

Aluminum

Wayne Wagner

The author is with the Minerals and Metals Sector, Natural Resources Canada.

Telephone: (613) 996-5951

E-mail: wwagner@nrcan.gc.ca (text-based only)

(Notes: General material on aluminum is available on the Internet at www.nrcan.gc.ca/mms/scho-ecol/main_e.htm#aluminum and in the 2000 chapter on Aluminum at www.nrcan.gc.ca/mms/cmy/com_e.html. Abbreviations of company names used in this paper are listed in Table 10 along with known Internet addresses of those companies.)

Canada's rank in world production of metal: Third
Installed capacity: 2.79 Mt/y

	<u>Amount</u>	<u>Value</u>
2002 primary aluminum production:	2.71 Mt	\$5.7 billion ^P
2002 exports (unwrought):	2.1 Mt	\$4.9 billion ^P
2002 exports (HS Chapter 76) ¹ :	n.a.	\$8.4 billion ^P

n.a. Not applicable; ^P Preliminary.

Increases in production at existing and new facilities around the world have now surpassed the cutbacks in metal production that occurred in the Americas in 2001. As a result, world production of primary and recycled aluminum has increased in 2002 to an estimated total of 33.8 Mt, compared to the past record 32.7 Mt in 2000. Of this total, 25.9 Mt was primary metal, compared to 24.5 Mt in 2001.

Although the average price was lower in 2002 compared to 2001, prices were less volatile and remained within a trading range of about 10% during 2002. Prices declined

in June and started to recover in October, ending the year at prices close to those at the start of year (refer to the table below).

PRIMARY ALUMINUM CASH PRICE, LONDON METAL EXCHANGE

	2000	2001	2002
	US\$/t (US\$/lb)		
Year average	1 555 (71)	1 444 (66)	1 349 (61)
Start of year	1 615 (73)	1 567 (71)	1 324 (60)
End of year	1 554 (71)	1 335 (61)	1 345 (61)
Year high	1 745 (79)	1 737 (79)	1 438 (65)
Year low	1 400 (63)	1 243 (56)	1 276 (58)

Prices in the spot alumina market reached a bottom in late 2001; after revisiting the lows in October 2002, prices started to rise as smelter expansions, particularly in China, placed increased demand on spot markets. *Metal Bulletin* reported that spot prices for metallurgical-grade alumina started the year at US\$130-\$140/t, rose to US\$150-\$160/t in mid-year, fell back to US\$138-\$143/t in October, and subsequently rose to US\$240-\$270/t in early 2003.

