

Foreword

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 mineral and metal 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 the secondary 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. 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 section). You can also provide feedback to the coordinator of this publication, Patrick Chevalier, at tel. (613) 992-4401, fax (613) 943-8450, or e-mail pchevali@nrca.gc.ca.

Denis Lagacé
Director General
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NOTE TO READER

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Introduction

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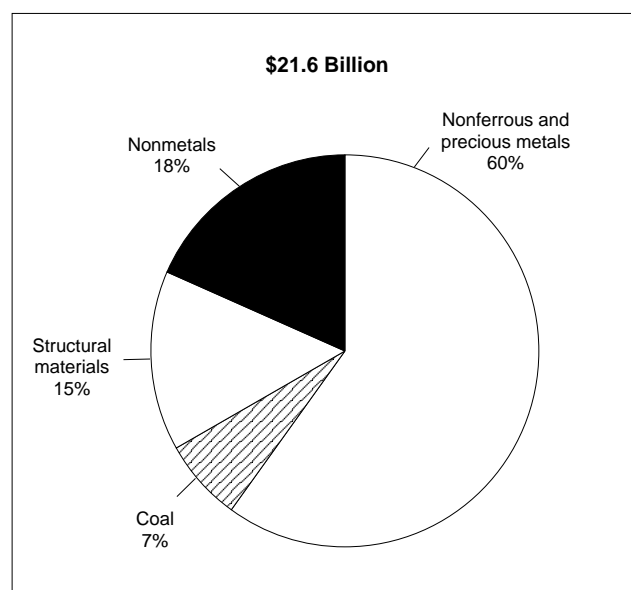
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This outlook for the major nonferrous metals was prepared by staff of the International and Domestic Market Policy Division in early November 2000 and reflects the market conditions and expectations at that time.

Canada's economy registered strong growth in 1999 and is expected to continue to grow over the near-term forecast period. Overall real Gross Domestic Product (GDP) increased by 4.5% in 1999. The total value of mineral commodities produced in Canada, including metals, nonmetals, structural materials and mineral fuels, increased by 20.6% to reach an estimated \$53.5 billion in 1999, its highest value

Figure 1
Value of Mineral and Metal Production, 1999

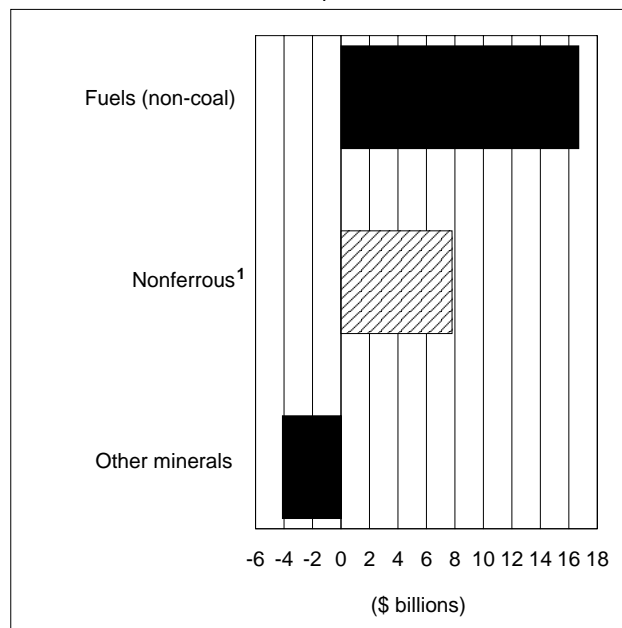


Source: Natural Resources Canada.

ever. In 1999, the value of the nonferrous metals produced in Canada included in this publication was \$12.4 billion.

Exports of crude minerals, coal, smelted and refined outputs, and mineral products contributed \$44.0 billion (an increase of 11.1% over 1998) to the value of Canada's total domestic exports of \$330.0 billion. Metallic mineral and mineral product exports accounted for 76.1% (\$33.5 billion) of the total non-fuel (including coal) value; nonmetal exports accounted for 16.7% (\$7.4 billion), structural materials for 2.5% (\$1.1 billion), and coal for 4.6% (\$2.0 billion). The United States remained Canada's principal trading partner with exports to that destination valued at \$34.7 billion, followed by the European Union (\$3.3 billion) and Japan (\$1.9 billion).

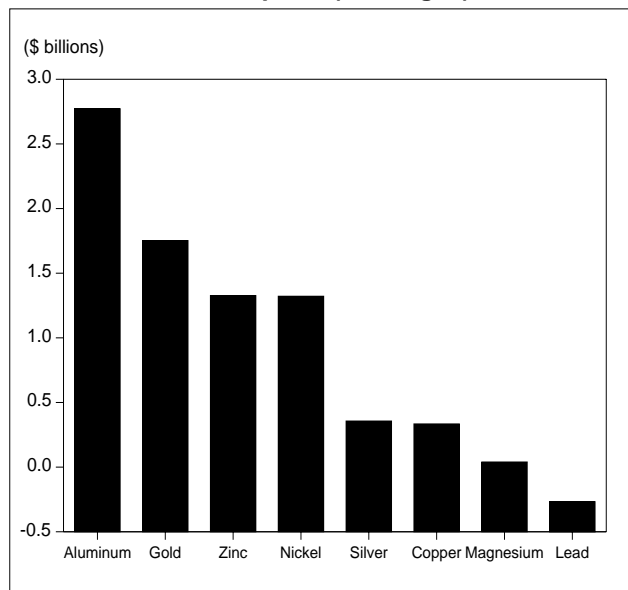
Figure 2
1999 Net Export Earnings
Mineral Commodities = \$20 Billion



Source: Natural Resources Canada.

¹ Includes aluminum.

Figure 3
1999 Net Value of Exports (All Stages)



Source: Natural Resources Canada.

In the first six months of 2000, GDP grew by an annualized 4.9%. Overall, Canada's economic growth is expected to be higher than previously expected in 2000, mainly because of stronger investment in both residential construction and machinery and equipment. The Canadian economy is projected to expand by about 4.7% in 2000 and by 3.5% in 2001.

The mining industry remains a vital contributor to Canada's economy. The mining and mineral processing industries directly employed 386 036 Canadians in 1999, a 1.8% increase over the 1998 level of 379 277. Direct employment in metal mining, non-metal mining, quarrying and coal mining was estimated at 52 297, down by over 2600 from the 1998 level of 54 903. Moreover, the mine closures that did occur in 1999 and those expected to occur in 2000 will have further dampening effects on mining employment. Employment in smelting and refining, estimated at 59 727 in 1998, increased to 60 048 in 1999. The major gain in total employment occurred in the mineral manufacturing industries as employment rose from 264 646 in 1998 to 273 690 in 1999, an increase of 3.4%.

Nonferrous metals are the second most important sector in terms of value of Canadian mineral production after non-coal fuels (crude oil, natural gas and uranium). With a total value of \$7.9 billion in 1999, nonferrous metals (excluding aluminum, which is not mined in Canada) accounted for 36% of the value of non-fuel mineral production. When aluminum production is added, the value of Canada's nonferrous metal production increases to an estimated \$13 billion.

In 1999, nonferrous metals generated a net trade surplus equivalent to about 50% of that of mineral fuels (excluding coal). Canada's overall merchandise export surplus was due in large part to the net surplus generated by the Canadian mining industry. Non-coal fuel minerals generated a net surplus of \$16.7 billion. Nonferrous metals (including scrap), with exports of \$16.5 billion and imports of \$8.7 billion, generated a net Canadian trade surplus of \$7.8 billion. Other mineral products generated a combined net trade deficit of \$4.1 billion.

Reviews and forecasts for aluminum, copper, gold, lead, magnesium, nickel and zinc are included in the following pages. Trade tables covering 1998, 1999 and the first nine months of 2000 are also provided.

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

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Aluminum

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1999 primary metal production: \$4.8 billion^P
 World rank: Fourth
 1999 exports (unwrought): \$4.1 billion
 Installed capacity: 2.3 Mt/y

Canada	1999	2000 ^e	2001 ^f
	(000 tonnes)		
Production	2 390	2 500	2 700
Apparent consumption	860	975	1 100

^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 (29%), packaging (18%), building and construction (19%), electrical (9%), consumer goods (7%), and machinery and equipment (6%). North America is the largest consuming region in the world, accounting for 30% of total world demand. Asia accounts for 27% and Europe accounts for another 25%.

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

1997	1998	1999	2000 ^e
(US\$/t)			
1 619	1 379	1 389	1 555

^e Estimated.

CANADIAN OVERVIEW

- Alcan Aluminium Limited's new 400 000-t/y smelter at Alma, Quebec, was more than 90% completed by November 2000. This plant replaces the 75 000-t/y Isle-Maligne smelter, which closed in early 2000. The Alma smelter started producing metal in October 2000 and is expected to reach full production capacity in the fall of 2001.
- The Alcan-Alusuisse-Lonza Group Limited (algroup) of Switzerland merger was completed in October 2000. The new Alcan has combined revenues of US\$12.4 billion and 53 000 employees in 37 countries. Additional information on the new company can be obtained on the Internet at <http://www.alcan.com>.
- KAI Technology & Development, an independent consulting firm, is working on a feasibility study for a possible 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/english/index.html>.

WORLD OVERVIEW

- Two greenfield primary smelters started up in 2000, which will add 575 000 t/y of capacity in 2001. In addition to the Alcan Alma smelter, Billiton Plc announced that the US\$1.3 billion Mozal smelter located in Mozambique had cast its first metal. The smelter is expected to reach its full capacity of 250 000 t/y early in 2001. The company has started a prefeasibility study on expanding both this and its Hillside smelter in South Africa.
- Hydro Aluminum a.s. announced that it would expand the Sunndal smelter in Norway by 234 000 t/y to a capacity of 321 000 t/y. In addition to a number of other smaller brownfield

expansions, a number of studies for new smelters have been announced for several countries, including Argentina, Bahrain, China, Russia, Ukraine and the United States.

- Alcoa Inc. and Reynolds Metals Company Limited completed their merger after receiving regulatory approval, which was conditional on the sale of assets in a number of locations. Additional information can be obtained from Alcoa's web site at <http://www.alcoa.com>.
- Kaiser Aluminum & Chemical Corporation expected to restart production by year-end at its Gramercy, Louisiana, alumina refinery, which closed after an explosion in mid-1999. The company expected that the plant would be in full operation in early 2001. More information can be obtained on Kaiser's web site at <http://www.kaiseral.com>.
- Power costs soared in the western United States in mid-2000, resulting in extra costs for smelters without long-term contracts. About 600 000 t of annual capacity had been affected from mid-summer to late fall 2000. As new Bonneville Power Administration contracts will be for less power than currently consumed by the smelters, new sources of power will be required if aluminum production in the region is to be maintained at capacity.

CONSUMPTION OUTLOOK

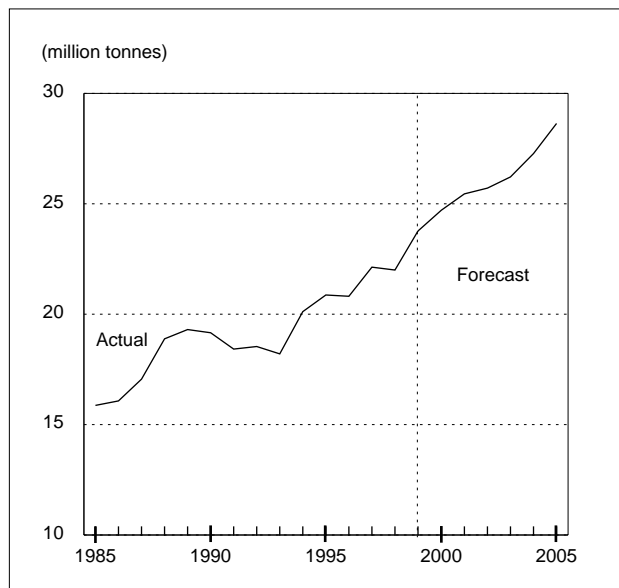
World apparent consumption of primary aluminum is estimated to be 24.5 Mt in 2000, approximately 4% higher than the 23.8 Mt recorded in 1999. Western World demand is also expected to increase by approximately 4% to 20.0 Mt in 2000. In 2001, world demand for aluminum is expected to increase approximately 3% from 2000, maintaining a long-term trend of just under 3% annual growth. In the longer term, annual growth of 1-3% is forecast for the early part of this decade. The transportation and packaging markets are expected to lead the increase in demand for aluminum to the year 2005 and perhaps beyond.

Canada's apparent consumption of primary aluminum increased strongly in 1999 to 0.86 Mt and is expected to increase to 0.9 Mt in 2000. In the longer term, consumption is expected to increase at a rate of about 5-6% annually.

CANADIAN AND WORLD PRODUCTION OUTLOOK

Canadian installed capacity for the production of primary aluminum is 2.3 Mt/y and is set to increase to more than 2.7 Mt/y in 2001 with the completion of Alcan's new smelter at Alma.

Figure 1
World Aluminum Consumption, 1985-2005



Source: Natural Resources Canada.

Canada is expected to produce 2.4 Mt of primary aluminum in 2000 and 2.7 Mt in 2001. Production in 1999 was 2.39 Mt valued at an estimated \$4.8 billion, ranking it 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/ms/efab/datadefault.html>.

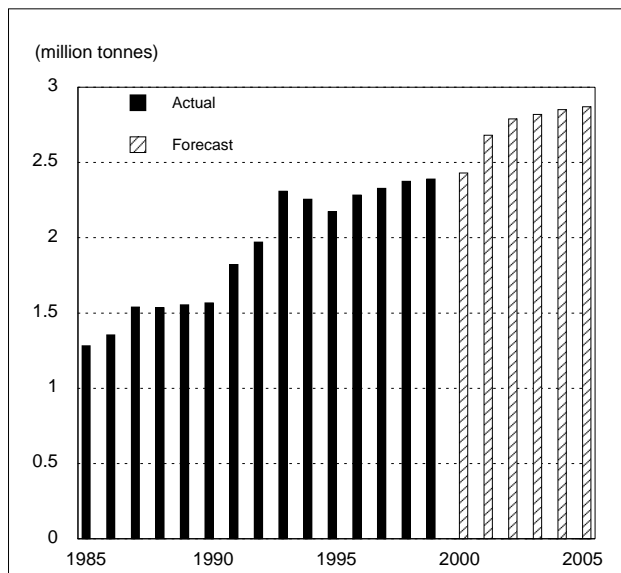
Other smelter expansion projects in Quebec (at Alouette, A.B.I. and Lauralco) are dependent on the negotiation of new long-term power supply contracts with Hydro-Québec. Decisions on possible new capacity in British Columbia are still pending.

