Lead

Lead - 2011 Annual Review and Outlook

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Lead - 2011 Annual Review and Outlook

HIGHLIGHTS

- Canada continued as an important producer and supplier of refined lead, ranking ninth in the world in 2011.

- Canadian mines produced 65 804 tonnes (t) of lead in concentrate in 2011, a 1.4% increase compared to 2010. World mine output increased 9.8% to 4.616 million tonnes (Mt).

- New lead mine production was realized from the Wolverine and Bellekeno mines in the Yukon. Work towards advancing several of Canada's northern lead-zinc deposits continued, focusing on the Howard's Pass, Prairie Creek, and Hackett River deposits.

- Global demand for refined lead continued to increase in 2011. The world consumed an estimated 10.21 Mt of lead, up 5.5% from the previous year. Demand growth was strong in China (9.9%), the United States (9.5%), and Germany (5.6%). Europe overall saw a slight decline in demand growth.

- In Canada, primary lead is produced mainly as a co-product of zinc mining. The recycling of lead, mainly from depleted car batteries, is an important source of refined lead, representing about 61% of Canada's total refined lead production in 2011.

CANADIAN PRODUCTION

Lead in concentrate was produced at four mines in 2011. Primary refined lead metal is produced from domestic and foreign concentrates at two smelters: one located in New Brunswick and the other in British Columbia. Secondary lead metal is produced from recycled lead (primarily car batteries) at four sites located in Quebec, Ontario, and British Columbia (Figure 1).

Canadian mines produced 65 804 t of lead in concentrate in 2011, compared to 64 844 t in 2010, a 1.4% increase (Table 1). This small increase in mine production relates to the contribution from the Wolverine and Bellekeno mines, which was offset by lower production at Xstrata's Brunswick mine. Refined metal production increased to 278 973 t from 272 937 t in 2010 (Table 1). Primary lead metal production was 110 655 t in 2011, compared to 105 836 t the previous year. Secondary metal production was 168 318 t, compared to 167 101 t in 2010. Statistics on exports and imports of lead concentrates, metal, and semi-fabricated products are provided in Table 2. Table 3 shows lead production, trade, and use for the period 1988-2011 (the lead use survey has been suspended since 2007).

The following is a summary of Canadian lead mines and metal production facilities in operation during 2011.

New Brunswick

Xstrata Zinc Canada owns the **Brunswick** zinc and lead mine. Located 21 kilometres (km) southwest of Bathurst, the Brunswick mine is Canada's largest producer of primary lead. In 2011, it produced 3.1 Mt of ore grading 7.9% zinc and 3.1% lead, resulting in the production of 56 762 t of lead in concentrate, down from 60 315 t in 2010 (2011 Production Report). Xstrata announced that the mine will close by March 31, 2013, due to the depletion of ore reserves.

Xstrata also owns and operates the **Belledune** lead smelter and refinery located 35 km north of Bathurst. The smelter produced 76 524 t of lead in 2011, compared to 85 282 t in 2010. Xstrata also operates a lead-acid battery-recycling plant at Belledune that produces secondary lead feeds for the smelter.

Quebec

Newalta Corporation of Calgary, Alberta, owns and operates a lead recycling facility in Ville Ste-Catherine, Quebec, just south of Montréal. The facility operates two long rotary kilns. It is capable of recycling 3.7 million lead-acid batteries per year and has the capacity to produce up to 100 000 t of lead and lead alloys, primarily for the automotive and industrial battery manufacturing industry. In 2011, the company reported sales volumes of 71 700 t of lead, compared to 67 037 t in 2010 (2011 Management Discussion and Analysis).

Ontario

Tonolli Canada Ltd. of Mississauga operates a secondary lead smelter and refinery that processes about 60 000 t of lead-acid batteries annually to produce about 35 000 t of lead and lead alloys.

British Columbia

The integrated zinc and lead smelting and refining complex at **Trail**, owned by **Teck Resources Limited**, has a capacity of 100 000 tonnes per year (t/y) of refined lead. The complex produces refined zinc and lead, as well as gold, silver, cadmium, germanium, indium, sulphuric acid, and fertilizers. In 2011, lead production at Trail was 86 000 t, up from 71 500 t in 2010 (2011 Annual Report). The increase in lead production was due to the KIVCET furnace operating at higher feed rates with no major maintenance outages.

Nyrstar NV's **Myra Falls** mine, located about 65 km west of Campbell River, reported 400 t of lead in concentrate production in 2011.

Metalex Products Ltd. of **Richmond** is a secondary lead smelting and refining operation that processes lead-acid batteries and other forms of scrap lead to produce lead and lead alloys for various manufacturing customers. The plant has the capacity to process 300 000 automotive batteries per year.

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's capacity

is 1700 tonnes per day (t/d) and it will produce zinc, lead, and copper concentrates. Reported concentrate production for 2011 was 19 714 t of concentrate 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. commenced ramp-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

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.

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 owned 50:50 by Selwyn Resources Ltd. and **Yunnan Chihong Zinc & Germanium Co. Ltd.** Late in the year, Selwyn Chihong Mining 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 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 operate 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-lead-zinc project located in western Nunavut to Xstrata Zinc Canada. Xstrata paid $50 million for the project 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 lead mine production for 2011 was 4.61 Mt, up 9.8% from the previous year (Table 4). In terms of mine production, Canada ranked

ninth among producing countries. The top five countries were China, Australia, the United States, Peru, and Mexico. Canada ranked sixth in the world in terms of refined lead production. World refined lead metal production was 10.37 Mt, up 7.1% from 2010 (Table 5). The top five lead metal-producing countries were China, the United States, Germany, India, and South Korea. The production of lead from secondary sources was 5.65 Mt, which represents about 54% of the total metal produced. Table 7 shows global secondary lead production for the period 2007-11.

In 2011, the top five mining companies producing lead were Xstrata AG (257 000 t), BHP Billiton (246 000 t), Doe Run Company (173 000 t), Hindustan Zinc (112 000 t), and JSC Gorevsky (102 000 t), which together accounted for about 18% of world mine production (data courtesy of Wood Mackenzie Limited). The largest lead mines are Cannington in Australia (243 000 t), Doe Run in Missouri, United States (173 000 t), Mount Isa in Australia (154 000 t), Gorevsk in Russia (102 000 t), and Red Dog in Alaska, United States (90 000 t), which together accounted for 15% of global mine production (Wood Mackenzie Limited).

Output from Chinese smelters increased 9.2% in 2011. European lead smelters increased their production by 3.8% due to strength in the automotive sector. In North America, lead production increased 3.0%.

