Preface

The Minerals and Metals Sector is the focus of federal expertise for mineral and metal commodity information. Within the Sector, the Mineral and Metal Policy Branch acts as the federal government's main source of in-depth knowledge, intelligence and expertise on mineral and metal commodity markets. One of its tasks is to forecast metal and mineral demand, supply and price.

Within the Branch, the International and Domestic Market Policy Division is responsible for the major base metals, the precious metals, certain associated minor by-products, and recycled materials such as scrap.

The commodity specialists of the Division maintain close contact with industry on a wide range of topics and issues. This year-end publication represents a more formal means of disseminating metal market developments through the first three quarters of the year and forecasts to the year 2005. Also included are articles from invited authors covering policy-related issues of significance to nonferrous metals. We would appreciate your feedback and encourage you to contact the specialists directly with your comments by telephone, facsimile or electronic mail (numbers and e-mail addresses are provided at the beginning of each chapter). You can also provide feedback to the coordinator of this publication, Patrick Chevalier, by telephone at (613) 992-4401, by fax at (613) 943-8450, or by e-mail at pchevali@nrcan.gc.ca.

NOTE TO READER

This Outlook has been prepared based on information available to Natural Resources Canada (NRCan) at the time of writing. The authors and NRCan make no warranty of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.

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This outlook for the major nonferrous metals was prepared by staff of the International and Domestic Market Policy Division in early November 2001 and reflects the market conditions and expectations at that time.

Canada's economy again registered strong growth in 2000 but is now expected to slow over the near-term forecast period. Overall real Gross Domestic Product (GDP) increased by 4.4% in 2000. The total value of all domestically mined mineral commodities produced in Canada, including metals, nonmetals, structural materials and mineral fuels, increased by 55.9% from $54.0 billion in 1999 to reach an estimated $84.2 billion[1] in 2000, its highest value ever. Most of this increase was due to the upsurge in the value of production of the mineral fuels group. The value of metal production increased 13.1% from $9.8 billion in 1999 to $11.1 billion in 2000. The increase was mainly attributed to the sharp rise in the values of production for nickel and the platinum group metals and a modest rise in the value of copper. The value of zinc production remained steady at $1.6 billion and the value of lead production dropped from $115.9 million in 1999 to $95.8 million in 2000, reflecting the drop in lead mine output.

Exports of crude minerals, coal, smelted and refined outputs, and mineral products contributed $49.1 billion (an increase of 10.0% over 1999) to the value of Canada's total domestic exports of $384.1 billion. Metallic mineral and mineral product exports accounted for 77.3% ($37.9 billion) of the total non-fuel (including coal) value; nonmetal exports accounted for 16.5% ($8.1 billion), structural materials for 2.5% ($1.2 billion), and coal for 3.7% ($1.8 billion). The United States remains Canada's principal trading partner with exports to that destination valued at $38.3 billion, followed by Japan ($1.9 billion) and the United Kingdom ($1.2 billion).

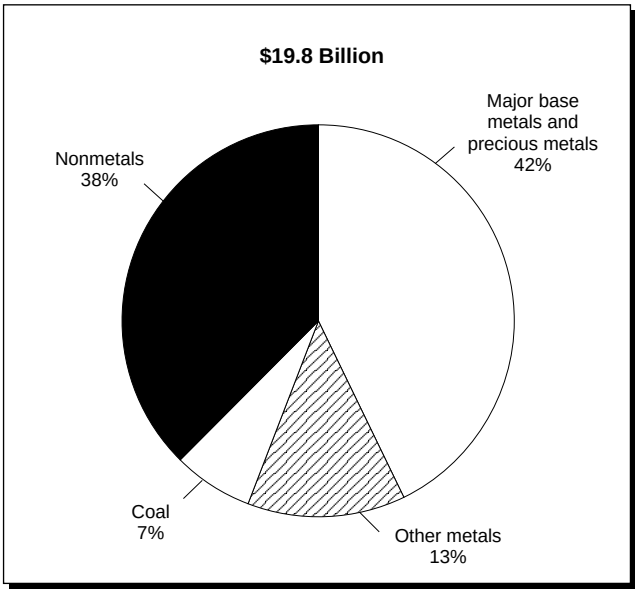
During the first half of the year, an overhang of inventories and excess capacity (especially in the auto and information technology sectors), the related contraction in industrial production, and the overall slowing of the global economy resulted in negative effects on most Canadian export-oriented industries and commodity prices (excluding energy). In the second quarter of 2001, GDP increased 2.1% compared to the second quarter of 2000, following a 2.5% annual increase in the first quarter of the year. Declining foreign demand, most notably in the United States, slowed the pace of growth as real exports dropped 3.1%. Overall, Canada's economic growth is expected to decline as the economy in the United States and elsewhere continues to slow. As a result of the expected lower U.S. GDP growth following the tragic events of September 11, the Canadian economy is projected to register little growth in the second half of the year for a total of about 1.5% in 2001 and about 1.6% in 2002.

The mining industry remains a vital contributor to Canada's economy. Employment in the non-fuel sector recorded a 3.7% increase in 2000, growing to an estimated 401 400 and accounting for roughly 3.3% of total Canadian full-time employment. Direct employment in metal mining, nonmetal mining, quarrying and coal mining was estimated at 54 000, up from the 1999 level of about 53 300. Mine openings and re-openings, including several gold mines and an asbestos tailings operation to recover magnesium, offset closures, particularly in the coal mining sector. Employment in the smelting and refining and primary steel industries, estimated at about 60 200 in 1999, increased by about a thousand in 2000 to 61 200. As was the case last year, the major gains in employment occurred in the mineral manufacturing industries as employment rose from 273 700 in 1999 to 286 300 in 2000, an increase of 4.6%.

In 2000, nonferrous metals generated a net trade surplus equivalent to about 23% of that of mineral fuels (excluding coal). Canada's overall merchandise export surplus was due in large part to the net

[1] This value represents the value of production from Canadian mines and therefore does not include production from imported ores and concentrates or recycled metals.

Figure 1
Value of Mineral Production From Canadian Mines, 2000



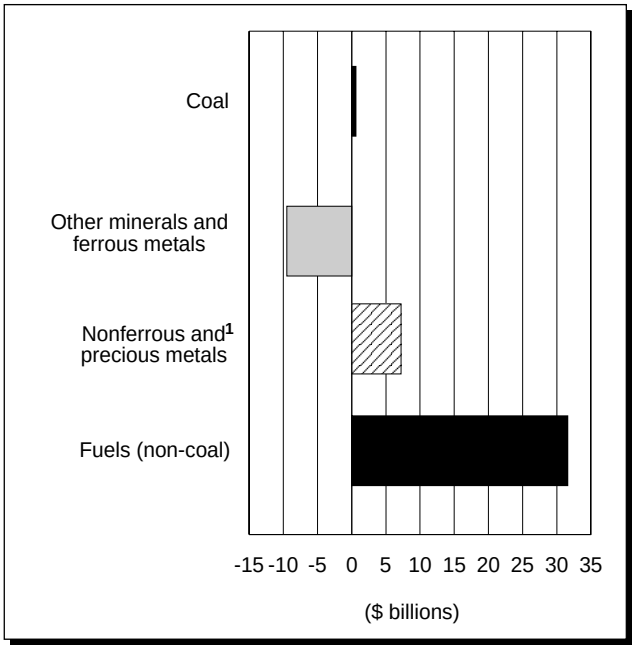
Source: Natural Resources Canada.

surplus generated by the Canadian mining and metals industry. Non-coal fuel minerals generated a net surplus of $31.6 billion. The major nonferrous and precious metals (including scrap), with exports of $18.4 billion and imports of $11.2 billion, generated a net Canadian trade surplus of $7.2 billion. Other mineral products generated a combined net trade deficit of $9.5 billion.

Reviews and forecasts for aluminum, copper, gold, lead, magnesium, nickel and zinc are included in the following pages. Trade tables covering 1999, 2000 and the first nine months of 2001 follow these commodity reviews. Note that throughout this document the term “consumption” has been replaced by “use” to reflect the fact that metals are not “consumed” but, rather, can be repeatedly recycled back to their original quality, unlike other materials such as fuel oil, natural gas, food or wood.

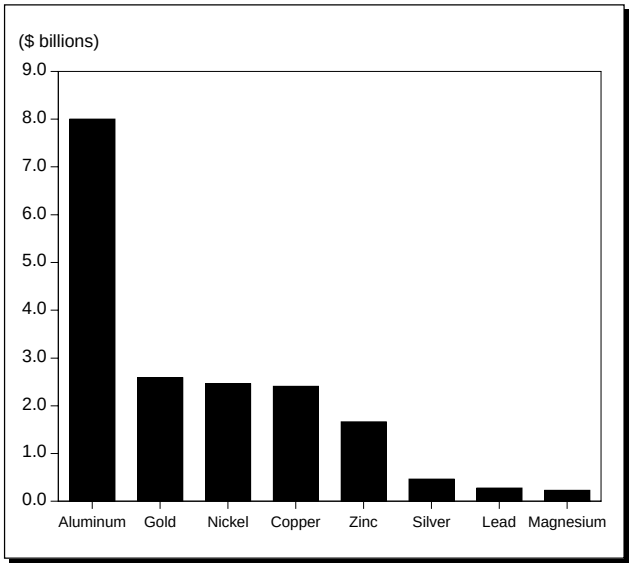
We would appreciate your feedback and encourage you to contact the specialists directly with your comments by telephone, facsimile or e-mail.

Figure 2
Net Export Earnings, 2000
Mineral Commodities Net = $30 Billion



Source: Natural Resources Canada.
[1] Includes aluminum.

Figure 3
Value of Exports, All Stages, 2000



Source: Natural Resources Canada.

Aluminum

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2000 primary metal production:	$5.5 billion[p]
World rank:	Fourth
2000 exports (unwrought):	$4.5 billion
Installed capacity:	2.7 Mt/y

Canada	2000	2001[e]	2002[f]
		(000 tonnes)	
Production	2 400	2 600	2 600
Use of primary aluminum	798	800	825

[e] Estimated; [f] Forecast; [p] Preliminary.

Aluminum, in both its pure and alloyed form, is used to make a wide variety of products for the consumer and capital goods markets. Aluminum's largest markets are transportation (30%), packaging (18%), building and construction (19%), electrical (9%), consumer goods (7%), and machinery and equipment (6%). North America uses the largest amount of all regions in the world, accounting for 31% of total world demand. Asia accounts for 28% and Europe accounts for another 25%.

AVERAGE (THREE-MONTH) ALUMINUM PRICES, LONDON METAL EXCHANGE

1998	1999	2000	2001[e]
	(US$/t)		
1 379	1 389	1 555	1 430

[e] Estimated.

CANADIAN OVERVIEW

- Alcan Inc. completed construction of its new 400 000-t/y smelter at Alma, Quebec; it reached full production before the end of September 2001.
- Alcan's 275 000-t/y Kitimat smelter continued to suffer from low water levels in the Nechako Reservoir. The company further reduced production in June. During the slowdown of up to 50% of the plant's capacity, Alcan will conduct studies on an expansion and pilot work on converting the smelter to pre-bake technology. (Alcan has a web site at www.alcan.com.)
- Alcoa Inc. signed a letter of intent with Newfoundland and Labrador Hydro and the Province of Newfoundland and Labrador on a joint review for a possible hydro-electric power expansion and a possible aluminum smelter located in that province. The review was expected to be completed in late 2001. (Alcoa has a web site at www.alcoa.com.)
- KPI Technology and Development LLC, an independent consulting firm, continued work on a feasibility study for a new 360 000-t/y smelter that would be located near Port Alberni, British Columbia.
- The Aluminium Association of Canada links the Canadian aluminum industry, aluminum users, the public and government. Further information and links to web sites of Canadian primary aluminum producers can be found on the Association's site at http://aia.aluminium.qc.ca.

WORLD OVERVIEW

- Power costs have declined from their highs in the western United States and about 1.3 Mt/y of the total U.S. annual primary aluminum capacity of approximately 3.7 Mt/y has been affected. Although spot power prices have now fallen, the timing of restarts is still uncertain.

- A lack of rainfall in Brazil has forced rationing of power to all users, including the aluminum industry. As a result, approximately 350 000 t/y of the country's 1.3-Mt/y capacity has been shut down, distributed among all producers. Further cuts are possible unless rainfall increases.

- The world economic slowdown now evident has resulted in a decline in the use of metals and metal-containing products with a resultant reduction in metal prices, despite the above-noted cutbacks in production.

- Expansions, generally at lower levels, continue in Chinese aluminum and alumina production. Aluminum Corp. of China (Chinalco) was expected to issue shares in a public offering, in part to fund further expansion of its interests. As a result, the rate of expansion in capacity may accelerate in the future.

- Expansions, smelter proposals and studies have been announced in several countries, although the current economic downturn may delay some construction. These include:

Country/Project	Comments
Australia - Aldoga consortium	Proposed 500 000-t/y smelter near Gladstone received major project status
Bahrain - Aluminium Bahrain	Approved a 250 000-t/y expansion
China – Aluminum Corp. of China (Chinalco)	Proposal to almost triple the capacity of the Pingguo aluminum smelter to 355 000 t/y by 2006
Dubai - Dubal	Dubal expansion discussions were under way
Iran - Iran Aluminium Company	Appears to be making progress on the 110 000-t/y Arak smelter proposal
India - Hindalco	100 000-t/y expansion
Indonesia - Perak smelter	Possible new 500 000-t/y smelter in Perak State
Mozambique - Mozal smelter	Billiton and partners will double the capacity of the Mozal smelter to 500 000 t/y
Russia, Leningrad	Proposed new 360 000-t/y Sosnovy Bor smelter

- New bauxite mine and alumina plant proposals/ongoing expansions/re-openings include:

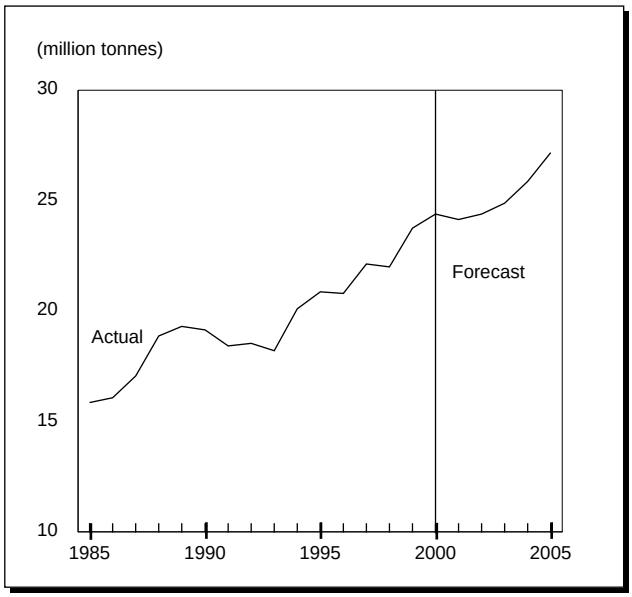
Country/Project	Comments
Australia - Rio Tinto's Comalco	Comalco's first stage of the proposed alumina refinery at Gladstone in central Queensland was approved for construction; will have a capacity of 1.4 Mt/y and requires an expansion of the Weipa bauxite mine
Brazil - Alunorte	Expansion by 350 000 t/y
China - Chinalco	Proposal to double the capacity of the Pingguo refinery to 800 000 t/y by 2003
India - Nalco	Doubled refining capacity at Damanjoi to 1.6 Mt/y
India - Hindalco	Expanding capacity by 200 000 t/y
Kuwait	900 000-t/y proposal
Kazakhstan - Pavlodar project	Alumina plant is to have a total capacity of 1.5 Mt/y by 2005
Ukraine - Russian Aluminium's Nikolayev	Well on its way to expand capacity to 1.5 Mt/y by 2005
United States	Kaiser completed rebuild of Gramercy alumina plant (1.08 Mt/y), although this was countered by the closure of Alcoa's 600 000-t/y St. Croix refinery
Venezuela - Bauxilium	Expanding by 350 000 t/y

DEMAND OUTLOOK

The world's apparent use of primary aluminum is estimated to be below 24 Mt in 2001, approximately 5% lower than the 25.2 Mt recorded in 2000. In 2002, world demand for aluminum, dependent on the world economy, is expected to be below its long-term trend of 3% annual growth. In the longer term, annual growth of 1-3% is forecast for the middle part of this decade. The transportation and packaging markets are expected to lead the increase in demand for aluminum.