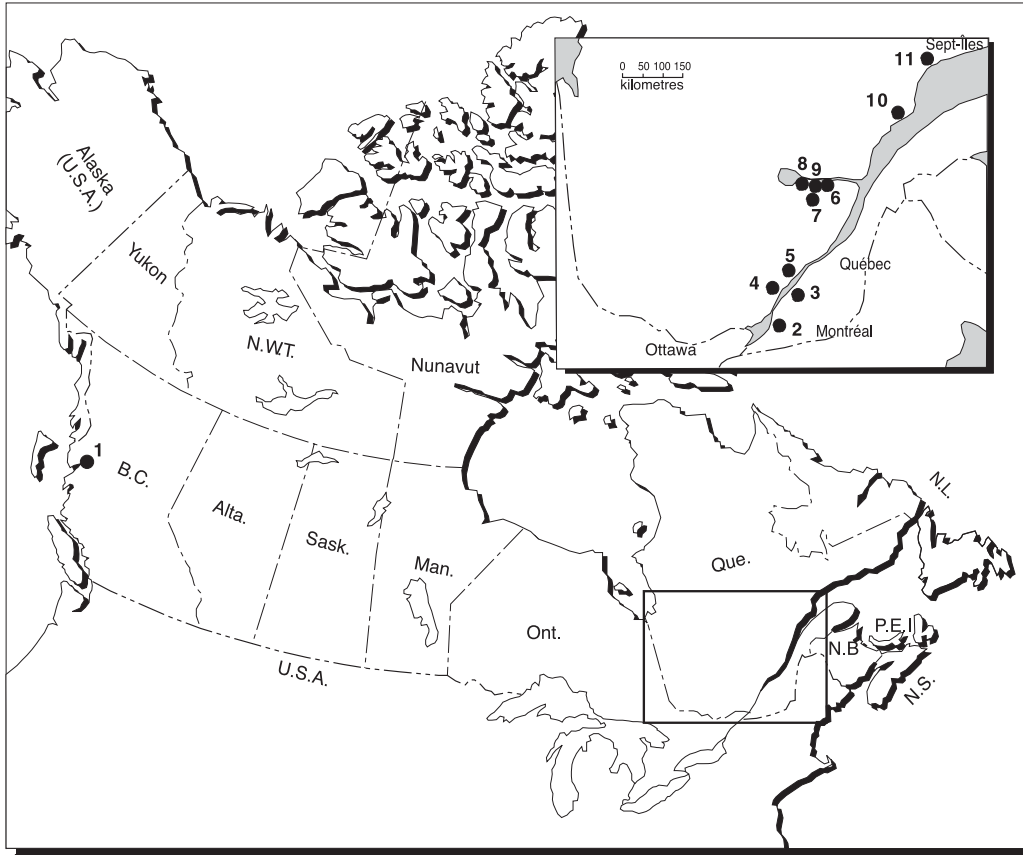
CANADIAN DEVELOPMENTS

Production of primary aluminum in Canada increased 4.9% to 2.71 Mt in 2002, compared with 2.583 Mt in 2001, ranking Canada third after China and Russia in terms of world primary production. The increase reflects a full year of operation at Alcan Inc.'s 400 000-t/y smelter in Alma, Quebec, which reached full operating capacity in September 2001. Monthly Canadian production statistics can be obtained on Natural Resources Canada's Internet site (http://mmsd1.mms.nrcan.gc.ca/mmsd/data/default_e.asp).

The value of Canadian primary aluminum production in 2002 is estimated at \$5.7 billion, down slightly from \$5.8 billion in 2001, reflecting the larger decrease in prices for aluminum when compared with the increase in production level.

Reported Canadian use of aluminum metal at the first processing stage, including the use of recycled aluminum,

Figure 1
Aluminum Smelters, 2002



SMELTER	COMPANY	CAPACITY (t/y)
1. Kitimat	Alcan	275 000
2. Beauharnois	Alcan	50 000
3. Bécancour	A.B.I.	390 000
4. Shawinigan	Alcan	91 000
5. Luralco Deschambault	Alcoa Luralco	240 000
6. Grande-Baie	Alcan	196 000
7. Laterrière	Alcan	219 000
8. Alma	Alcan	400 000 ^a
9. Arvida, Jonquière	Alcan	248 000
10. Baie-Comeau	Canadian Reynolds Metals (Alcoa)	437 000
11. Alouette, Sept Îles	Alouette	244 000
		2 790 000

^a Reached full capacity in mid-2001.

was 945 336 t in 2001, down from a revised figure of 1 012 816 t in 2000² (Table 3a). The data revisions for 2000 and part of the decrease in 2001 are due to revisions in the survey to clarify and exclude run-around scrap from reported use.

Canada is the second largest aluminum-exporting country in the world after Russia. Canadian exports of primary smelter products in 2002 increased in quantity to 2.13 Mt valued at \$4.937 billion (US\$3.14 billion), compared to 2.05 Mt valued at \$4.914 billion (US\$3.17 billion) in 2001. Of this amount, unwrought exports to the United States totaled 1.61 Mt valued at \$3.78 billion (US\$2.4 billion) (see Table 1).