MARKETS AND PRICES

The average annual London Metal Exchange (LME) settlement price for lead in 2011 was US$2400/t, an 11.8% increase over the 2010 average. The trend in lead prices for the period 2007-11, along with producer, consumer and LME stocks, is shown in Figure 2. Lead inventories held in LME warehouses increased from 282 000 t in January to 351 000 t in December. Total reported stocks in December were 622 000 t, representing a substantial increase of 170 000 t from the previous year. The trend in daily LME cash settlement prices for 2011 is shown in Figure 3. Prices started the year at US$2593/t and traded generally downwards to close the year at US$1980/t. The highest price reached in 2011 was US$2939/t on April 11. Table 8 shows the monthly average LME lead prices for 2010 and 2011.

According to the most recent figures from the ILZSG, world refined lead usage was 10.21 Mt in 2011, up 5.5% from the previous year (Table 6). On a regional scale, Europe showed demand growth in Ireland (9.1% over 2010), Germany (5.6%), and Italy (1.2%). In Asia, China (9.9%), Indonesia (4.2%), and Japan (4.0%) were the leading countries for demand growth. The United States also saw positive growth in demand of 9.5%.

TRADE

Total exports of lead and lead products from Canada were valued at $761.6 million in 2011, compared to $642.6 million in 2010. Imports were valued at $991 million, compared to $473 million in the previous year. Canadian smelters imported 68 300 t of lead in concentrates, compared to 59 600 t in 2010. Concentrates were imported mainly from the United States and Peru with lesser amounts from Mexico, Spain, and Chile. Smelters exported 278 600 t of refined lead in 2011, compared to 260 700 t in 2010, due to increased capacity availability. About 91% of the lead metal exports were to the United States with minor amounts shipped to China, Japan, and Taiwan.

OUTLOOK

The ILZSG predicts that global lead mine production for 2012 will be 4.9 Mt, a 6.2% increase over 2011 output levels, due primarily to production increases in China, India, and Mexico. Refined metal production should increase to 10.65 Mt, representing 280 000 t of added metal production. It is expected that global refined lead use will be 10.56 Mt in 2012, representing a 4% change from 2011.

Asian countries are expected to continue to post encouraging demand growth rates in the medium term due to e-bike and automobile demand in China predominantly, and to industrial development in India. As demand increases, construction of new smelting capacity is keeping pace. Growth in lead demand in Europe and the Americas is expected to continue to underperform compared to global averages. In North America, growth in telecommunications networks will increase demand for industrial batteries to back up new wireless network capacity. Europe will continue to exhibit minimal growth as the sovereign debt malaise and poor economic prospects persist. Recent growth in global primary smelting capacity will face challenges related to future concentrate shortages. New emissions regulations in the United States will force the closure of the Doe Run lead smelter in Herculaneum, Missouri, in 2013.

The forecast for the lead metal balance in 2012 is 97 000 t, according to the ILZSG.

Lead prices are expected to vary within the US$2090-$2420/t (US$0.95-$1.10 per pound) range during 2012.

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.

Lead - Other Information

INTRODUCTION TO LEAD

Lead has been known since ancient times and is one of several metals that were discovered during the earliest periods of human history. Some experts believe that lead was used as early as 5000 B.C. The oldest archaeological evidence of lead use by humans is a figurine found in the Dardanelles area of Asia Minor dating from 3800 B.C.

Lead was used in coinage in China about 2000 B.C. and was mined by the Greeks from about 1200 B.C. to make coins, ornaments, weights, and many other articles. One of lead's most enduring uses has been as pipe for the transportation of water. Romans manufactured lead pipes in one standard length and in several diameters, and used them extensively in municipal water systems. The Latin word for lead is *plumbum*, which forms the root of modern English words such as "plumber" and "plumbing," as well as the chemical symbol for lead, Pb.

Almost all lead is obtained from sulphide ores in which the most common lead mineral is galena (PbS). It is usually found in combination with other sulphide ores, most frequently zinc, and also copper. Other lead-containing minerals include cerussite ($PbCO_3$) and anglesite ($PbSO_4$).

HISTORY OF LEAD MINING IN CANADA

Lead-zinc ores were originally discovered in the Kootenay region of British Columbia in the 1820s. Active prospecting in the area dates from 1865 and mining commenced shortly thereafter. In the early years, the ore from British Columbia was sent to the United States for smelting and refining.

The now-famous Sullivan mine started operating near Kimberley, British Columbia, in the early 1900s and continued to produce lead until its closure in December 2001. By 1914, the Sullivan mine was the largest lead producer in Canada – a position it held for 50 years until the Pine Point mine in the Northwest Territories completed its first year of operation in 1966. Pine Point closed in 1988. The Kingdon mine at Galetta, on the Ottawa River near Arnprior, Ontario, was discovered in 1884, operated briefly in the 1880s, and was reactivated in 1914, producing lead and zinc ore until the early 1930s. The discovery, by the Geological Survey of Canada, of lead and zinc ores on Baffin Island in the mid-1950s led to the development of the Nanisivik mine in the mid-1970s. It closed in 2002. The discovery of lead-zinc on Little Cornwallis Island in 1971 led to the development of the Polaris mine. Operated by Teck Cominco, the mine had the distinction of being the most northerly base-metal mine in the world until its closure in 2002 after 20 years of operation.

USES

The largest single use of lead today is in the manufacture of the lead-acid storage battery, which is a vital part of every automobile. The average car battery contains about 10 kilograms of lead. Lead-acid batteries for automotive, industrial, and consumer purposes account for about 75% of world lead usage. In the communications industry, lead is still used extensively as protective sheathing for underground and underwater cables, including transoceanic cable systems. Lead-acid storage batteries are also used for back-up power in the telecommunications sector in cell phone towers. With the expected advancement in mobile phone technology, demand for large battery systems will continue to be strong. Certain lead compounds are used as paint pigments. Red lead (lead oxide) is the basic paint primer for iron and steel. Lead compounds are also used as stabilizers in plastic (polyvinyl chloride) piping and in decorative glass. Lead's corrosion-resistant nature also makes it suitable for applications in sheeting for roofing purposes, while its high density imparts radiation attenuation properties that prevent the emission of harmful radiation from television, video, and computer screens. Lead alloys such as lead-antimony are used in batteries and in the chemicals industry for pumps and valves. Lead-tin solders are used for welding metal parts together. In the area of hybrid vehicles, lead starter batteries will still be standard equipment in cars no matter which hybrid battery system is chosen.