Canada's apparent use of primary aluminum increased in 2000 to 798 000 t from a revised 777 200 t in 1999 and is expected to increase to 800 000 t in 2001. In the longer term, use is expected to increase at a rate of 2-5% annually.

Figure 1
World Primary Aluminum Use, 1985-2005



Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics.

CANADIAN AND WORLD PRODUCTION OUTLOOK

Canadian installed capacity for the production of primary aluminum is now 2.7 Mt/y with the completion of Alcan's new smelter at Alma. Canadian production rates will likely remain near this level for the immediate future depending on cutbacks at Kitimat. Studies are under way on several brownfield expansions and greenfield smelters and, should positive decisions result, this capacity could increase.

Canada is expected to produce approximately 2.6 Mt of primary aluminum in 2001 and a similar amount in 2002. Production in 2000 was 2.37 Mt valued at an estimated $5.5 billion, ranking Canada fourth after the United States, Russia and China. Canadian monthly production statistics can be obtained from Natural Resources Canada's web site at http://www.nrcan.gc.ca/mms/efab/data/default.html.

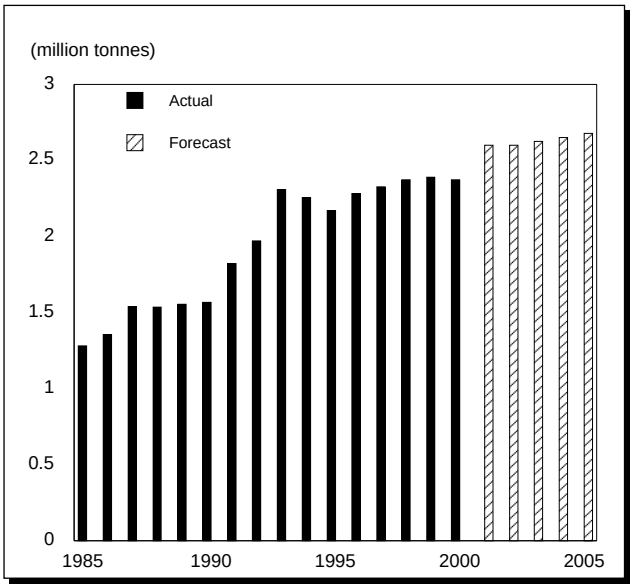
Smelter expansion projects in Quebec (at Alouette, A.B.I. and Lauralco) are dependent on the negotiation of new long-term power supply contracts with Hydro-Québec. Decisions on possible new capacity in British Columbia and elsewhere in eastern Canada are pending.

World production of primary aluminum increased to an estimated 25.2 Mt in 2000, up from 23.7 Mt in 1999, but is expected to remain flat or to decline slightly in 2001.

The International Aluminium Institute (IAI) indicates that world daily average primary aluminum production in September was 55 500 t, down 2200 t/d from September 2000, reflecting the reduced production rates in North and South America. Additional information can be obtained from the IAI's web site at http://www.world-aluminium.org.

IAI inventories of unwrought aluminum have remained around 1.8 Mt, while IAI total inventories have remained at approximately 3.1 Mt throughout the year. Primary aluminum inventories at the London Metal Exchange (LME) increased steadily throughout the year from 0.4 Mt in January to almost 0.7 Mt in October.

Figure 2
Canadian Primary Aluminum Production, 1985-2005



Source: Natural Resources Canada.

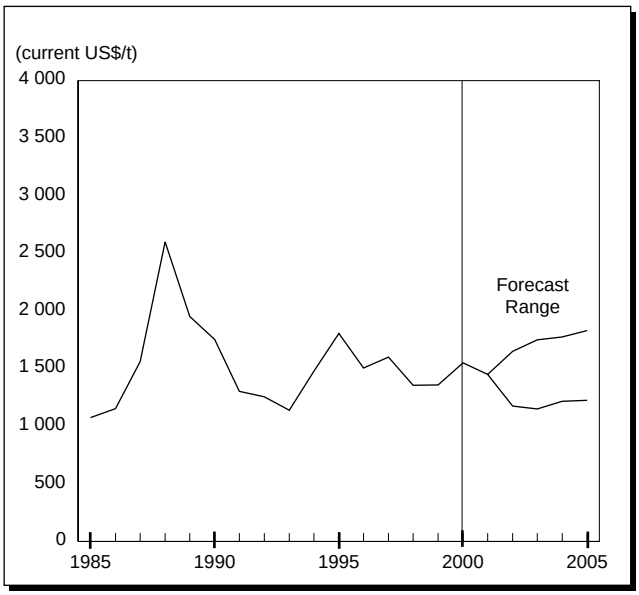
PRICE OUTLOOK

Cash prices for primary grade aluminum have remained weak since the early part of the year. LME cash prices started the year at approximately US$1560/t (71¢/lb) and declined to around US$1270/t (58¢/lb) at the end of September.

At the time of writing, prices appeared to be heading once again to lows established in 1999, and increased prices will depend on an increase in the economies of the world. Should this occur in 2002, aluminum prices could spike sharply unless closed facilities are re-opened and those smelters running at lower than capacity levels in North and South America return to

capacity. If the economy remains at current levels, prices can be expected to remain in the mid-to-lower part of their longer-term price range of between US$1200 and $1800/t (55¢ and 82¢/lb). Daily metal prices can be obtained from various news services, journals and newspapers, as well as from the LME web site at http://www.lme.co.uk and from http://metalprices.com.

Figure 3
Aluminum Settlement Price, 1985-2005
Annual LME Settlement



Sources: Natural Resources Canada; http://metalprices.com (Internet site).

Note: Information in this article was current as of November 1, 2001.

NOTE TO READERS

Copper

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2000 production:	$1.69 billion
World rank (mine production):	Fifth
Exports (concentrate and unwrought):	$1.65 billion

Canada	2000	2001[e]	2002[f]
	(000 tonnes)		
Copper mine production	634	625	622
Refined copper production	551	575	615
Refined copper use	274	280	290

[e] Estimated; [f] Forecast.

Copper's properties, particularly its high electrical and thermal conductivity, good tensile strength, elevated melting point, non-magnetic properties and resistance to corrosion, make it and its alloys very attractive for electrical transmission, water tubing, castings and heat exchangers. Copper is the most efficient conductor of electrical power, signals and heat of all the industrial metals. In Canada, more than half of the refined copper used annually is for electrical applications, mostly in wire.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE

1997	1998	1999	2000	2001[e]
		(US$/t)		
2 276	1 654	1 572	1 813	1 559

[e] Estimated.

CANADIAN OVERVIEW

- In April, Teck Corporation and Cominco Ltd. announced that the two companies would merge. Teck Cominco Limited was formed in July and ranks as the fourth largest North American-based base-metal mining and refining company. The merged companies' copper assets include a 64% interest in the Highland Valley copper mine in British Columbia, a 25% interest in the Louvicourt mine in Quebec, and a 22.5% interest in the Antamina zinc-copper mine in Peru.
- In July 2001, Imperial Metals Corporation announced plans to suspend production at its copper-gold operations in British Columbia effective September 30, 2001, due to low metal prices.
- In October 2001, Hudson Bay Mining and Smelting Co., Limited (HBMS) announced that it will permanently close the Ruttan zinc-copper mine in northern Manitoba no later than May 2002. Low metal prices, a slowing world economy and a poor economic outlook were the reasons cited for the closure. The Ruttan mine produces approximately 13 500 t/y of copper in concentrate.
- Also in October 2001, Boliden AB announced a three-month suspension of production at its Myra Falls zinc-copper mine in British Columbia beginning on December 3 in response to low metal prices. The mine produces 15 000 t/y of copper in concentrate.

WORLD OVERVIEW

- In March, London-based Billiton Plc and Australia's BHP Limited announced their intention to merge their operations to form a new company to be known as BHP Billiton. The merged company's assets are valued at approximately US$11 billion and it ranks as the world's fourth largest producer of copper. BHP Billiton's operations in Canada include a 33.6% partnership interest in the Highland Valley Copper (HVC) copper mine in British Columbia and the 100%-owned Selbaie mine located in northwestern Quebec.

- Noranda Inc., Teck Cominco Limited, BHP Billiton Plc and Mitsubishi Corporation announced that the Antamina copper-zinc project in northern Peru had achieved commercial production in October, more than four months ahead of the original schedule of February 2002. At an average annual production of 675 million pounds of copper, Antamina is one of the largest copper mines in the world.

- In October, in response to falling copper prices, Arizona-based Phelps Dodge Corporation announced a series of production cutbacks and temporary closures at its U.S.-based operations that would result in a 220 000-t/y reduction in copper metal output by mid-January 2002. The reductions comprise a temporary closure of the Chino and Miami mines, a cutback of 50% at the Sierrita and Bagdad mines, and closure of the Chino smelter and Miami refinery.

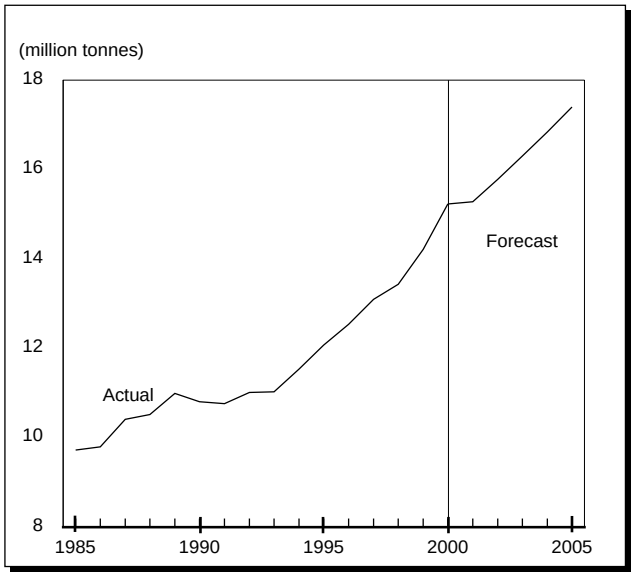
- In November, BHP Billiton announced that it would reduce planned production at the Escondida mine in Chile by 10%, or approximately 80 000 t/y of copper in concentrate, effective the end of November. The company also announced that it would suspend sulphide production at the Tintaya mine, also in Chile, effective January 8, 2002; this represents 90 000 t of the mine's annual output. The company cited the serious fall in copper demand as the rationale for the production cuts.

DEMAND OUTLOOK

According to the International Copper Study Group (ICSG), global demand for refined copper is expected to decline by about 3.3% from 15.3 Mt in 2000 to 14.8 Mt in 2001. The decline is due to a a sharp drop in economic activity that began in the second quarter in most of the major copper-using regions (e.g., the United States, Europe and Asia). Demand in Mexico and the United States in 2001 is forecast to decline by 12.9% and 10.2%, respectively. Other regions forecast to record declines in demand in 2001 include Japan at -14.1%, Taiwan at -10.5%, and the European Union at -5.1%. Offsetting these forecast declines is expected growth in demand from China (+11.8%) and India (+7.2%).

Based on figures supplied to the ICSG by member governments in November 2001, world copper usage is forecast to rise by about 3.3% in 2002 to 15.3 Mt.

Figure 1
World Refined Copper Use, 1985-2005

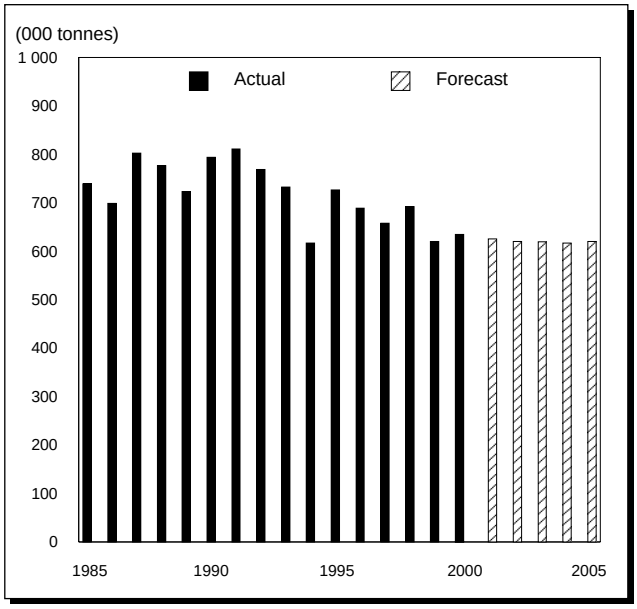


Source: Natural Resources Canada.

CANADIAN PRODUCTION OUTLOOK

Canadian copper mine production (recoverable copper in concentrate) is expected to total approximately 625 000 t in 2001, slightly below 2000's output of 634 000 t. Lower output from the Myra Falls mine, the Mount Polley mine and Falconbridge's Sudbury operations, which were affected by a strike, were partially offset by increases at other operations, notably at Northgate Exploration Limited's Kemess mine. Estimated mine production in 2002 is currently forecast at 622 000 t, slightly below the 2001 forecast level. The forecast production for 2002 includes a reduction in output from HBMS, reflecting the announced closure of the Ruttan mine by May 2002.

Figure 2
Canadian Mine Production of Copper, 1985-2005



Source: Natural Resources Canada.

Refined copper production is forecast to grow by 4.4% to 575 000 t in 2001 and by a further 7.0% to 615 000 t in 2002. The forecast rise is based on anticipated full production from the recently expanded CCR and Kidd Creek refineries compared to estimated below-capacity output at both plants in 2001.

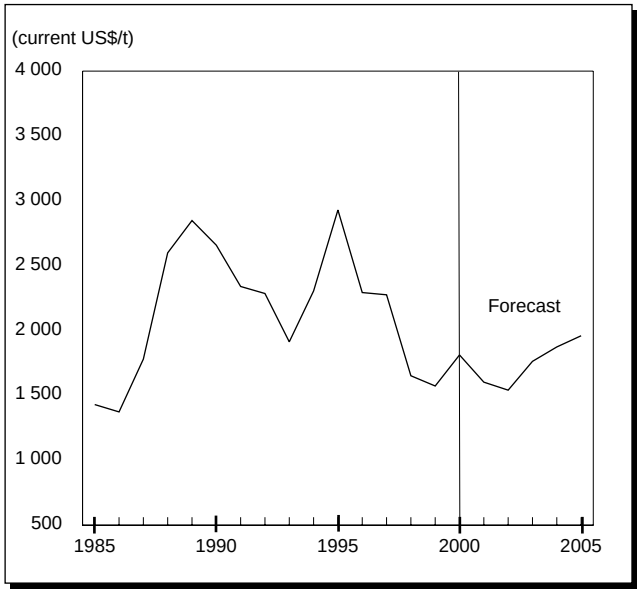
PRICE OUTLOOK

The dramatic decline in demand that began in the second quarter of 2001, combined with an estimated 3.9% increase in world refined copper production during the year, has pushed the supply/demand balance for copper metal from a deficit in 2000 of 457 000 t to a forecast surplus of 541 000 t in 2001. Exchange stocks, which stood at 524 000 t at the start of the year, have risen dramatically since the third quarter and are now expected to finish the year at just over 1 Mt. These supply/demand fundamentals have driven down prices from a first-quarter average on the London Metal Exchange (LME) of US81¢/lb, or $1794/t, down to the US64¢/lb ($1485/t) level by the end of September. For the full year of 2001, the LME Cash settlement price for Grade A copper is forecast to average in the 70¢- 71¢/lb range, or US$1600-$1654/t, down 14% from the 2000 average of US81.4¢/lb, or US$1813/t.

Looking ahead to 2002, based on the cutbacks in mine production totaling approximately 485 000 t/y announced as of mid-November, growth in world refined copper use is expected to increase by 3.1% while world production of refined copper is expected to decline by about 1.1%. As a result, a small deficit of about 100 000 t is forecast. Despite this anticipated return to a balanced market in 2002, high stocks of copper metal will likely impede a major price recovery; thus, in 2002, prices are expected to average around US70¢/lb (US$1540/t). Beyond 2002, the price outlook becomes much more bullish as growth in demand is anticipated to outstrip supply. This could push prices up to the US80¢/lb level (US$1764/t) in the period 2003/04.