The Canadian aluminum industry has made major strides in reductions in greenhouse gas emissions per tonne of aluminum produced over the last 10 years. Industry reports the intensity of emissions per tonne of aluminum has fallen from 5.59 t of CO₂ equivalent³ (CO₂e) in 1990 to 3.94 t in 2000. However, total emissions have not fallen in the same proportion due to increased production of metal over the period. In January 2002, the Aluminium Association of Canada and the Quebec government signed a framework agreement on the voluntary reduction of 200 000 t of CO₂e emissions from Quebec smelters by the end of 2007. However, subsequently, company-specific agreements were signed with Alcan, Alcoa and Alouette, which further detail company-specific reduction targets actually totaling 500 000 t of CO₂e. The agreements acknowledge the importance of aluminum's life cycle and contribution to the collective effort to reduce greenhouse gas emissions. Refer to the Association's web site at www.aia.aluminium.qc.ca for further details and links for additional information.

In early 2002, after discussions with Quebec aluminum companies, the Quebec government chose an expansion proposal by Aluminerie Alouette Inc. and Alcan Inc. and allocated 500 MW of power (at standard regulated commercial rates) to the company. Aluminerie Alouette plans to invest \$1.4 billion to expand capacity of its smelter from 244 000 t/y to 550 000 t/y. Preliminary work began in late 2002 and the first metal is expected in 2005. In addition to the 2500 construction jobs, the expansion will create 340 permanent new jobs at the smelter and 1500 indirect jobs in other areas of the province. Further details are on the company's web site at <http://www.alouette.qc.ca>.

Alcoa signed an agreement with the Quebec government in December 2002 to upgrade the 437 000-t/y Baie Comeau smelter. The agreement provides the additional power required for the operation of pre-baked cells, which will replace existing Söderberg technology. Construction of the \$1 billion upgrade to the smelter will begin in 2003 with completion expected in 2010. The capacity of the smelter is expected to increase by 110 000 t/y to 547 000 t/y. Modernization and construction work will

create over 5000 direct and indirect jobs over the eight years of work.

Alcoa also signed a Memorandum of Understanding with the Quebec government on March 5, 2003, on the expansion of the Deschambault smelter (Lauralco) located near Québec City. Alcoa wishes to expand the smelter from 240 000 t/y to a capacity of 570 000 t/y. If power is available, the expansion will entail an investment of more than \$1 billion and the creation of 9000 direct and indirect jobs for the length of the construction period. Alcoa agreed to create a minimum of 1250 jobs, most of which will be in the Quebec aluminum fabricating industry, and more than 250 jobs with the expansion of the Deschambault plant.

Alcan signed a Memorandum of Understanding with Hydro-Québec in February 2002 to explore opportunities. These range from optimizing hydro-electric resources in the Saguenay-Lac-St-Jean region to providing the power to support the eventual expansion of Alcan's Alma smelter.

Alcan's 275 000-t/y smelter at Kitimat, British Columbia, suffered from low water levels in the Nechako Reservoir. The company had announced a slowdown, of up to 50% of the facility's capacity, in 2001 and, in June 2002, Alcan announced a partial restart from 180 000 t/y to 240 000 t/y. During the slowdown, Alcan worked on studies for an expansion and pilot work on converting the smelter to pre-bake technology (www.alcan.com).

In 2001, Alcoa Inc. signed a letter of intent with the Province of Newfoundland and Labrador and with Newfoundland and Labrador Hydro on a joint review of a possible hydro-electric power expansion in Labrador and a new aluminum smelter. The review was completed in late 2001 and discussions continued in 2002, but the parties have now terminated negotiations without reaching an agreement (www.alcoa.com, www.gov.nf.ca, and www.gov.nf.ca/releases/2002/mines&en/0729n04.htm).