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 the ILZSG, with member government support, are widely used in industry as a basis for determining potential price directions.

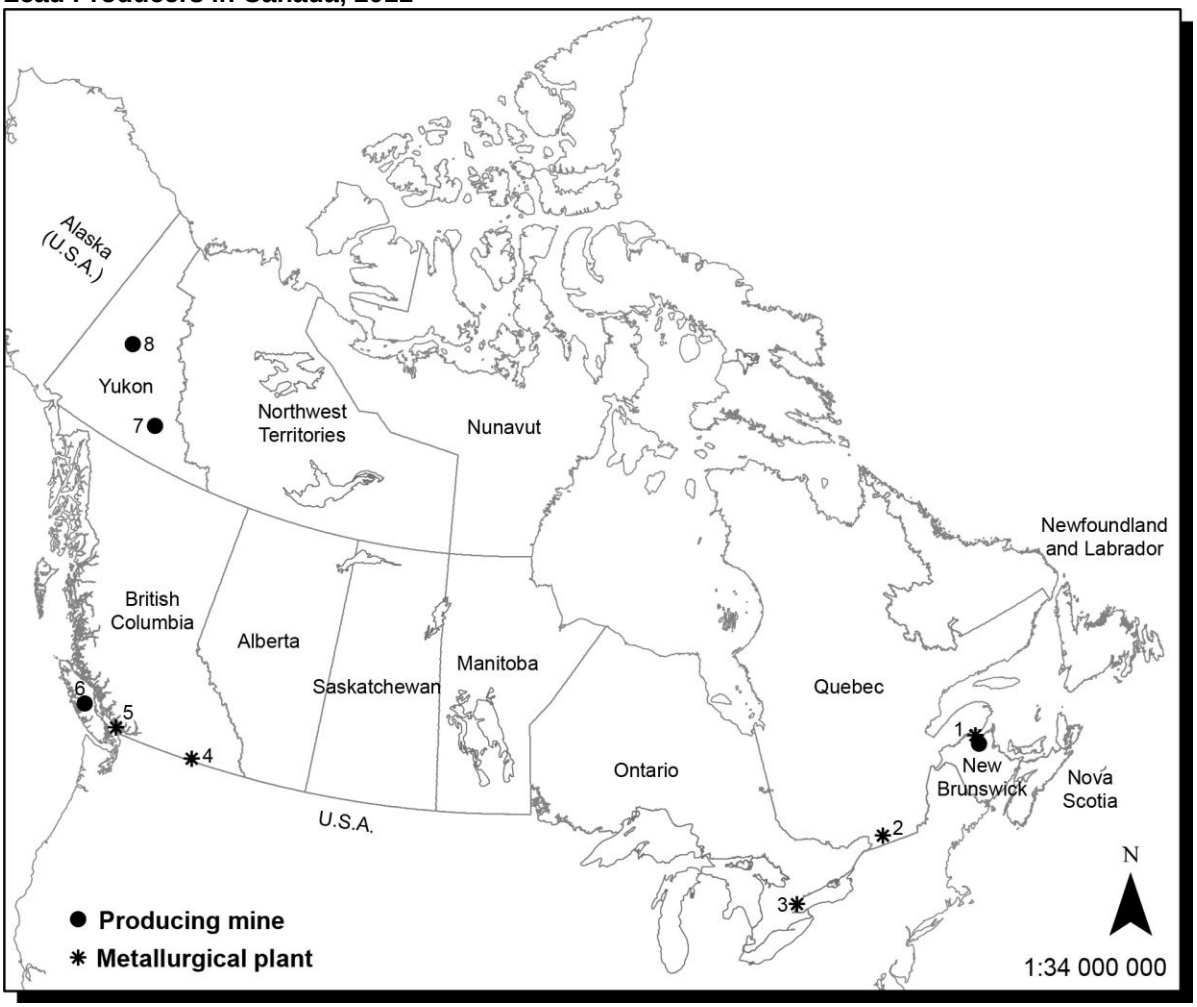
The Study Group, headquartered in Lisbon, Portugal, represents most of the world's major lead- and zinc-producing and using nations. The Group has an extensive information-gathering and dissemination role, and acts as an effective mechanism for increasing market transparency related to the production, 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 on the Group's activities can be obtained from its web site at www.ilzsg.org/static/home.aspx.

OTHER SOURCES OF INFORMATION

Battery Council International	www.batterycouncil.org
Eurometaux (European Association of Metals)	www.eurometaux.org
International Lead Association	www.ila-lead.org
International Lead Management Center	www.ilmc.org
Lead Sheet Association	www.leadsheetassociation.org.uk
London Metal Exchange	www.lme.com
U.S. Geological Survey	http://minerals.usgs.gov/minerals/pubs/commodity/lead
World Bureau of Metal Statistics	www.worldbureau.com