Note: Information in this article was current as of November 22, 2001.

Figure 3
Copper Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

NOTE TO READERS

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Gold

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2000 mine production:	$2.05 billion
World rank:	Fourth
Exports:	$2.6 billion (includes exports from recycled products and public and private reserves)

Canada	2000	2001[e]	2002[f]
		(000 tonnes)	
Production	154	162	156

[e] Estimated; [f] Forecast.

Gold is valued for its rarity, lustrous colour, malleability, ductility, high resistance to corrosion and conductivity. It has been treasured for its decorative and monetary value for at least 8000 years. Gold has a high density, its weight being equal to 19.3 times an equivalent volume of water. The main industrial uses for gold are in jewellery (85%) and electronics (7%). Gold bullion coins, such as the Maple Leaf coin, are also important products.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON BULLION MARKET ASSOCIATION

1998	1999	2000	2001[e]
	(US$/troy oz)		
294	279	279	271

[e] Estimated.

CANADIAN OVERVIEW

- In 2001, Goldcorp Inc. expects to produce nearly 15.6 t of gold (500 000 troy oz) at the Red Lake mine at a direct production cost of approximately US$65/troy oz, which will place this mine among the leading Canadian gold producers for volume of gold produced and among the producers with the lowest production costs in the world.

- In August, Agnico-Eagle inaugurated a new shaft on its LaRonde property. With a depth of 2250 m (7380 ft), it will provide access to reserves of nearly 100 t of gold (3.3 million oz) and additional resources of 140 t (4.5 million oz). Agnico-Eagle also expanded its mill facilities from 2000 to 5000 t/d, and the company expects to increase mill facilities to 7000 t/d by the end of 2003. With this expansion, annual gold production will go from 230 000 troy oz in 2001 to nearly 400 000 oz in 2004. The ore at LaRonde also contains commercial ore-grade zinc, copper and silver, which will place this mine among those with the lowest production costs in Canada when the credits obtained for these metals are taken into account.

- Cambior completed the restructuring begun the previous year to cover operational debts stemming from its hedging program. In 2002, the company expects to begin work that will lead to the start-up of production at the Gross Rosebel deposit in Suriname.

- River Gold Mines closed the Edwards mine as its reserves have been depleted. The company plans to put the Mishi mine into production on a seasonal basis. Mishi is a small, open-pit deposit located near the mill where approximately 310 kg of gold (10 000 troy oz) will be produced each year.

- In February 2001, McWatters was granted protection under the *Companies' Creditors Arrangement Act* to allow a financial restructuring process. Activities at the Sigma-Lamaque complex have been suspended until the company finds additional funds and negotiates an arrangement with its creditors. However, operations at the Kiena complex have been maintained.

- During the course of the year, the closing or suspension of operations at six other small mines was announced due to the depletion of reserves or a lack of financial viability: Nugget Pond in Newfoundland and Labrador, the Beaufor and Francoeur mines in Quebec, the Bissett mine in Manitoba, the Golden Bear mine in British Columbia, and the Brewery Creek mine in the Yukon. The closure of the Mount Polley polymetallic mine in British Columbia will also have a significant impact on the level of Canadian gold production in 2002.

WORLD OVERVIEW

- Major gold companies continued their consolidation strategy more successfully with a view to increasing market capitalization, attracting new investors, and exercising a certain control over supply. During 2001, Barrick Gold and Homestake announced plans to merge, and AngloGold and Newmont launched bids to acquire Normandy, an Australian company. By acquiring Homestake, Barrick becomes the largest silver producer in Canada and the fifth largest in the world.

- Australian companies Delta Gold and Goldfields Limited announced their merger, which will create a company whose production is slightly over 30 t/y of gold (1 million oz). WMC Inc., another Australian company, sold its gold mining operations to the South African company Pangea Goldfields, which will boost Pangea's annual production to nearly 145 t of gold (4.6 million oz).

- Globally, gold mine production will set a new record in 2001 in terms of amount produced. Production is expected to exceed 2600 t and will combine with gold sales and loans by central banks, recycled gold, and sales by investors for a global supply of 3800 t, a drop of nearly 150 t compared to the previous year.

- Demand for gold fell by nearly 4% in 2001 despite generally depressed relative prices for the metal. A number of people see the fall in demand as being the result of the global economic slowdown. The weak demand for jewellery in the United States and Europe and the decline of activities in the electronics sector in Asia contributed greatly to the drop. Although the events of September 11 led to an increase in activity in the collector coin and gold bar sector, the resulting rise in the price of gold was short-lived, confirming that the role of gold as an inflation hedge has declined in importance.

- At their annual meeting in Denver, Colorado, the major gold producers announced that, in spring 2002, they will launch a huge advertising and awareness campaign with a view to increasing sales of gold jewellery and other items. Together, gold producers expect to collect an annual sum of US$150 million to $200 million to be used for this campaign and, to a lesser extent, to lobby certain governments to liberalize the gold trade in their countries.

- In 2001, China began the liberalization of its gold trade by setting the price of gold each week rather than every six months, establishing a gold exchange, and setting up a Chinese gold association that will link producers, manufacturers and other stakeholders. Chinese mine production of gold is expected to total nearly 150 t in 2001, with 115 t coming from gold mines and 35 t from polymetallic deposits. Demand for gold in China is expected to amount to nearly 200 t and to be met by domestic mine production, recycling, and gold obtained from refining imported copper concentrates.

- Barrick began production at its Bulyanhulu deposit in Tanzania. The company expects to produce nearly 12 t/y (400 000 oz) of gold for a 20-year period. With the start-up of production at this deposit, Tanzania will become the fourth largest gold producer in Africa, after Mali, Ghana and South Africa. Production from Bulyanhulu will be added to production from the new Golden Pride and Geita mines, which were put into production in 1999 and 2000, respectively. A fourth mine, belonging to the Australian company Afrika Mashariki, will probably open in 2002.

MARKET OUTLOOK

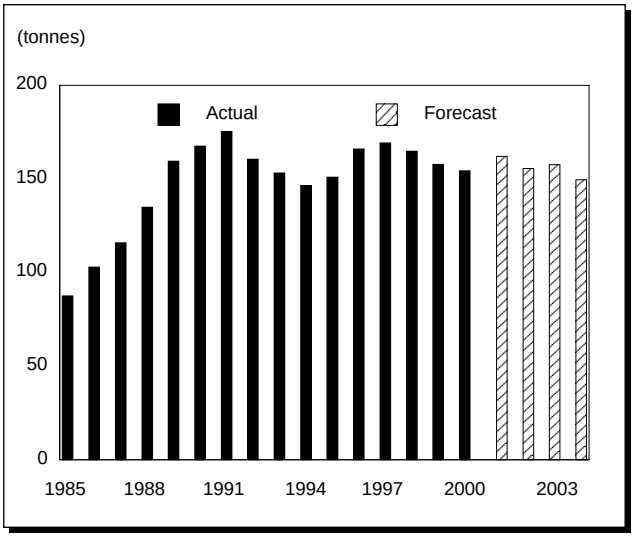
World mine production of gold, which has been rising for nearly 20 years, is expected to begin to decline in 2002 and to enter a downward cycle that could last three or four years. The weakness in the price of gold in recent years has led to a drop in exploration expenditures, which in turn has lowered the number of economic deposits discovered. The decline in gold production as a result of mine closures cannot be completely offset by mine capacity expansion or by the start-up of production at new deposits. Until 2004, when the *Washington Agreement* expires, gold sales and loans by central banks – another important element in the gold supply – are expected to remain at more or less the same level as in the past two years.

World demand grew more than 35% over the last decade, mainly because weakness in the price of gold led to an increase in demand by jewellers that specialize in gold jewellery. World gold demand for jewellery and electronics is expected to resume its upward trend as soon as economic conditions are favourable again.

CANADIAN PRODUCTION OUTLOOK

To the end of 1999, Canada had produced over 9000 t of gold since official production was first recorded in 1858 (ref. *Canadian Minerals Yearbook: 1999 Review and Outlook*). Canadian gold production is expected to increase by nearly 5% in 2001, reaching 162 t, which is 8 t more than in 2000. This production increase is partly due to the discovery and mining of high-grade ore at the Red Lake mine in Ontario. The closures and suspensions of operations announced in 2001 are expected to contribute to a net drop of 6-7 t in gold production in 2002. For the following years, mine production is forecast to reach between 150 and 155 t/y. Any growth in Canadian gold production over the coming years is expected to come essentially from mine capacity expansions or from the resumption of production at existing mines.

Figure 1
Mine Production of Gold in Canada, 1985-2004



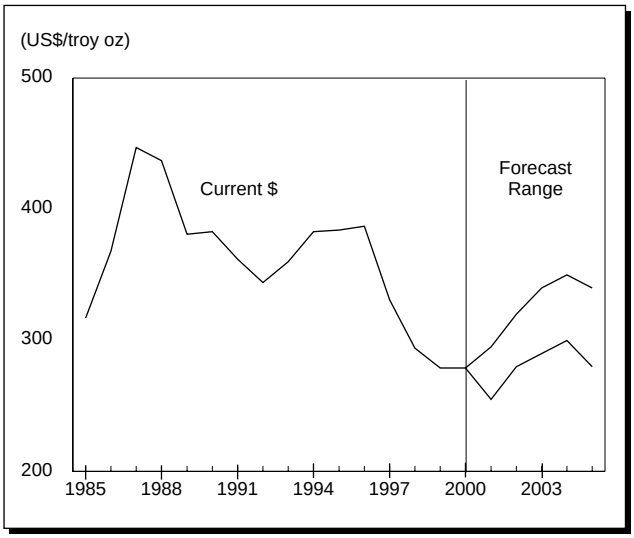
Source: Natural Resources Canada.

PRICE OUTLOOK

The average price of gold maintained its downward trend in 2001 to settle around US$270/troy oz, dropping from US$279/troy oz in 2000 and US$278/troy oz in 1999. The stabilization of gold sales from the official sector and the decline in gold producers' hedging programs did not lead to the price recovery anticipated by many. The drop in demand caused by the economic slowdown and the lack of investor interest in gold kept downward pressure on the price.

However, the anticipated decrease in the global gold supply in 2002, combined with stable or slightly increased demand, is expected to place upward pressure on the price of gold. Over the next few years, the price of gold is forecast to vary between US$280 and $350/troy oz and could even exceed US$350/troy oz. The higher price level could be reached if global demand comes under new pressure stemming from the liberalization of the gold trade in China and from possible successes brought on by the advertising campaign that gold producers will begin in 2002 and the success of the bid launched by Newmont for Normandy, which will cause the liquidation of Normandy's hedging program.

Figure 2
London Bullion Market Association Gold Prices, 1985-2005



Source: Natural Resources Canada.

Note: Information in this article was current as of November 30, 2001.

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Lead

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2000 mineral production: $95.8 million
World rank: Seventh
2000 exports: $286 million

Canada	2000	2001e	2002f
	(000 tonnes)		
Mine production	149	135	85
Refined production	284	245	275
Usage (refined)	68	60	60

e Estimated; f Forecast.

Lead-acid batteries for automotive, industrial and consumer purposes account for 75% of the world's demand for lead. Lead's corrosion-resistant nature also makes it suitable for applications in sheeting for roofing purposes, while its radiation attenuation properties prevent the emission of harmful radiation from television, video and computer monitors. Certain dispersive or readily bio-available uses, such as lead in gasoline, in piping for drinking water systems and in household paints, have been or are being phased out in Canada and in certain other countries due to health concerns.

ANNUAL AVERAGE CASH SETTLEMENT PRICES, LONDON METAL EXCHANGE

1997	1998	1999	2000	2001e
		(US$/t)		
624.0	528.4	502.2	454.2	480

e Estimated.

CANADIAN OVERVIEW

- Cominco Ltd. began a series of announced production cutbacks at its Trail smelter complex in southern British Columbia in December 2000. The cutbacks at Trail were part of a plan to allow for a fixed-price power swap agreement with a major U.S. energy company. All work at the lead smelter stopped in September to examine health concerns related to workers exposed to thallium while performing furnace maintenance. Lead production was set to restart in November.
- Elsewhere at Cominco, work continued in preparation for the closure of the Sullivan mine at Kimberly, British Columbia. The mine, which was discovered in 1892 and began operations in 1909, will continue to operate until the planned closure date in December 2001.
- In April, Teck Corporation and Cominco announced that the two companies would merge. The new company, Teck Cominco Limited, was formed in July.
- Exide Technologies delayed the start of production of industrial-type lead-acid batteries at its Maple, Ontario, plant until at least the first quarter of 2002.

WORLD OVERVIEW

- In March, Doe Run reduced its lead output by 80 000 t/y by closing two mines in the United States and cutting lead concentrate purchases. The company placed the No. 29 mine in its southeast Missouri Mining Division on care and maintenance. The No. 28 mine at the division will be mined to closure this year. As a result of the closures, production at Doe Run's Herculaneum smelter will fall from 250 000 t/y to 170 000 t/y.
- Grupo Mexico, S.A. de C.V. announced in May that its wholly owned subsidiary, ASARCO Incorporated, would continue the suspension of operations at its 70 000-t/y East Helena lead smelter in the United States until market conditions and the

supply of lead concentrates and other raw materials improved.

- Boliden Limited closed the Laisvall mine located in Norrbotten, Sweden, in October after nearly 60 years of production. Elsewhere in Europe, the company's subsidiary, Boliden Apirsa SL, ceased production at its Los Frailes operations in Spain.
- The Henan Yuguang Gold & Lead Group Co., Ltd. completed an expansion project in China that added 50 000 t/y of capacity, increasing the company's total lead production capacity to 130 000 t/y.
- Exide Technologies, the U.S.-based battery maker and lead recycler, announced plans to close two automotive battery manufacturing plants in North America and to restructure its European operations.

LEADING WORLD LEAD PRODUCERS

Producers Lead in Concentrate	2001e	Producers Lead Metal	2001e
	(000 tonnes)		(000 tonnes)
Australia	723	United States	1 365
China	600	China	1 100
United States	420	Germany	375
Peru	275	United Kingdom	370
Mexico	140	Japan	299
Canada	135	Australia	254
Morocco	91	Canada	245

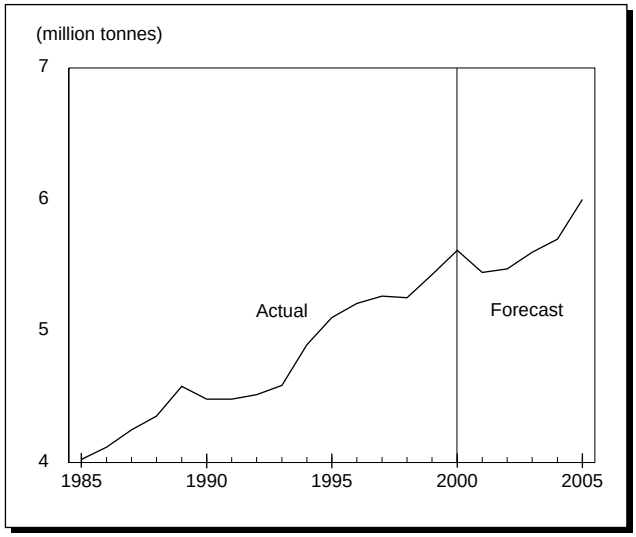
e Estimated.

DEMAND OUTLOOK

According to the International Lead and Zinc Study Group (ILZSG), the world's use of refined lead is expected to fall by just under 1% to 6.4 Mt in 2001, with Western World usage falling by 2.6% to 5.5 Mt. The decline in demand is mainly due to a predicted 5.8% fall in the United States, the first such decline since 1991. Demand in Europe is also expected to fall by about 0.5%. Demand in Asia is forecast to rise 3.8%, mainly as a result of continued good growth in the Chinese market. World demand in 2002 is expected to recover somewhat and to rise by just under 1% to just over 6.5 Mt. Demand in the West will also show signs of recovery in 2002, rising by only 0.5% to 5.5 Mt. Demand in the United States is expected to rise 1.1% with growth in Asia of about 2.7%.

