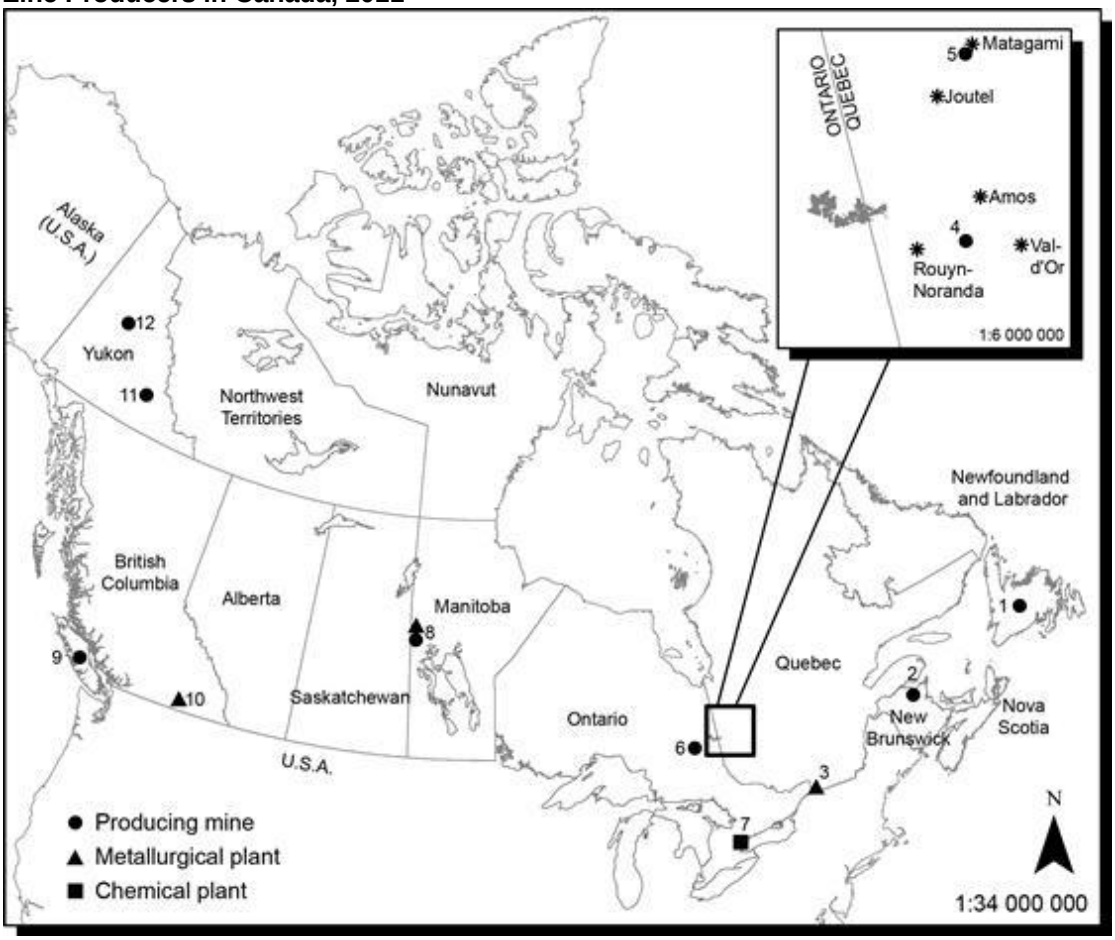
Figure 1
Zinc Producers in Canada, 2011



Zinc-Producing Mines

1.	Duck Pond	Teck Resources Limited	www.teck.com
2.	Brunswick	Xstrata Zinc Canada	www.xstrata.com
4.	LaRonde	Agnico-Eagle Mines Limited	www.agnico-eagle.com
5.	Perseverance	Xstrata Zinc Canada	www.xstrata.com
6.	Kidd Creek	Xstrata Copper Canada	www.xstrata.com
8.	Trout Lake	HudBay Minerals Inc.	www.hudbayminerals.com
	777	HudBay Minerals Inc.	www.hudbayminerals.com
	Chisel North	HudBay Minerals Inc.	www.hudbayminerals.com
9.	Myra Falls	Nyrstar NV	www.nyrstar.org
11.	Wolverine	Yukon Zinc Corporation	www.yukonzinc.com
12.	Bellekeno	Alexco Resource Corp.	www.alexcoresource.com