World production of primary aluminum increased to 23.7 Mt in 1999, up from 22.6 Mt in 1998, and is expected to increase to over 24.5 Mt in 2000. Western World production is expected to increase to over 17.5 Mt in 2000, up from 17.2 Mt in 1999. Primary aluminum production in 2000 is expected to be 3.5 Mt in the United States, 3.9 Mt in Western Europe and 3.3 Mt in Russia.

Increased production throughout the world has made up for the initial U.S. reductions. The International Primary Aluminium Institute (IPAI) indicates that the world daily average primary aluminum production to October was 58 100 t/d, up 800 t/d from October 1999. Additional information can be obtained from the IPAI's web site at <http://www.world-aluminium.org>.

Although IPAI inventories of unwrought aluminum have remained around 1.8 Mt, primary aluminum

Figure 2
Canadian Primary Aluminum Production,
1985-2005



Source: Natural Resources Canada.

inventories at the London Metal Exchange (LME) have marked a large decrease throughout the year. Primary aluminum inventories started the year at approximately 775 000 t and peaked at 860 000 t in February, but steadily decreased during the year to almost 300 000 t late in the year. Various authors have suggested that this represents a fundamental long-term change resulting from the electronic trading of metals.

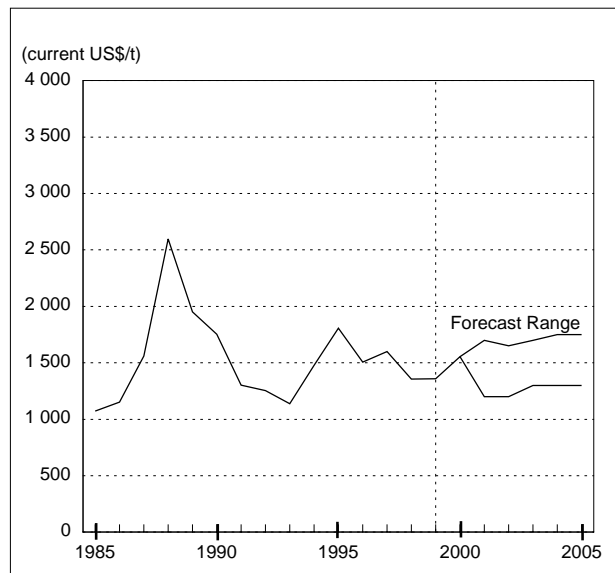
PRICE OUTLOOK

Cash prices for primary grade aluminum remained volatile through the year. LME cash prices started the year at approximately US\$1600/t (73¢/lb), increased to above US\$1745/t (79¢/lb) in late January, drifted lower to about US\$1400/t (64¢/lb) in April before returning to above US\$1600/t (73¢/lb) in September, and have since been trading generally lower to below US\$1500/t (68¢/lb) in November.

The alumina market weakened during the year as expansions and increased utilization of capacity in existing plants countered the effect of lost production at Gramercy and increases in aluminum production capacity. The *Metal Bulletin* reports that spot prices for metallurgical-grade alumina have declined to US\$165-\$175/t from over US\$400/t in early 2000.

For 2001, aluminum price volatility is expected to continue during the early part of the year. Prices are expected to fluctuate in the mid-to-lower part of their

Figure 3
Aluminum Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

longer-term price range of between US\$1200 and US\$1800/t (55¢ and 82¢/lb). Should metal shortfalls result from ongoing decreased production in the United States and increased consumption in China and elsewhere, prices could rise later in 2001 as any shortage works its way through the system. 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>.¹

Note: Information in this article was current as of December 1, 2000.

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¹ Please note the caveats on using these metals prices published here and from sources such as those mentioned above. Readers should verify and confirm that the data are appropriate for their use.

Copper

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1999 production:	\$1.69 billion
World rank (mine production):	Fourth
Exports (concentrate and unwrought):	\$1.83 billion

Canada	1999	2000 ^e	2001 ^f
	(000 tonnes)		
Copper mine production	614	640	630
Refined copper production	549	557	608
Refined consumption	264	278	288

^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 consumed annually is used for electrical applications, mostly as wire.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE

1996	1997	1998	1999	2000 ^e
(US\$/t)				
2 294	2 276	1 654	1 572	1 827

^e Estimated.

CANADIAN OVERVIEW

- In March 2000, Cambior Inc. announced the sale of its Bouchard-Hebert and Langlois mining operations, located in northwestern Quebec, to Breakwater Resources Ltd. for US\$48 million. Both mines produce zinc and copper concentrates containing silver and gold. In 1999, the Bouchard-Hebert mine produced 7200 t and the Langlois mine produced 1000 t of copper in concentrate.
- In June, Inco Limited announced it will proceed with a plan to develop a high-grade nickel deposit at its McCreedy East mine at a cost of \$46 million. The project will enable the mine to increase its production rate by 60% from 2700 t/d to 4350 t/d by late 2004. Copper-in-concentrate production will rise from 37 200 t/y to 41 800 t/y.
- In July, Falconbridge announced it will proceed with a \$640 million project to extend the depth of its Kidd Creek mine in Timmins, Ontario, by 1000 m to a total depth of 2700 m. At the new depth, the Kidd Creek mine will be the world's deepest base-metal mine. Stage 1 of the project, set to begin in 2004, will increase the mine's depth to 2700 m and give access to an estimated 15.7 Mt of ore at an average grade of 5.74% zinc, 2.82% copper and 58 g/t silver. Stage 2, to begin in 2009, will give access to a further 10.5 Mt grading 5.27% zinc, 2.2% copper and 97 g/t silver.
- A strike by workers at Falconbridge's copper-nickel smelter in Sudbury, which began on August 1, forced the company to close the smelter for a period of 14 days and declare a partial force majeure on copper shipments from its Nikkelverk smelter/refinery in Norway. Production was restarted on August 17. During the third and fourth quarters, the smelter was operated by management staff and other employees at about 50% capacity. As of late November, the labour dispute had not yet been resolved and the partial force majeure on copper deliveries from the Nikkelverk refinery was still in force.
- A series of explosions in the main smelting furnace at Hudson Bay Mining and Smelting Co. Limited's Flin Flon, Manitoba, metallurgical

complex on August 8 forced the company to shut down copper smelting operations and declare force majeure on copper shipments for a period of almost three months. The explosion was triggered when water being used to cool the furnace in preparation for rebrickwork came into contact with molten metal. One worker was killed and thirteen others were injured. Force majeure was lifted on November 27. The rated capacity of the smelter is 90 000 t/y of copper.

- In October 2000, Cominco Engineering Services signed a memorandum of understanding with Gibraltar Mines Limited, owned by Taseko Mines Limited, to commence a \$3 million study to investigate the feasibility of constructing a 35 000-t/y copper refinery at the Gibraltar mine site near William Lake, British Columbia. The refinery would use Cominco's hydro-metallurgical technology to leach copper concentrate. The study will be completed in early 2001.

WORLD OVERVIEW

- The Corporacion Nacional del Cobre de Chile (Codelco-Chile) announced in January that it will expand production at the El Teniente Division by 140 000 t/y to 490 000 t/y by 2004.
- In February, Noranda Inc. announced plans to proceed with a US\$170 million, two-stage expansion of its Altonorte smelter in northern Chile. The first stage will involve a technology upgrade of some equipment by the end of 2001. The second stage comprises an expansion from 160 000 to 290 000 t/y of anode and blister and will be completed in early 2003.
- In Japan, Sumitomo Metal Mining announced plans in April to raise copper production from 230 000 t/y to 400 000 t/y by 2005.
- In November 2000, Cambior announced the sale of its La Granja copper project in Peru to Billiton for approximately \$35 million.
- Government-owned Zambia Consolidated Copper Mines (ZCCM) completed the privatization process of Zambia's largest and most promising mining and metallurgical assets. The sale was made under two separate agreements. The first was the sale of ZCCM's Mufulira Division and part of the Nkana Division to a new company called Mopani Copper Mines, formed by a consortium comprising Canadian-based First Quantum Minerals (44%), Swiss-based Glencore (46%) and ZCCM (10%). The second transaction was the sale of the Konkola Division, including the Konkola Deep project, the Nchanga Division and the Nam-pundwe pyrite mine, to a newly formed company

called Konkola Copper Mines, owned 65% by Anglo American plc's subsidiary Zambian Consolidated Investments, 20% by ZCCM, and 15% by the World Bank's Commonwealth Development Corp. and International Finance Corporation (IFC) (7.5% each).

- In September, Furukawa announced that it expects production at the newly commissioned Port Kembla smelter to total only 30 000 t for the fiscal year ending March 31, 2001. The smelter has a production capacity of 120 000 t/y.

CONSUMPTION OUTLOOK

World refined copper consumption is expected to grow by 6.3% to 15.1 Mt in 2000 from 14.2 Mt in 1999. Growth in demand was strong in all major geographic regions with the exception of the NAFTA region (Canada, Mexico and the United States), which recorded only modest demand growth of 1.1%. Countries set to record the strongest growth in 2000 include China (20%), Thailand (17%) and Germany (15%).

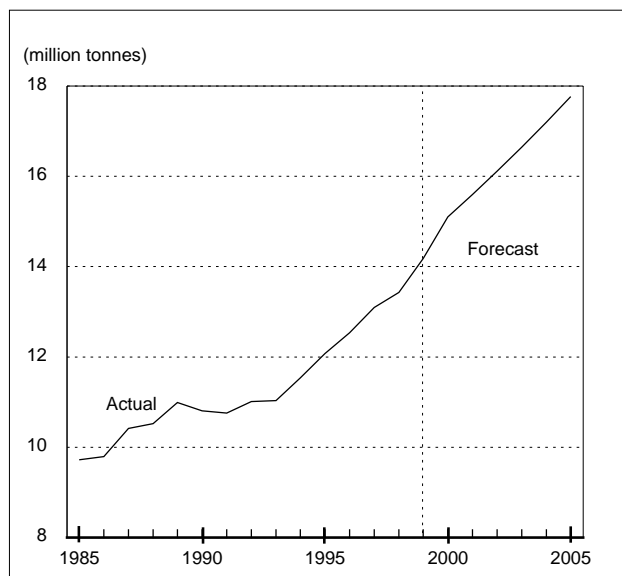
World consumption is forecast to rise by a more modest 3.2% in 2001 to 15.6 Mt based on slower demand growth in Western Europe and Asia while, in North America, continuing strong demand in Mexico (10%) will be offset by a comparatively smaller forecast increase in consumption in the United States (2.2%). Based on consumption growth rates seen during the 1990s, copper consumption is expected to grow at an average annual rate of about 3.3% between 2002 and 2005.

The largest increases in copper consumption will occur in the construction, transportation, and electrical and electronics industries. China and India are expected to account for a significant portion of this growth. There is continuing strong growth in demand for air conditioning in countries with hot climates, particularly across Asia, Mexico and the United States.

A number of promising new markets for copper could provide significant growth opportunities. These include certain roofing applications, fire suppression systems, natural gas systems, solar power generation, data communications, and the storage of spent nuclear fuel.

While aluminum has largely replaced copper in original-equipment automotive radiators, new fabrication techniques such as no-flux brazing could allow copper to regain a significant share of this important market. In addition, the expected increase in the number of electrical circuits in automobiles could provide a significant boost for copper demand. In recent years, there has been a noticeable increase in the

Figure 1
World Copper Consumption, 1985-2005



Source: Natural Resources Canada.

intensity of copper use in residential applications in North America. Part of this change is attributable to the construction of larger houses and the growth of home-based offices and home entertainment.

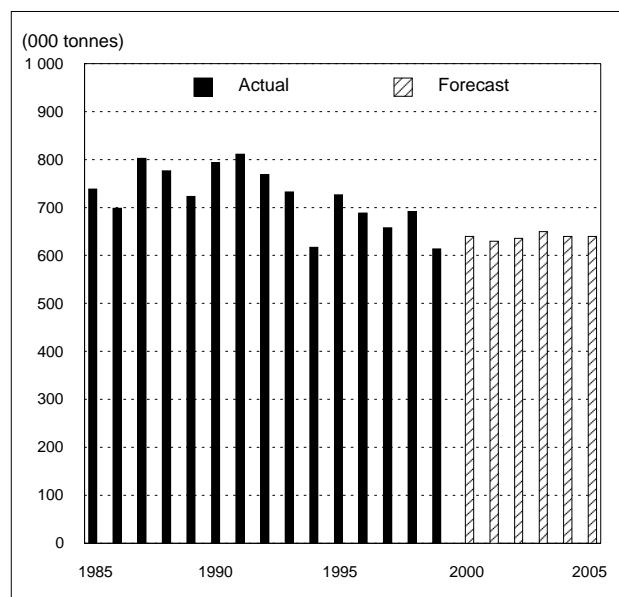
CANADIAN PRODUCTION OUTLOOK

Canadian copper mine production (recoverable copper in concentrate) is expected to total approximately 640 000 t in 2000 which, although it represents a substantial increase from the 1999 production total of 614 000 t, still falls below 1998 output of 692 000 t. Mine output in 1999 was low due to the temporary closure of the Highland Valley and Myra Falls mines and the permanent closure of the Gaspé mine in October 1999. Estimated mine production in 2001 is currently forecast at 630 000 t, slightly below the 2000 forecast level, as net reductions in output from existing mines are anticipated and no new mines are scheduled to come on stream until 2002.

Refined copper production is forecast to grow by 1.5% to 557 000 t in 2000, and by a further 9.2% to 608 000 t in 2001. The rise in production is a result of increased capacity at Noranda's CCR refinery and Falconbridge's Kidd Creek refinery.

Canadian refined copper consumption is expected to increase by 5.3% to 278 000 t in 2000 and by a further 3.6% to 288 000 t in 2001. The expected rise in demand stems from several factors. There is growing demand for power cable and building wire coming from the oil & gas and pulp & paper industries.

Figure 2
Canadian Mine Production of Copper, 1985-2005



Source: Natural Resources Canada.

Demand for use in new housing construction is also strong. In addition, Alcatel Canada Wire is set to complete the last stage of a planned expansion at its Montréal-Est rod plant by July 2000, which will lift its capacity from 200 000 t/y to 250 000 t/y.