In British Columbia, the Alberni Aluminium Company has been formed to continue work on a proposal for a 360 000-t/y aluminum smelter. KTD L.L.C., an independent U.S.-based consulting firm, is providing engineering and design services and management/operations expertise. In 2002, the companies completed a pre-feasibility study for a new smelter to be located near Port Alberni, Vancouver Island. Work continued on environmental and engineering studies, a long-term power supply, and finding investors for the project. The proposed smelter would require 650 MW of power and new infrastructure. Engineering and permitting studies were estimated to take up to three years. Construction is expected to take 34 months and, as a result, initial metal production would not occur before 2008. A total of 650 direct jobs and a substantial number of indirect jobs would be created with this proposed US\$1.5 billion smelter. (Additional information is

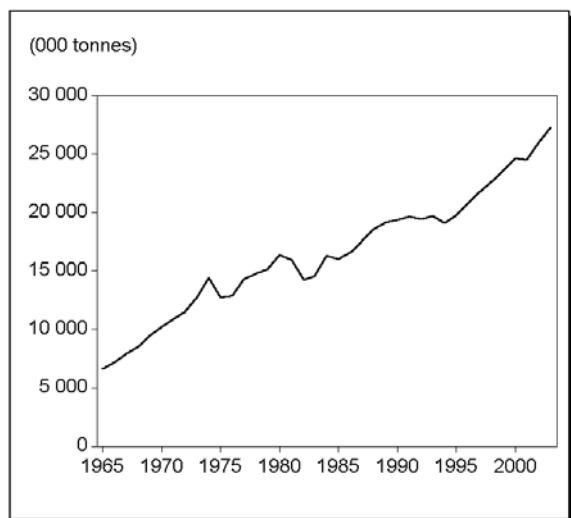
available on the Internet at www.bchydro.bc.ca, www.alberni-region.com and www.ktdal.com).

Alcan purchased a 20% share of the Alouette smelter from the Société générale de financement du Québec (SGF) and a 20% interest from Corus Aluminium Québec Inc. SGF purchased a 13.33% interest from Kobe Aluminium Canada Inc. As a result of Norsk Hydro ASA's purchase of VAW AG from E.ON, the new Hydro Aluminium group, Hydro Aluminium, now owns 20% of the smelter. The remaining partners in Alouette are Aluminium Austria Metall Québec (20%) and Marubeni Québec Inc. (6.66%).

CANADIAN OUTLOOK

Although Canadian aluminum production capacity increased substantially during the latter half of the 1980s and early 1990s, it remained relatively stable until Alcan's new Alma smelter opened in 2001. Canada's production capacity increased slightly to 2.79 Mt/y by the end of 2002 as capacity creep⁴ was reported in several smelters. With the announcements of expansions at the Alouette, Baie Comeau and Lauralco smelters, Canadian capacity could surpass 3 Mt/y by 2005 and 3.6 Mt/y by 2010. Other potential smelter expansion projects would be in excess of the capacities noted above and are dependent on power supplies and favourable company decisions. Decisions on potential new capacity in British Columbia and elsewhere are still pending.

Figure 2
World Total Primary Aluminum Production,
1965-2002 (e)



Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics.
(e) Estimate for 2002.

Canada is expected to produce about 2.75 Mt of primary aluminum in 2003, up slightly from 2002. The increase will result from capacity creep in existing smelters; however, reaching this level will also depend on power availability to the Kitimat smelter in northern British Columbia.