Figure 1
Lead Producers in Canada, 2011

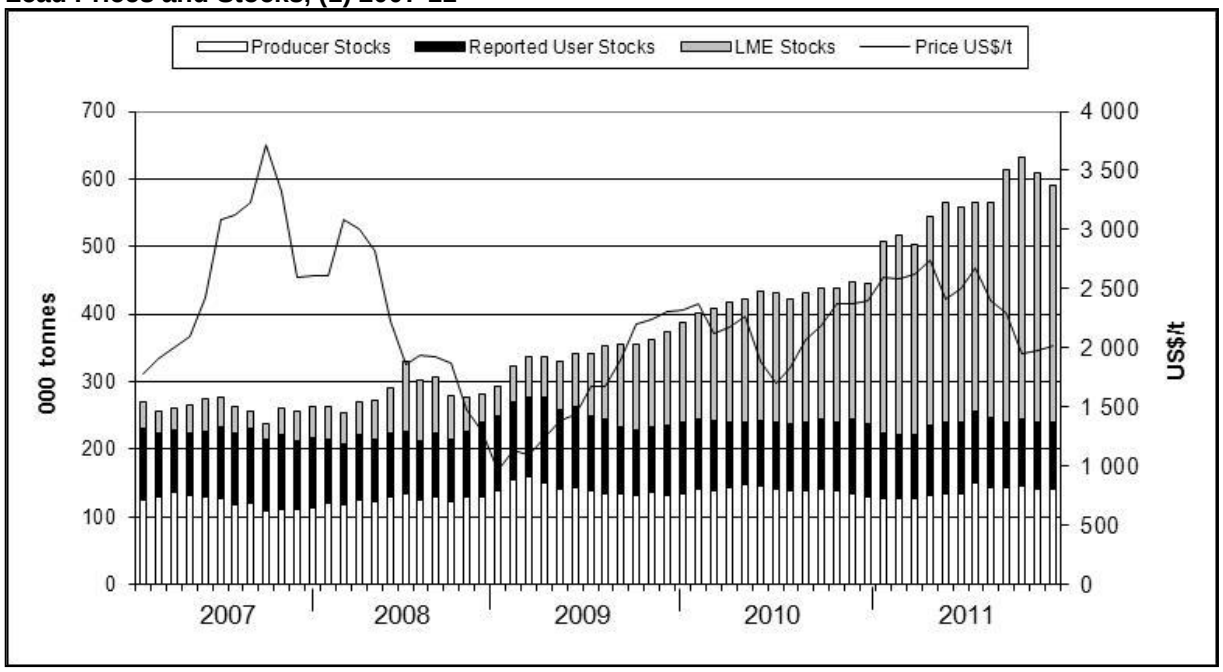


Numbers refer to locations on map above.

Lead-Producing Mines		**Web Site**
1. Brunswick	Xstrata Zinc Canada	www.xstrata.com
6. Myra Falls	Nyrstar NV	www.nyrstar.org
7. Wolverine	Yukon Zinc Corporation	www.yukonzinc.com
8. Bellekeno	Alexco Resource Corp	www.alexcoresource.com

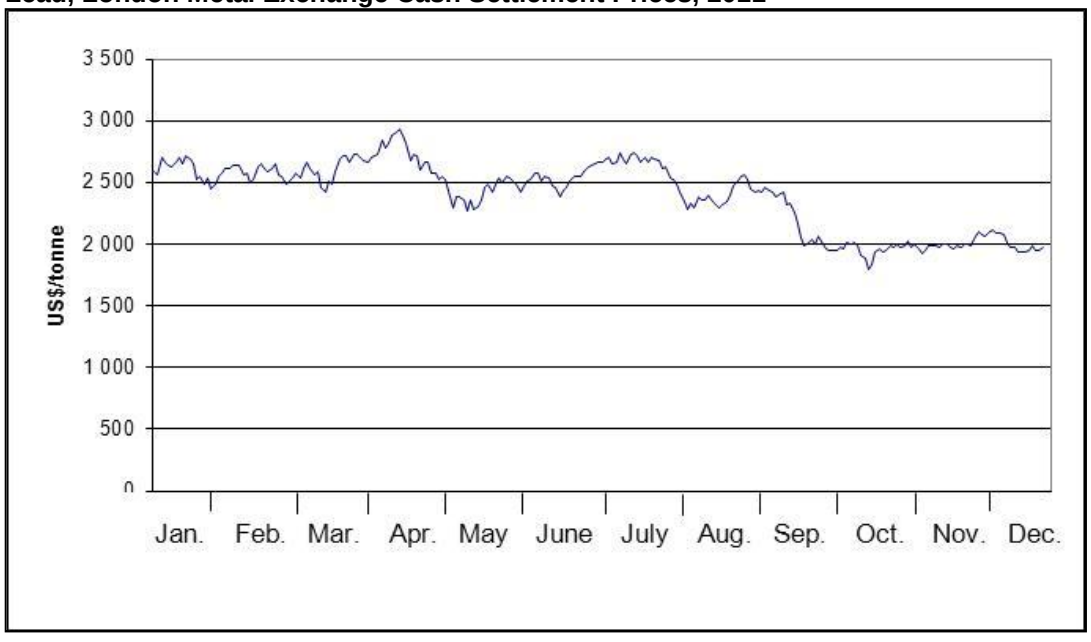
Lead Metallurgical Plants		
1. Belledune	Xstrata Zinc Canada	www.xstrata.com
2. Newalta	Newalta Corporation	www.newalta.com
3. Tonolli	Tonolli Canada Ltd.	www.tonolli.ca
4. Trail	Teck Resources Limited	www.teck.com
5. Metalex	Metalex Products Ltd.	www.metalexleadrecycling.com

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



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

Figure 3
Lead, London Metal Exchange 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 (1)	Conventional Rate (1)	WTO (2)
26.07	Lead ores and concentrates	Free	Free	Free	Free	Free	Free
2608.00.20	Zinc ores and concentrates: lead content	Free	Free	Free	Free	Free	Free
2616.10.00.20	Precious metal ores and concentrates: silver ores and concentrates: lead content	Free	Free	Free	Free	Free	Free
2617.90	Other ores and concentrates: other	Free	Free	Free	Free	Free	Free
2620.29	Slag, ash and residues (other than from the manufacture of iron or steel) containing metals, arsenic or their compounds: containing mainly lead: other	Free	Free	Free	Free	Free	Free
2824.90.10	Lead oxides; red lead and orange lead: other: red lead and orange lead	Free	Free	Free	Free	5.5%	4.7%
78.01	Unwrought lead						
7801.10	Refined lead	Free	Free	Free	Free	2.5%	Free-2.7yen/kg
7801.91	Other: containing by weight antimony as the principal other element	Free	Free	Free	Free	2.5% (3)	Free-3% or 3.10 yen/kg whichever is the greater
7801.99	Other: other	Free	Free	Free	Free	Free-2.5%	Free-3% or 4.50 yen/kg whichever is the greater
78.02	Lead waste and scrap	Free	Free	Free	Free	Free	2.1%
78.04	Lead plates, sheets, strip and foil; lead powders and flakes						
7804.11	Plates, sheets, strip and foil: sheets, strip and foil of a thickness (excluding any backing) not exceeding 0.2 mm	Free	Free	Free	Free	5%	3%
7804.19	Plates, sheets, strip and foil: other	Free	Free	Free	Free	5%	3%
7804.20	Powders and flakes	Free	Free	Free	Free	Free	3%
78.06	Other articles of lead	Free	Free	Free	Free	Free-5%	3%
8507.10	Electric accumulators, including separators therefor, whether or not rectangular (including square): lead-acid, of a kind used for starting piston engines	Free	Free	Free	Free	3.7%	Free
8548.10	Waste and scrap of primary cells, primary batteries and electric accumulators; spent primary cells, spent primary batteries and spent electric accumulators	Free	Free	Free	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; MFN Most Favoured Nation; mm Millimetres; 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. (3) This information comes from the footnote in the *Official Journal of the European Union*: "Customs duty autonomously suspended, for an indefinite period, for lead for refining, containing 0.02% or more by weight of silver (bullion lead) (TARIC code 7801 91 00 10). Entry under this subheading is subject to the conditions laid down in the relevant Community provisions (see Articles 291 to 300 of Commission Regulation (EEC) No 2454/93 (OJ L 253, 11.10.1993, p. 1))."