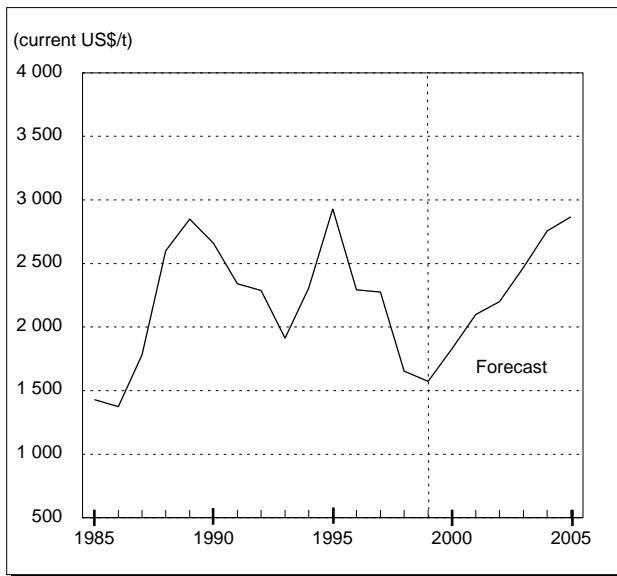
PRICE OUTLOOK

World refined copper demand will outstrip supply in 2000, resulting in a reversal of the metal surplus that has persisted in the copper market over the past four years. Having begun the year at an all-time high of 790 000 t, LME stocks had declined 49% to 377 050 t, or 4.9 weeks of consumption, by the end of October. A copper metal deficit of 340 000 t is forecast in 2000, based on an estimated increase of 2.1% in world refined production and 6.4% in world refined consumption.

Demand in 2001 will soften compared to 2000. Although growth in refined production is expected to be higher in 2001 than 2000, there is a general consensus that there are not enough new mine projects coming on stream over the next three years to meet demand growth. This should result in a continued metal deficit through to 2003 and a continuing recovery in prices. In 2001, a metal deficit of 250 000 t is forecast, based on an estimated increase of 5.2% in world refined production and 2.7% in world refined consumption.

In 2001, the price of LME-grade copper is expected to average US\$2100/t (US95¢/lb). For the period 2002-05, prices are expected to trade in a range between US\$2205 and \$2866/t (US\$1.00 and \$1.30/lb).

Figure 3
Copper Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

Note: Information in this article was current as of November 30, 2000.

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Gold

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1999 mine production: \$2.1 billion
 World rank: Fourth
 Exports: \$2.8 billion
 (includes exports from Bank
 of Canada gold sales)

Canada	1999	2000 ^e	2001 ^f
		(000 tonnes)	
Production	158	152	155

^e Estimated; ^f Forecast.

Gold is valued for its rarity, lustrous beauty, 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

1997	1998	1999	2000 ^e
(US\$/troy ounce)			
331	294	279	280

^e Estimated.

CANADIAN OVERVIEW

- Goldcorp reached an agreement with the employee's union to end the 46-month strike at the Red Lake mine. The mine reached commercial capacity in November and is expected to produce 80 000 oz in 2000.
- Echo Bay re-opened the Lupin mine in Nunavut (Canada's new territory). The mine is expected to produce gold at an average annual rate of 150 000 oz through 2004.
- The Joe Mann mine suspended production in Quebec in response to low gold prices.
- Cambior continued to repay and refinance about \$225 million as part of a restructuring plan to cover hedging debts.
- The federal government introduced a 15% Exploration Investment Tax Credit for flow-through share investors in order to stimulate grass-roots exploration in Canada.

WORLD OVERVIEW

- Major gold companies continued efforts to merge or acquire companies in order to increase market capitalization and attract investor interest.
- Major gold producers (Placer Dome, Barrick, AngloGold, Gold Fields) also reduced hedging programs to increase exposure to spot gold prices and improve market sentiment.
- Civil unrest disrupted production in a number of Southeast Asian countries.
- Ashanti completed a restructuring agreement with creditors and shareholders following hedging losses in 1999.
- The Swiss National Bank began a plan to sell 1300 t of gold from its reserves as part of the 1999 agreement (*Washington Agreement*) amongst

European central banks to limit total sales of gold reserves to 2000 t over five years.

- The International Monetary Fund completed a revaluation of 14 million oz of gold reserves through a transaction with member countries that did not impact the market.

MARKET OUTLOOK

The world's mine supply of gold is expected to decline by about 4% in 2000, but to stabilize and increase slightly during the next few years as high-cost producing mines close, existing mines increase output to reduce costs, and new low-cost mines come on stream in regions such as Africa and South America.

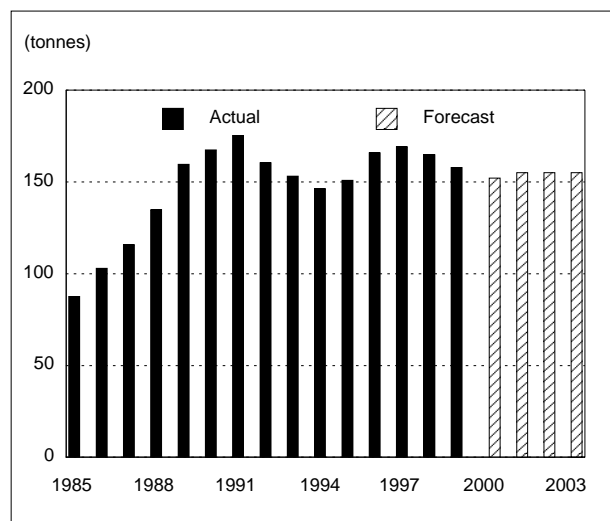
Total world demand has risen over 35% in the last decade, largely in response to increased fabrication demand for gold jewellery. However, investor interest continues to wane as gold's role as a reserve asset for central banks diminishes. World fabrication demand is expected to continue to show modest gains over the next few years as long as economic conditions remain positive, particularly in India and Asia.

The market is forecast to remain in a supply deficit situation in the near future with central bank sales covering shortages. Central bank sales should have less influence on the market, at least until 2004 when the *Washington Agreement* expires.

CANADIAN PRODUCTION OUTLOOK

To the end of 1999, Canada had produced over 9000 t of gold since official production was first recorded in 1858 (refer to the historical review of gold in the *Canadian Minerals Yearbook: 1999 Review and Outlook*). Production is forecast to decline by about 3% in 2000, partly because of 13 mine closures in 1999 and 1 closure in 2000. However, output is expected to increase as the Red Lake and Lupin mines complete a full year of production in 2001. Future growth in production will largely be dependent on expansion programs at existing mines and new discoveries coming on stream, such as the Hope Bay prospect in Nunavut.

Figure 1
Canadian Gold Production, 1985-2003



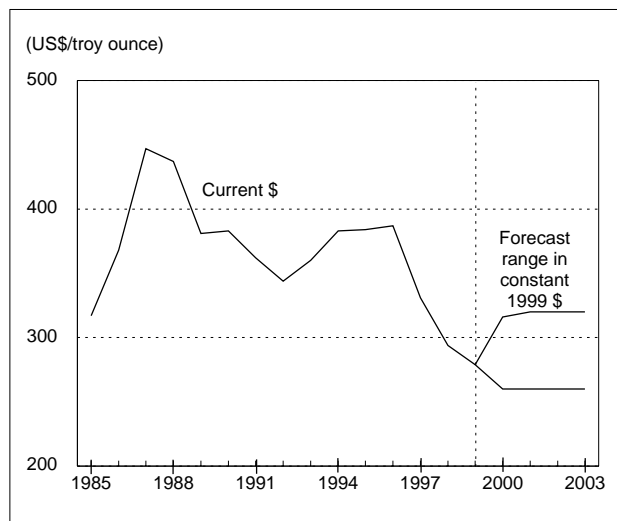
Source: Natural Resources Canada.

PRICE OUTLOOK

In 2000, an average gold price of US\$280/troy oz is forecast, compared to \$279/oz in 1999 and \$294/oz in 1998. Transparency in official sector gold sales has brought some stability to the supply of gold, at least until 2004 when the *Washington Agreement* expires. Although fabrication demand is expected to remain healthy, investor interest continues to wane and place downward pressure on prices. During the next few years, the price of gold is forecast to range between US\$250 and \$300/oz (in 1999 constant dollars) if bank lease rates on gold loans remain low and producers continue to hedge gold sales or increase output to reduce costs.

The current cloud over gold markets may, however, have a silver lining. The price of gold is currently near historical lows similar to the situation for silver prices in 1993. Should oil prices continue to rise, inflationary pressures increase, and equity markets soften further, then gold may become a preferred investment haven given the existing high prices for platinum group metals. The gold price could spike well above US\$300/oz. The upside potential would likely only be limited by the level of interest in disharding, similar to the situation for silver in the mid-1990s.

Figure 2
London Bullion Market Association Gold Prices,
1985-2003



Source: Natural Resources Canada.

Note: Information in this article was current as of November 30, 2000.

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Lead

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1999 mineral production: \$117 million
 World rank: Sixth
 1999 exports: \$283 million

Canada	1999	2000 ^e	2001 ^f
	(000 tonnes)		
Mine production	161	153	129
Refined production	263	289	313
Consumption (refined)	68	68	75

^e Estimated; ^f Forecast.

Lead-acid batteries for automotive, industrial and consumer purposes account for 70% of the world's demand for lead. Lead's corrosion-resistant nature also lends itself 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

1996	1997	1998	1999	2000 ^e
(US\$/t)				
774.0	624.0	528.4	502.2	460

^e Estimated.

CANADIAN OVERVIEW

- Late last year, rock stability problems at Cominco Ltd.'s Sullivan mine resulted in lower concentrate production. Subsequent improvements at the mine in the first quarter of 2000 resulted in higher zinc and lead concentrate production. Results are being reviewed at Sullivan to ensure that the mine can be operated on an economic basis until the planned closure date, which is now expected to be December 2001.
- Noranda Inc. ratified new three-year collective agreements with unionized employees at its Brunswick smelter in Belledune, New Brunswick. In 1999, the Brunswick bulk concentrate facility handled some 360 000 t of zinc and lead concentrate. The lead smelter produced more than 100 000 t of lead and custom alloys.

WORLD OVERVIEW

- The Lisheen mine was officially opened in June. An equal joint-venture project between Ivernia West Plc and Anglo American plc, the Lisheen mine, located near Thurles, County Tipperary, Ireland, is the fifth largest zinc and lead mine in the world. The mine is expected to produce 4.83 Mt of zinc and lead concentrate during its 14-year lifespan.
- Pasminco Limited officially opened its new Century mine in Queensland, Australia, in early April and began shipments of lead concentrate in August. The mine is expected to reach its full production rate of 70 000 t/y of lead concentrate by the end of 2001.
- Cominco announced that its U.S. subsidiary, Cominco American Inc., will re-open the Pend Oreille zinc-lead mine near Metaline Falls, Washington. Work on the US\$70 million project began in October and is expected to start production in the third quarter of 2002. Lead and zinc concentrate will be shipped to Cominco's nearby Trail smelter in British Columbia.

- The Doe Run Company announced in mid-April that the company would implement further production cutbacks at its Missouri lead facilities in the United States. Together with the cutbacks announced by the company in January, its production of lead in concentrate was reduced by about 50 000 t.
- U.S. battery manufacturer and lead recycling company, Exide Corporation, completed a deal to acquire GNB Technologies, the global battery business of Pacific Dunlop Limited, for US\$368 million and will now do business as Exide Technologies. GNB supplies about 20% of the North American market for industrial batteries and is also a maker of lead-acid automotive batteries.

LEADING WORLD LEAD PRODUCERS

Producers Lead in Concentrate		Producers Lead Metal	
	2000 ^e		2000 ^e
	(000 tonnes)		(000 tonnes)
Australia	631	United States	1 400
China	560	China	1 000
United States	480	Germany	380
Peru	266	United Kingdom	354
Canada	142	Japan	290
Mexico	138	Canada	289
Sweden	117	France	268

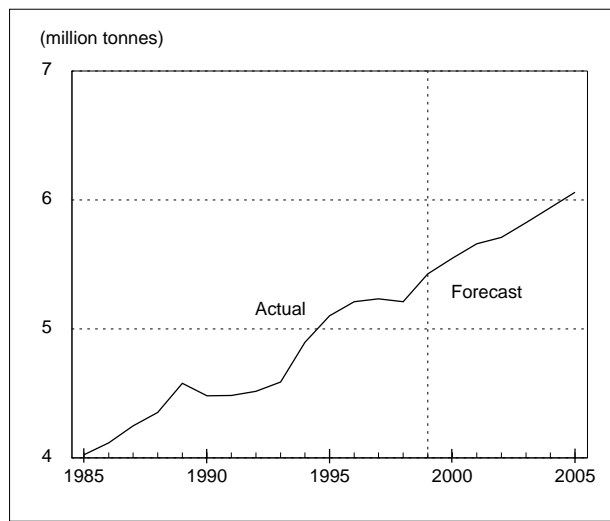
^e Estimated.

CONSUMPTION OUTLOOK

According to the International Lead and Zinc Study Group (ILZSG), world refined lead consumption is expected to rise by 2.8% to 6.4 Mt in 2000, with Western World consumption increasing by 2.1% to 5.6 Mt. The growth in demand is mainly due to strong growth in Asia, particularly China. Demand in Europe and the United States is expected to rise by 1.2%. World demand in 2001 is expected to rise by a further 2.2% to 6.5 Mt. Demand in the West will slow somewhat in 2001, rising by only 1.9% to 5.7 Mt. Demand in the United States is expected to continue at a rate of about 1.4% and in Europe is expected to remain flat.

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 Consumption, 1985-2005**

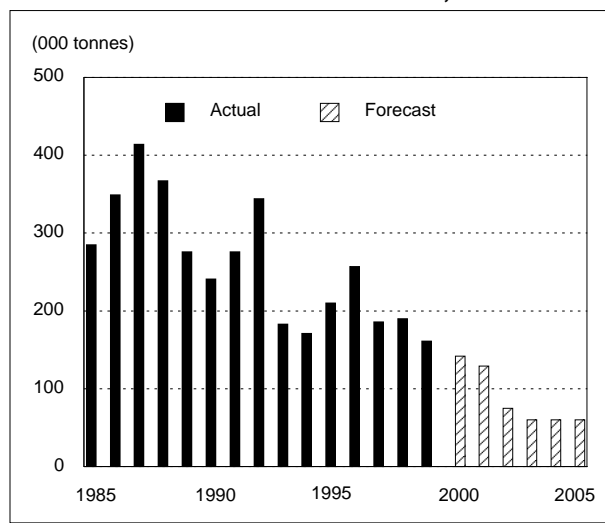


Source: Natural Resources Canada.