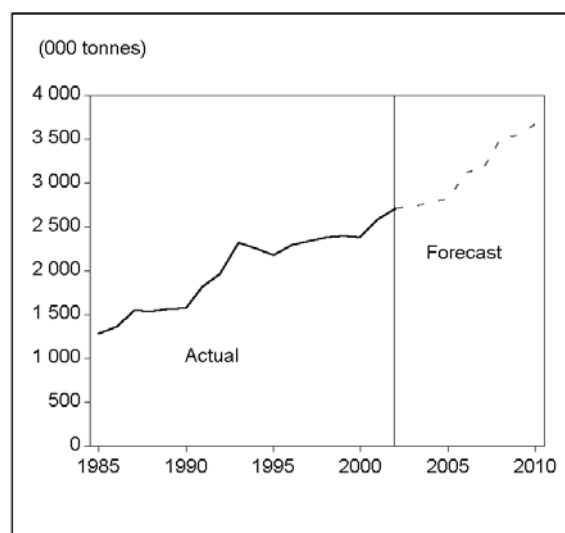
PRODUCTION, USE AND INVENTORY

World production of primary aluminum increased to 24.51 Mt in 2001 from 24.46 Mt in 2000 (see Table 8). World production in 2002 is estimated to have risen by about 5.8% to 25.9 Mt. The International Consultative Group on Nonferrous Metal Statistics reported that total world use of primary aluminum was 23.8 Mt in 2001, 4.6% lower than the revised figure of 24.9 Mt for 2000 (Table 9). On a longer-term basis, the average daily production rate has been growing at about 2% per year since 1980 (See Figure 2).

The World Bureau of Metal Statistics (WBMS) reported that, in 2002, use of primary aluminum was 24.9 Mt. Asia was the region in the world with the largest aluminum use, accounting for 38% of total world refined aluminum use. Europe accounts for 30% and North America accounts for 24%.

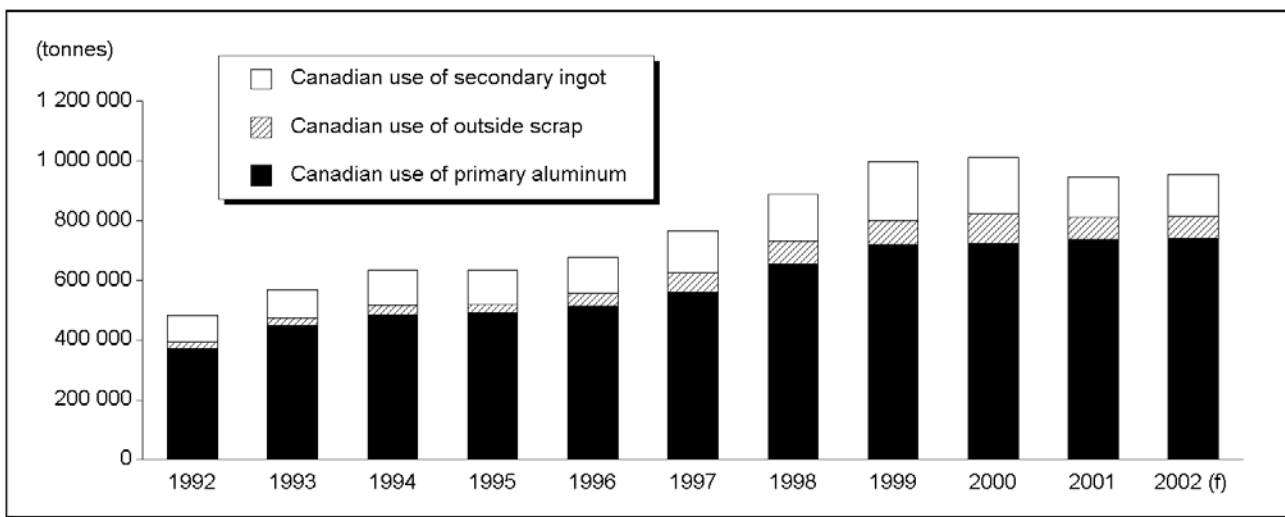
Production of International Aluminium Institute (IAI) members reached 21.2 Mt in 2002 (~86% of world production). Their primary aluminum production rate increased 5.7% during the year to 59 300 t/d in December

Figure 3
Canadian Primary Aluminum Production,
1985-2010



Source: Natural Resources Canada.