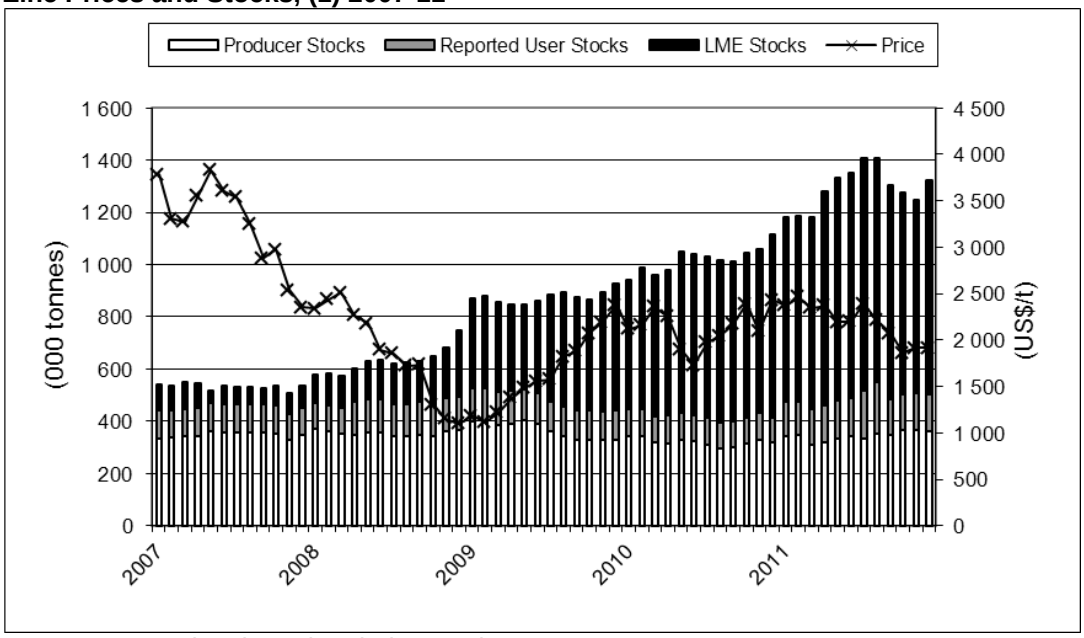
Zinc Metallurgical Plants

3.	Valleyfield	Canadian Electrolytic Zinc Limited	www.norandaincomefund.com
8.	Flin Flon	HudBay Minerals Inc.	www.hudbayminerals.com
10.	Trail	Teck Resources Limited	www.teck.com

Zinc Oxide Plants

7.	Zochem	Horsehead Corporation	www.zochem.com

Figure 2
Zinc Prices and Stocks, (1) 2007-11



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

Figure 3
LME Daily Official Cash Settlement Prices, 2011

Source: International Lead and Zinc Study Group.

TARIFFS

Item No.	Description	Canada			United States	European Union	Japan
		MFN	GPT	USA	Canada	Conventional Rate (1)	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
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	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	Cyanides, cyanide oxides and complex cyanides: cyanides and cyanide oxides: other	Free	Free	Free	Free	5.5%	3.3%
2842.90	Other salts of inorganic acids or peroxoacids (including aluminosilicates whether or not chemically defined), other than azides: other	Free	Free	Free	Free	5.3-5.5%	3.3%
32.06	Other colouring matter; preparations as specified in note 3 to this chapter of the Canadian *Customs Tariff*, other than those of heading 32.03, 32.04 or 32.05; inorganic products of a kind used as luminophores, whether or not chemically defined						
3206.42	Other colouring matter and other preparations: lithopone and other pigments and preparations based on zinc sulphide	Free	Free	Free	Free	6.5%	2.5-3.9%
3206.49.89	Other colouring matter and other preparations; other	3%	3%	Free	Free	6.5%	2.5-3.3%
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 2011, Canada Border Services Agency; *Harmonized Tariff Schedule of the United States*, 2011; *Official Journal of the European Union* (Tariff Information), October 29, 2010, edition; *Customs Tariff Schedules of Japan,* 2011.
GPT General Preferential Tariff; kg Kilograms; 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 AND TERRITORY, 2009-11