CANADIAN PRODUCTION OUTLOOK

In 2000, Canadian mine production of lead is expected to be 142 000 t, down 12% from 1999. The decrease primarily reflects the loss in production from Noranda's Heath Steele mine, where operations were closed in October 1999. Mine output is forecast to continue to decline in 2001 to 129 000 t. Mine output is also expected to continue to decline over the next few years as older mines close, unless additional reserves are found at existing mines or through new

**Figure 2
Canadian Mine Production of Lead, 1985-2005**



Source: Natural Resources Canada.

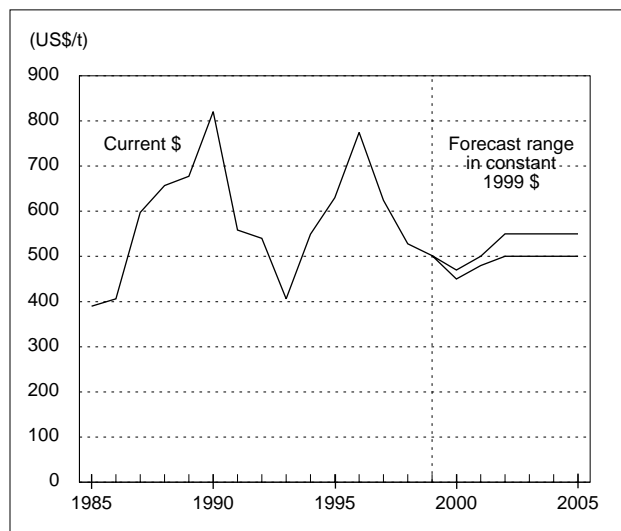
discoveries. Lead metal production is expected to increase by about 10% to 289 000 t in 2000 from 263 000 t in 1999. Metal output is forecast to continue to rise to 313 000 t in 2001.

PRICE OUTLOOK

The LME cash settlement price for lead maintained a downward trend, mirroring the steady rise in stocks through the first half of the year, falling from a peak of US\$493/t in January to a low of \$399/t in April, the lowest price for the year to date. As prices fell, cuts in mine production, aggressive buying by China, and reduced availability of scrap quickly turned a balanced market into a deficit. To meet consumer demand, stocks began to follow a steady decline in late May and early June from a peak of just under 209 000 t. As a result, prices began to recover and reached a peak of US\$515.00/t in late September. The recovery, however, came to an abrupt end in early October when a large volume of hidden stocks suddenly made an appearance, rising from 57 000 t to 157 000 t in a matter of one week. Prices subsequently fell back, trading between US\$475 and \$500/t by the end of October.

For 2001, the lead market, according to information gathered by the members countries of the ILZSG, is expected to result in a small surplus. It was recognized, however, that the predicted rise in lead metal output was somewhat dependent on the availability of sufficient concentrate supplies in the West. As the ILZSG forecasts indicate that lead concentrate supplies will not be sufficient next year, it is likely that present lead metal output targets will not be achieved. Cash prices are expected to average between US\$480 and \$490/t. In the longer term, prices are expected to average between US\$500 and \$550/t to the year 2005.

Figure 3
Lead Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

Note: Information in this article was current as of November 10, 2000.

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Magnesium

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1999 metal production: \$360 million^e

World rank: Third

Exports: \$226 million

Canada	1999 ^e	2000 ^e	2001 ^f
	(tonnes)		
Production	71 000(1)	70 000	100 000
Consumption	42 600	45 000	55 000
Exports	49 708	51 000	70 000

^e Estimated; ^f Forecast.

(1) Canadian magnesium production data are confidential due to the limited number of companies reporting. This is a U.S. Geological Survey estimate, which includes secondary 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 43% of magnesium shipments in 1999. 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 33% 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)

1996	1997	1998	1999	2000 ^e
(US\$/lb)				
1.87	1.65	1.59	1.55	1.40

^e Estimated.

CANADIAN OVERVIEW

- Construction of Magnola Metallurgy Inc.'s 63 000-t/y magnesium metal plant at Danville, Quebec, is complete and commissioning of the electrolytic cells is under way. The \$750 million plant started production of magnesium metal in October 2000, creating 320 jobs. It is expected to reach commercial production levels in early 2001. Further information on the project can be found on Magnola's web site at <http://www.magnola.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 Magnola's web site at <http://www.magnola.com> and from Norsk Hydro's web site at <http://www.hydro.com>.
- Cassiar Mines and Metals Inc. continues planning for a US\$600 million magnesium metal project based on a serpentine resource in northern British Columbia. A banking report on financing the next stage of the project is due in early 2001. Further information on the project is available on the Internet at <http://www.minroc.com>.

WORLD OVERVIEW

- The major factor in magnesium markets remains the increased production and export of magnesium from China. Production and export levels in 2000 are expected to be similar to those in 1999. 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 to reconsider import duties on Chinese magnesium.
- After an investigation, the European Commission imposed a revised definitive anti-dumping ad valorem duty of 63.4% on imports of unwrought, unalloyed magnesium originating in China by related parties. Further information is available on the Internet at <http://europa.eu.int>.
- The Australian Magnesium Corporation (AMC) completed its feasibility study and received government approvals to construct a 90 000-t/y plant at Stanwell, Queensland. Metal production is expected to start in late 2003 and to reach full capacity in 2005. AMC is currently seeking financing for the A\$900 million project and expects to make a formal decision on the project in early 2001. For further information, see the company's web sites at <http://www.austmg.com>, <http://www.normandy.com.au/site.htm> and <http://www.amc-magnesium.com.au>, or Australian government sites at <http://www.minister.industry.gov.au> and <http://www.qld.gov.au>.
- Pima Mining NL is investing A\$580 million to build the 52 000-t/y Samag project in Port Pirie, South Australia. Once financing arrangements have been completed, the company will start construction on a plant to process magnesite in South Australia. Construction will take about two years with full production in 2004. Further information is available on the Internet at <http://www.pima.com.au>.
- Work continued on a feasibility study for a magnesium complex at Delfzijl in the Netherlands by a consortium of companies, including Nedmag Industries Mining and Manufacturing, Corus Aluminium, Noordelijke Ontwikkelings Maatschappij, and the Netherlands Ministry of Economic Affairs. A feasibility study for a 75 000- to 80 000-t/y smelter (with an associated casting and recycling operation) will be completed in early 2001. A decision on construction is expected in late 2001. The plant would start production in 2004 and could be built to accommodate a doubling of the production rate. Additional information is available on the Internet at <http://www.antheus.nl>, <http://www.nedmag.nl/home.htm> and <http://www.nom.nl/uk/index.htm>.
- Magnesium Alloy Corp. continued to work on its Kouilou project in the Republic of the Congo

(Brazzaville). Russian National Aluminium and Magnesium Institute and Ukrainian Titanium Institute technology would be used to extract magnesium from solution-mined salt deposits. Magnesium Alloy Corp. is continuing discussions with potential partners and entered into an agreement with AES Sirocco Ltd. on energy generation and supply. For further information, see the company's web site at <http://www.magnesiumalloy.ca>.

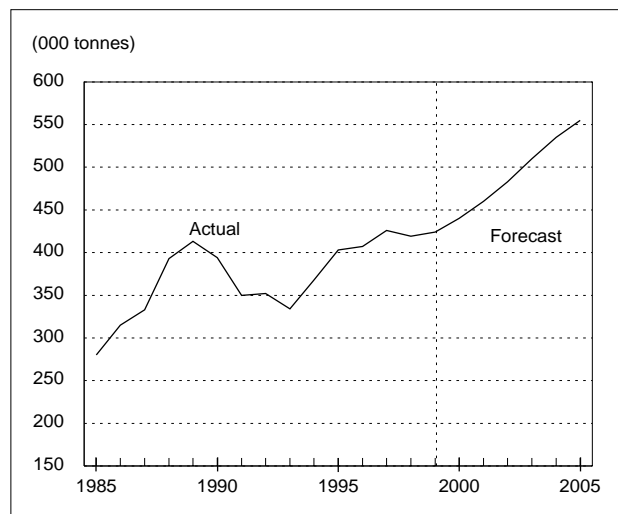
CONSUMPTION OUTLOOK

The International Consultative Group on Nonferrous Metals Statistics reported that consumption of primary magnesium increased to over 332 000 t in 1999 from about 328 000 t in 1998. Total secondary magnesium total consumption increased to 424 000 t in 1999 from 419 000 t in 1998.

Magnesium consumption 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 prices and price stability as 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 North American automotive industry.

In Canada, reported consumption of magnesium increased from 32 600 t in 1998 to 42 600 t in 1999, due in part to an increased number of companies reporting the consumption of magnesium for the production of castings and wrought products.

Figure 1
World Magnesium Consumption, 1985-2005

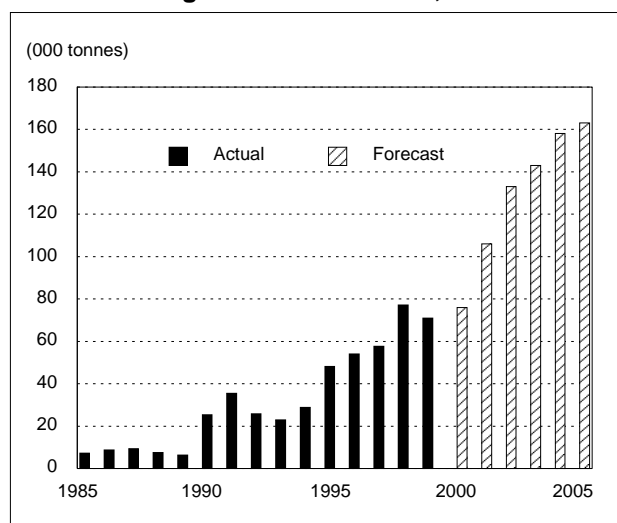


Source: Natural Resources Canada.

CANADIAN AND WORLD PRODUCTION OUTLOOK¹

Canada is the third largest producer of primary magnesium in the world after China and the United States. Canadian primary magnesium production increased dramatically with the opening of Norsk Hydro's 40 000-t/y primary magnesium plant at Bécancour in 1990. Installed primary nameplate capacity has since remained stable, but is now set to increase due to the start-up of Magnola Metallurgy's 63 000-t/y plant at Danville, Quebec, and a possible future expansion of Norsk Hydro's Bécancour plant. Canadian primary magnesium production capacity will rise to over 100 000 t/y in 2001.

Figure 2
Canadian Magnesium Production, 1985-2005



Source: Natural Resources Canada.

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 430 000 t/y in 2000 to more than 550 000 t/y by 2005 and higher if Australian projects achieve their goals.

PRICE OUTLOOK

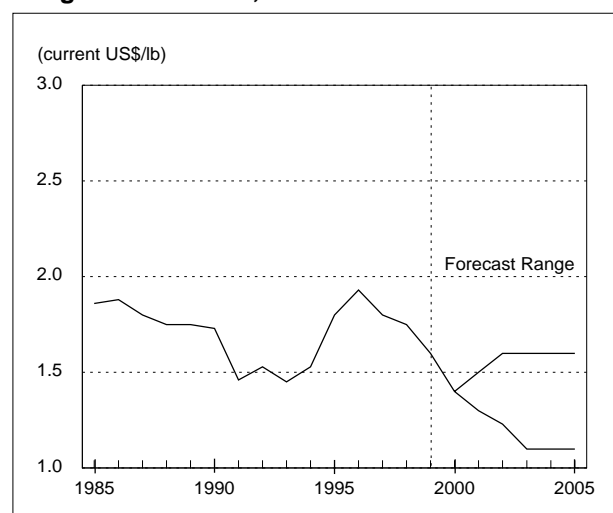
Prices for primary magnesium remained relatively weak for most of the year as markets and governments continued to react to increased production and magnesium exports from China. Prices as published

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

by *Metals Week* for magnesium trended downward through the year. The U.S. Spot Western Mean started the year at around US\$1.54/lb, decreasing to below \$1.40/lb late in the year, while mean U.S. dealer import prices decreased from US\$1.31/lb to below \$1.14/lb. Norsk Hydro's European producer price for pure magnesium started the year at 2.61 euros/kg (US\$1.30/lb), but fell to 2.33 euros/kg in April. Late in 2000, prices for magnesium produced in China were reported to have declined to US\$1300-\$1400/t, f.o.b. China.

A major factor that will influence magnesium prices in the longer term will be the change in supply over the next decade as the result of expansions or re-opening of existing capacity or the opening of new plants in Canada, the Middle East and Australia. The availability of newer, possibly lower-cost, supply may eventually cause prices to decline. Prices are expected to remain in the US\$1.10-\$1.60/lb range over the medium term until consumption catches up with current production rates.

Figure 3
Magnesium Prices, 1985-2005



Source: Natural Resources Canada.

Note: Information in this article was current as of December 1, 2000.

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Nickel

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1999 mineral production: \$1.8 billion^P
 World rank: Second
 1999 exports: \$1.7 billion

Canada	1999	2000 ^e	2001 ^f
	(000 t)		
Mine production	205	205.5	195
Refined production	133	132	140
Consumption	15	15	15.5

^e Estimated; ^f Forecast; ^P Preliminary.

Notes: Mineral production refers to recoverable content in concentrates shipped, whereas 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. Abbreviations used: Ni = nickel; PAL = pressure acid leach plant.

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 include stainless steel (65%), nickel-based alloys, electroplating, alloy steels, foundry products, batteries, and copper-based alloys. Nickel is intensively recycled; nickel in stainless steel scrap accounts for about 45%, on average, of nickel input to stainless steel-making.

ANNUAL AVERAGE SETTLEMENT PRICES, LONDON METAL EXCHANGE

1996	1997	1998	1999	2000 ^e
(US\$/lb)				
3.40	3.14	2.09	2.73	4.01

^e Estimated.