Over the long term, lead demand is expected to maintain an average annual growth rate of 1.5-2.0%. The battery sector will continue to account for most of the growth with the newly industrialized nations of Southeast Asia expected to continue to record the most rapid growth as the vehicle population expands.

Figure 1
Western World Lead Use, 1985-2005

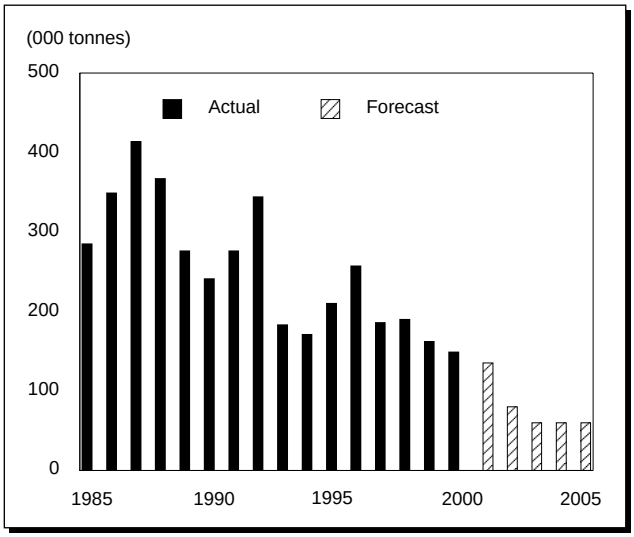


Source: Natural Resources Canada.

CANADIAN PRODUCTION OUTLOOK

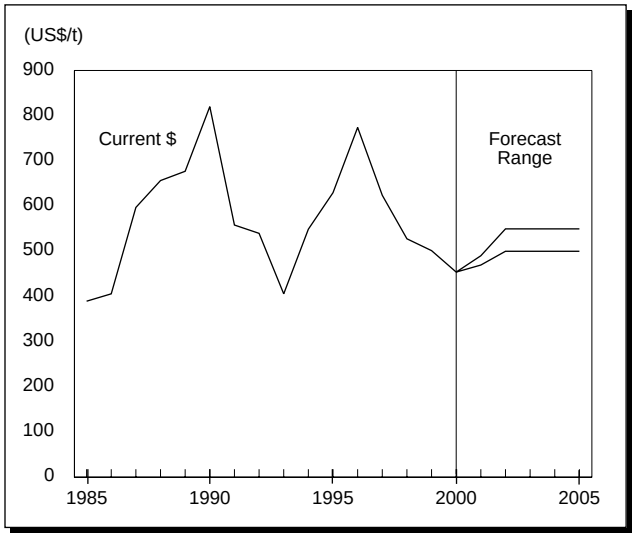
Canadian lead mine production in 2001 is forecast to decrease by about 8.7% from the 2000 level to 135 000 t, due primarily to reduced production at Teck Cominco Limited's Sullivan mine. Mine production is expected to decline a further 37% in 2002 to 85 000 t with the closure of the Sullivan mine at the end of 2001 and the Polaris mine at the end of the first half of 2002. Canadian lead metal production is expected to be 17% lower in 2001 compared to 2000, primarily due to the production cutbacks at, and temporary closure of, the Trail smelter in September and October.

Figure 2
Canadian Mine Production of Lead, 1985-2005



Source: Natural Resources Canada.

Figure 3
Lead Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

PRICE OUTLOOK

Cash London Metal Exchange (LME) settlement prices for lead traded within the range of between US$450 and $500/t over the year. Prices peaked at US$522/t in March, then fell to reach a minimum for the year of US$430/t in July. Prices rallied to trade in the $470/t range by the end of October. Overall, lead prices have not followed the same downward pattern as the other major base metals and are expected to end the year with an average of about US$480/t. Production has been cut, several mines have already closed or are set to close due to depleted ore reserves, and the replacement battery market is less dependent on the global economic cycle. LME stocks rose to a peak of 143 900 t at the end of February, then continued a downward decline to reach the lowest point for the year at 99 100 t in mid-October.

According to the ILZSG, Western World refined lead market is expected to move into a deficit of about 50 000 t in 2001 and again in 2002 as primary production is affected by mine closures. It is, however, recognized that the predicted levels of refined lead metal output in 2002 will be partially dependent on the availability of sufficient concentrate supplies in the West. Given that the forecasts indicate that these supplies will not be sufficient next year, it is likely that not all lead metal output targets will be achieved. The net result on prices for next year is that they will average about US$520/t in 2002. In the longer term, prices are expected to average between US$500 and $550/t to the year 2005.

Note: Information in this article was current as of November 9, 2001.

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Magnesium

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2000 metal production: $365 million[e]
World rank: Third
Exports: $226 million

Canada	1999[e]	2000[e]	2001[f]
		(tonnes)	
Production[1]	80 000[r]	80 000	90 000
Exports	49 708	51 000	70 000

[e] Estimated; [f] Forecast; [r] Revised.
[1] Canadian magnesium production data have been confidential due to the limited number of companies reporting. This is a U.S. Geological Survey estimate, which includes recycled magnesium production provided to the International Consultative Group on Nonferrous Metals Statistics.

Magnesium's main application is as an alloying agent for aluminum, which accounted for close to 45% of magnesium shipments in 2000. The next most important use for magnesium metal is for die-cast products. Increased interest in magnesium die-cast products by the automotive industry is largely due to weight savings of about 30% compared to aluminum. The third largest market for magnesium is as a deoxidizing and desulphurizing agent in the ferrous industry. Chemical applications include pharmaceutical products, perfumes and pyrotechnics.

ANNUAL AVERAGE PRICES, *METALS WEEK* (U.S. SPOT WESTERN MEAN)

1997	1998	1999	2000	2001[e]
		(US$/lb)		
1.65	1.59	1.55	1.37	1.25

[e] Estimated.

CANADIAN OVERVIEW

- Magnola Metallurgy Inc.'s 58 000-t/y magnesium metal plant at Danville, Quebec, is complete and commissioning of the electrolytic cells is under way. Progress on solving start-up problems was well under way and the plant was operating 10 cells in July. The company planned to have 14 cells producing by the end of 2001. The plant was expected to produce 10 000 t of metal in 2001 and to reach full commercial production levels in early 2003. Further information can be found on the Noranda Magnesium web site at http://www.norandamagnesium.com.

- Primary production at Norsk Hydro Magnesium Division's Bécancour facility will be increased to 48 000 t/y in 2002 through debottlenecking. Future capacity increases in Bécancour will be evaluated based upon market needs and profitable returns. Hydro Magnesium does not expect any large-scale increases to be initiated in the short term. Further information is available on the Internet at http://www.magnesium.hydro.com.

- Canada's two largest magnesium producers have developed new magnesium alloys for use in higher temperature applications. With the continued

involvement of metal producers in alloy development, increased uses will be found for magnesium on a longer-term basis. Further information can be obtained from the Noranda Magnesium web site at http://www.norandamagnesium.com and from Hydro Magnesium's web site at http://www.magnesium.hydro.com.

- Globex Mining Enterprises Inc. hired Hatch Associates to complete a scoping study on Globex's magnesium-talc deposit located 13 km south of Timmins, Ontario. Previous work has indicated the potential for production of both magnesium metal and high-quality talc from the deposit. Results of the study were positive and indicated good economic potential, and the company is now reviewing the results in anticipation of conducting the recommended $12 million full bankable feasibility study. A mine-mill complex would be located near Timmins, Ontario, and a smelter complex would be located west of Rouyn-Noranda in Quebec. Globex Mining has an Internet site at http://www.globexmining.com.

WORLD OVERVIEW

- The major factor in magnesium markets remains the increased production and export of magnesium from China. Production and export levels in 2001 are expected to be similar to those in 2000. Pressure on markets from this production has resulted in a general decrease in the price of magnesium and has caused the United States and the European Union (EU) to impose high import duties on Chinese magnesium. The pressure on prices, combined with other factors, has caused several closures but has also helped stimulate growth in use.

- Norsk Hydro ASA has announced the closure of the 55 000-t/y Porsgrunn magnesium smelter in Norway. The existing casthouse will operate based on scrap and ingot remelt feedstock for magnesium alloy production. The Porsgrunn casthouse has a 20 000-t/y remelt capacity. Further information is available on the Internet at http://www.magnesium.hydro.com.

- Pechiney Électrométallurgie has announced the closure of the 18 000-t/y Marignac magnesium smelter in France. Pechiney has an Internet site at http://www.pechiney.com.

- Alcoa Inc. announced the October 2001 closure of the 38 000-t/y Northwest Alloys magnesium smelter in Addy, Washington. Alcoa has an Internet site at http://www.alcoa.com.

- Magnesium Corp. of America filed for protection from its creditors under Chapter 11 of the bankruptcy code. The company is modernizing equipment at its 43 000-t/y smelter in Rowley, Utah, after considerable pressure to clean up its site and reduce emissions. Modernization of the plant is expected to eventually increase its capacity but, in the near term, production will be significantly reduced.

- The U.S. International Trade Administration, after a review, determined that imports of pure magnesium from China were sold at less than market value and determined duty margins of 24.67% for Minmetals and 305.56% country wide. It also determined that sales of pure magnesium from Israel were made at less than fair value during the period of investigation and determined duty margins but, at the time of writing, appeared that it would not apply duties to the imports from Israel.

- Australian Magnesium Corporation (AMC), after some difficulty and government assistance of about A$300 million in the last year, completed financing for the construction of a 90 000-t/y plant at Stanwell, Queensland. Metal production is expected to start in late 2004 and to reach full capacity in 2006. For further information, see the company's web site at http://www.austmg.com and Australian government sites at http://www.minister.industry.gov.au and http://www.qld.gov.au.

- Work on other Australian projects continues. Mt. Grace received Major Project status from the Australian government for its metal project and Samag continued work on its Pima project. Further information is available on the Internet at http://www.mtgrace.com and http://www.pima.com.au, respectively.

- A number of Chinese magnesium producers agreed in October to limit the production of magnesium to avoid continued surpluses of material. By the time of writing, markets had not been noticeably affected.

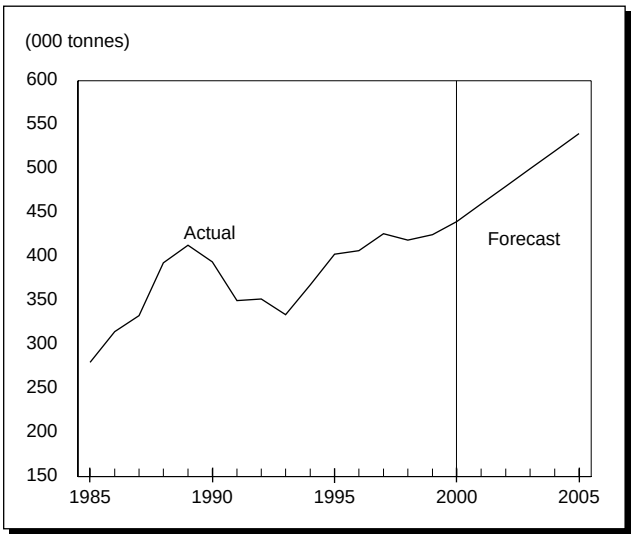
DEMAND OUTLOOK

Magnesium use is expected to increase to over 500 000 t/y by 2005. Growth will result from demand for magnesium in aluminum alloys and die-cast automotive parts, although the rate of growth will be dependent on the general economy, prices and price stability. Magnesium continues to face stiff competition from other materials, including aluminum, steel and plastics, in the all-important automotive parts sector. New applications and increased awareness of the advantages of magnesium in certain applications are growing, particularly in the automotive industry.

In Canada, reported use of magnesium increased from a revised 43 850 t in 1999 to over 52 000 t in 2000, due in part to an increased number of

companies reporting. It should be noted that published figures on use may include run-around scrap and work is nearing completion on a revised survey for 2001 data.

Figure 1
World Magnesium Use, 1985-2005



Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metal Statistics.

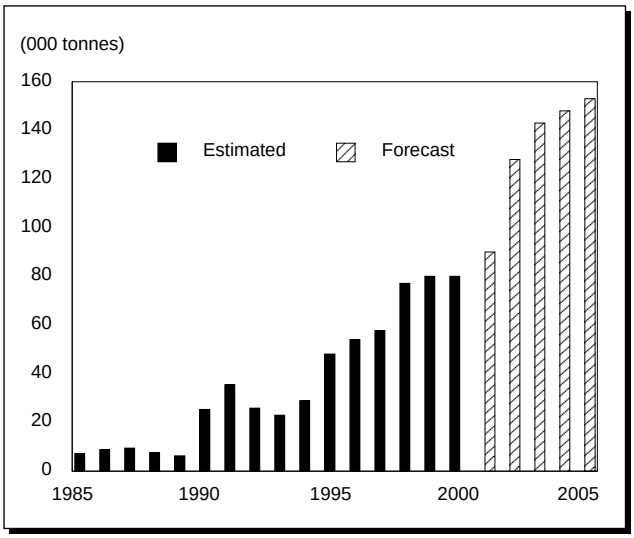
CANADIAN AND WORLD PRODUCTION OUTLOOK[1]

In 2001, Canada was the third largest producer of primary magnesium in the world after China and the United States; however, in 2002, with the closures in the United States and the ramping up of Magnola Metallurgy, Canada is expected to become the second largest producer.

Canadian primary magnesium production increased dramatically with the opening of Hydro Magnesium's 40 000-t/y primary magnesium plant at Bécancour in 1990. Installed Canadian primary nameplate capacity has since remained stable, but is now set to increase due to the start-up of Magnola Metallurgy's 58 000-t/y plant at Danville, Quebec, and a debottlenecking of Hydro Magnesium's Bécancour plant. Canadian primary magnesium production is expected to rise to approximately 80 000 t/y in 2002.

A number of projects around the world, primarily focused in Australia, could, if all constructed, significantly increase magnesium production to more than double today's production rate. World primary magnesium production is expected to rise from an estimated 460 000 t in 2000 to more than 550 000 t/y by 2006 and higher if many new producers achieve their goals.

Figure 2
Canadian Magnesium Production, 1985-2005



Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metal Statistics.
Notes: Canadian production data are confidential due to the limited number of producers. This is estimated production and includes recycled material.

PRICE OUTLOOK

Prices for primary magnesium remained relatively weak for most of the year as markets and governments continued to react to increased production and magnesium exports from China. Prices as published by *Metals Week* for magnesium again trended downward through the year. The U.S. Spot Western Mean price started the year at around US$1.26/lb, decreasing to below $1.25/lb late in the year, while mean U.S. dealer import prices decreased from US$1.08/lb to $1.06/lb. Hydro Magnesium's European producer price for pure magnesium started the year at 2.33/kg but, after declining to 2.22/kg in January, rose to 2.42/kg in July. Late in 2001, prices for magnesium produced in China were reported to be in the range of US$1200-$1300/t, f.o.b. China.

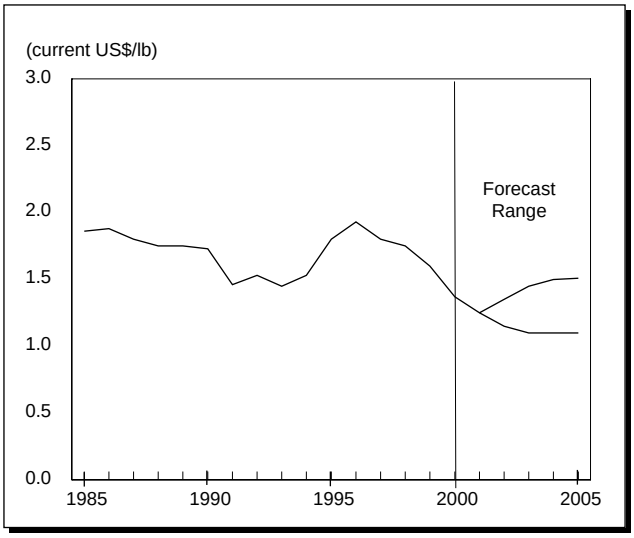
A major influence on magnesium prices will be the changes in supply over the next decade as the result of closures, expansions, the re-opening of existing capacity, or the opening of new plants in China, Canada, Russia, the Middle East and Australia.