Province	2009		2010		2011 (p)	
	(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
PRODUCTION (All Forms) (1)						
Newfoundland and Labrador	18 910	35 721	13 774	30 648	20 526	46 203
New Brunswick	251 001	474 141	203 442	452 659	191 404	430 850
Quebec	192 915	364 416	200 693	446 542	189 920	427 510
Ontario	102 684	193 970	81 778	181 957	71 414	160 752
Manitoba	76 316	144 161	74 806	166 443	73 221	164 820
British Columbia	28 053	52 993	35 074	78 039	26 663	60 018
Yukon	–	–	–	–	2 615	5 885
Total	**669 879**	**1 265 402**	**609 567**	**1 356 287**	**575 761**	**1 296 039**
Mine output (2)	699 145	..	649 065	..	607 447	..
Refined (3)	685 504	..	690 152	..	658 518	..

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, 2009-11

		2009		2010		2011	
		(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
EXPORTS							
2608.00.30	Zinc content in zinc ores and concentrates						
	Belgium	15 083	16 143	30 482	43 283	44 264	84 505
	Spain	45 596	35 792	72 348	97 424	52 791	71 995
	Finland	6 297	7 542	48 278	60 478	29 064	38 719
	South Korea	12 016	14 236	18 777	22 920	20 919	28 547
	China	94 936	83 571	10 463	10 699	23 329	23 553
	Norway	39 960	36 026	–	–	16 422	16 212
	Bulgaria	–	–	–	–	10 500	14 874
	United States	1 554	1 348	–	–	3 300	7 903
	Japan	8 865	10 056	9 350	13 011	5 163	5 860
	Poland	–	–	–	–	2 086	1 804
	Other countries	2 511	2 842	23	76	25	33
	Total	**226 818**	**207 556**	**189 721**	**247 891**	**207 863**	**294 005**
2617.90	Other ores and concentrates: other						
	China	255	148	2 277	2 147	995	824
	Hong Kong	–	–	–	–	640	582
	United States	–	–	44	59	35	160
	Belgium	–	–	–	–	65	28