TABLE 1. CANADA, LEAD PRODUCTION, (1) BY PROVINCE AND TERRITORY, 2009-11

	2009		2010		2011 (p)	
	(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
SHIPMENTS (1)						
New Brunswick	69 251	135 871	57 917	128 112	50 437	125 841
Quebec	80	158	1 942	4 295	2 135	5 326
British Columbia	2 045	4 012	2 538	5 615	425	1 059
Yukon	–	–	–	–	7 007	17 482
Total	**71 377**	**140 041**	**62 397**	**138 022**	**60 003**	**149 707**
Mine output (2)	68 839	. .	64 844	. .	65 804	. .
REFINED PRODUCTION						
Primary	101 484	. .	105 836	. .	110 655	. .
Recycled	157 370	. .	167 101	. .	168 318	. .
Total	**258 854**	. .	**272 937**	. .	**278 973**	. .

Sources: Natural Resources Canada; Statistics Canada.
– Nil; . . Not available; (p) Preliminary.
(1) Production includes recoverable lead in ores and concentrates shipped valued at the Montréal Exchange average price for the year. (2) Lead content of domestic ores and concentrates exported.
Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, LEAD TRADE, 2009-11

		2009		2010		2011	
		(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
EXPORTS							
2607.00	Lead ores and concentrates						
	China	344	896	827	824	4 443	13 369
	Other countries	1 311	726	–	–	6	80
	Total	**1 655**	**1 622**	**827**	**824**	**4 449**	**13 449**
2608.00.20	Lead content of zinc ores and concentrates						
	China	40 904	15 597	5 414	4 882	2 350	2 787
	Poland	–	–	–	–	1 367	1 352
	Other countries	278	229	7	12	–	–
	Total	**41 182**	**15 826**	**5 421**	**4 894**	**3 717**	**4 139**
2616.10.20	Lead content of silver ores and concentrates						
	Germany	281	322	339	675	381	833
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**
2620.29	Slag, ash and residues (other than from the manufacture of iron or steel) containing metals, arsenic or their compounds: containing mainly lead: other						
	Belgium	1 259	3 620	3 417	11 673	1 870	9 395
	Other countries	–	–	201	52	3	3
	Total	**1 259**	**3 620**	**3 618**	**11 725**	**1 873**	**9 398**
7801.10	Refined lead, unwrought						
	United States	100 034	187 981	108 471	236 756	98 040	234 543
	Other countries	2 281	4 532	763	1 828	1	2
	Total	**102 315**	**192 513**	**109 234**	**238 584**	**98 041**	**234 545**
7801.91	Lead, unwrought, containing by weight antimony as the principal other element						
	United States	25 974	40 346	22 730	45 751	24 033	54 717
	China	1 403	2 273	1 036	1 831	5 406	12 539
	Other countries	–	–	. . .	. . .	63	168
	Total	**27 377**	**42 619**	**23 766**	**47 582**	**29 502**	**67 424**

7801.99	Lead, unwrought, other						
	United States	80 422	171 596	107 680	259 621	129 486	334 735
	Japan	4 531	8 938	5 306	12 962	8 641	23 066
	Taiwan	6 860	12 365	2 939	6 713	4 712	13 982
	Thailand	8 384	17 706	7 521	15 879	4 140	10 786
	Belgium	862	1 726	1 326	2 805	2 067	4 796
	China	7 180	11 533	1 835	3 948	1 701	3 864
	Other countries	9 630	17 595	1 100	2 837	317	842
	Total	**117 869**	**241 459**	**127 707**	**304 765**	**151 064**	**392 071**
7802.00	Lead waste and scrap						
	United States	854	2 186	685	1 570	584	1 337
	India	327	291	440	640	616	886
	China	16	16	157	159	146	269
	Sri Lanka	–	–	–	–	83	132
	Other countries	29	15	–	–	46	48
	Total	**1 226**	**2 508**	**1 282**	**2 369**	**1 475**	**2 672**
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) less than 0.2 mm						
	United States	–	–	40	92	36	118
	China	–	–	–	–	1	3
	Morocco	–	–	1	3	–	–
	United Kingdom	–	–	16	37	–	–
	British Virgin Islands	–	–	**. . .**	**. . .**	–	–
	Total	**–**	**–**	**57**	**132**	**37**	**121**
7804.19	Lead plates, sheet, strip and foil, n.e.s.						
	United States	164	561	93	343	145	567
	Cuba	–	–	3	7	5	13
	Other countries	6	14	15	34	**. . .**	**. . .**
	Total	**170**	**575**	**111**	**384**	**150**	**580**
7804.20	Lead powders and flakes						
	United States	**. . .**	3	1	9	16	11
	South Korea	1	2	–	–	–	–
	Morocco	–	–	21	50	–	–
	Total	**1**	**5**	**22**	**59**	**16**	**11**
		(n.a.)	**($000)**	**(n.a.)**	**($000)**	**(n.a.)**	**($000)**
7806.00	Other articles of lead						
	United States	**. .**	8 399	**. .**	7 353	**. .**	9 701
	South Africa	**. .**	367	**. .**	164	**. .**	291
	Thailand	**. .**	78	**. .**	178	**. .**	207
	Nigeria	–	–	–	–	**. .**	186
	Other countries	. .	414	. .	342	. .	367
	Total	**. .**	**9 258**	**. .**	**8 037**	**. .**	**10 752**
		(number)	**($000)**	**(number)**	**($000)**	**(number)**	**($000)**
8507.10	Electric accumulators, lead-acid of a kind used for starting piston engines						
	United States	14 161	2 129	10 185	1 887	6 663	1 961
	Greenland	–	–	–	–	758	379
	Nigeria	–	–	216	39	3 475	359
	Australia	23	12	40	4	3 116	243
	Russia	–	–	33	**. . .**	1 335	109
	Cuba	496	67	1 059	138	705	85
	Netherlands	10	2	–	–	120	61
	Kazakhstan	–	–	6	3	178	60
	Italy	–	–	–	–	444	57
	Antigua and Barbuda	103	4	245	13	225	13
	Other countries	2 108	135	1 635	142	535	38
	Total	**16 901**	**2 349**	**13 419**	**2 226**	**17 554**	**3 365**
		(n.a.)	**($000)**	**(n.a.)**	**($000)**	**(n.a.)**	**($000)**