CANADIAN OVERVIEW

- At Voisey's Bay in early January, Inco and the Government of Newfoundland and Labrador ceased negotiations to develop Voisey's Bay, but exploration work continued. Inco proposed a US\$500 million mine/mill project, a US\$65 million underground exploration project, and a US\$125 million R&D program to prove up a proprietary hydrometallurgical process.
- At Inco's producing areas, new projects and exploration continued. Inco announced a US\$48 million deepening of the Birchtree mine in Thompson, extending the mine life by 15 years. The mining rate will be nearly doubled to 3175 t/d by 2004 by accessing 13.6 Mt grading 1.79% Ni. In Ontario, a labour strike was averted. Work continued on the Kelly Lake deposit (10.5 Mt grading 1.77% Ni, 1.34% copper and 3.6 g/t platinum group metals) and an economic feasibility study of the Totten deposit (8.4 Mt grading 1.42% Ni, 1.90% copper and 4 g/t platinum group metals). The US\$33 million McCreedy East mine work program will increase production to 21 000 t/y by 2004 from 8 Mt/y grading 1.88% Ni, 0.84% copper and 0.91 g/t platinum group metals.

- Workers at Falconbridge's Sudbury operations went on strike on August 1. The smelter continued running at half capacity, principally using feed from the Raglan mine, which reached a rate of 1 Mt/y by September. Falconbridge will evaluate Outokumpu's Montcalm property (7.75 Mt grading 1.48% Ni and 0.7% copper) by 2003. Noranda continued to purchase Falconbridge stock, owing 51.6% by November.
- Sherritt's 50%-owned Metals Enterprise produced 20 400 t of Ni and a record 2136 t of cobalt at the Fort Saskatchewan refinery in Alberta in the first nine months of 2000, using feed from Moa Bay in Cuba.
- Canmine began modernizing its hydrometallurgical cobalt-nickel refinery near Cobalt, Ontario. Purchased material, stockpiled near the refinery, will allow production of 300 t/y of cobalt and 100 t/y Ni, both as higher-valued powders. Canmine's Werner Lake mine project in Manitoba will subsequently feed the refinery.

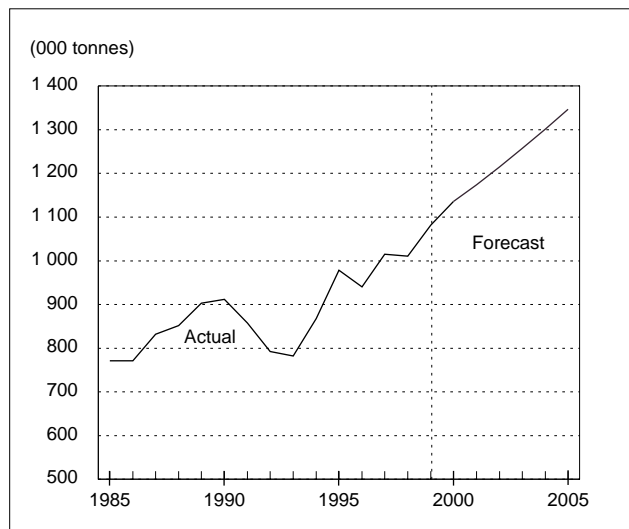
WORLD OVERVIEW

- RAO Norilsk Nickel said its exports will decline by 20% in 2000 due to increased domestic demand. Eight-month exports were 115 000 t, down 26 500 t from the same period in 1999.
- The three Australian PAL producers, Murrin Murrin, Cawse and Bulong, produced a total of 17 500 t of Ni by the end of September. The properties continue to experience financial or technical problems that continue to deter the financing of similar projects elsewhere. Comet and QNI continued work on the A\$720 million Ravensthorpe project (35 000 t/y of Ni and 1300 t/y of cobalt) with final recovery at QNI's Yabulu refinery.
- Australian concentrate producer Jubilee will send 8600 t/y of contained Ni to Inco's Thompson smelters; the first shipment left in July. Inco agreed to buy 30 000 t of Ni in concentrate from the future Cosmos Deeps project. Inco will also assist LionOre Australia in developing the Emily Ann sulphide deposit, providing a US\$16 million loan to Emily Ann and an agreement to buy at least 6000 t/y of Ni in concentrate.
- Outokumpu sold its nickel refinery in Finland to OM Group in January; OMG will build a green-fields nickel powder plant at the refinery by the second quarter of 2001, while Outokumpu will complete a study of converting its nickel smelter to process only copper. OMG is working with Weda Bay, in Indonesia, to advance development of a 30 000-t/y Ni and 3000-t/y cobalt PAL plant to supply OMG's refinery in Harjavalta. PT Aneka Tambang owns 10% of Weda Bay.
- At Inco's Asian properties, PT Inco, after an expansion that was completed in 1999, expects to produce 61 000 t/y of Ni in matte in 2000 compared to 45 000 t/y in 1999. In New Caledonia, pilot work continued at Goro where Inco is testing a proprietary process for a possible 55 000-t/y nickel oxide and 5000-t/y cobalt operation.
- Anglo American sold its portion of the Kabanga/Kagera sulphide nickel project in Tanzania back to Barrick Gold; a 17 000-t/y output was planned from 21 Mt grading 2.18% Ni.
- Philnico and Impala signed a memorandum of understanding to advance development of a PAL plant at Nonoc in The Philippines to produce 41 000 t/y of Ni and 4000 t/y of cobalt, both as intermediates. Impala's refinery in South Africa could be expanded to 60 000 t/y to handle new feed. Philnico needs financing of US\$1 billion to proceed.
- In Cuba, WMC withdrew from its Pinares de Mayari West project; Norilsk resumed negotiations, which had been suspended in 1999, with the Cuban government to develop the Las Camariocas deposit.

CONSUMPTION OUTLOOK

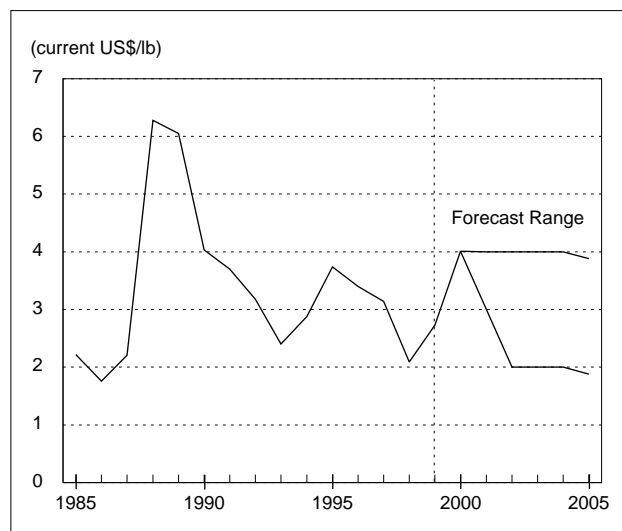
The world nickel market was forecast by the International Nickel Study Group (INSG) as a deficit for 2000 and a surplus for 2001. In October, the INSG 2000 forecast was demand of 1.136 Mt and refined production of 1.127 Mt; the forecast for 2001 was demand of 1.174 Mt and refined production of 1.209 Mt. Macquaries forecast stainless steel production to increase to 19.5 Mt in 2001, up from an estimated 17.3 Mt in 2000. Nickel in scrap supplied an increasing share of feed to stainless steel plants in 2000. World stainless demand paused in the third quarter as mills destocked, unconcerned about low London Metal Exchange (LME) stocks of Ni, perhaps because of inventories built up prior to the potential strike at Inco that did not materialize. Medium-term consumption is expected to trend at about 3%/y assuming past economic growth rates continue. Economic indicators, correlated to stainless use, showed slower growth of industrial activity in the OECD in the third quarter, partly resulting from higher oil prices, while U.S. stainless inventories continued significantly above "normal" levels.

Figure 1
World Nickel Consumption, 1985-2005



Source: Natural Resources Canada.

Figure 2
Nickel Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

PRODUCTION OUTLOOK

Canadian production of nickel in concentrate in 2000 is forecast at 194 000 t; the strike at Falconbridge's Sudbury operations reduced the previously forecast production for 2000. Canadian production is forecast to rise to 202 000 t in 2001 (assuming no strikes or unforeseen production interruptions). Voisey's Bay negotiations ceased in January 2000 and had not resumed as of November. Depending upon prices, permitting and studies, new production in the medium term includes: Canmine's Maskwa deposit, the Montcalm deposit, the Totten deposit, or Voisey's Bay. Because of the relative size of Voisey's Bay and the associated uncertainty, a yearly forecast of Canadian nickel production is not presented. Finished nickel production in Canada is estimated at 135 000 t in 2000; this is forecast to rise to 140 000 t in 2001.

PRICE OUTLOOK

Nickel prices continued the increase that began in late 1998, buoyed in 2000 by increased stainless demand and lower-than-projected production from Australian PAL projects. Hence, prices for 2000 should average just over US\$4/lb (my forecast in November 1999 for prices in 2000 was US\$3/lb). A surplus of nickel in 2001 is expected by many; however, such forecasts may be based upon optimistic production projections and may not allow for labour disputes, weather or technical problems. Nickel stocks on the LME declined in 2000 from 47 000 t to 11 000 t in early November, concurrent with the

trend of decreasing prices in 2000; while this should continue, a serious production interruption in 2001 could result in a sharp price spike. A price of US\$3.50/lb is forecast for 2001, in the upper portion of the long-term forecast range of US\$2-\$4/lb (in current dollars). Subsequent years are expected to see prices decline in this range. If Murrin Murrin operates reliably at capacity, then a potential second wave of PAL projects is likely, which would bring on sufficient capacity to depress medium- to long-term prices.

Note: Information in this review was current as of November 8, 2000.

NOTE TO READERS

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Zinc

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1999 mine production: \$1.5 billion
 World rank: Second (metal production)
 Exports: \$1.6 billion

Canada	1999	2000 ^e	2001 ^f
	(000 tonnes)		
Mine production	1 009	970	935
Metal production	781	805	805
Consumption	169	200	205

^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. Secondary zinc has become an increasingly important source of the metal in recent years. Secondary 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 secondary zinc exclusively from secondary 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

1996	1997	1998	1999	2000 ^e
(US\$/t)				
1 025.0	1 313.3	1 023.3	1 077.3	1 160

^e Estimated.

CANADIAN OVERVIEW

- In July, Falconbridge Limited approved the development of Mine D (Deep) at the Kidd Creek mine at Timmins, Ontario. The project will extend the mine from 2100 m to 3100 m below the surface. The Mine D project will contribute 2 Mt/y of ore when full production levels are reached in 2004.
- In April, Noranda Inc. announced that it had resumed underground operations and milling at its Bell-Allard zinc mine near Matagami, Quebec. Operations were suspended in late February following an incident where the mine's underground shaft compartment sustained damage when the hoisting skip malfunctioned.
- Elsewhere in the Matagami region, Noranda continued to report good drilling results from an exploration program. The presence of a significant zinc and copper deposit consisting of three distinct ore zones, Equinox, Perseverance and Perseverance West, was discovered within the Matagami mining camp. Preliminary results for the Equinox zone indicate an inferred resource of 2.6 Mt grading 16.6% zinc, 1.1% copper, 34 g/t silver and 0.36 g/t gold. Work continues to define the zones.

- In May, Breakwater Resources Ltd. acquired the Bouchard-Hébert and Langlois zinc mines, located in northwestern Quebec, from Cambior Inc. Earlier in the year, Cambior announced mechanical problems with the SAG mill at the Bouchard-Hébert mine, which resulted in a temporary shutdown of the mill. The repaired SAG mill was back in production in October and is expected to reach full capacity of 2900 t/d by year-end.
- Late last year, rock stability problems at Cominco Ltd.'s Sullivan mine resulted in lower concentrate production. Subsequent improvements at the mine in the first quarter of 2000 had resulted in higher zinc and lead concentrate production. Results are being reviewed at Sullivan to ensure that the mine can be operated on an economic basis until the planned closure date, which is now expected to be December 2001.
- Evaluation continues on several advanced projects, including Expatriate Resources Ltd.'s Kudze Kayah property in the Yukon, Canadian Zinc Corporation's Prairie Creek project in the Northwest Territories, and Redfern Resources Ltd.'s Tulsequah Chief project in British Columbia.

WORLD OVERVIEW

- The Lisheen mine was officially opened in June. An equal joint-venture project between Ivernia West Plc and Anglo American plc, the Lisheen mine, located near Thurles, County Tipperary, Ireland, is the fifth largest zinc and lead mine in the world. The mine is expected to produce 4.83 Mt of zinc and lead concentrate during its 14-year lifespan.
- Boliden's Spanish subsidiary, Boliden Apirsa SL, filed for bankruptcy in October. The subsidiary, which operates the Los Frailes mine, will continue to operate until the end of October 2001.
- Vancouver-based EuroZinc Mining is in final discussions with European banks to secure financing for its US\$60 million Aljustrel zinc mine project in Portugal. Once secured, the project is expected to start in 2001 with an ore throughput rate of about 1.45 Mt/y.
- Finland's Outokumpu signed a letter of intent in October to acquire the 150 000-t/y Norzink zinc smelter in Norway from its joint owners, Rio Tinto plc and Boliden Limited, for US\$180 million.
- Pasminco Limited officially opened its new Century mine in Queensland, Australia, in early April.

The mine is expected reach its full annual production rate of 500 000 t of zinc contained in concentrate by the end of 2001. Half of the mine's zinc concentrate will supply Pasminco's Budel Zink smelter in the Netherlands.

- Cominco announced that its U.S. subsidiary, Cominco American Inc., will re-open the Pend Oreille zinc-lead mine near Metaline Falls, Washington. Work on the US\$70 million project began in October and it is expected to start production in the third quarter of 2002. The lead and zinc concentrate will be shipped to Cominco's nearby Trail smelter in British Columbia.

LEADING WORLD ZINC PRODUCERS

<u>Producers</u> Zinc in Concentrate		<u>Producers</u> Zinc Metal	
	2000 ^e		2000 ^e
	(000 tonnes)		(000 tonnes)
China	1 500	China	1 800
Australia	1 397	Canada	805
Canada	970	Japan	652
Peru	890	Australia	513
United States	860	South Korea	470

Source: International Lead and Zinc Study Group.