	Other countries	1	1	3	4	–	–
	Total	**256**	**149**	**2 324**	**2 210**	**1 735**	**1 594**
2620.11	Ash and residues containing hard zinc spelter						
	Japan	–	–	–	–	40	83
	Norway	40	49	–	–	9	24
	Other countries	65	86	67	184	–	–
	Total	**105**	**135**	**67**	**184**	**49**	**107**
2620.19	Ash and residues containing mainly zinc, n.e.s.						
	United States	6 621	5 920	7 112	7 513	5 521	6 687
	Italy	–	–	–	–	60	126
	Norway	–	–	–	–	40	77
	Japan	–	–	–	–	14	54
	Netherlands	–	–	–	–	20	32
	Other countries	470	578	21	32	–	–
	Total	**7 091**	**6 498**	**7 133**	**7 545**	**5 655**	**6 976**
2817.00	Zinc oxide; zinc peroxide						
	United States	33 450	62 803	50 879	115 549	44 967	103 835
	Japan	31	86	20	57	859	2 202
	Sweden	362	973	419	1 015	603	1 555
	United Kingdom	291	768	453	1 128	595	1 497
	Denmark	285	739	382	888	491	1 284
	Egypt	441	1 423	556	1 412	399	950
	Mexico	–	–	19	47	246	737
	Brazil	948	2 599	734	1 833	228	563
	Other countries	1 149	3 006	2 605	6 404	704	1 750
	Total	**36 957**	**72 397**	**56 067**	**128 333**	**49 092**	**114 373**
3206.42	Lithophone and other pigments and preparations based on zinc sulphide						
	Belgium	–	–	–	–	. . .	. . .
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc						
	United States	383 017	677 869	295 254	676 470	291 104	661 968
	Taiwan	6 219	11 332	12 756	30 038	9 591	24 072
	Hong Kong	3 314	5 652	3 270	7 554	3 209	7 305
	Malaysia	2 676	4 406	1 974	5 010	1 145	2 654
	Philippines	1 020	1 743	816	2 007	835	1 954
	China	5 186	9 270	2 519	6 364	489	1 157
	Other countries	8 252	15 169	693	1 635	305	680
	Total	**409 684**	**725 441**	**317 282**	**729 078**	**306 678**	**699 790**
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc						
	United States	168 183	316 747	210 264	476 395	156 422	352 547
	Taiwan	3 187	5 701	10 698	25 193	13 418	34 029
	Malaysia	7 894	15 458	5 978	14 875	3 724	8 676
	Vietnam	827	1 787	1 523	3 183	1 531	3 649
	Philippines	1 031	1 889	1 138	2 687	724	1 788
	Other countries	1 170	2 111	602	1 446	. . .	. . .
	Total	**182 292**	**343 693**	**230 203**	**523 779**	**175 819**	**400 689**
7901.20	Zinc alloys, unwrought						
	United States	231	530	460	887	35 323	79 125
	Hong Kong	3 581	7 413	5 419	13 532	5 824	15 036
	China	4 784	10 285	3 731	9 613	3 068	8 011
	Thailand	797	1 568	1 714	4 205	1 596	3 863
	Other countries	369	724	415	1 021	1 014	2 497
	Total	**9 762**	**20 520**	**11 739**	**29 258**	**46 825**	**108 532**
7902.00	Zinc waste and scrap						
	United States	4 505	4 718	9 964	12 679	12 513	15 217
	Taiwan	–	–	105	191	507	1 043
	China	141	185	92	136	414	737

	India	652	610	307	517	458	697
	Japan	39	32	137	180	210	319
	Belgium	–	–	5	7	79	136
	Other countries	354	568	160	215	76	89
	Total	**5 691**	**6 113**	**10 770**	**13 925**	**14 257**	**18 238**
7903.10	Zinc dust						
	United States	3 717	10 319	5 343	15 838	5 990	17 761
	Italy	52	187	37	141	71	231
	Other countries	15	51	44	46	64	131
	Total	**3 784**	**10 557**	**5 424**	**16 025**	**6 125**	**18 123**
7903.90	Zinc powders and flakes						
	United States	5 157	9 234	5 969	15 496	2 317	6 492
	Hong Kong	86	369	99	458	1 408	5 614
	Belgium	183	280	180	432	244	567
	Other countries	38	145	26	104	110	207
	Total	**5 464**	**10 028**	**6 274**	**16 490**	**4 079**	**12 880**
7904.00	Zinc bars, rods, profiles and wire						
	United States	33	269	57	321	59	334
	United Kingdom	–	–	2	6	5	28
	Russia	. . .	2	1	4	3	9
	China	–	–	3	18	2	9
	Other countries	12	46	19	77	2	7
	Total	**45**	**317**	**82**	**426**	**71**	**387**
7905.00	Zinc plates, sheets, strip and foil						
	United States	. . .	4	5	82	5	21
	Taiwan	–	–	–	–	1	4
	Other countries	18	49	16	58	. . .	2
	Total	**18**	**53**	**21**	**140**	**6**	**27**
7907.00	Other articles of zinc						
	United States	1 529	16 270	1 780	17 881	1 336	13 115
	Mexico	3	17	8	44	18	158
	United Kingdom	2	9	10	51	13	70
	Brazil	–	–	. . .	. . .	13	66
	Australia	. . .	1	. . .	1	8	42
	France	40	210	1	5	5	27
	Ireland	3	16	2	10	5	25
	Czech Republic	–	–	–	–	3	24
	India	26	30	. . .	. . .	4	21
	United Arab Emirates	1	3	. . .	. . .	4	19
	Netherlands	1	6	3	14	3	14
	China	1	4	17	45	2	13
	Italy	–	–	2	8	2	11
	Thailand	9	60	–	–	2	10
	Other countries	59	296	13	63	6	25
	Total	**1 674**	**16 922**	**1 836**	**18 122**	**1 424**	**13 640**
Total exports		**889 641**	**1 420 379**	**838 943**	**1 733 406**	**819 678**	**1 689 361**
IMPORTS							
2607.00.00.30	Zinc content in lead ores and concentrates						
	United States	67	227	89	158	103	197
2608.00.00.30	Zinc content in zinc ores and concentrates.						
	United States	232 842	163 071	145 844	195 908	149 985	244 234
	Bolivia	10 038	10 786	24 159	36 495	24 857	42 309
	Mexico	7 848	12 136	14 626	26 729	27 060	42 247
	Peru	41 127	33 971	26 106	23 722	6 577	9 205
	Chile	1 758	2 613	5 456	9 346	2 147	3 840
	Other countries	6 553	4 225	1	2	. . .	. . .