8548.10	Waste and scrap of primary cells, primary batteries and electric accumulators; spent primary cells, spent primary batteries and spent electric accumulators						
	United States	**. .**	11 297	**. .**	17 885	**. .**	20 668
	Other countries	**. .**	42	**. .**	278	**. .**	55
	Total	**. .**	**11 339**	**. .**	**18 163**	**. .**	**20 723**
Total exports		**. .**	**524 164**	**. .**	**642 629**	**. .**	**761 677**
		(tonnes)	**($000)**	**(tonnes)**	**($000)**	**(tonnes)**	**($000)**
IMPORTS (1)							
2607.00	Lead ores and concentrates						
	Peru	85	44 966	11 154	120 248	18 488	397 806
	United States	45 007	172 871	32 480	143 442	33 577	257 607
	Mexico	1 029	7 633	1 041	7 096	5 328	75 623
	Spain	17	10 864	7 036	30 420	3 430	39 491
	Chile	–	–	–	–	3 031	20 478
	United Kingdom	9	5 216	1 184	5 267	4 424	8 126
	Panama	–	–	–	–	9	1 008
	Other countries	8 307	42 153	6 707	30 756	15	38
	Total	**54 454**	**283 703**	**59 602**	**337 229**	**68 302**	**800 177**
2608.00.00.20	Lead content of zinc ores and concentrates						
	Ireland	–	–	–	–	**. . .**	**. . .**
	United States	–	–	–	–	**. . .**	**. . .**
	Total	**–**	**–**	**–**	**–**	**. . .**	**. . .**
2616.10.00.20	Lead content of silver ores and concentrates						
	Bolivia	271	292	625	649	852	894
	Peru	121	126	1	1	–	–
	United States	–	–	5	5	–	–
	Total	**392**	**418**	**631**	**655**	**852**	**894**
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**
2620.29.00	Slag, ash and residues (other than from the manufacture of iron or steel) containing metals, arsenic or their compounds: containing mainly lead: other						
	Belgium	80	42	23 291	7 590	47 800	20 818
	United States	604	330	41	21	315	167
	Taiwan	1	**. . .**	–	–	–	–
	Total	**685**	**372**	**23 332**	**7 611**	**48 115**	**20 985**
2824.90.10	Other: red lead and orange lead						
	United States	101	111	**. . .**	**. . .**	2	2
	Taiwan	**. . .**	**. . .**	–	–	–	–
	Total	**101**	**111**	**. . .**	**. . .**	**2**	**2**
7801.10.10	Refined lead, unwrought, pig and block						
	United States	4 071	7 158	3 198	6 311	595	1 117
	Canada	–	–	1	2	12	20
	Total	**4 071**	**7 158**	**3 199**	**6 313**	**607**	**1 137**
7801.10.90	Refined lead, unwrought, other						
	United States	1 285	2 417	507	1 080	218	407
	Other countries	8	14	14	25	**. . .**	**. . .**
	Total	**1 293**	**2 431**	**521**	**1 105**	**218**	**407**
7801.91	Lead, unwrought, containing by weight antimony as the principal other element						
	United States	204	334	126	209	136	246
	China	11	19	6	10	8	14

	Other countries	310	385	. . .	1	1	3
	Total	**525**	**738**	**132**	**220**	**145**	**263**
7801.99	Lead, unwrought, other						
	United States	500	829	1 268	2 123	875	1 450
	Other countries	15	26	10	34	. . .	. . .
	Total	**515**	**855**	**1 278**	**2 157**	**875**	**1 450**
7802.00	Lead waste and scrap						
	United States	78 813	39 008	8 062	8 679	5 010	8 014
	Mexico	–	–	12	18	28	47
	Other countries	23	6	15	12	–	–
	Total	**78 836**	**39 014**	**8 089**	**8 709**	**5 038**	**8 061**
7804.11	Lead sheets, strip and foil of a thickness (excluding any backing) less than 0.2 mm						
	United States	395	1 771	383	2 544	441	3 481
	Germany	6	65	3	21	7	71
	Poland	–	–	–	–	2	52
	United Kingdom	5	38	4	31	5	37
	Other countries	4	124	. . .	12	6	15
	Total	**410**	**1 998**	**390**	**2 608**	**461**	**3 656**
7804.19	Lead plates, sheet, strip and foil, n.e.s.						
	United States	147	411	187	486	111	294
	United Kingdom	24	70	19	52	12	34
	Other countries	4	12	3	11	2	6
	Total	**175**	**493**	**209**	**549**	**125**	**334**
7804.20	Lead powders and flakes						
	United States	195	641	166	608	172	688
	Other countries	–	–	. . .	3	9	24
	Total	**195**	**641**	**166**	**611**	**181**	**712**
7806.00	Other articles of lead						
	United States	914	7 271	1 348	8 641	1 702	12 442
	China	86	323	194	349	89	239
	Germany	20	199	33	218	29	211
	Turkey	–	–	25	89	26	100
	Other countries	19	272	15	205	43	256
	Total	**1 039**	**8 065**	**1 615**	**9 502**	**1 889**	**13 248**
		(number)	**($000)**	**(number)**	**($000)**	**(number)**	**($000)**
8507.10.00.90	Electric accumulators. Lead-acid, of a kind used for starting piston engines: other						
	United States	644 670	25 228	445 704	15 332	471 538	20 642
	South Korea	251 095	7 920	289 489	9 148	214 893	9 482
	China	93 487	1 877	183 233	2 865	175 932	3 205
	Mexico	16 675	1 235	8 357	525	17 504	1 102
	Taiwan	37 521	940	34 791	656	23 194	495
	Other countries	35 861	2 036	9 579	864	6 173	564
	Total	**1 079 309**	**39 236**	**971 153**	**29 390**	**909 234**	**35 490**
		(n.a.)	**($000)**	**(n.a.)**	**($000)**	**(n.a.)**	**($000)**
8548.10	Waste and scrap of primary cells, primary batteries and electric accumulators; spent primary cells, spent primary batteries and spent electric accumulators						
	United States	. .	18 214	. .	64 829	. .	99 804
	Japan	. .	. . .	. .	9	. .	728
	France	–	–	. .	. . .	. .	192
	Russia	–	–	–	–	. .	152
	Other countries	. .	212	. .	63	. .	17
	Total	**. .**	**18 426**	**. .**	**64 901**	**. .**	**100 893**
Total Imports		**. .**	**404 899**	**. .**	**472 951**	**. .**	**991 116**

Sources: Natural Resources Canada; Statistics Canada.