[1] It should be noted that magnesium statistics vary between sources.

Another major factor will be the economy of the world and its impact on automotive use of the metal in more magnesium-intensive applications along with the imposed duties in the U.S. and EU markets. The availability of newer, possibly lower-cost, supply may eventually cause prices to decline. Prices are expected to remain historically weak, likely in the bottom part of a US$1.10-$1.50/lb range, over the medium term until use catches up with production rates and stockpiles.

Note: Information in this article was current as of November 1, 2001.

Figure 3
Magnesium Prices, 1985-2005



Source: *Metals Week* (U.S. Spot Western Mean).

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Nickel

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(Abbreviations used in this article include: **e** Estimated; **f** Forecast; **p** Preliminary; Ni = nickel; NiO = nickel oxide sinter; Cu = copper; Co = cobalt; pgm = platinum group metals; Pt = platinum; Pd = palladium; FeNi = ferronickel; LME = London Metal Exchange.)

2000 nickel: $1.8 billion**p**
World rank: Second
2000 exports: $1.7 billion

Canada	2000	2001**e**	2002**f**
	(000 tonnes)		
Mine production	190	187	190
Refined production	134	141	143
Usage	15	14	15

e Estimated; **f** Forecast.
Notes: Mine production refers to metal content in concentrates produced. "Refined" production refers to "primary" nickel production, which includes refined nickel, nickel in nickel oxide sinter, and nickel in nickel chemicals.

Nickel's resistance to corrosion, high strength over a wide temperature range, pleasing appearance, and suitability as an alloying agent make it useful in a wide variety of applications. Markets for primary nickel include stainless steel (64%), nickel-based alloys, electroplating, alloy steels, foundry products, batteries, and copper-based alloys. Nickel is intensively recycled; between 45% and 48% of nickel used to make stainless steels is in the form of stainless steel scrap.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE

1997	1998	1999	2000	2001**e**
		(US$/lb)		
3.14	2.09	2.73	3.92	2.65

e Estimated.

CANADIAN OVERVIEW

- **Inco**: A feasibility study of the Totten discovery (10 Mt grading 1.5% Ni, 1.97% Cu and 4.8 g/t Pd and Pt) continued. Exploration continued at the Copper Cliff North and McCreedy East mines for pgm-rich areas. Negotiations between Inco and the Government of Newfoundland and Labrador about the Voisey's Bay project resumed in June with a target for completion of year-end 2001; provincial processing requirements remain the major issue. Inco ceased exploration activities at Voisey's Bay in the third quarter of the year; Inco raised US$230 million selling Lyon notes. Inco produced 149 000 t of Ni worldwide in nine months, compared to 148 000 t in the same period in the previous year.

- **Falconbridge**: After a seven-month strike, workers at Falconbridge's Sudbury operations agreed to a new labour contract in February lasting until February 28, 2004. Falconbridge's operations returned to full production by June. Falconbridge bought the Montcalm property from Outokumpu in May; Montcalm has a potential to produce 8000 t/y of Ni in concentrate. Falconbridge's nine-month mine production was 35 000 t, compared to 38 000 t in the same period in the previous year.

- The Ontario government issued Notices of Intent to Inco and Falconbridge that the hourly ground-level concentration of SO_2 will be reduced to 0.32 ppm from 0.50 ppm by April 2002 and that allowable yearly SO_2 emission will be reduced by 34% by 2006. Public consultations are the next step.

- **Sherritt International** owns 50% of **Metals Enterprise** (ME); ME's nine-month production at its Fort Saskatchewan refinery was 21 000 t of Ni and 2100 t of Co, up 16% and 11% respectively compared to the same period in the previous year. ME is expected to establish a new record at Moa Bay, Cuba, mining higher grade ore.

- **North American Palladium**'s new 15 000-t/d mill is producing; the $207 million mine/mill expansion will increase by-product Ni production to about 900 t/y when ramped up. The concentrate is sent to Inco and Falconbridge for processing.

- With financing of $6.7 million secured, **Canmine** will start the final phase of expansion of its hydrometallurgical plant in December 2001; initial production will be 300 t/y of Co in chemicals, and a subsequent expansions will see Ni production from the refinery.

- **The Royal Canadian Mint** completed its program to substitute solid alloy coins with new plated coins using a proprietary Ni-Cu and Ni-Cu-Ni plating process. The Mint will save $10 million per year and reduce Ni usage in coins; the former coins will be available for recycling.

WORLD OVERVIEW

- **Norilsk Nickel** completed its share swap; now **Norilsk Nickel MMC** owns **RAO Norilsk Nickel**, instead of the reverse. The major shareholder of Norilsk Nickel MMC is Interros; foreign interests own 17.5%. Norilsk said it would only export 155 000 t of Ni in 2001; lower domestic demand implies that Norilsk is building a Ni stockpile, estimated to reach about 50 000 t by year-end. To compensate for falling ore grades, Norilsk will pay Outokumpu US$250 million to build a modern 10-Mt/y mill, replacing an older one, and to expand another mill by 7 Mt/y; Norilsk increased mine operations to seven days/week as of October 1, mining more ore because of lower ore grades.

- **WMC** sold some smaller mines in Australia: The **Miitel Joint Venture** bought the Miitel mine in May and the Wannaway mine in the third quarter while the Otter John and Coronet mines were sold to **GBF Pty Ltd**. These companies will sell the ore to WMC for processing. WMC bought the Yakabindie deposit from **Rio Tinto** in the first quarter.

- Pressure acid leach plants: **Anaconda**'s Murrin Murrin plant produced 19 300 t in nine months, up 220%, or 10 600 t compared to the same period in the previous year; operation at the nameplate capacity of 60 000 t/y by mid-2002 was promised. **Preston Resources'** Bulong plant produced 4200 t in eight months, up 150%, or 1500 t, compared to the same period in the previous year. **Centaur**'s Cawse operation went into receivership; no production details were released in 2001. The Cawse plant is for sale and Inco and WMC were among those expressing interest. A lack of both financial or technical success at the above Australian pressure acid leach plants inhibits most proposed similar pressure acid leach developments worldwide except for Inco's Goro project. This project, which secured a tax holiday in New Caledonia, is targeted to start up in late 2004 producing 54 000 t/y of Ni in NiO by 2006. Norilsk will fund a bankable feasibility study and progressively pay **Argosy Minerals** for increased ownership in the Nakety project in New Caledonia.

- **BHP** and **Billiton** merged in June to form **BHP Billiton** with Ni interests in **QNI** and **Cerro Matoso**, as well as in the Ravensthorpe and Gag Island projects. The feasibility study of the 35 000-t/y Ni, 2000-t/y Co Ravensthorpe project was extended to the fourth quarter of 2002. Forestry concerns at Gag Island in Indonesia inhibited Falconbridge from completing its purchase of a 37.5% share in the BHP Billiton-PT Aneka Tambang laterite project.

- Production cuts in 2001 included: **Ufaleynikel** in Russia, 3000 t; **Falcondo** in Dominican Republic, 5300 t; **Korea Nickel**, 3000 t; **Sumitomo** in Japan, 4000 t by the end of the first quarter of 2002; WMC in Australia will cut output of Ni in matte by 3000 t in 2001 and by a further 3000 t in 2002.

- Project delays have included: Ravensthorpe (noted above); the 40 000-t/y Nonoc project in the Philippines (**Jinchuan** will not participate and **Pacific Energy** wrote off its 37.5% share of the project); the 40 000-t/y Mindoro project (Philippine authorities canceled **Crew Development**'s contract of work); and **Weda Bay** suspended work in Indonesia as **OMG** reduced funding due to business uncertainties.

- Expansions: **Eramet** will expand at **SLN** (from 60 000 t in 2001) to 75 000 t by 2006; **Sumitomo** and **Rio Tuba** will build a 10 000-t/y leach plant in the Philippines to produce Ni-Co intermediates for Sumitomo's refinery in Japan; **Feni-Mak** in the Former Yugoslavian Republic of Macedonia restarted its 8000-t/y plant in April; the **Pobuzhsky Ferronickel Works** in the Ukraine restarted in April and will produce 6000-t/y of Ni in FeNi; **Tectonic Resources'**s RAV8 started up in April and will send 9000 t of Ni in concentrate to WMC over two years; **Loma de Niquel**'s 19 000-t/y mine smelter started up in Venezuela

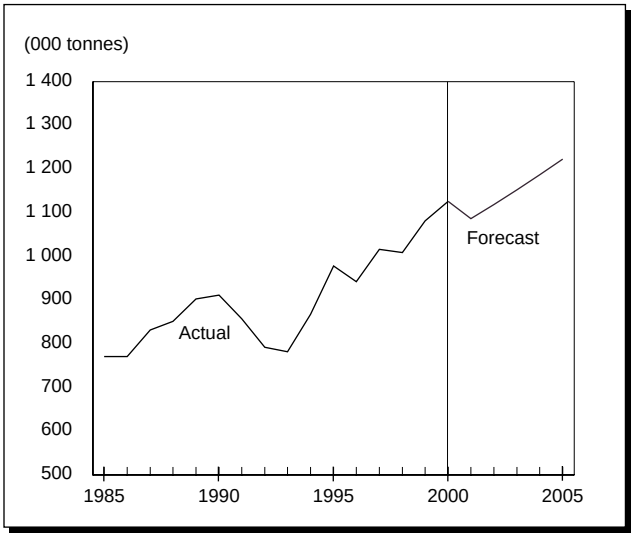
and is scheduled to produce 11 000 t of Ni in FeNi during ramp-up in 2001; and **Cerro Matoso**'s 26 000-t/y expansion in Colombia produced its first FeNi on January 1 and expects ramp-up to be completed by mid-2002.

- Australian nickel producer **Titan Resources** continued trials to commercialize its BioHeap^{TM} bacterial leach for sulphide ores; the Research and Productivity Council in Canada is testing 65 t of Inco's ore from Canada for use in cold climates. Titan is commissioning a plant in Australia to recover metals and mixed sulphides from the bioleaching.

DEMAND OUTLOOK

The world nickel market forecast by the International Nickel Study Group (INSG) in April was a surplus of 35 000 t for 2001. The updated INSG forecast will be completed in November (after the due date for this article). The October INSG Bulletin showed increased finished production of 18 000 t and decreased demand of 46 000 t to August 2001 compared to August 2000. Nickel demand was adversely affected by destocking in the stainless steel industry as demand fell with economic activity. Medium-term world use is expected to trend at about 3%/y, but will be controlled by economic growth rates. Lower prices in the latter half of the decade are expected to increase demand as technology makes Ni production cheaper.

Figure 1
World Primary Nickel Use, 1985-2005



Source: Natural Resources Canada.
Note: This is an average forecast; yearly actuals will differ from the trend.

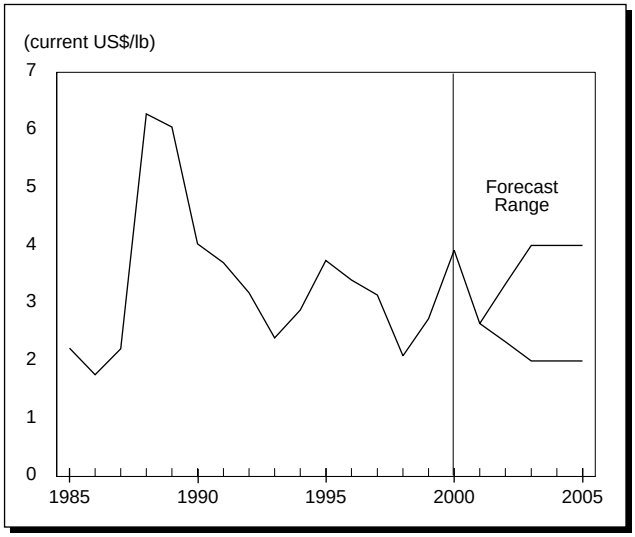
PRODUCTION OUTLOOK

Canadian production of nickel in concentrate in 2001 is forecast at 187 000 t and is expected to rise back to the 2000 level of 190 000 t in 2002. Finished nickel production in Canada is forecast at 141 000 t in 2001, rising to 143 000 t in 2002. Both forecasts assume no strikes or unforeseen production interruptions. Depending upon prices, permitting and financing, possible new production in the medium term includes: **Canmine**'s Maskwa deposit, **Falconbridge**'s Montcalm deposit, and **Inco's** Totten and Voisey's Bay projects. **Nuinsco** in Manitoba and **Ft. Knox-Dynatec** in Ontario have the potential to produce from former Inco properties and mines. Because of the relative size of Voisey's Bay and the associated uncertainty, a yearly forecast of Canada's nickel production is not presented.

PRICE OUTLOOK

Nickel cash settlement prices on the LME peaked in May at US$7535/t ($3.42/lb); despite a small rebound in August, prices continued downward to, at the time of writing (October 31), US$4420/t (or $2.00/lb). The average price for the year to October 31 is US$6085/t ($2.76/lb). If the price were to average US$4500/t during the last two months of 2001, then the year's average would be US$5832/t, or $2.64/lb. LME stocks rose from 9624 t in January to 17 844 t on October 31, peaking at 18 180 t on October 24.

Figure 2
Nickel Prices, 1985-2005
Annual LME Cash Settlement



Source: Natural Resources Canada.

Prices in 2002 will depend upon the recovery of the world economy. The outlook seems gloomy as of October, although de-stocking of nickel inventories has taken place. The build-up of Norilsk's stockpile overhangs prospects for price growth in 2002. In the medium to long term, prices are expected to average between US$2 and $4/lb; if pressure acid leach operations show good production records and low costs by the period 2005-07, prices are then expected to trend downward as lower-cost production starts up. The downward price trend will assist nickel demand growth. The prices below are shown in current dollars or dollars of the day.

Note: Information in this review was current as of October 31, 2001.

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Zinc

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2000 mine production:	$1.57 billion
World rank:	Second (metal production)
Exports:	$1.68 billion

Canada	2000	2001e	2002f
	(000 tonnes)		
Mine production	970	980	850
Metal production	780	705	730
Usage	176	180	190

e Estimated; f Forecast.

Zinc is used in the automotive and construction industries for the galvanization of steel and manufacture of die-cast alloys, in the production of brass, in semi-manufactures such as rolled zinc, and in chemical applications. Promising new applications for zinc are in the manufacture of zinc-air batteries and in galvanized steel studs as an alternative to wood in residential construction. Recycled zinc has become an increasingly important source of the metal in recent years. Recycled zinc includes high-purity refined zinc, remelted zinc of a purity less than 98.5% zinc, and zinc scrap used in the production of zinc alloys. Canada currently produces only a minor amount of recycled zinc exclusively from recycled feeds in primary zinc smelters. However, refined zinc from the processing of electric arc furnace dusts or from the de-zincing of galvanized steel scrap may become important in the future.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE FOR SPECIAL HIGH GRADE ZINC

1997	1998	1999	2000	2001e
		(US$/t)		
1 313.3	1 023.3	1 077.3	1 128.1	1 050

e Estimated.

CANADIAN OVERVIEW

- Cominco Ltd. began a series of announced production cutbacks at its Trail smelter in southern British Columbia. Zinc production was reduced by about 100 000 t for the period December 2000 to September 2001. The cutbacks were part of a plan to allow for a fixed-price power swap agreement with a major U.S. energy company. Elsewhere at Cominco, work continued in preparation for the closure of the Sullivan mine at Kimberly, British Columbia.

- Boliden Limited will temporarily halt production starting in December at its Myra Falls mine in British Columbia due to low metal prices.

- In April, Teck Corporation and Cominco announced that two companies would merge. Teck Cominco Limited was formed in July and ranks as the fourth largest North American-based base-metal mining and refining company.

- Falconbridge Limited's Kidd Mining Division in Timmins, Ontario, reduced production due to ground movement that occurred at the No. 1 mine in late December 2000.

- Breakwater Resources Ltd. suspended operations at the Langlois mine located in northwestern Quebec due to problems associated with the main

ore pass system. A decision to re-open the mine awaits financing and an improvement in the price of zinc. The company also announced the accelerated closure of the Nanisivik mine in Nunavut. The mine will be closed in September 2002.