	Total	**300 166**	**226 802**	**216 192**	**292 202**	**210 626**	**341 835**
2617.90.00.90	Other ores and concentrates: other: other						
	United States	2 031	431	4 055	1 278	7 759	1 716
	China	45	17	38	11	170	1 126
	Belgium	5	564	. . .	. . .	625	240
	Australia	14	4	31	6	587	198
	Turkey	176	119	38	28	59	41
	Chile	29	12	28	17	22	19
	New Zealand	–	–	–	–	6	18
	Other countries	315	93	181	51	168	49
	Total	**2 615**	**1 240**	**4 371**	**1 391**	**9 396**	**3 407**
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	3 623	397	6 951	765	12 813	1 195
	Other countries	. . .	. . .	84	14	135	13
	Total	**3 623**	**397**	**7 035**	**779**	**12 948**	**1 208**
2817.00	Zinc oxide; zinc peroxide						
	United States	5 041	8 109	3 959	9 906	4 770	10 868
	Mexico	2 198	3 680	2 359	5 012	2 484	4 979
	Netherlands	238	351	274	420	297	506
	Turkey	399	565	521	1 038	231	388
	Belgium	102	142	20	31	138	244
	Canada	27	109	35	101	36	100
	Other countries	35	147	205	466	77	148
	Total	**8 040**	**13 103**	**7 373**	**16 974**	**8 033**	**17 233**
2827.39.40.00	Other chlorides: other: of zinc						
	United States	774	1 276	1 050	1 619	1 057	1 534
	Germany	1	14	2	24	12	43
	Belgium	44	122	48	109	12	30
	Other countries	208	424	46	106	3	12
	Total	**1 027**	**1 836**	**1 146**	**1 858**	**1 084**	**1 619**
2837.19.00.30	Zinc cyanide						
	United States	5	26	1	7	1	7
	South Korea	–	–	3	13	. . .	1
	United Kingdom	. . .	. . .	. . .	. . .	. . .	. . .
	Total	**5**	**26**	**4**	**20**	**1**	**8**
2842.90.99.10	Other: other: ammonium zinc chloride (zinc ammonium chloride)						
	United States	355	259	338	247	243	178
	Spain	115	84	124	91	217	158
	Other countries	64	47	51	37	6	4
	Total	**534**	**390**	**513**	**375**	**466**	**340**
3206.42.10	Lithopone and other pigments and preparations based on zinc sulphide, for use in the manufacture of acrylonitrile-butadiene-styrene copolymers						
	Germany	42	44	88	92	53	55
3206.42.90	Pigments based on zinc sulphide						
	United States	6	7	16	20	46	55
	Italy	5	5	14	16	27	29
	Germany	1	2	20	18	15	25
	Other countries	14	17	18	21	6	7
	Total	**26**	**31**	**68**	**75**	**94**	**116**
3206.49.89	Pigments and preparations based on zinc oxide						
	United States	360	478	279	371	142	189
	Colombia	–	–	–	–	76	101
	Spain	–	–	–	–	16	21
	Other countries	160	213	62	84	4	7