– Nil; . . Not available; . . . Amount too small to be expressed; mm Milimetres; n.a. Not applicable; n.e.s. Not elsewhere specified.

(1) Imports from "other countries" may include re-imports from Canada.

Notes: Numbers may not add to totals due to rounding. Harmonized System (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, LEAD PRODUCTION, TRADE AND USE, HISTORICAL, 1988-11

Year	Production				Domestic Exports (1)			Imports	Quantity Used (3)
	All Forms (2)	Refined			In Ores and Concentrates	Refined	Total	Refined	
		Primary	Secondary	Total					
	(tonnes)								
1988	351 148	179 461	88 615	268 076	200 822	179 946	380 769	15 133	88 728
1989	268 887	157 330	85 515	242 845	170 582	121 444	292 027	11 734	88 408
1990	233 372	87 180	96 465	183 645	221 566	84 007	305 573	11 781	72 203
1991	248 102	106 420	105 946	212 366	175 150	86 631	261 781	7 553	80 253
1992	339 626	151 252	101 633	252 885	190 822	131 546	322 368	8 289	92 420
1993	183 105	147 907	69 107	217 014	96 428	124 610	221 039	11 611	91 915
1994	167 584	153 035	98 605	251 640	55 923	133 203	189 127	5 119	95 764
1995	204 227	178 019	103 372	281 390	90 254	140 478	230 732	3 969	91 171
1996	241 751	192 877	117 914	310 791	154 696	159 859	314 555	4 180	93 373
1997	170 847	139 736	131 659	271 395	112 694	155 639	268 333	5 841	92 997
1998	150 019	129 750	135 737	265 487	52 249	145 358	197 607	6 460	87 466
1999	155 369	148 526	117 889	266 414	58 831	139 622	198 453	7 662	92 557
2000	143 303	159 192	125 141	284 333	50 524	148 427	198 952	7 029	81 365
2001	150 389	127 007	103 921	230 928	69 093	126 651	195 743	5 111	56 905
2002	101 330	136 896	114 664	251 560	53 183	144 178	197 360	3 619	66 575
2003	92 934	118 506	104 927	223 434	22 068	129 737	151 805	4 038	68 359
2004	72 773	131 717	109 453	241 169	11 179	130 491	141 671	5 822	71 738
2005	72 828	109 996	120 241	230 237	14 524	141 088	155 612	3 477	68 066
2006	79 171	115 989	134 475	250 464	17 063	165 186	182 249	5 869	48 428
2007	69 851	95 577	141 111	236 688	36 781	144 848	181 629	6 695	56 512
2008	87 127	105 526	153 569	259 094	27 632	86 205	113 837	6 798	. .
2009	71 377	101 484	157 370	258 854	42 791	102 485	145 276	6 144	. .
2010	62 397	105 836	167 101	272 937	5 760	109 422	115 182	4 486	. .
2011 (p)	60 003	110 655	168 318	278 973	6 852	98 246	105 098	1 590	. .

Sources: Natural Resources Canada; Statistics Canada.

. . Not available; (p) Preliminary.

(1) Beginning in 1988, exports and imports are based on the Harmonized System (HS) and may not be in complete accordance with previous method of reporting. Exports in ores and concentrates include HS classes 2603.00.20, 2607.00.20, 2608.00.20 and 2616.10.20. Refined exports include HS classes 7801.10, 7803.00, 7804.11, 7804.19 and 7804.20. Refined imports include HS classes 7801.10.10, 7801.10.90, 7803.00, 7804.11, 7804.19 and 7804.20. (2) Recoverable lead in ores and concentrates shipped. (3) Use of lead, primary and secondary in origin, as measured by a survey of consumers.

TABLE 4. MINE PRODUCTION OF LEAD, BY COUNTRY, 2007-11

Country	2007	2008	2009	2010	2011 (p)
	(000 tonnes)				
EUROPE					
Bulgaria	15	15	12	12	12
Greece	16	15	12	12	11
Ireland	57	50	50	38	50
Italy	3	3	2	3	3
Macedonia	32	40	51	40	40
Poland	68	72	61	47	42
Romania	1	–	3	3	3
Russia	48	60	72	97	113
Spain	–	–	–	3	7
Serbia and Montenegro	1	3	4	4	2
Sweden	63	64	69	68	64
Other	**. .**	3	3	2	9
Total Europe	**287**	**301**	**338**	**329**	**356**
AFRICA					
Morocco	36	34	34	32	36
Namibia	11	14	12	11	11
South Africa	42	46	49	43	56
Other Africa	1	12	10	12	10
Total Africa	**90**	**106**	**107**	**98**	**113**
AMERICAS					
Canada	75	99	67	65	58
Mexico	137	141	144	192	225
Peru	329	345	302	262	230
United States	434	410	406	372	335
Other Americas	65	131	133	139	134
Total Americas	**1 040**	**1 126**	**1 052**	**1 030**	**982**
ASIA					
China	1 402	1 403	1 610	1 851	2 358
India	78	84	82	97	118
Iran	25	30	32	30	30
Kazakhstan	40	39	40	38	35
North Korea	35	33	25	26	26
Turkey	14	18	16	26	30
Other Asia	11	21	20	18	34
Total Asia	**1 605**	**1 628**	**1 825**	**2 086**	**2 631**
OCEANIA					
Australia	589	594	525	661	534
Total world	**3 610**	**3 896**	**4 031**	**4 204**	**4 616**

Sources: Natural Resources Canada; International Lead and Zinc Study Group.
– Nil; **. .** Not available; (p) Preliminary.