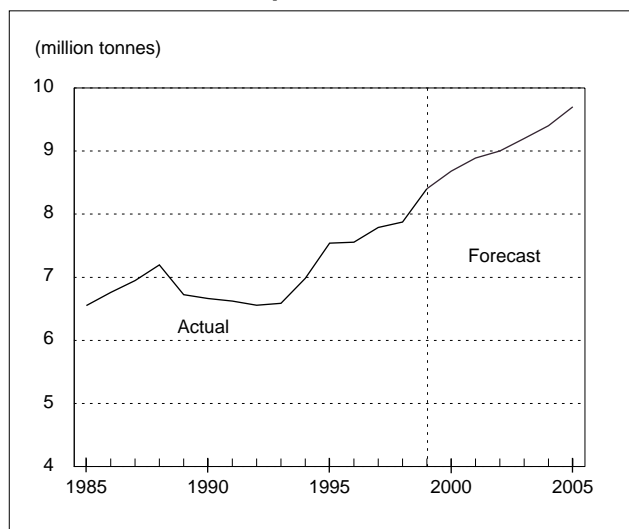
^e Estimated.

CONSUMPTION OUTLOOK

An increase of 2.4% in world zinc consumption to 8.90 Mt is forecast in 2001, following an estimated 3.3% increase in 2000. Continued economic growth in North America should result in increased zinc demand of over 2.6% in 2000, with Europe expected to show more modest growth at about 1.6%. Following two successive years of decline, growth in Japanese demand is expected to reach 5.2% in 2000. In 2001, European demand is expected to rise by 2.3% and to remain at 2000 levels for North America while levelling off at about just under 1% in Japan.

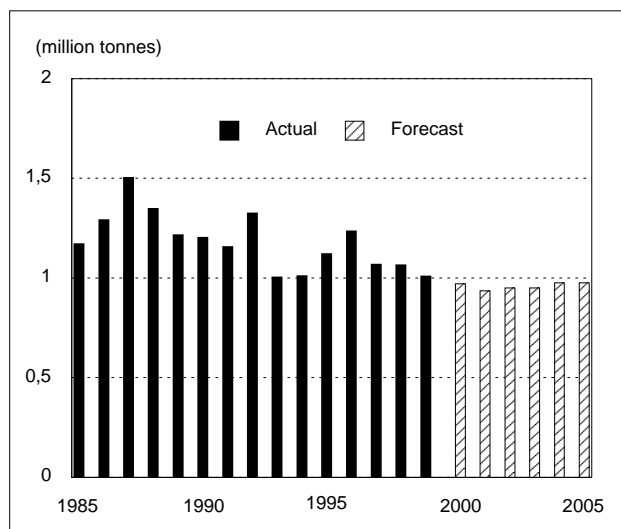
Beyond 2001, world zinc consumption is forecast to grow by an average 2.8%/y to 2005. Galvanizing will remain the dominant end use of zinc and exhibit the largest increase in consumption during the forecast period, followed by brass and die-cast alloys.

Figure 1
World Zinc Consumption, 1985-2005



Source: Natural Resources Canada.

Figure 2
Canadian Mine Production of Zinc, 1985-2005



Source: Natural Resources Canada.

CANADIAN PRODUCTION OUTLOOK

Zinc mine production in Canada is expected to be 3.9% lower in 2000 compared to 1999, primarily as a result of temporary technical problems at Noranda's Brunswick and Bell Allard facilities. The new circuit at Agnico Eagle's LaRonde mine continues to ramp up production. As older mines such as Cominco's Sullivan mine near closure, Canadian zinc mine production overall is expected to decrease by a further 3.5% in 2001. In the longer term, mine production should stabilize by 2004 as Hudson Bay Mining and Smelting Co. Limited's 777 project increases to full production and Falconbridge's Mine D project comes on stream.

With the shift from domestic sources of concentrate to more imports, zinc metal production in Canada will increase about 10% in 2000 to 805 000 t, primarily as a result of increased production at Cominco's Trail operations in British Columbia and at Noranda's Valleyfield zinc refinery in Quebec. In 2001, Canada is expected to again produce 805 000 t of zinc metal. Production capacity in Canada is set to further increase by 15 000 t/y by the end of 2001 as a result of the modernization and expansion project currently under way at Hudson Bay Mining and Smelting Co. Limited's Flin Flon operations.

PRICE OUTLOOK

The LME Cash Settlement prices for zinc followed a downward trend in the first quarter of 2000. Cash prices started the year at US\$1200/t and fell to \$1065/t by the end of February, only to rally to reach a peak of \$1277/t in mid-September. As stock levels began to rise towards the end of September (up 7700 t from the start of the month), prices began to fall and the gains made through the first three quarters dropped to a new low for the year, with the cash price at US\$1061/t towards the end of October.

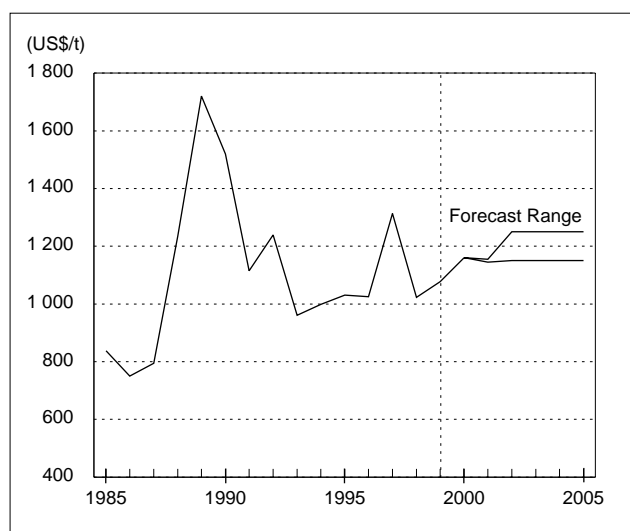
Stocks on the LME declined steadily through the first three quarters of the year. Stock levels fell from 278 850 t in January to 201 925 t in mid-August, rising to 224 000 t at the end of October. Together with other consumer stocks, total reported stock levels are still low, representing just over five weeks of Western World supply. After taking into consideration the net exports from the former Eastern countries and releases from the U.S. Defense National Stockpile, according to the ILZSG, the close supply and demand balance seen during the first half of 2000 is expected to develop into a modest surplus for the year as a whole if current production schedules are met.

For 2001, the zinc market, according to information gathered by the member countries of the ILZSG, is

expected to result in a substantial Western World market surplus if ambitious production targets are achieved. While market demand is expected to remain strong overall, zinc metal output in 2001 is expected to increase 3.7%. Prices will likely reflect this potential oversupply and average about US\$1150/t (52¢/lb) for the year.

Beyond 2001, investments made in the zinc industry in recent years have resulted in large increases in mine and smelter capacity. 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\$1150 to \$1250/t through to 2005.

Figure 3
Zinc Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

Note: Information in this article was current as of November 10, 2000.

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The Evolution of the International Metal Study Groups

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Last year marked the 40th anniversary of the International Lead and Zinc Study Group (ILZSG). When it was created in 1959, it marked only the second time that an intergovernmental consultative forum of this kind had been established (the first being for tin in 1956). Governments of the day were concerned with the poor market situation for lead and zinc that had persisted through the mid-to-late 1950s: high production, weak consumption, high stocks and low prices. The situation led a number of countries within the United Nations to convene a number of high-level discussions to seek possible solutions without direct intervention by governments into the marketplace.

As a result of these discussions, governments decided to establish a permanent intergovernmental organization to address concerns related to lead and zinc and to provide up-to-date market information. The ILZSG was born and held its first annual session as an autonomous intergovernmental consultative forum in January 1960. The Secretariat for the Group was located in the United Nations headquarters in New York and remained there until it was relocated to its current location in London, England, on April 1, 1977.

Canada played an important role in the creation of the ILZSG and, by the late 1980s, countries with an interest in nickel and then copper convened to discuss the establishment of additional study groups based on the success of the ILZSG model. The International Nickel Study Group (INSG) was established in 1990 with its headquarters in The Hague, Netherlands, followed by the International Copper Study Group (ICSG) in 1992 with its headquarters in Lisbon, Portugal.

Throughout the history of the groups, Canadians have been active participants and have played a prominent role in their establishment and in the operation of the secretariats and the work of the com-

mittees. Canada has also been active in soliciting new members to the groups and is seen to be a key player in all three forums.

CURRENT STATUS AND MANDATES

Currently, the three study groups operate independently as autonomous, United Nations-affiliated intergovernmental organizations that provide their member states with:

- accurate and timely information on world commodity markets; and
- regular consultations on international trade, environmental and other issues of importance to member countries.

The Groups are recognized as an international commodity body by the United Nations Common Fund for Commodities, which entitles them to apply for funding for development projects from the Common Fund. Figure 1 shows the countries that are members of one, two or all three of the metal study groups.

Membership in the groups is open to member states of the United Nations (or of its specialized agencies or the World Trade Organization) and to intergovernmental organizations having responsibilities with respect to the negotiation, conclusion and application of international agreements, particularly commodity agreements. Each member has one vote, with the exception of the European Union, and financing for the groups comes from the member governments. There are currently 25 members in the ICSG, 28 members in the ILZSG and 16 members in the INSG.

In addition to member governments, several multilateral institutions and non-governmental organizations have been accredited observer status. Unlike some other commodity groups, observers do not pay membership dues. Intergovernmental organizations with observer status to the study groups include:

- Commission of the European Communities (ILZSG)
- Organization for Economic Co-operation and Development (ILZSG, INSG)

- United Nations Conference on Trade and Development (ILZSG, INSG)
- United Nations Environment Programme (ILZSG)
- United Nations Industrial Development Organization (ILZSG)
- World Bank (ILZSG)
- World Trade Organization (ILZSG)

Non-governmental organizations that have been granted observer status to the study groups include:

- American Bureau of Metal Statistics Inc. (ICSG)
- American Zinc Association (ILZSG)
- Association of the European Non Ferrous Metals Industries (ICSG, ILZSG, INSG)
- EUROFER (INSG)
- European Copper Institute (ICSG)
- European Zinc Institute (ILZSG)
- International Copper Association (ICSG)
- International Council on Metals and the Environment (ICSG, ILZSG, INSG)
- International Lead Zinc Research Organisation (ILZSG)
- International Wrought Copper Council (ICSG)
- International Zinc Association (ILZSG)
- Lead Development Association International (ILZSG)

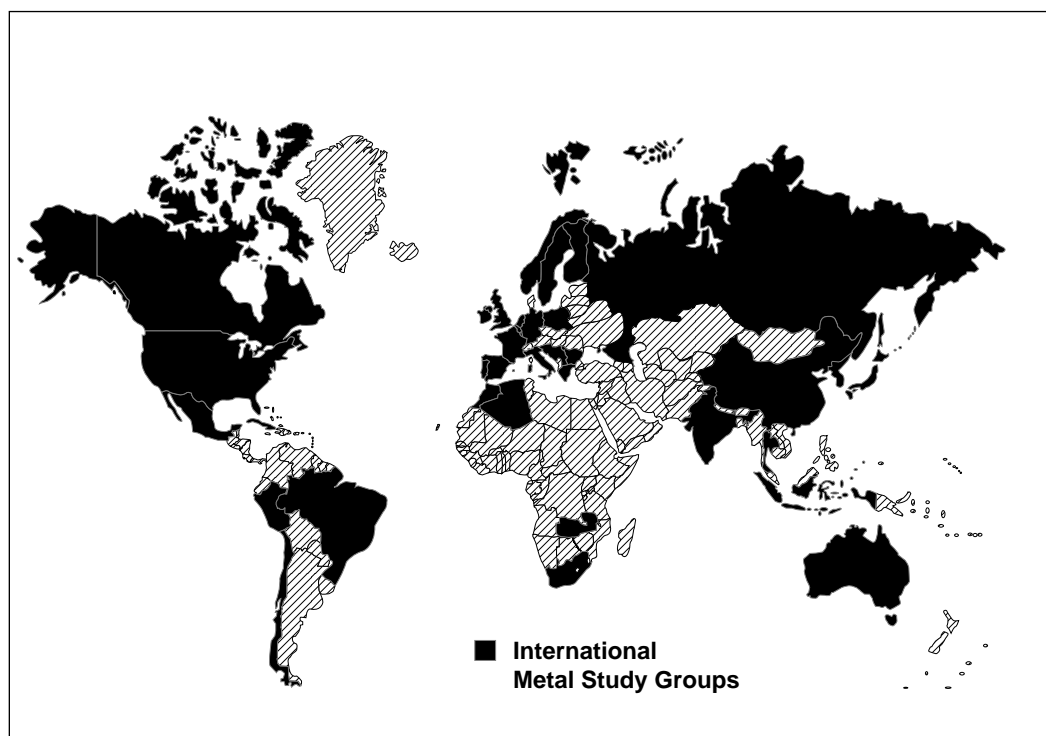
- Lead Industries Association Inc. (ILZSG)
- Nickel Development Institute (INSG)
- Nickel Producers Environmental Research Association (INSG)
- World Bureau of Metal Statistics (ICSG)

EVOLUTION OF THE GROUPS

When the ILZSG was created in 1959, countries were concerned about the transparency of markets and restrictive trade rules that made use of protectionist measures such as tariffs. Today, many of these tariffs have been removed as countries move into free trade agreements within regional trading blocks. However, we are now seeing a move to more sophisticated, less transparent, technical barriers to trade being erected. The effects of such measures on metal markets are already being felt. In addition to strictly technical or commercial challenges, governments must also address the issue of society's expectation that the industry act in a responsible manner consistent with the principles of sustainable development.

To meet these new challenges, member countries of the three study groups convened a workshop on sustainable development for nonferrous metals in

Figure 1
Member Countries of the International Metal Study Groups



Source: Natural Resources Canada.

London, England, in December 1999. The London workshop clearly demonstrated how the policy environment that governments and industry are currently operating in has evolved since the inception of the groups. Governments and others engaged in the sustainable development of mineral and metal production, use and recycling need to ensure that economic, social and environmental policy and management decisions will support trade and development in a responsible manner.

The groups are now in the process of finding the appropriate mechanisms to respond to the changing nature of market transparency issues, the need to address issues from a sustainable development approach, and how to deliver this information. As the only existing intergovernmental forums to discuss issues of concern to governments related to the production and consumption of metals, the groups have started to position themselves to become more relevant to the policy issues affecting nonferrous metals. In September 2000, the member governments of the three metal study groups convened the first meeting of the Non-Ferrous Metals Consultative Forum on Sustainable Development in Brussels, Belgium.

The Consultative Forum was convened to build on the outcomes of the London workshop. Workshop participants had identified the need for activities that promote the production, use, re-use, and recycling of efficient, effective, durable and environmentally sound materials for use by society. The purpose of the Forum was to identify those recommendations or action items from the workshop with the broadest level of support from governments, multilateral institutions, industry and other non-government organizations. Forum participants were given the task of developing the components of an action plan and its implementation for consideration by member countries of the study groups and others (see Chairmen's summary). More information about this activity is available through the joint study group web site at www.nfmsd.org.