	Total	**520**	**691**	**341**	**455**	**238**	**318**
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc						
	United States	773	1 451	798	1 877	352	918
	Germany	–	–	–	–	18	74
	Finland	4	11	1	4	12	48
	Other countries	64	239	504	1 107	1	4
	Total	**841**	**1 701**	**1 303**	**2 988**	**383**	**1 044**
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc						
	China	–	–	–	–	6	30
	United States	125	301	181	489	...	1
	Singapore	–	–	–	–	...	1
	Total	**125**	**301**	**181**	**489**	**6**	**32**
7901.20	Zinc alloys, unwrought						
	United States	3 592	7 901	5 200	13 144	5 605	13 454
	Other countries	1	6	26	106	26	71
	Total	**3 593**	**7 907**	**5 226**	**13 250**	**5 631**	**13 525**
7902.00	Zinc waste and scrap						
	United States	128	154	272	497	226	434
	Mexico	–	–	–	–	16	36
	Canada	1	2	1	2	1	1
	Total	**129**	**156**	**273**	**499**	**243**	**471**
7903.10	Zinc dust						
	Belgium	1 574	4 629	3 156	7 681	3 215	8 181
	United States	403	1 321	228	953	247	983
	Canada	3	8	9	52	23	111
	Other countries	...	1	...	...	...	...
	Total	**1 980**	**5 959**	**3 393**	**8 686**	**3 485**	**9 275**
7903.90	Zinc powders and flakes						
	United States	179	568	496	1 538	705	1 950
	Germany	3	15	6	30	1	3
	Belgium	1	2	...	...	1	2
	Other countries	10	35	17	59	...	1
	Total	**193**	**620**	**519**	**1 627**	**707**	**1 956**
7904.00	Zinc bars, rods, profiles and wire						
	United States	704	1 790	572	2 000	825	2 934
	China	200	816	277	1 132	358	1 313
	Finland	144	493	188	667	255	944
	India	58	209	32	105	55	222
	Other countries	18	74	8	38	39	166
	Total	**1 124**	**3 382**	**1 077**	**3 942**	**1 532**	**5 579**
7905.00	Zinc plates, sheets, strip and foil						
	France	269	1 607	459	2 716	378	2 075
	United States	137	570	197	713	294	1 145
	Germany	193	770	194	943	273	917
	China	48	263	61	257	31	108
	Other countries	56	436	61	235	50	213
	Total	**703**	**3 646**	**972**	**4 864**	**1 026**	**4 458**
7907.00	Other articles of zinc						
	United States	1 769	7 042	2 450	9 290	1 533	8 260
	China	975	6 997	1 291	9 553	1 191	7 775
	Mexico	296	2 490	352	2 664	392	2 832
	India	181	1 757	228	2 302	173	2 219
	Taiwan	496	1 771	527	2 213	373	1 695
	Vietnam	23	151	64	277	95	488
	Germany	35	441	25	441	25	370
	Canada	146	1 005	67	488	29	342

	France	63	399	47	298	55	313
	United Kingdom	15	284	16	318	25	243
	Malaysia	27	149	15	91	31	159
	Other countries	33	333	38	352	29	260
	Total	**4 059**	**22 819**	**5 120**	**28 287**	**3 951**	**24 956**
8506.60	Primary cells and batteries, air-zinc						
	United States	3 386 232	5 789	3 693 001	3 803	4 622 921	4 781
	Germany	3 331 755	4 612	2 052 743	2 907	2 946 327	2 888
	China	235 778	234	310 952	128	114 362	104
	United Kingdom	182 098	235	168 587	107	154 674	104
	South Korea	70 757	37	7 537	23	90 972	39
	Spain	–	–	–	–	7 790	32
	Singapore	50	. . .	10	. . .	2 325	10
	Other countries	152 229	682	22 402	42	19 985	21
	Total	**7 358 899**	**11 589**	**6 255 232**	**7 010**	**7 959 356**	**7 979**
Total imports		**. .**	**302 868**	**. .**	**386 021**	**. .**	**435 611**

Sources: Natural Resources Canada; Statistics Canada.

– Nil; **. .** Not available; **. . .** Amount too small to be expressed; n.e.s. Not elsewhere specified.