TABLE 5. REFINED LEAD PRODUCTION, BY COUNTRY, 2007-11

Country	2007	2008	2009	2010	2011 (p)
	(000 tonnes)				
EUROPE					
Belgium	117	109	109	121	119
Bulgaria	87	91	83	81	79
Czech Republic	26	36	29	30	32
France	88	82	62	71	65
Germany	405	415	391	404	439
Italy	212	200	149	150	160
Poland	104	108	100	120	130
Russia	103	112	90	96	99
Spain	128	145	138	165	170
Sweden	70	56	52	56	54
United Kingdom	275	303	312	301	276
Other Europe	151	155	114	121	127
Total Europe	**1 766**	**1 812**	**1 629**	**1 716**	**1 750**
AFRICA					
Morocco	45	37	21	27	37
South Africa	59	62	58	51	56
Other Africa	13	17	19	24	25
Total Africa	**117**	**116**	**98**	**102**	**118**
AMERICAS					
Argentina	46	48	48	44	42
Brazil	131	96	92	112	114
Canada	237	259	259	273	283
Mexico	255	255	228	270	268
Peru	117	114	26	–	–
United States	1 303	1 280	1 214	1 252	1 296
Other Americas	63	69	73	70	77
Total Americas	**2 152**	**2 121**	**1 940**	**2 021**	**2 080**
ASIA					
China	2 788	3 206	3 708	4 199	4 648
India	239	274	307	380	426
Japan	276	279	248	267	246
Kazakhstan	118	98	89	109	111
Malaysia	17	39	54	26	30
South Korea	260	270	238	321	410
Thailand	67	73	57	71	72
Other Asia	274	252	239	242	244
Total Asia	**3 924**	**4 382**	**4 940**	**5 615**	**6 187**
OCEANIA					
Australia	238	261	246	218	226
New Zealand	11	9	13	11	12
Total Oceania	**249**	**270**	**259**	**229**	**238**
Total world	**8 114**	**8 653**	**8 866**	**9 683**	**10 373**

Sources: Natural Resources Canada; International Lead and Zinc Study Group.
– Nil; (p) Preliminary.

TABLE 6. REFINED LEAD USE, BY COUNTRY, 2007-11

Country	2007	2008	2009	2010	2011 (p)
	(000 tonnes)				
EUROPE					
Austria	25	34	33	35	42
Czech Republic	77	76	82	84	41
France	210	190	100	71	60
Germany	408	369	314	341	360
Ireland	58	42	35	33	36
Italy	269	276	209	247	250
Netherlands	26	25	18	18	18
Poland	101	99	82	121	125
Russia	76	75	58	72	74
Spain	260	248	245	264	261
United Kingdom	239	236	205	214	205
Other Europe	190	180	129	137	154
Total Europe	**1 939**	**1 850**	**1 510**	**1 637**	**1 626**
AFRICA					
Algeria	13	10	11	5	7
Egypt	5	6	4	1	4
South Africa	69	74	59	55	60
Other Africa	17	17	20	14	16
Total Africa	**104**	**107**	**94**	**75**	**87**
AMERICAS					
Brazil	188	177	170	198	193
Canada	32	31	38	21	14
Mexico	235	215	157	201	146
United States	1 510	1 515	1 397	1 441	1 578
Other Americas	128	123	125	114	123
Total Americas	**2 007**	**2 013**	**1 887**	**1 975**	**2 054**
ASIA					
China	2 573	3 211	3 860	4 213	4 632
India	282	290	297	446	448
Indonesia	85	103	88	95	99
Iran	68	65	58	54	53
Japan	279	261	189	224	233
Malaysia	68	64	54	47	40
South Korea	342	312	269	385	384
Taiwan	111	70	102	75	112
Thailand	134	124	124	145	136
Other Asia	255	508	255	281	287
Total Asia	**4 197**	**5 008**	**5 296**	**5 965**	**6 424**
OCEANIA					
Australia	25	23	20	28	24
New Zealand	2	2	2	2	2
Total Oceania	**27**	**26**	**22**	**30**	**26**
Total world	**8 367**	**9 047**	**8 809**	**9 682**	**10 217**

Sources: Natural Resources Canada; International Lead and Zinc Study Group.
(p) Preliminary.

TABLE 7. WORLD PRODUCTION OF LEAD FROM RECYCLING, BY COUNTRY, (1) 2007-11

Country	2007	2008	2009	2010	2011 (p)
	(000 tonnes)				
EUROPE					
Austria	22	23	23	24	25
Belgium	117	109	109	121	119
France	88	82	62	71	65
Germany	294	302	286	279	303
Greece	11	11	10	10	11
Ireland	22	20	19	19	19
Italy	164	158	132	150	160
Netherlands	16	16	17	16	16
Poland	60	66	62	82	108
Slovenia	15	15	14	14	15
Spain	128	145	138	165	170
Sweden	44	43	43	43	42
United Kingdom	164	165	154	150	150
Other Europe	15	211	156	173	195
Total Europe	**1 160**	**1 366**	**1 225**	**1 317**	**1 398**
AFRICA					
Algeria	6	6	6	9	11
Morocco	5	5	4	4	6
Nigeria	3	8	8	11	9
South Africa	59	62	58	51	56
Other Africa	4	2	5	4	5
Total Africa	**77**	**83**	**81**	**79**	**87**
AMERICAS					
Argentina	36	38	39	34	32
Brazil	131	96	92	112	114
Canada	141	154	157	167	170
Colombia	10	10	11	10	10
El Salvador	10	11	12	11	12
Mexico	114	114	115	128	128
United States	1 183	1 184	1 131	1 137	1 179
Venezuela	36	47	50	49	55
Total Americas	**1 575**	**1 606**	**1 607**	**1 648**	**1 700**
ASIA					
China	800	922	1 254	1 363	1 428
India	70	212	245	305	306
Indonesia	18	18	18	18	18
Iran	54	68	54	57	57
Japan	172	172	151	166	146
Malaysia	12	27	16	18	22
Philippines	34	34	32	30	32
South Korea	74	70	110	130	160
Taiwan, China	54	38	36	35	36
Thailand	67	73	57	71	72
Other Asia	250	135	176	139	141
Total Asia	**1 605**	**1 769**	**2 149**	**2 332**	**2 418**
OCEANIA					
Australia	37	40	30	38	35
New Zealand	11	9	13	11	12
Total Oceania	**48**	**49**	**43**	**49**	**47**
Total World	**3 423**	**3 528**	**3 496**	**5 425**	**5 650**

Sources: Natural Resources Canada; International Lead and Zinc Study Group.
(p) Preliminary.
(1) Refined lead and lead alloys (lead content) produced from scrap, waste, and residues.

TABLE 8. MONTHLY AVERAGE LEAD PRICES, 2010 AND 2011

Year/Month	LME Special High Grade Settlement (US$/t)
2010	
January	2 368.4
February	2 123.7
March	2 172.1
April	2 264.9
May	1 882.7
June	1 704.0
July	1 837.0
August	2 075.2
September	2 184.2
October	2 379.7
November	2 376.7
December	2 404.2
Yearly average	**2 147.7**
2011	
January	2 600.1
February	2 585.4
March	2 622.3
April	2 740.8
May	2 418.7
June	2 511.1
July	2 681.5
August	2 403.5
September	2 297.0
October	1 947.9
November	1 981.1
December	2 018.2
Yearly average	**2 400.6**

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