Activities like the Consultative Forum, workshops on recycling, and the joint Working Group on Trade and Environment are just a few examples of how the study groups are evolving to meet the needs of the member countries, industry and others. To address the ever-changing needs and rapid growth in information technology, the three groups have also established web sites for rapid delivery and access to the wide range of publications and information generated by the groups (for more information, visit their sites at www.icsg.org, www.ilzsg.org and www.insg.org).

Improved Internet capability is becoming a high priority for the groups and Canada is leading the way with technical assistance to the groups for web site design and database programming to create interactive web sites that are accessible to all subscribers. Through their individual and combined efforts, the groups are positioning themselves well to meet the challenges of the coming decade.

Non-Ferrous Metals Consultative Forum on Sustainable Development

Brussels, Belgium
September 28-29, 2000

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 first meeting of the Non-Ferrous Metals Consultative Forum on Sustainable Development in Brussels (Belgium), September 28-29, 2000. The Forum, co-chaired by Sauli Rouhinen, Ministry of the Environment, Finland, and Alek Ignatow, Natural Resources Canada, was held at the Conference Centre Albert Borschette and hosted by the European Commission. Some 90 delegates from 22 countries attended, including 9 representatives from environment and social non-governmental organisations. A list of Forum delegates is attached.

The Forum was convened to build on the outcomes of the Workshop on Sustainable Development held in London in November 1999. At that time, the Workshop identified the need for activities that promote the production, use, re-use, and recycling of efficient, effective, durable and environmentally sound materials for use by society. The purpose of the Forum was to identify those recommendations or action items with the broadest level of support from governments, multilateral institutions, industry and other non-government organisations. Forum participants were tasked with developing the components of an action plan and its implementation, for consideration by member countries of the Study Groups and others.

The first day of the Forum was divided into five sessions. In the first session, participants were asked whether or not the Discussion Paper (circulated in advance of the meeting and available on the Consultative Forum Web site at www.nfmsd.org) adequately reflected the outcome of the 1999 Workshop. Participants were then asked in each of the subsequent sessions to identify those Workshop recommendations with the broadest level of support for further action.

Based on the points raised during the first day of discussions, the Co-Chairs and Rapporteurs compiled a list of recommended activities into the following six areas for consideration by the Forum on the second day:

- Stewardship Programmes
- Community Consultation and Involvement
- Promotion of Recycling
- Research and Development
- Open and Transparent Mechanisms to Improve Communication
- Information Development and Dissemination for Decision Making

The key recommendations or actions identified by the Forum for each of the six areas are included in Annex A.

Given the breadth of activities identified in Annex A, the Co-Chairs suggested a path forward to reflect the strong desire on the part of the Forum participants to achieve visible and rapid progress. The Forum strongly recommended the establishment of the following three ad-hoc working groups to take actions forward: i) Production of Non-Ferrous Metals, ii) Product Stewardship, including use and recycling, and iii) Science, Research and Development. Each working group will take into consideration all the recommended activities from each of the six identified areas outlined in Annex A. As examples, the Forum identified some preliminary actions, which commanded significant support at the meeting, each working group might wish to take forward as follows:

- **Production of Non-Ferrous Metals (including metal production)**
 - best practices in dealing with community issues such as consultation

- **Product Stewardship, including use and recycling**
 - methodologies for addressing materials choice
 - material flow analysis in metals production
 - Study Group initiative to facilitate technology transfer to enhance recycling in developing countries
- **Science, Research and Development**
 - establishment of a Global Research Network
 - Workshop on Risk Assessment

Forum participants also recommended that the existing joint Study Group Web site for the Forum be expanded to act as a clearing house for information exchange and to facilitate the work of the three working groups.

The three ad-hoc working groups should be established with co-chairs from government, industry and non-government organisations, with a mandate to bring together existing work, share information, identify gaps and to rapidly initiate relevant activities related to the recommendations identified by the Forum for future action. Initially each working group should consider all the outcomes from this meeting in Brussels and draw up a work plan for taking the most appropriate forward as quickly as possible. Each ad-hoc working group will receive secretariat support from one of the three international metal study groups. The Study Groups' Advisory Committee on Sustainable Development will establish the terms of reference for the groups in consultation with the Forum Co-Chairs.

Once the Chairmen's Summary has been revised based on comments from Forum participants (*this has now been completed by the Co-Chairs*), it will be widely distributed through the Study Groups to

member countries and others, seeking an indication of their willingness to participate in the working groups. Interested parties will be asked to confirm their intentions by the end of January 2001. The Study Groups' Advisory Committee on Sustainable Development will collate the responses and establish the groups, which will then draw up their own work plans. Each working group will report back to the Forum, at a time and place yet to be determined, towards the end of 2001.

The Co-Chairs noted the strong spirit of co-operation during the Forum discussions and the desire on the part of participants to maintain the momentum and to continue working collectively towards achieving tangible results. Already during the discussions, several participants volunteered to participate in the working groups and offered to support work on specific actions.

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28 November 2000

Non-Ferrous Metals Consultative Forum On Sustainable Development

Brussels, Belgium
September 28-29, 2000

ANNEX A

Aware of the need to set specific targets for each aspect of sustainable development and recognising that these targets need to be timely and credible, the participants of the Non-Ferrous Metals Consultative Forum on Sustainable Development recommended the following activities for consideration:

1. STEWARDSHIP PROGRAMMES

Stewardship programmes need to be established that promote and demonstrate responsible management of processes and products throughout the life cycle from exploration through to recycling or final disposal. This should include:

- international guidelines, principles and codes of practice;
- meaningful communication and co-operation in the supply chain between industry sectors, taking into account the interests of all stakeholders;
- worker health and safety;
- environmental management systems;
- improved product performance and eco-efficiency;
- identifying, promoting and demonstrating best practices including technology;
- developing efficient, effective and consistent regulations that maintain competitiveness and have incentives, e.g., promote market-based approaches;
- meaningful consultation with stakeholders;
- fuller accounting and dissemination of social, economic and environmental costs/benefits.

2. COMMUNITY CONSULTATION AND INVOLVEMENT

Facilitation of broad and comprehensive community consultation and involvement in the decision-making process. This should include:

- broader representation, education and capacity building for communities to participate;
- outreach programmes;
- recognition of regional/local costs and benefits;
- economic diversification during and post mining activities;

- transparent collection and communication of data with third parties;
- early and ongoing communication and involvement with local/regional communities;
- land access/ownership including indigenous issues;
- develop intercultural tools and mechanisms for communication and involvement of communities in decision making.

3. PROMOTION OF RECYCLING

Opportunities for recycling of metal-bearing products should be increased through a number of measures including:

- facilitating the transboundary movement of metal-containing products and materials destined for recycling in an environmentally sound manner, including maintenance of a safe working environment;
- facilitating the development and transfer of technologies that reduce and manage wastes during production and/or recycling, taking into account the long-term effects on health and the environment;
- incorporating recycling into product design;
- engaging downstream manufacturers and consumers in the collection and recycling of products including dispersed sources;
- monitoring and communicating progress on metal recycling, including better harmonised data gathering and optimising the trends in metal recycling;
- reviewing/assessing regulatory and non-regulatory activities related to metal use and recycling and developing initiatives to enhance the benefits and address impediments such as those that restrict materials choice;
- highlighting the economic as well as social and environmental benefits of recycling, including energy savings and employment;
- differentiating between waste and recyclable materials;
- and promoting campaigns/activities that promote all aspects of metals recovery and recycling, particularly in regions currently lacking the required infrastructure.

4. RESEARCH AND DEVELOPMENT

Programmes to develop, share and communicate credible scientific research and data on metals in a timely manner to facilitate decision making by governments, industry and others. This should include:

- appropriate internationally recognised test methods and screening criteria to assess hazard characteristics of metals and metal compounds for risk assessment and classification including the need to differentiate between metals, alloys and organic chemicals;
- an international multi-stakeholder approach and cross-country involvement for the development of protocols for risk assessment of metals;
- a mechanism to resolve contentious science issues;
- development of non-discriminatory methodologies for materials choice.

5. OPEN AND TRANSPARENT MECHANISMS TO IMPROVE COMMUNICATION

Develop open and transparent mechanisms to improve international communication, consultation, and co-operation on cross-cutting issues relating to metals and sustainable development, particularly the balance between the social, economic and environmental aspects. This should include:

- participation of all stakeholders to foster continued dialogue and assess and address the contribution of metals to sustainable development;
- information relevant to sustainable development decision making, including recognition of its importance to developing countries - using available tools like the Consultative Forum's web site (www.nfmsd.org);
- enhanced awareness and interpretation of risk management activities (e.g., regulations, voluntary measures) that influence the trade, production and use of metals;
- expert panels and other sources of expertise to scope out problems, identify information sources, and work with governments, industry, communities, media and others on specific issues;
- increased public awareness/education of the contribution and benefits to society related to the production, use and recycling of non-ferrous metals.

6. INFORMATION DEVELOPMENT AND DISSEMINATION FOR DECISION MAKING

Tracking and measuring performance and reporting on economic, environmental and social factors at all stages of metal processing from exploration, mining and production through to application, use, recycling and end of life. This should include:

- identification of information needs such as materials flow data and recycling data;
- explore the feasibility of developing sustainable development indicators;
- identify target audience, recognise capacity to receive the information, develop appropriate messages and means of dissemination;
- develop baseline data, and track and measure performance.

The Canadian and World Economic Situation and Outlook

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The Canadian economy continues to grow at a very healthy pace. Real Gross Domestic Product (GDP) rose by 4.5% in 1999 and, for the year ending the second quarter of 2000, the pace of expansion accelerated to 5.3%. The economic growth is well balanced with business investment, consumer spending and merchandise trade all contributing. In spite of this very strong growth, inflation remains under control. Growth in Canada is expected to slow through the last part of this year and in 2001, reflecting the tightening monetary policy of the last year, a slowing U.S. economy, higher energy costs and high consumer debt. For 2000, real GDP is expected to expand by about 4.7% and then slow to a little over 3% in 2001, a rate that can be maintained without fuelling inflation. The core rate of inflation in 2001, excluding the food and energy components, is expected to rise slightly to the upper region of the Bank of Canada's target range of 1-3%.

Canada's inflation rate has been low for several years, averaging 1.4% from 1997 through 1999. For the first 10 months of 2000, the Consumer Price Index (CPI) has increased moderately to average about 2.6%. The core rate, however, has remained remarkably steady, averaging 1.5% so far in 2000, the same as the average for the previous three years. For 2000, the all items CPI should average about 2.7% and remain at about that level in 2001.

The bank rate, as set by the Bank of Canada, stood at 4.75% in October 1999. Successive 25-to-50-point increases since then moved the rate to 6% by May 2000, the level at which it remains as of November 2000. These increases closely followed those in the United States as Canada and the U.S. attempted (so far successfully) to slow the economies of both nations to levels sustainable without causing an outbreak of inflation. Evidence now indicates that the North American economies are slowing. While remaining vigilant and maintaining a slight tightening bias, the Bank of Canada and the U.S. Federal Reserve are not expected to raise rates over the short

term. By late 2001, rates may even begin to decrease modestly.

In spite of Canada's current account surplus, low inflation and improved fiscal situation, the Canadian dollar has depreciated against the U.S. dollar. The Canadian dollar began the year at US\$0.69 but, by mid-November, hovered around US\$0.65. This is a reflection of the strength of the U.S. currency rather than a weakness in the Canadian currency. The Canadian dollar has given up the least ground against the U.S. currency of any of the major world currencies. In light of strong Canadian economic fundamentals, many believe the Canadian dollar is due for at least a modest recovery against the U.S. dollar and continuing strength against other currencies.

Even though consumer debt levels are at record highs (including mortgage debt, the level is about 100% of personal disposable income), debt service costs are relatively low, thus, consumer spending is expected to rise by about 3.7% in 2000 before moderating to about 3% in 2001 as spending on interest-sensitive durable goods declines. Employment growth of about 2.5% in 2001, real personal disposable income growth of perhaps 3%, and continuing tax relief from the federal and provincial governments should sustain consumer spending levels. Canada Mortgage and Housing Corporation predicts housing starts will reach nearly 155 000 units in 2000 and rise to nearly 161 000 in 2001. This compares to 149 968 in 1999. In October, housing starts rose to an annual rate of 164 800 from 157 100 in September. However, there is evidence that housing starts may be peaking as higher interest rates, energy costs and softer equity prices begin to affect the housing market.

Low financing costs have contributed significantly to Canadian business investment in machinery and equipment, especially high-technology equipment such as computers. Investment grew by 15.6% in 1999 and is expected to reach nearly 20% in 2000. This pace will not likely be sustained in 2001, but rising corporate profits, high capacity utilization rates, low borrowing costs, and the adoption of new technologies are all factors that should maintain healthy business investment expenditures. To the extent that investment in high-technology equipment or information technology supports productivity growth, business investment can be expected to improve

Canada's productivity performance and, hence, to subdue inflationary pressures.

While both the level of exports and imports increased in August (the latest month for which data are available), the merchandise trade surplus reached \$4 billion. There is little evidence that a slowdown in the U.S. economy is affecting the merchandise trade sector, although a decline in U.S. housing starts hampered the forestry sector. The main contributor to the rising export values was higher export volumes, although higher energy prices also contributed. Based on information available through August, a trade surplus of about \$38 billion may be expected in 2000. This should contribute to a current account balance of more than \$14 billion in 2000, compared with a negative \$3.8 billion balance in 1999.

Full-time jobs in Canada increased by 51 700 in October, bringing the total number of full-time jobs created for the first 10 months of 2000 to 261 000. The number of part-time employees declined by 30 500, for a net increase in the number of jobs of 20 200. In spite of the healthy increase in the number of jobs in October, the unemployment rate rose to 6.9% from 6.8% in September as the number of people in the labour force increased by 34 800. Canada's unemployment rate has declined steadily over the last few years, from 9.1% in 1997 to 7.6% in 1999, to an average of 6.8% for the first 10 months of 2000. Job growth over the next year is expected to be moderate but, with further gains in labour force participation anticipated, the unemployment rate will likely decline only modestly to about 6.5%.