Notes: Harmonized System (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. HS code descriptions in this table may have been abbreviated. For detailed HS code descriptions related to this commodity, please refer to the corresponding tariffs table.

TABLE 3. CANADA, ZINC PRODUCTION AND EXPORTS, (1) 1988-2011

Year	Production		Exports		
	All Forms (2)	Refined (3)	In Ores and Concentrates	Refined	Total
	(tonnes)				
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	669 879	685 504	226 817	591 978	818 795

2010	609 567	690 152	189 722	547 483	737 205
2011 (p)	575 761	658 518	207 863	482 497	690 360

Sources: Natural Resources Canada; Statistics Canada.
(p) Preliminary.
(1) Beginning in 1988, exports are based on the new Harmonized System (HS) 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 4. WORLD MINE PRODUCTION OF ZINC, 2006-11

Country	2006	2007	2008	2009	2010	2011 (p)
	(000 tonnes)					
EUROPE						
Finland	36	39	28	30	56	63
Ireland	426	401	398	386	343	344
Poland	127	124	132	116	73	65
Russia	178	177	204	214	235	252
Spain	–	–	–	6	17	33
Sweden	210	214	188	193	199	194
Others	50	79	121	72	91	91
Subtotal	**1 027**	**1 034**	**1 071**	**1 017**	**1 014**	**1 042**
AFRICA						
Morocco	95	51	48	44	46	38
Namibia	208	196	204	208	209	197
South Africa	34	31	29	28	38	36
Others	3	3	3	10	8	7
Subtotal	**340**	**281**	**284**	**290**	**301**	**278**
OCEANIA						
Australia	1 338	1 498	1 479	1 270	1 458	1 476
AMERICAS						
Bolivia	173	194	384	434	425	430
Brazil	173	194	173	173	196	186
Canada	638	630	716	699	649	612
Mexico	469	452	442	478	570	640
Peru	1 202	1 444	1 603	1 509	1 470	1 256
United States	727	803	779	736	751	771
Others	121	117	125	96	96	100
Subtotal	**3 503**	**3 834**	**4 222**	**4 125**	**4 157**	**3 995**
ASIA						
China	2 844	3 048	3 186	3 324	3 700	4 308
India	503	558	616	695	740	835
Iran	166	75	86	115	120	130
Japan	7	–	–	–	–	–
Kazakhstan	410	446	459	442	459	465
Mongolia	55	77	72	74	62	70
North Korea	85	95	48	29	38	40
Thailand	42	42	35	30	33	30
Turkey	59	71	127	136	196	160
Others	119	77	5	6	82	130
Subtotal	**4 235**	**4 489**	**4 634**	**4 851**	**5 430**	**6 168**
Total world	**10 443**	**11 136**	**11 690**	**11 553**	**12 360**	**12 959**

Source: International Lead and Zinc Study Group.
– Nil; (p) Preliminary.

TABLE 5. WORLD ZINC METAL PRODUCTION, (1) 2006-11

Country	2006	2007	2008	2009	2010	2011 (p)
	(000 tonnes)					
EUROPE						
Belgium	238	240	239	14	254	252
Finland	282	306	298	294	307	308
France	120	125	118	161	163	164
Germany	317	295	292	153	165	170
Italy	109	102	107	103	105	110
Netherlands	238	219	241	227	259	270
Norway	161	157	145	139	149	153
Poland	134	142	143	139	135	156
Russia	248	263	263	208	241	245
Spain	507	509	466	515	515	524
Others	154	158	164	96	89	87
Subtotal	**2 508**	**2 516**	**2 476**	**2 049**	**2 382**	**2 439**
AFRICA						
Algeria	33	27	31	28	31	27
Namibia	134	150	145	150	152	146
South Africa	90	101	82	86	90	73
Zambia	–	1	2	1	–	–
Subtotal	**257**	**279**	**260**	**265**	**273**	**246**
AMERICAS						
Argentina	43	43	31	43	41	42
Brazil	272	265	249	242	280	272
Canada	824	802	764	686	691	662
Mexico	285	320	321	336	328	321
Peru	175	162	190	149	223	314
United States	269	279	286	204	249	252
Subtotal	**1 868**	**1 871**	**1 841**	**1 660**	**1 812**	**1 863**
ASIA						
China	3 163	3 743	3 913	4 286	5 164	5 222
India	415	459	606	640	735	790
Iran	139	125	110	115	115	102
Japan	614	598	616	541	574	545
Kazakhstan	365	358	366	328	319	320
South Korea	667	691	739	722	750	828
Thailand	84	99	102	105	101	98
Others	108	114	127	62	109	112
Subtotal	**5 555**	**6 187**	**6 579**	**6 799**	**7 867**	**8 017**
OCEANIA						
Australia	466	502	499	519	499	517
Total world	**10 654**	**11 355**	**11 655**	**11 292**	**12 833**	**13 082**