- Work continued at Hudson Bay Mining and Smelting Co., Limited's new zinc tank house at the Flin Flon smelter. When completed before the end of this year, capacity will be increased by 15% to 115 000 t/y. Elsewhere, the company announced the permanent closure of the Ruttan mine in Manitoba for the end of May 2002.

WORLD OVERVIEW

- Noranda Inc., Teck Cominco Limited, BHP Billiton Plc and Mitsubishi Corporation announced that the Antamina copper-zinc project in northern Peru had achieved commercial production in October, more than four months ahead of the original schedule of February 2002.

- Outokumpu Oyj announced that is was getting out of base-metal mining and placed the Tara zinc mine in Ireland on care and maintenance in November, pending better zinc prices. Tara is the largest zinc mine in Europe and produces nearly 200 000 t/y of zinc in concentrate.

- ASARCO Incorporated, a wholly owned subsidiary of Grupo Mexico S.A. de C.V., announced that it would suspend its zinc mining and processing operations in the state of Tennessee in November due to low metal prices.

- Pasminco Limited was placed into voluntary administration in September in an attempt to restructure the company's debt of over A$3.4 billion. As part of the restructuring, final bids for the sale of the new Century zinc mine in Queensland are expected before the end of the year.

- Industrias Peñoles, S.A. de C.V. opened the Francisco I Madero zinc mine in the Mexican state of Zacatecas in September. The mine will operate with a production capacity of 110 000 t/y of zinc in concentrates.

- In July, Anglo American plc postponed development of its Gamsberg zinc mine in South Africa due to economic uncertainty and low zinc prices.

LEADING WORLD ZINC PRODUCERS

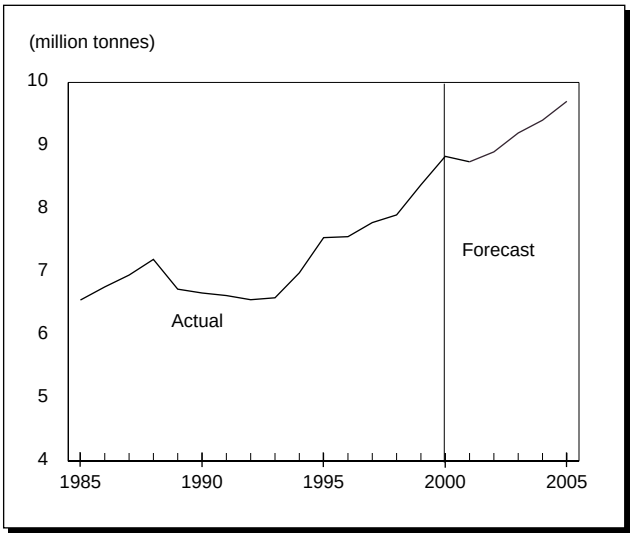
Producers Zinc in Concentrate	2001e	Producers Zinc Metal	2001e
	(000 tonnes)		(000 tonnes)
China	1 860	China	2 100
Australia	1 484	Canada	705
Canada	980	Japan	646
Peru	960	Australia	548
United States	830	South Korea	530

Source: International Lead and Zinc Study Group.
e Estimated.

DEMAND OUTLOOK

According to the International Lead and Zinc Study Group (ILZSG), global demand for refined zinc metal is expected to contract by 0.7% in 2001 and by 3.1% in the Western World. In 2002, however, demand is forecast to increase by 1.8% worldwide and by 1.3% in the West. The fall in 2001 will be heavily influenced by a predicted 10.7% decrease in the United States, reflecting negative trends in the construction and automotive industries, the main end-use sectors for galvanized steel. In 2002, a limited recovery in the United States of 3.6% is predicted.

Figure 1
World Zinc Use, 1985-2005



Source: Natural Resources Canada.

The European outlook is not as severe with a reduction of 0.8% expected in 2001 followed by a rise of 0.4% in 2002. Despite expected falls in Japan, South Korea and Taiwan (China), overall demand in Asia is expected to continue to grow, by 2.8% in 2001 and 2% in 2002, primarily as a consequence of further increases in China.

Overall, galvanizing will remain the dominant end use of zinc and exhibit the largest increase in demand during the forecast period, followed by brass and die-cast alloys.

CANADIAN PRODUCTION OUTLOOK

Zinc mine production is expected to be about 2% lower in 2001 compared to 2000. Lower output as a result of the closure of the Langlois mine and reduced production at a number of other mines was largely offset by increased production at the new circuit at Agnico Eagle Limited's LaRonde mine. Mine production overall is expected to decrease by about 13% in 2002 as a result of the closures of the Sullivan and Myra Falls mines in December 2001 and the Polaris, Nanisivik and Ruttan mines in 2002.

Zinc metal production in Canada is expected to decrease by about 10% over 2000 but to rise again by 3.5% in 2002 as the full effects of the expansion at Flin Flon come on stream.

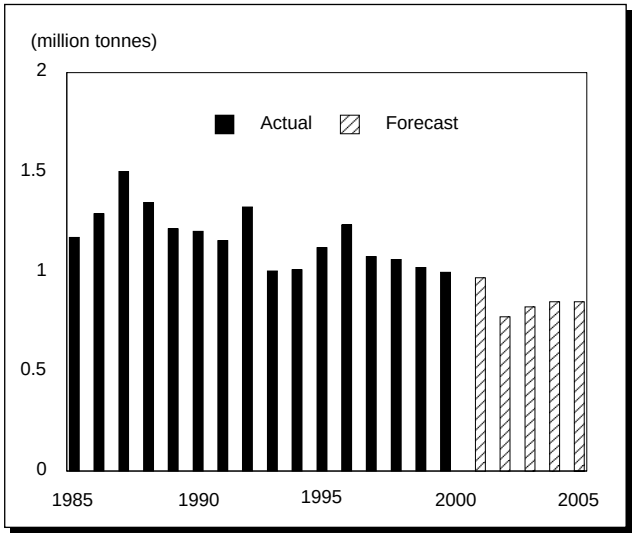
PRICE OUTLOOK

After maintaining a cash settlement price of around US$1050/t on the London Metal Exchange (LME) in the first quarter of 2001, zinc prices followed a downward trend, reaching record lows of less than $740/t by mid-November. A number of zinc producers are under severe financial pressure with no near-term relief for price increases expected.

While consumer stocks remained relatively constant over the year, stocks on the LME rose sharply at the start of the year from just over 300 000 t and continued to climb to over 400 000 t by mid-November. Overall, after taking into consideration releases from the U.S. Defense National Stockpile, the ILZSG envisages a substantial surplus of refined metal supply over demand in both 2001 and 2002. The Group acknowledged that the scale of the surplus in 2002, currently estimated at about 500 000 t, could be reduced if present production plans are curtailed as a consequence of low market price levels. Prices will continue to reflect the oversupply in the market and are expected to average about US$890/t in 2001 and to rise to average $920/t in 2002.

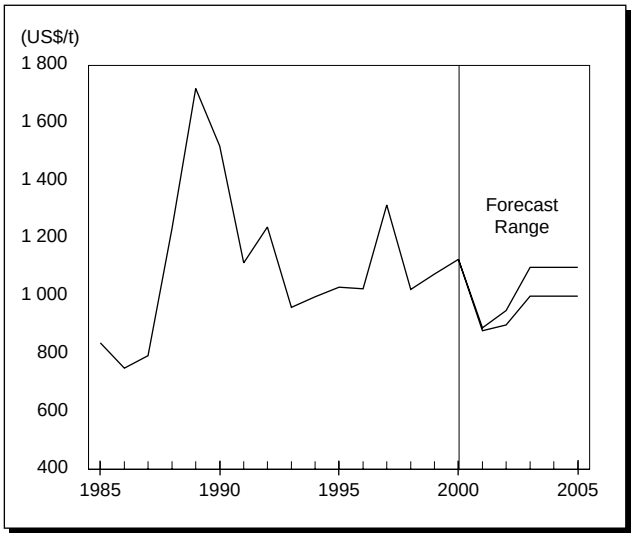
Beyond 2002, continued growth in galvanizing markets, combined with good growth overall for principal zinc markets, is expected in the remainder of the forecast period with zinc prices ranging from US$1100-$1200/t through to 2005.

Figure 2
Canadian Mine Production of Zinc, 1985-2005



Source: Natural Resources Canada.

Figure 3
Zinc Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

Note: Information in this article was current as of November 9, 2001.

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The Canadian and World Economic Situation and Outlook

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After registering strong growth in 1999 and through most of 2000, the Canadian economy slowed significantly in 2001. Real growth in Canada's Gross Domestic Product (GDP) increased 5.1% in 1999 and 4.4% in 2000 although, by the fourth quarter of 2000, it had slowed to an annual rate of 3.5%. This slowdown in the growth of the economy has continued through the first half of 2001 as the annual rate of increase decelerated to 2.5% in the first quarter and 2.1% in the second. The reduced growth exhibited this year is due largely to the weakening U.S. economy. Real GDP growth in the United States has not reached an annualized rate of even 2% since the second quarter of 2000 and, in the third quarter of 2001, declined by a preliminary rate of 0.4%.

The shocking terrorist attacks on the United States on September 11 and the events that have unfolded since will have significant negative economic consequences for both Canada and the United States for at least the next several months. In an effort to bolster the U.S. economy, the U.S. Federal Reserve Board has been aggressively cutting interest rates and both President Bush and the U.S. House of Representatives have passed fiscal stimulus packages centring on tax cuts. The Bank of Canada has also cut interest rates substantially in 2001 but, other than some modest tax cuts, further fiscal stimulus in Canada is unlikely as government revenues slow and increased expenditures on security measures and the military may not leave much room for additional fiscal measures. Under the present circumstances, economic growth in Canada for the rest of 2001 will likely be slightly negative, resulting in a growth rate for the whole of 2001 of about 1%. Growth is expected to pick up gradually through 2002, especially during the second half, resulting in a real rate of increase of about 1.5% for the year.

Canada's inflation rate averaged 2.7% in 2000. For the first nine months of 2001, the Consumer Price Index (CPI) has averaged 3.0%. High energy prices caused the rate to rise to 3.6% in the second quarter of 2001, but the rate has since moderated to an average of 2.7% in the third quarter. The core rate (which excludes the effects of energy and food prices), however, has remained remarkably steady, averaging just over 2% so far in 2001. For the year 2001, the all items CPI should average about 2.8% as the economy, operating below capacity, will produce rates near 2% by the end of the year with rates remaining at about that level through 2002.

The Bank of Canada's target for the overnight rate stood at 5.75% at the end of 2000. As evidence mounted that both the U.S. and Canadian economies were slowing, the Bank instituted a series of 25- and 50-point rate reductions (0.25% and 0.50%) through the first part of 2001. After the events of September 11 and as further evidence of a waning economy accumulated, the Bank cut the target rate for the eighth time by an aggressive 75 basis points, bringing the overnight rate in October 2001 to 2.75%, the lowest level in about 40 years. The chartered banks' prime business rate also declined by 75 points to 4.5%. The cuts have not had an appreciable effect as yet, but they are intended to underpin business and consumer confidence and provide additional support for domestic demand growth through 2002. With the Canadian economy expected to continue to weaken along with its U.S. counterpart, and as inflation ceases to be a concern, the Bank is likely to trim another 75 points off the target rate before this easing cycle ends.

The Canadian dollar has been undermined by the poorly performing U.S. economy, subsequent weakness in the Canadian economy, the global slowdown, and a continuing decline in commodity prices. Other factors may be financial market unease following the September 11 attacks and a potential Argentine default on some of its debt payments. Against other currencies, however, the dollar has not fared too badly. Since its lows in 1998, the Canadian dollar has gained against the euro, the British pound, the Swiss franc and the Australian dollar. After averaging about US$0.674 over the 1998-2000 period, the dollar averaged about US$0.649 for the first 10 months of 2001. In the wake of several unfavourable indicators coming from the United States at the end of October, the dollar sunk to an all-time low relative to the U.S. dollar, trading at under

US$0.63. In times of uncertainty and poor economic conditions, investors tend to invest in a "safe haven," which now is the U.S. dollar. The Canadian dollar, which continued to set new lows against the U.S. dollar in early November, will likely remain in the doldrums under US$0.63 for the rest of the year. The Canadian dollar should fare moderately better next year as signs of recovery in the United States and Canada begin to appear and as global demand for raw materials improves.

Even before the terrorist attacks in September, the Canadian economy was showing signs of slowing. It managed only a 0.4% annualized advance in the second quarter of 2001, its poorest performance since the third quarter of 1995. In addition to weakness in business investment and exports, both of which were becoming evident earlier in the year, consumer spending grew at only a 1.1% pace in the second quarter. Early third-quarter data on retail sales suggests that consumer spending remains subdued – a 0.3% increase in August offset a 0.3% decline in July. Sales by auto dealers, furniture stores and clothing stores have softened, which may indicate consumers are cutting back on discretionary purchases. Canada's export sector is affected by shrinking U.S. demand, and business investment is affected by falling corporate profits and flagging business confidence. Business investment is expected to increase by only about 0.6% in 2001 and by about 1.7% in 2002 compared to 6.6% in 2000. Corporate profits, which increased almost 22% in 2000, are expected to increase by about 4.4% in 2001 and remain flat in 2002. A Statistics Canada business conditions survey, conducted quarterly to test manufacturers' plans for production and employment, showed companies more pessimistic in October 2001 than at any time since 1990/91.

Canada's unemployment rate declined steadily over the 1997-2000 period, dropping from an annual average of 9.2% in 1997 to 6.8% in 2000. The rate has averaged a little over 7% so far in 2001 but, with job losses expected to increase for the remainder of the year, the rate should average about 7.2 or 7.3% for 2001. The labour picture, combined with falling equity markets, indicates that consumer spending in Canada will remain soft.

Canada's construction sector, by contrast, seems to be weathering the downturn in economic activity relatively well. Housing starts are expected to reach about 158 000 in 2001 compared with about 152 000 in 2000. Lower mortgage rates, a relatively low inventory of new buildings, and firm home prices have helped support this sector. Housing starts may decline in 2002, however, as the economic slowdown continues through the first part of the year.

Canada's merchandise exports fell to their lowest level in 17 months in August 2001 (the latest month for which data are available). Exports have been generally declining since January 2001 when they reached a record $38.4 billion. Imports in August declined slightly to $29.7 billion, leaving a trade surplus for August of $4.4 billion, the lowest surplus since April 2000. However, the cumulative merchandise trade surplus for the first eight months of 2001 stood at $48.3 billion, about $11.3 billion higher than for the same period in 2000. The most notable drop in exports in August occurred in exports to the United States, but shipments to all major regions of the globe also faltered. The short-term export picture is not bright. The events of September 11 have caused delays across the Canada-U.S. border, and the terrorist attacks have caused continuing weakness in the U.S. economy as well as in many of Canada's other major trading partners. Another concern is the tariff and duty penalties the U.S. government has imposed on softwood lumber exports from Canada. The two penalties (a 19.3% tariff imposed in August and a further duty averaging 12.6%) means the effective rate of duty is now up to 32%. Softwood lumber exports to the United States have dropped 10% since the countervail duty was imposed.

The lower Canadian dollar has, to some extent, helped the export sector. To the extent the dollar is lower, exporters are able to charge more in Canadian dollars than if the dollar were stronger and, as Canadian goods become cheaper for foreign buyers, they have an incentive to purchase Canadian goods. The opposite is true for importers. Higher costs (in Canadian dollars) cannot always be passed on to consumers in the current economic environment. Also, a weaker currency means costs, such as raw material costs, become more expensive for exporting companies.

The U.S. economy has been slowing for several quarters with the weakness becoming much more evident in the second and third quarters of 2001. After posting a respectable 4.1% real growth in GDP in 2000, growth declined to an annualized quarterly rate of 1.1% in the first quarter of 2001 and only 0.3% in the second. For the first time since early in 1993, the U.S. economy shrank in the third quarter of 2001. Preliminary figures released by the U.S. Department of Commerce indicate that the U.S. economy contracted by an annual rate of 0.4 % during that quarter. A fourth-quarter contraction seems increasingly likely as well. In an effort to counteract this weakening trend, the U.S. Federal Reserve cut interest rates nine times in 2001 by a total of 350 basis points. Because inflationary pressures are subdued, the Federal Reserve has room to continue cutting the interest rates, which is what it is expected to do one or two more times in 2001. In the third quarter, business investment in new plant and equipment declined at an annual rate of 11.9%, the third consecutive quarterly drop. Consumer spending rose, but at a feeble rate of 1.2%, the poorest showing since early 1993. Other recent indicators pointing to the deteriorating economic situation in the United States

include: orders to factories for durable goods fell in September for the fourth consecutive month; the number of Americans filing claims for unemployment benefits in late October reached its second highest level in nearly a decade; and U.S third-quarter corporate profits plunged an average of 21% on average compared to the third quarter of 2000.