The expected slowdown in the U.S. economy appears to have begun. Following a 4.2% rate of real GDP growth in 1999, the U.S. economy surged ahead in the first half of 2000 at a 5% pace (5.6% in the second quarter). Preliminary third-quarter results released by the U.S. Department of Commerce show that the economy grew by only a 2.7% annual rate, less than half the rate of the previous quarter. This growth slowdown was much swifter than many forecasters had predicted and seems to indicate that the Federal Reserve's interest rate policy has obtained the desired result of slowing the U.S. economy to a sustainable non-inflationary pace. Between June 1999 and May 2000, the Federal Reserve raised its benchmark funds rate from 4.75% to 6.5%. Other factors influencing the reduced growth rate are high energy prices, softer equity markets and a firm U.S. dollar. There are factors at work in the latter part of 2000 that may cause the economy to slow even more, including another potential jump in oil prices, disappointing corporate profit news, and slumping stock market performance. For 2000 as a whole, real growth should approach 5%, with growth slowing in 2001 to about 3% as the interest rate hikes and a firm U.S. dollar continue to exert their influence.

Inflation in the United States has increased slightly over the last year from an average of 2.2% in 1999 to an expected level of just over 3% in 2000. Moderating consumer expenditures in 2001 and robust business investment should help contain inflationary pressures. Corporate profits are likely to moderate from 2000 to 2001 as rising input costs combined with a competitive pricing environment and a strong U.S. dollar have their effect. This may temper their hiring somewhat, easing the very tight labour market. In October, the rate stood at 3.9%, the same as in September. For 2000, the unemployment rate is expected to average about 4% and, for 2001, to rise slightly to about 4.2%.

As a result of strong domestic demand and a negative merchandise trade balance, the U.S. current account deficit has been widening, reaching an annualized \$420 billion in the second quarter of 2000, a record 4.3% of GDP. To run a current account deficit, foreign capital must be invested in the United States. The increased demand for U.S.-denominated assets has resulted in an appreciation of the U.S. dollar in relation to most of the world's major currencies. To the extent that the form of these investments are in equities, any indication that these equity values may be leveling off may prompt a change in investor sentiment out of the United States, resulting in a depreciation of the currency and a potential source of inflationary pressure.

Most regions of the world are enjoying stronger growth than last year, with 2000 shaping up to be the best year in a decade, as growth is likely to reach 4.5%, compared with only 2.5% in 1998, the period of the emerging markets' financial crisis. As 2000 is likely to mark the peak of the current recovery cycle, world economic growth is expected to moderate in 2001 to between 3.5% and 4%.

The North American economies should remain atop the G-7 rankings in 2000, but the euro-zone has rebounded strongly, bringing with it robust employment growth. Although the euro currency continues to decline relative to the U.S. currency, the major euro-zone economies of Germany, France and Italy are expected to turn in their strongest economic rate of growth in nearly a decade in 2000. The European Central Bank is expected to further increase interest rates in an attempt to bolster the euro and to also curtail possible inflationary pressures due to rising energy prices and depreciating currency. Reduced corporate and personal income tax rates in 2001 should support economic growth.

The Japanese economy registered two consecutive quarters of growth in the first half of 2000, indicating that perhaps the economy has bottomed out. While industrial production and business investment have risen this year, ongoing corporate, financial and public sector restructuring will continue to weigh on

Japanese growth prospects. Recent unemployment rates of about 4.9% are near historic highs. Confidence has been shaken by a number of corporate bankruptcies and the precarious state of the government's finances, with the budget deficit approaching 10% of GDP. Given these factors, economic growth in Japan is unlikely to reach 2% this year or in 2001.

There are several positive developments in the emerging markets. China's economy expanded by more than 8% in the first half of 2000. Economic growth has also been impressive in the information technology economies of Malaysia, Singapore, South Korea and Taiwan. In Indonesia, political uncertainty impedes the implementation of needed economic and financial reforms. Overall, economic growth in Asia, excluding Japan, is expected to reach 6.6% in 2000 and then to moderate somewhat to 6.2% in 2001.

Many emerging market oil producers, especially the OPEC countries, Mexico and Russia, have seen their fiscal and current account positions enhanced significantly. Mexico has also benefited (along with Brazil) from the strong North American economies. Mexico's growth rate is likely to reach 5.5% in 2000 then decline to 4.4% in 2001. Latin America in general should see growth rates of over 4% in both 2000 and 2001.

Note: Information in this article was current as of November 10, 2000.

Sources: Toronto Dominion Bank, *Quarterly Economic Outlook*, September 2000; Royal Bank *Economic Outlook*, Autumn 2000; Toronto Dominion Bank, *Comment on August Merchandise Trade*; Statistics Canada, *Canadian Economic Observer*, October 2000; Newspaper articles on aspects of the Canadian and world economic situation and outlook.

TABLE 1. CANADA, VALUE OF MINERALS AND MINERAL PRODUCTS (STAGES I TO IV), IMPORTS BY COMMODITY, 1998-2000

	1998	1999	2000 ^a
	(\$000)		
METALS			
Aluminum	4 372 743	4 444 735	4 667 635
Antimony	9 749	8 396	8 100
Barium	6 195	6 367	4 585
Beryllium	75	317	83
Bismuth	2 426	1 564	2 254
Cadmium	607	887	1 171
Calcium metals	47 562	48 466	47 591
Chromium	94 036	80 868	72 228
Cobalt	62 975	37 432	46 392
Copper	1 626 759	1 660 299	3 158 102
Gallium	31	62	33
Germanium	14 841	7 172	3 301
Gold	1 577 846	1 059 564	887 327
Hafnium	...	249	222
Indium	1 085	1 128	1 350
Iron and steel	15 389 839	15 414 722	16 010 948
Iron ore	389 217	378 638	341 312
Lead	473 199	395 839	458 987
Lithium	48 894	36 701	59 870
Magnesium and magnesium compounds	186 692	211 331	180 117
Manganese	210 136	211 670	202 337
Mercury	589	1 152	544
Mineral pigments	130 681	156 745	133 344
Molybdenum	41 009	39 403	36 105
Nickel	556 603	308 734	367 612
Niobium	25 358	24 556	21 364
Platinum group metals	182 448	181 518	339 061
Rare earth metals	8 365	6 205	6 937
Rhenium	26	23	29
Selenium	470	567	568
Silicon	97 031	84 523	83 212
Silver	136 916	134 187	138 857
Strontium	2 073	1 871	1 795
Tantalum	1 240	804	1 333
Tellurium	112	326	410
Thallium	10	24	18
Tin	61 768	74 028	66 493
Titanium metals	93 897	67 803	136 396
Tungsten	9 393	7 617	10 344
Uranium and thorium	223 768	295 284	225 604
Vanadium	62 730	21 421	14 692
Zinc	234 800	262 594	256 360
Zirconium	42 763	37 393	37 531
Other metals	9 195 623	10 130 923	10 407 779
Total metals	35 622 580	35 844 108	38 440 333
NONMETALS			
Abrasives	429 564	451 426	445 401
Arsenic	1 315	3 009	401
Asbestos	81 052	102 949	97 195
Barite and witherite	2 479	7 168	6 311
Boron	29 048	35 524	30 708
Bromine	1 637	1 850	2 062
Calcium (industrial minerals)	6 592	6 167	5 167
Chlorine and chlorine compounds	55 868	77 340	81 105
Diamonds	251 158	295 652	326 410
Feldspar	448	373	314
Fluorspar	49 486	40 334	45 192

TABLE 1 (cont'd)

	1998	1999	2000 ^a
	(\$'000)		
NONMETALS (cont'd)			
Glass and glassware products	2 144 607	2 505 761	2 616 862
Graphite	447 326	505 444	432 981
Gypsum	36 145	48 255	44 055
Iodine	16 676	13 000	12 599
Mica	11 465	13 265	11 755
Nepheline syenite	3	13	1
Nitrogen	164 882	128 888	193 958
Pearls	17 227	23 126	22 676
Peat	2 743	1 814	1 045
Perlite	13 215	15 218	13 479
Phosphate and phosphate compounds	477 479	419 121	473 013
Potash and potassium compounds	41 572	37 366	40 958
Salt and sodium compounds	308 362	326 736	319 386
Silica and silica compounds	143 386	196 027	203 353
Sulphur and sulphur compounds	21 943	21 213	22 354
Talc, soapstone and pyrophyllite	12 173	14 541	14 364
Titanium oxides	269 981	276 401	245 145
Vermiculite	6 504	9 674	7 183
Other nonmetals	551 473	599 635	587 040
Total nonmetals	5 595 809	6 177 290	6 302 473
STRUCTURAL MATERIALS			
Cement	210 285	210 897	215 649
Clay and clay products	883 009	893 901	907 003
Dolomite	1 127	1 412	1 812
Granite	51 432	54 719	53 790
Lime	5 752	7 724	7 671
Limestone flux and other limestone	20 397	21 169	19 805
Marble, travertine and other calcareous stones	50 063	49 478	43 616
Olivine	836	986	1 195
Sand and gravel	18 956	18 037	17 272
Sandstone	2 077	2 473	2 210
Slate	9 102	7 537	9 413
Other structural materials	78 072	82 249	82 204
Total structural materials	1 331 108	1 350 582	1 361 640
FUELS			
Coal and coke	1 141 527	1 117 034	1 066 529
Natural gas	104 003	87 885	206 248
Natural gas by-products	56 798	71 269	135 219
Petroleum	9 053 958	9 774 127	15 666 891
Other fuels	442 675	495 572	480 330
Total fuels	10 798 961	11 545 887	17 555 217
Total mining imports (including fuels)	53 348 458	54 917 867	63 659 663
Total economy imports	298 381 900	319 909 560	

Sources: Natural Resources Canada; Statistics Canada.

. . . Amount too small to be expressed.

^a First ten months of 2000.

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, 1998-2000**

	1998	1999	2000 ^a
	(\$000)		
METALS			
Aluminum	7 116 487	7 195 813	7 422 975
Antimony	1 403	491	398
Barium	—	18	4
Beryllium	—	70	—
Bismuth	2 015	2 102	2 883
Cadmium	3 205	3 789	3 905
Calcium metals	3 743	2 593	2 225
Chromium	31 939	29 914	28 666
Cobalt	472 106	295 133	222 929
Copper	2 432 249	1 999 024	2 191 723
Gallium	—	—	—
Germanium	1 401	2 376	—
Gold	3 384 921	2 811 460	2 398 421
Hafnium	—	—	—
Indium	—	—	—
Iron and steel	9 612 605	9 812 633	10 322 151
Iron ore	1 289 784	1 052 194	968 551
Lead	275 946	280 232	233 057
Lithium	159	69	43
Magnesium and magnesium compounds	273 404	251 628	216 397
Manganese	14 574	24 383	27 327
Mercury	17	26	49
Mineral pigments	72 002	77 206	86 970
Molybdenum	67 770	47 480	44 170
Nickel	1 927 514	1 697 522	2 297 455
Niobium	39 647	42 314	37 089
Platinum group metals	207 882	204 003	277 156
Rare earth metals	271	65	—
Rhenium	—	—	—
Selenium	4 607	2 844	3 022
Silicon	99 122	105 127	96 250
Silver	508 457	488 117	422 105
Strontium	8	—	—
Tantalum	1 067	341	1 214
Tellurium	1 178	2 851	1 286
Thallium	—	—	—
Tin	13 791	11 818	11 080
Titanium metals	17 134	39 620	16 267
Tungsten	635	1 343	292
Uranium and thorium	786 159	700 704	577 467
Vanadium	41 615	9 581	4 362
Zinc	1 552 139	1 587 855	1 346 182
Zirconium	3 317	5 174	10 875
Other metals	4 495 084	4 711 934	5 743 578
Total metals	34 755 357	33 499 847	35 018 524
NONMETALS			
Abrasives	226 760	235 231	215 573
Arsenic	—	—	—
Asbestos	264 272	271 021	239 269
Barite and witherite	9 158	6 061	3 990
Boron	393	281	399
Bromine	23	24	8
Calcium (industrial minerals)	83	301	—
Chlorine and chlorine compounds	143 079	106 078	142 944
Diamonds	6 869	559 734	542 227
Feldspar	23	205	66
Fluorspar	68 796	53 534	62 026

TABLE 2 (cont'd)

	1998	1999	2000 ^a
	(\$000)		
NONMETALS (cont'd)			
Glass and glassware products	1 007 983	1 145 275	1 105 286
Graphite	134 099	106 060	77 700
Gypsum	341 551	461 821	270 972
Iodine	12 525	6 896	6 129
Mica	11 289	14 214	13 779
Nepheline syenite	52 205	48 959	48 301
Nitrogen	916 985	1 026 915	930 189
Pearls	2 252	2 643	3 504
Peat	320 963	331 366	301 655
Perlite	—	—	—
Phosphate and phosphate compounds	28 077	30 731	24 788
Potash and potassium compounds	1 978 593	2 109 106	2 295 819
Salt and sodium compounds	543 058	492 258	448 683
Silica and silica compounds	16 923	22 179	20 402
Sulphur and sulphur compounds	359 787	315 339	310 657
Talc, soapstone and pyrophyllite	10 227	17 723	21 147
Titanium oxides	211 332	212 456	176 638
Vermiculite	—	—	—
Other nonmetals	397 213	357 686	327 823
Total nonmetals	7 064 518	7 934 097	7 589 974
STRUCTURAL MATERIALS			
Cement	627 716	735 696	700 113
Clay and clay products	39 821	45 578	47 905
Dolomite	15 533	31 526	36 550
Granite	67 879	76 600	81 019
Lime	21 300	13 214	10 749
Limestone flux and other limestone	32 825	26 811	23 147
Marble, travertine and other calcareous stones	32 681	42 827	56 916
Olivine	—	—	—
Sand and gravel	19 723	25 713	27 059
Sandstone	234	61	69
Slate	4 927	7 969	9 999
Other structural materials	97 892	106 391	145 365
Total structural materials	960 531	1 112 386	1 138 891
FUELS			
Coal and coke	2 522 542	2 044 322	1 717 564
Natural gas	8 967 101	10 951 393	15 597 394
Natural gas by-products	863 115	977 309	1 462 911
Petroleum	12 949 875	14 992 623	25 039 428
Other fuels	269 669	251 207	277 814
Total fuels	25 572 302	29 216 854	44 095 111
Total mining exports (including fuels)	68 352 708	71 763 184	87 842 500
Total economy exports	297 451 300	330 409 547	

Sources: Natural Resources Canada; Statistics Canada.

— Nil.

^a First ten months of 2000.

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