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 6. ZINC USE, (1) BY COUNTRY AND BY REGION, 2006-11

Country	2006	2007	2008	2009	2010	2011 (p)
	(000 tonnes)					
EUROPE						
Belgium	360	387	382	288	399	395
France	285	275	252	221	217	206
Germany	564	535	527	376	493	509
Italy	313	398	318	216	339	338
Netherlands	116	117	105	78	98	94
Russia	199	207	195	150	178	201
Spain	225	225	210	148	200	201
United Kingdom	172	174	158	112	128	120
Others	552	532	473	350	436	454
Subtotal	**2 786**	**2 850**	**2 620**	**1 939**	**2 488**	**2 518**
AFRICA						
South Africa	99	108	100	77	92	83
Others	100	102	99	83	89	94
Subtotal	**199**	**210**	**199**	**160**	**178**	**177**
OCEANIA						
Australia	255	202	182	165	190	205
New Zealand	12	12	11	10	10	11
Subtotal	**267**	**214**	**193**	**175**	**200**	**216**
AMERICAS						
Brazil	238	248	248	194	238	224
Canada	181	173	134	140	149	145
Mexico	250	250	247	200	218	215
United States	1 153	1 016	1 003	912	891	923
Others	200	196	227	172	207	218
Subtotal	**2 022**	**1 883**	**1 859**	**1 618**	**1 703**	**1 725**
ASIA						
China	3 115	3 597	4 015	4 659	5 358	5 468
India	430	455	485	497	568	581
Japan	594	588	564	433	516	501
South Korea	534	512	504	465	538	531
Taiwan	282	226	220	189	232	221
Thailand	104	105	111	94	120	122
Turkey	136	137	128	136	153	163
Others	502	533	539	480	531	552
Subtotal	5 697	6 153	6 566	6 953	8 016	8 139
Total world	**10 971**	**11 310**	**11 437**	**10 845**	**12 585**	**12 776**

Source: International Lead and Zinc Study Group.
(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 7. CANADA, ZINC METAL CAPACITY, 2011

Company and Location	Annual Rated Capacity (000 tonnes of slab zinc)
PRIMARY	
Canadian Electrolytic Zinc Limited Salaberry-de-Valleyfield, Quebec	280
Xstrata Zinc Canada Timmins, Ontario	(a)
HudBay Minerals Inc. Flin Flon, Manitoba	118
Teck Resources Limited Trail, British Columbia	295
Total primary, Canada	**693**

Source: Natural Resources Canada.
(a) Xstrata Zinc permanently closed the Kidd Creek facility on May 31, 2010.

TABLE 8. MONTHLY AVERAGE ZINC PRICES, 2010 AND 2011

Year/Month	LME Special High Grade Settlement (US$/tonne)
2010	
January	2 434.5
February	2 156.9
March	2 275.1
April	2 366.7
May	1 968.4
June	1 742.8
July	1 843.9
August	2 044.6
September	2 151.4
October	2 372.1
November	2 291.7
December	2 280.9
Yearly average	**2 160.7**
2011	
January	2 371.6
February	2 465.1
March	2 349.2
April	2 372.4
May	2 190.3
June	2 203.3
July	2 390.6
August	2 211.8
September	2 076.8
October	1 859.2
November	1 916.1
December	1 916.4
Yearly average	**2 193.6**

Source: International Lead and Zinc Study Group.
LME London Metal Exchange.