In addition to the Federal Reserve's interest rate reductions in 2001, the U.S. government has initiated a substantial fiscal stimulus package. In August, the Administration announced a US$30 billion tax cut and rebate program that takes effect over the last half of 2001. The Administration also announced the allocation of US$40 billion to disaster relief, defence, intelligence and other anti-terrorist efforts. These funds will be dispersed through the end of 2003 with most to be spent in 2002. Another US$5 billion in direct subsidies and US$10 billion in loan guarantees to the airline industries is forthcoming in the fourth quarter of 2001. President Bush is also urging the speedy passage of an additional US$100 billion stimulus package that, as of early November, was being debated in the House.

While the impact on economic growth of these monetary and fiscal measures will be modest at best for the rest of 2001, the boost to the U.S. economy in 2002 will likely be substantial and supports the case for a meaningful rebound in economic growth during the latter part of 2002 and through 2003. For the whole of 2002, real growth should approach about 1.5% although, towards the latter part of the year, real growth above 3% is anticipated. This rate may be expected to continue through 2003. If this turns out to be the case, the Federal Reserve may move to a more restrictive monetary position in 2003.

A major downside risk with these scenarios is the impact of the September 11 terrorist attacks. Repercussions from those events are still unfolding. Future attacks or other disruptions cannot be ruled out. Even the threat of attacks or perceived threats will undoubtedly shake the confidence of both consumers and businesses. Two reports released in early November reinforce this view. The National Association of Purchasing Management said its monthly factory index fell to its lowest level since early 1991. New orders and production both fell. In the other report, the U.S. Department of Commerce stated that personal spending in September declined 1.8%.

The terrorist attacks are also expected to take a toll on global economic output. With the U.S. economy expected to contract over the last half of 2001, world economic growth seems set to drop to just over 2% in 2001, compared to a growth rate of 4.8% in 2000. A major contributor to this slowdown has been a decline in world trade, which has dropped since the beginning of the year in line with the U.S. slowdown. While few regions are expected to escape the effects of the attacks, Latin America and the emerging economies of Asia may suffer the most as they are still emerging from the economic and financial crises of a few years ago.

Japan is attempting an ambitious program of financial and fiscal restructuring. Even before the events of September 11, and assuming that the restructuring would be successful, the outlook for Japan was for growth to remain below 1% for several years. With the more pessimistic world outlook, Japan may be expected to register negative growth over the next two years. If the forces against restructuring prevail, Japan can expect a more prolonged stagnation.

The weakness of the Japanese economy, combined with reduced U.S. demand for their information technology (IT) products, has caused a significant deterioration in the IT-exporting countries of Taiwan, South Korea, Hong Kong and Singapore, where their combined growth rate is expected to decline from over 8% in 2000 to less than 1% this year. South Korea, alone among these countries, should experience reasonable growth this year and next due to its more diversified export base and stronger domestic demand. Other Asian countries are weathering the storm better due to their lower reliance on high-tech exports, but even they are being affected. Civil and political tensions in some of these countries add to their concerns.

China seems to have escaped much of the turmoil affecting much of the rest of the world. Real growth in China should remain above 7% through 2003 at least.

The European Central Bank's modest interest rate response to the economic downturn will not likely prevent growth in the euro-zone from falling to below 2% in 2001 from almost 3.5% in 2000.

The financial crisis facing Argentina has eased somewhat with the recent US$8 billion International Monetary Fund loan. The loan will likely enable Argentina to meet its financial needs for the rest of 2001, although short-term financing pressures are likely to return next year. Mexico is being greatly affected by the U.S. slowdown. Eighty-five percent of Mexico's exports are destined for the United States. As a result, growth in Mexico is expected to decline to less than 1% in 2001 from nearly 7% in 2000.

In Russia and other Commonwealth of Independent States (C.I.S.) energy-exporting countries, the combination of higher oil prices and sharply depreciated exchange rates led to a surge in real GDP growth to 8.6% in 2000. In 2001, C.I.S. GDP growth is projected at 4.4%, 3.5% lower than in 2000. The decline in 2001 largely reflects the partial reversal of the factors that boosted growth earlier – real exchange rate appreciation, weaker-than-expected activity in Western Europe, and lower energy prices.

Note: Information in this article was current as of November 2, 2001.

Sources: Bank of Canada, October 23, 2001 Press Release, *Remarks by Governor of the Bank*, October 24, 2001; Canada Mortgage and Housing Corporation, Press Release, May 2, 2001; International Monetary Fund, *World Economic Outlook*, October 2001; Statistics Canada, *The Daily*, October 19, 2001, Canadian International Merchandise Trade, October 22, 2001, retail trade; TD Economics, *Quarterly Economic Forecast*, September 26, 2001; *Policy Response to Terrorist Attack*, October 5, 2001; TD Economics Commentary, October 19 and October 23, 2001; Comments and reports on aspects of the Canadian and world economic situation and outlook in *The Globe and Mail Report on Business, The Financial Post* and *The Ottawa Citizen.*

World Summit on Sustainable Development – The Case for a Minerals and Metals Perspective

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From August 26 to September 4, 2002, Johannesburg, South Africa, will host the world at the World Summit on Sustainable Development (WSSD). More than just an event to mark the 10th anniversary of the United Nations Conference on Environment and Development (Earth Summit), the WSSD also holds the potential to raise activity related to mining, minerals and metals to a higher level.

For many years, there has been a concern about the lack of a high-level intergovernmental policy forum where issues related to minerals and metals could be discussed in a sustainable development context. Regional issues are being effectively addressed through such fora as the Mines Ministries of the Americas (CAMMA), the Asia-Pacific Economic Cooperation (APEC) Expert Group on Mineral and Energy Exploration and Development (GEMEED), and an emerging network of mining ministries in southern Africa. Sector-specific considerations, such as production, product stewardship, and science, research and development issues, are being addressed through such mechanisms as the multi-stakeholder Nonferrous Metals Consultative Forum on Sustainable Development, supported by the three commodity study groups. The Intergovernmental Forum on Chemical Safety (IFCS) addresses risk assessment and environmentally sound management of chemicals, but is not mandated to cover the social and economic aspects of sustainable development.

While each of these initiatives is positive, even when taken together they do not provide a holistic, sustainable development approach to the mining and metals sector. There are few linkages among them. In some cases, recommendations emanating from these fora are not enacted because there is no responsible body for follow-up. And while mines ministries may be fully involved in the discussions, the information is often not available to other ministries. The result is that governments lack a means of moving forward on important issues at a global level – a limitation that is becoming more and more significant in our increasingly globalized world.

Mining and metals have significant international implications. While mining remains important in many developed countries, it is increasingly moving into developing countries. Metals use is still primarily a factor in developed countries, but is also growing rapidly in developing countries.

There are also global social and environmental considerations associated with minerals and metals. These can be found at both the production (mines) and product levels, and can affect the developed and developing worlds in different but related ways. In addition, products using metals are internationally manufactured and traded with resulting global implications. To date, there has not been a way for governments to address these issues at a global level with the full participation of all interested and affected stakeholders.

The WSSD presents a unique opportunity to remedy this situation. The WSSD will shape the global sustainable development agenda for the coming years. It will both review progress made since the 1992 Earth Summit and identify priorities for further action in new areas or on emerging issues. The WSSD is not intended to re-open Agenda 21, the program of action adopted at the 1992 Earth Summit. Rather, it will focus on the specific actions needed to accelerate progress towards sustainable development. From a metals perspective, one positive outcome would be for Heads of Government at the Summit to acknowledge the importance of metals to society and to issue a call for governments to explore how mining, minerals and metals can contribute to sustainable development.

How Could the WSSD Impact on Minerals and Metals?

The proposal is a two-stage approach. First, it seeks endorsement from the highest level of government to address mining and metals issues at a global level and in a sustainable context. This high-level commitment will help raise the profile of metals and sustainable development on the world stage and provide momentum for continued action.

Minerals and metals are just one of a range of issues that could be addressed at WSSD. Since it would not be possible for leaders to fully explore all aspects of the issue in the limited time available at the WSSD, a more useful outcome would be for leaders to establish a process that would facilitate in-depth examination at a later time.

The second phase would come after the WSSD. It would bring together interested governments and other stakeholders to identify approaches for future cooperation.

Participants would be asked to consider creating a forum or building on an existing body to enable governments to work together to address global mining and metals issues. If there were agreement to establish such a forum, the discussion would then move on to how it should be structured and organized, as well as to the types of issues that should be addressed.

Without pre-supposing the outcome of such discussions, there are a number of features that would be desirable in any such forum:

- It should be a government forum, with stakeholder participation, since many of the issues affecting minerals and metals require action by governments, or by governments working with other stakeholders.

- It should be based on all three pillars of sustainable development (economic, environmental and social) in order to ensure balanced outcomes.

- It should consider the full life cycle from mining to metals and recycling.

THE WAY FORWARD

The agenda-setting process for the WSSD includes a series of regional meetings in the fall of 2001 aimed at identifying regional priorities. The results of these meetings will then be reviewed during a series of global preparatory meetings, between January and May 2002, that will identify the themes and/or develop the documents to be adopted in Johannesburg.

Several regional meetings identified mining and metals as priority areas for action at the WSSD. Industry will also be seeking to have its Mining, Metals and Sustainable Development (MMSD) report acknowledged at the WSSD. Canada will be working with other interested governments throughout the preparatory process to support having minerals and metals addressed at the WSSD.

At the Earth Summit in 1992, the relationship between sustainable development and minerals and metals was not well understood. At that time, minerals and metals and related compounds were dealt with in the context of chemicals management and hazardous waste. But this treatment did not recognize that the management of inorganic chemicals, such as minerals and metals, should take into account criteria that are different from those applied to organic chemicals. The 10-year review of Agenda 21 in Johannesburg gives governments an opportunity to build on what they have learned in the last decade and to launch a process of dialogue and information sharing that will allow for real progress in the minerals and metals sector.

The International Metals Study Groups' Work on Sustainable Development

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An intergovernmental consultative forum was established in September 2000 to examine the role of nonferrous metals in sustainable development. This initiative was launched by the members of the International Copper Study Group, the International Lead and Zinc Study Group and the International Nickel Study Group. These three autonomous, United Nations-affiliated intergovernmental organizations were set up to provide accurate and timely statistical and other data on the production, use and trade of the four principal nonferrous metals.

The 38 governments involved in the Study Groups and this initiative are those with an interest – whether as producers or users – in ores, concentrates and metals. This initiative covers issues relating to the entire life cycle of metals in the context of sustainable development, and will help promote a better understanding of the contribution that nonferrous metals can make to sustainable development.

RATIONALE FOR THE INITIATIVE

Sustainable development provides a useful policy framework for governments to help provide future generations with as many options for development as are available to the present generation. Sustainable development can be pursued through policies that integrate social, economic and environmental considerations into the decision-making process.

Issues that affect one metal are often common to another; for example, a product restriction on one metal could have an adverse impact with regard to another metal, especially when the two are co-produced. Many countries have widely differing views on the environmental impacts of metals. Some views could have significant implications for the continuing use of the metals in many applications with clear adverse repercussions for other countries involved in the production chain.

It is essential that the full spectrum of national opinion be engaged to ensure the safe production, use, recycling and disposal of nonferrous metals. Working together, the three Study Groups provide a unique forum for governments from across the globe to discuss cross-metal social, economic and environmental issues with industry, multilateral institutions and other stakeholder groups.

ACTIVITIES

The Study Groups first convened a Workshop on Sustainable Development in London (U.K.) in late 1999. Workshop participants agreed to consider the possible role of the Study Groups in examining the potential contribution of mining and metals to sustainable development. They decided to establish the Non-Ferrous Consultative Forum on Sustainable Development in order to develop an action plan. They also agreed that the process should involve dialogue and cooperation among all stakeholders, including governments, industry, environmental and other non-governmental organizations (NGOs), local communities (representing indigenous and other people affected by all production stages), and users themselves.

The first meeting of the Forum was held in Brussels on September 28-29, 2000. It was co-chaired by Sauli Rouhinen, Ministry of Environment, Finland, and Alek Ignatow, Department of Natural Resources, Canada. The European Commission acted as host. Representatives from all major stakeholder groups were involved; some 90 delegates from 22 countries attended, including nine representatives from environmental and social NGOs. The discussions generated a list of recommended activities within the following six areas:

- stewardship programs,
- community consultation and involvement,
- promotion of recycling,
- research and development,

- open and transparent mechanisms to improve communication, and
- information development and dissemination for decision-making.

Reflecting the strong desire of the participants to achieve visible and rapid progress, three ad-hoc working groups were established to consider all the recommendations that emerged during the Forum and to act on those of common interest to all represented stakeholders. The three working groups are respectively focusing on:

- production of nonferrous metals,
- product stewardship, and
- science, research and development.

Each working group has co-chairs from government, industry and NGOs, and their mandate is to work on a consensus basis. Group members have established work plans and draw from existing work, share information, identify gaps, and rapidly initiate activities, taking into account the recommendations from the Forum. Each working group receives secretariat support from one of the three Study Groups. The Forum meets on an ad-hoc basis to monitor and review progress. The second meeting of the Forum was held in Porto, Portugal, on November 12-13, 2001. The Chairmen's summary follows this review.

Full contact addresses of the Study Groups and details of all the actions taken to date, including the London, Brussels and Porto meetings, are available on the Internet at www.nfmsd.org. Anyone with an interest in ensuring that nonferrous metals are available for future generations is welcome to support one or more of these multi-stakeholder groups.

Non-Ferrous Metals Consultative Forum On Sustainable Development

Porto, Portugal
November 12-13, 2001

CHAIRMEN'S SUMMARY

The member countries of the three international non-ferrous metals study groups – the International Copper Study Group, the International Lead and Zinc Study Group and the International Nickel Study Group – convened the second meeting of the Non-Ferrous Metals Consultative Forum on Sustainable Development in Porto (Portugal), November 12-13, 2001. The Forum was opened by Prof. Eduardo Oliveira Fernandes, Secretary of State for the Economy, Portugal. The meeting, hosted by the Government of Portugal at the Le Meridien Hotel, was co-chaired by Alec Estlander, Division Director, Finnish Environment Institute, Finland, and Gerry Miles, Assistant Director, Non-Ferrous Metals, Department of Trade and Industry, United Kingdom. Some 75 delegates from 21 countries attended, including 7 representatives from environment, social and other non-governmental organizations as well as those from industry, industry associations and governmental organizations such as the European Commission, the Common Fund for Commodities and UNCTAD. A list of Forum delegates is attached.

The Forum was convened to discuss progress made in each of the three Working Groups since the Brussels meeting and to chart a path forward. The Production Working Group, the Product Stewardship Working Group and the Science, Research and Development Working Group were established with a mandate to bring together existing work, share information, identify gaps and rapidly initiate activities identified by the Forum for future action. Over 100 participants from governments, industry, industry associations, non-governmental organizations, academia and intergovernmental organizations are collaborating in the work of the three Groups.

In addition to the individual tasks identified for action, the Working Groups collectively prepared an overall "vision" for the contribution non-ferrous metals make to sustainable development. This vision statement provides a useful checklist to assess progress and helps to set priorities for the future.

The co-chairs from each of the three Working Groups presented their results and ideas for seeking opportunities to move the work forward and to broaden participation, e.g.:

PRODUCTION WORKING GROUP

The Group will continue its work on Sustainable Development (SD) drivers and best practices in Community Engagement, developing case studies for presentation to and consideration by a broader forum.

SCIENCE, RESEARCH AND DEVELOPMENT WORKING GROUP

Recognizing that considerable work is already under way on life-cycle analysis and risk assessment, the Group will concentrate its efforts on adding value to the existing work under way globally on these topics.

PRODUCT STEWARDSHIP WORKING GROUP

The Group will move forward in a timely manner with a group of industry ssociations/companies/NGOs to pilot a product stewardship scheme based on the Principles and Criteria it has developed. The Forum encouraged the Group to share its experience in the coming months with other institutions, particularly the MMSD/ICMM, OECD and World Bank, to avoid duplication.

The work program for each of the three Working Groups is detailed in Annex A. Outputs from each of the Groups and background papers presented at the

meeting are available on the Forum's web site at www.nfmsd.org.

The Forum recommended that the joint Study Group Recycling Conference (planned for 2003) address policy issues concentrating on the needs of developing countries and economies in transition.

The Forum accepted that the linkage between the three Working Groups needs to be strengthened together with broader participation in each. Each Working Group has a role to play in this but the Working Group co-chairs will take responsibility for coordinating their activities.

The Forum recognized that it is essential to raise the profile of its activities and to work with other institutions as outlined in its strategic directions discussion paper, refined at the meeting to better reflect how this could be achieved. In addition, acknowledging the forthcoming World Summit on SD in Johannesburg, South Africa, the Forum recommended that member countries, unless they preferred a different approach, should engage their PrepCom representatives with a view to having the importance of minerals and metals recognized in the final Summit communiqué. Other stakeholders were encouraged to seek this same outcome through the channels open to them.

Recognizing that several opportunities to enhance the work of the Forum will present themselves in the coming months, the Forum directed the Working Groups to implement their work programs, to meet regularly on a monthly basis, and to report progress to a meeting of the Forum on April 8 and 9, 2002, at a venue to be decided.

The co-chairs noted the continued strong commitment of the Forum participants to work collectively to achieve tangible results. Considerable progress has been made already through the entirely voluntary efforts of this global group of stakeholders.

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December 5, 2001

Annex A

PRODUCTION WORKING GROUP

SD Driver Analysis

- Continue to add to database; focus on industry viewpoints/input;
- Continue to develop criteria for evaluating the effectiveness of sustainable development initiatives;
- Develop specific case studies on selected initiatives; seek the participation of people directly involved.

Community Engagement

- Expand the list of initiatives;
- Evaluate successful mechanisms for involving stakeholders in the decision-making process and develop case studies;
- Broaden participation;
- Invite individuals directly involved in these case studies to discuss their experiences/lessons learned in a broader forum;
- Broader forum to include other government departments not involved to date, i.e., environment, resources, health, finance and other international agencies (overseas development agencies, etc.) and NGOs covering geographical and developed/developing considerations;
- The broader forum to define the lessons learned and criteria for effective SD drivers and best practices in community engagement;
- Bring in financing and financial services community (Debt & Equity);
- Use the forum to address initiation of integrated decision-making/regulation and voluntary actions;
- Publish findings.

PRODUCT STEWARDSHIP WORKING GROUP

Recycling

- The Joint Study Group Recycling Conference should cover non-technical issues, i.e., social, policy and institutional, concentrating on policy issues affecting recycling and the needs of developing countries and economies in transition;
- A small task force, comprising the Study Groups' Secretariats in consultation with the appropriate bodies and the assistance of experts available within the Forum, e.g., commodity associations, NGOs and intergovernmental organizations, will organize this conference;
- It was noted that organizations such as the World Bank would be more interested in financing support for enabling policies and capacity building rather than hard technology transfer;
- UNCTAD offered to support the conference.

Product Stewardship Scheme

- Approval of cascading from vision to principles to criteria was accepted as a useful systematic approach;
- The basic principles put forward gained general support;
- Key characteristics of any product stewardship scheme were emphasized, i.e., voluntary, allow for progressive adoption, flexible and responsive to different circumstances;
- Strong encouragement that the outlines developed here by the working group should be shared with other institutions, particularly MMSD/ICMM, OECD, World Bank, etc., with a view to avoiding duplication and bringing more clarity to the process;

- A small delegation representative of the Forum should meet with ICMM ideally before the end of 2001 with a view to being able to present a fuller picture of progress on product stewardship to The Global Mining Initiative Toronto Conference in May 2002;
- Identify a group of industry associations/companies keen to move forward and examine some of the issues further by trialing a scheme using a multi-stakeholder process; pilot scheme need not embrace every aspect of one metal but could cover a defined subset;
- The group should take every opportunity it can to discuss the principles and criteria that are being developed in all available fora whether they be intra-governmental, intergovernmental, industry or NGO led;
- A case study paper on experience with existing product stewardship activities should be circulated more broadly;
- The group should continue to resolve issues of scope, product use indicators and data recognizing there was a trade-off between the intellectual robustness of a scheme and data availability;
- A timetable should be set.

SCIENCE, RESEARCH AND DEVELOPMENT WORKING GROUP

Stock-Take of Sustainable Development Science Activities

- Define user groups and their needs;
- Determine how best their resources can be used;
- Make user-friendly and plan for ongoing update;
- Integrate further/link with appropriate existing databases:
  - the UN System,
  - databases set up by individual sectors.

Risk Assessment

- Forum recognizes the need for sound scientific risk assessments in policy making;
- Continue dialogue to develop recommendations for metal risk assessments;
- Work in partnership with other risk assessment policy/technical groups to develop the risk assessment process for metals;
- Stock-take of existing policy frameworks and procedures, seeking better ways of applying these to metals, including improved stakeholder dialogue.

Life-Cycle Analysis (LCA)

- Compile lessons learned from ongoing initiatives for metals;
- Derive do's and don'ts from evaluation of best practices for metals;
- Participate actively in ongoing metals-specific initiatives in other fora;
- Identify gaps for data and methodologies and strategies to address them;
- Identify linkages to supplement tools related to SD;
- Determine resources available to take this work forward;
- Recognize that LCA does not cover social and economic considerations.

Science Network

- Increase awareness of the Science Network;
- Expand the content, coverage and uptake of the Network;
- Identify how this resource can be best used; define intended user groups; provide mechanism for user feedback;
- Use the forum web site at www.nfmsd.org to host the Network.

Maximize Impact of Science Group Activities

- Recognizing the Group has limited resources and that there is considerable work under way in the numerous fora in the life-cycle analysis and risk assessment areas, the Group should concentrate on inputting its metal-specific expertise and substantive work undertaken to date to generate greater leverage from their overall work;
- Linkages between the Science, Product Stewardship and Production Working Groups must be explicitly addressed;
- Sharpen the profile of the Science Group through an agreed priority list, i.e., do the most important things first;

- Identify various actors and their role in taking NFMSD forward;
- Need to clarify resources available;
- Maintain focus on policy aspects; this is the unique strength of the Forum.

TABLE 1. CANADA, VALUE OF MINERALS AND MINERAL PRODUCTS (STAGES I TO IV), IMPORTS BY COMMODITY, 1999-2001

	1999	2000	2001[a]
		($000)	
METALS			
Aluminum	4 448 324	5 009 205	7 115 277
Antimony	8 449	8 494	10 932
Barium	6 386	5 259	6 953
Beryllium	317	106	858
Bismuth	1 564	2 640	3 444
Cadmium	837	1 217	1 473
Calcium metals	48 467	51 658	63 853
Chromium	80 829	79 201	107 391
Cobalt	37 561	49 336	65 283
Copper	1 660 206	3 349 731	2 719 284
Gallium	62	36	28
Germanium	7 172	3 664	9 163
Gold	1 059 412	948 489	1 169 189
Hafnium	249	222	1
Indium	1 157	1 489	2 816
Iron and steel	15 457 952	17 140 946	21 483 635
Iron ore	355 665	364 182	478 583
Lead	396 467	471 010	522 904
Lithium	36 744	62 982	90 067
Magnesium and magnesium compounds	211 504	192 789	258 680
Manganese	211 596	212 830	247 874
Mercury	1 152	552	236
Mineral pigments	157 537	144 629	210 876
Molybdenum	39 405	38 494	46 000
Nickel	307 163	399 069	512 599
Niobium	24 561	24 245	26 940
Platinum group metals	181 782	378 022	665 703
Rare earth metals	7 259	9 990	12 603
Rhenium	23	36	376
Selenium	567	624	5 885
Silicon	84 510	88 127	104 463
Silver	134 242	150 353	210 961
Strontium	1 871	1 904	2 464
Tantalum	804	1 924	6 555
Tellurium	326	468	1 082
Thallium	24	18	7
Tin	73 515	70 787	80 303
Titanium metals	68 302	151 768	167 677
Tungsten	7 621	10 904	15 232
Uranium and thorium	295 282	252 757	299 105
Vanadium	21 410	15 271	19 368
Zinc	262 471	269 448	254 484
Zirconium	37 364	39 927	57 690
Other metals	10 546 325	11 737 702	16 226 711
Total metals	36 284 436	41 742 505	53 285 008
NONMETALS			
Abrasives	449 501	477 090	602 616
Arsenic	3 009	427	754
Asbestos	102 948	103 048	133 213
Baryte and witherite	7 164	6 702	12 549
Boron	35 533	33 692	51 395
Bromine	1 850	2 215	4 225
Calcium (Industrial minerals)	6 167	5 501	7 418
Cement	210 881	233 812	345 388
Chlorine and chlorine compounds	77 532	87 631	145 960
Clay and clay products	893 347	977 940	1 411 167
Diamonds	295 824	342 620	415 844

TABLE 1 (cont'd)

	1999	2000	2001[a]
		($000)	
NONMETALS (cont'd)			
Mica	13 265	12 749	18 544
Nepheline syenite	13	2	7
Nitrogen	130 149	207 450	338 941
Olivine	986	1 272	1 421
Pearls	23 105	24 253	26 892
Peat	1 814	1 219	1 619
Perlite	15 218	14 585	23 665
Phosphate and phosphate compounds	416 140	520 138	601 326
Potash and potassium compounds	37 365	44 747	55 620
Salt and sodium compounds	315 761	342 651	548 165
Sand and gravel	18 188	17 679	19 957
Sandstone	2 473	2 373	4 919
Silica and silica compounds	196 145	217 345	293 376
Slate	7 557	10 091	16 325
Sulphur and sulphur compounds	21 213	24 184	37 255
Talc, soapstone and pyrophyllite	14 541	15 520	24 687
Titanium oxides	276 418	261 915	355 032
Vermiculite	9 674	7 428	14 351
Other nonmetals	595 327	631 295	878 035
Other structural materials	84 465	88 624	129 793
Total nonmetals	7 512 607	8 274 920	11 639 072
FUELS			
Coal and coke	1 116 487	1 174 075	1 622 672
Natural gas	87 885	228 763	485 360
Natural gas by-products	71 309	146 207	151 100
Petroleum	9 777 946	17 300 518	25 039 919
Other fuels	509 055	530 508	827 314
Total fuels	11 562 682	19 380 071	28 126 365
Total mining imports (including fuels)	55 359 725	69 397 496	93 050 445
Total non-fuel mining imports	43 797 043	50 017 425	64 924 080
Total mining imports (including coal)	44 913 530	51 191 500	66 546 752
Total economy imports	320 260 998	356 717 542	

Sources: Natural Resources Canada; Statistics Canada.
[a] First nine months of 2001.
Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, VALUE OF MINERALS AND MINERAL PRODUCTS (STAGES I TO IV), EXPORTS BY COMMODITY, 1999-2001

	1999	2000	2001[a]
		($000)	
METALS			
Aluminum	7 223 202	8 034 444	11 792 409
Antimony	784	519	962
Barium	302	1 131	864
Beryllium	70	–	44
Bismuth	2 181	3 320	2 388
Cadmium	3 837	4 190	7 058
Calcium metals	3 250	3 229	2 115
Chromium	35 854	35 920	54 354
Cobalt	298 302	241 140	273 714
Copper	2 020 575	2 649 018	3 716 173
Gallium	–	–	–
Germanium	2 381	97	270
Gold	2 814 324	2 589 740	3 316 118
Hafnium	–	–	–
Indium	–	–	–
Iron and steel	10 204 837	11 552 798	15 322 596
Iron ore	1 061 052	1 060 337	1 250 101
Lead	282 909	285 559	326 434
Lithium	178	116	267
Magnesium and magnesium compounds	259 878	250 157	327 386
Manganese	25 610	29 669	20 817
Mercury	221	71	79
Mineral pigments	79 165	98 391	161 166
Molybdenum	47 480	48 912	84 302
Nickel	1 715 453	2 564 150	3 145 496
Niobium	42 349	44 378	71 602
Platinum group metals	207 723	377 830	621 380
Rare earth metals	296	10	561
Rhenium	–	–	–
Selenium	3 126	4 020	7 606
Silicon	115 659	128 440	157 712
Silver	493 594	473 272	624 154
Strontium	–	9	56
Tantalum	341	1 227	2 740
Tellurium	3 299	2 386	3 973
Thallium	–	–	–
Tin	12 676	14 048	15 639
Titanium metals	43 836	21 579	49 758
Tungsten	1 823	852	2 329
Uranium and thorium	730 577	645 966	1 066 744
Vanadium	9 581	4 738	5 739
Zinc	1 592 320	1 678 531	1 766 952
Zirconium	7 248	11 925	11 164
Other metals	4 987 069	6 395 927	8 154 912
Total metals	34 333 362	39 258 046	52 368 134
NONMETALS			
Abrasives	259 608	260 203	341 993
Arsenic	67	–	86
Asbestos	271 689	262 247	365 583
Barite and witherite	6 069	5 189	12 133
Boron	1 981	1 581	1 756
Bromine	66	33	12
Calcium (industrial minerals)	617	136	175
Cement	745 065	755 926	1 125 046
Chlorine and chlorine compounds	106 650	160 812	205 207
Clay and clay products	68 534	81 572	111 115
Diamonds	594 603	713 299	1 015 618
Dolomite	31 526	42 305	53 619
Feldspar	211	66	185

TABLE 2 (cont'd)

	1999	2000	2001[a]
		($000)	
NONMETALS (cont'd)			
Fluorspar	54 384	68 699	85 368
Glass and glassware products	1 172 954	1 219 454	1 965 162
Granite	79 104	90 694	131 298
Graphite	109 367	88 002	89 827
Gypsum	471 594	288 676	412 767
Iodine	6 999	6 566	9 202
Lime	13 266	11 439	18 594
Limestone flux and other limestone	26 811	25 205	34 366
Marble, travertine and other calcareous stones	44 592	65 539	38 265
Mica	14 357	15 215	17 957
Nepheline syenite	48 959	52 176	73 115
Nitrogen	1 042 273	1 025 121	1 306 969
Olivine	–	–	–
Pearls	3 981	5 148	6 982
Peat	331 779	330 346	470 751
Perlite	–	–	–
Phosphate and phosphate compounds	37 061	35 678	37 083
Potash and potassium compounds	2 109 224	2 428 680	3 334 999
Salt and sodium compounds	503 928	498 536	898 975
Sand and gravel	25 723	29 902	52 571
Sandstone	61	106	549
Silica and silica compounds	23 388	23 954	40 819
Slate	8 280	11 590	10 622
Sulphur and sulphur compounds	322 625	336 077	337 123
Talc, soapstone and pyrophyllite	17 752	22 889	27 542
Titanium oxides	223 680	195 326	273 029
Vermiculite	–	–	–
Other nonmetals	379 033	372 712	629 031
Other structural materials	109 597	158 552	252 204
Total nonmetals	9 267 458	9 689 651	13 787 698
FUELS			
Coal and coke	2 047 826	1 874 784	2 867 231
Natural gas	10 951 403	20 555 588	44 784 364
Natural gas by-products	977 309	1 816 085	2 972 379
Petroleum	15 120 823	27 724 121	37 115 669
Other fuels	262 596	311 513	439 644
Total fuels	29 359 957	52 282 091	88 179 287
Total mining exports (including fuels)	72 960 780	101 229 788	154 335 120
Total non-fuel mining exports	43 600 824	48 947 696	66 155 832
Total mining exports (including coal)	45 648 650	50 822 481	69 023 063
Total economy exports	355 016 947	412 866 764	

Sources: Natural Resources Canada; Statistics Canada.
– Nil.
[a] First nine months of 2001.
Note: Numbers may not add to totals due to rounding.