Figure 4
Reported Canadian Use of Aluminum, 1992-2002

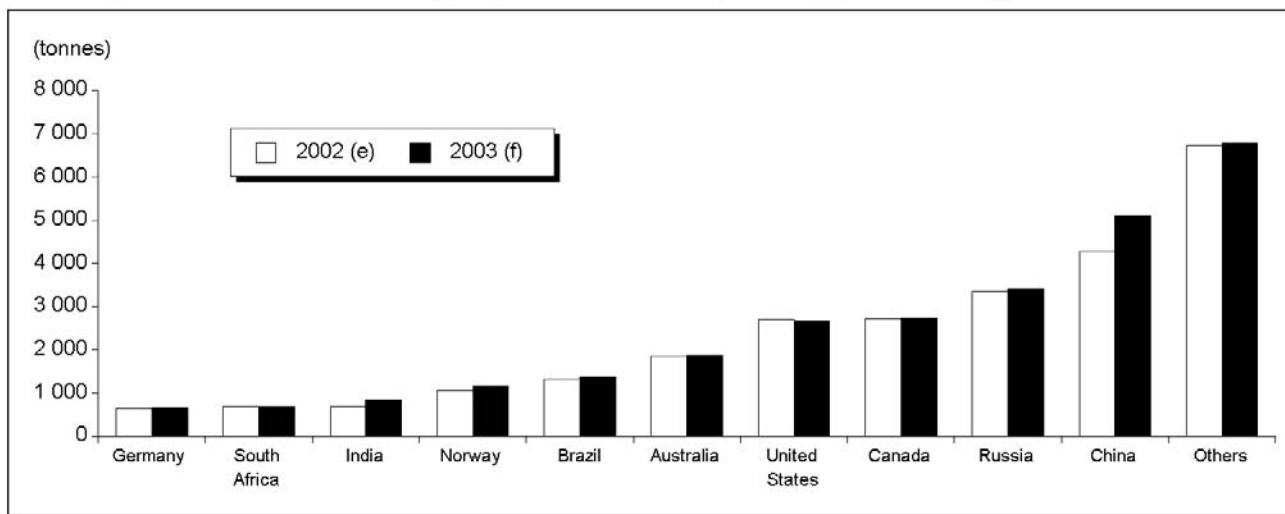


Source: Natural Resources Canada, Annual Survey of Aluminum Metal Use in Canadian Establishments.

(f) Forecast.

Notes: Export figures are obtained from Canadian government trade data. Data on metal use are obtained from responses to questionnaires sent to aluminum-using companies. In 2000, over 185 Canadian companies used primary, recycled and scrap aluminum. Companies surveyed include primary metal producing, recycling, casting, rolling, extruding and foundry operations.

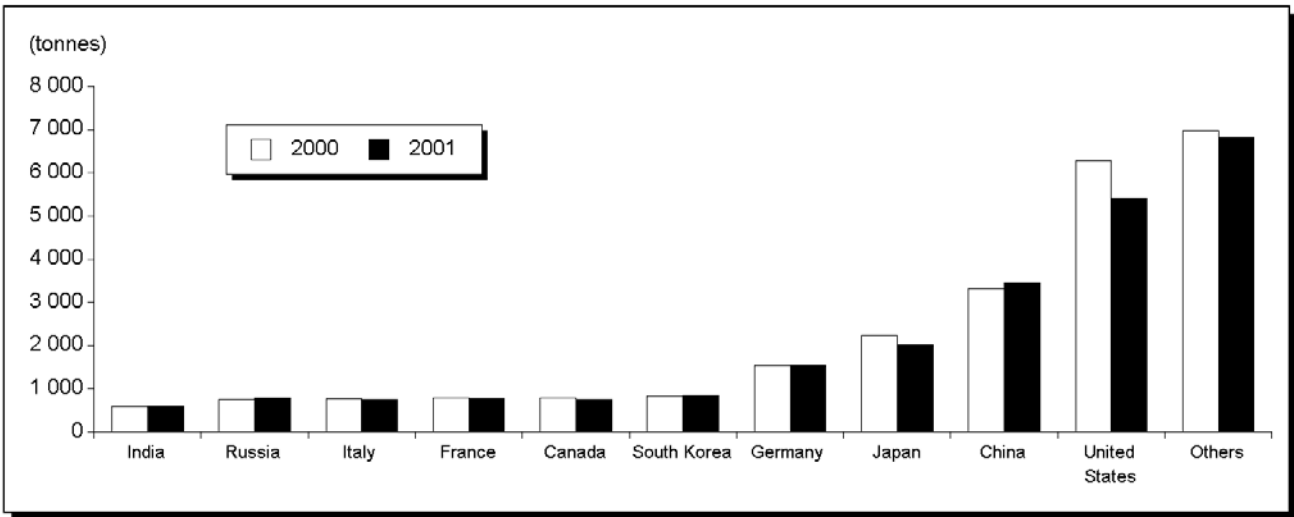
Figure 5
Primary Aluminum Production, Top Ten Producers, 2002 (e) and 2003 (f)



Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics; World Bureau of Metal Statistics; International Aluminum Institute.

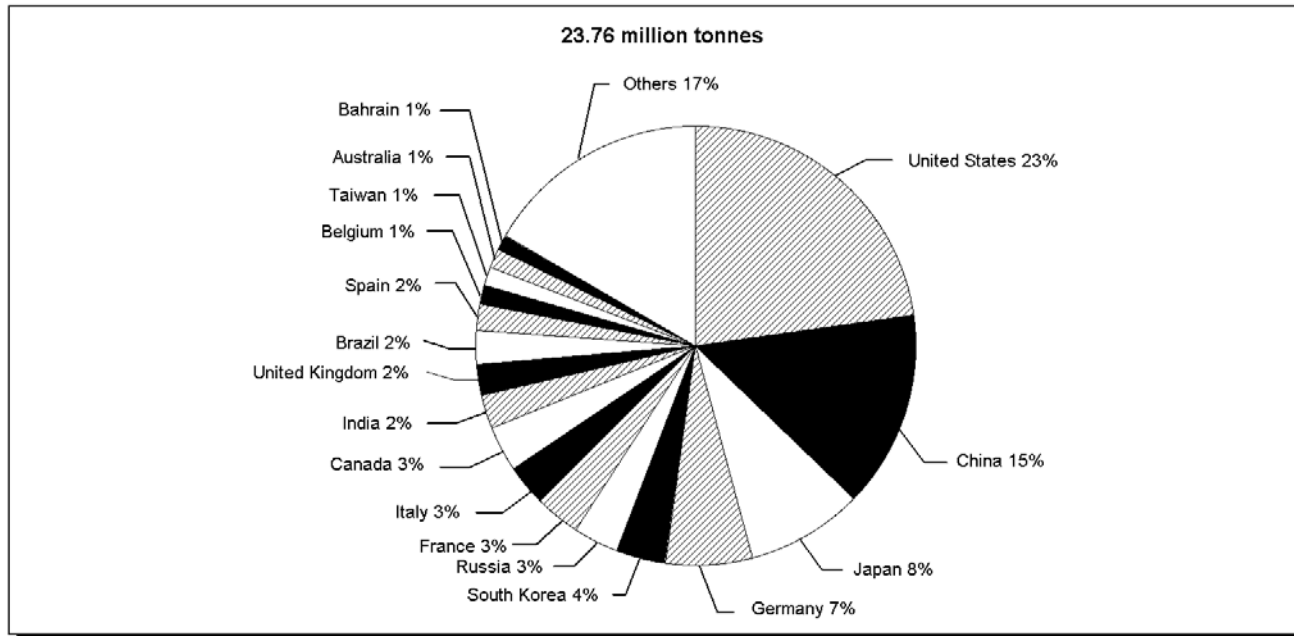
(e) Estimate; (f) Forecast.

Figure 6
Apparent Use of Primary Aluminum, 2001
 Top 10 Countries - 80% of Total



Source: International Consultative Group on Nonferrous Metals Statistics.

Figure 7
Total Apparent Use of Primary Aluminum by Country, 2001



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

2002 from 56 100 t/d in December 2001. The average production rate for all of 2002 was 58 100 t/d, compared with an average of 56 300 t/d in 2001 (an increase of 3.2%). Members' aluminum production capacity increased from 22.976 Mt/y at the end of 2001 to 23.108 Mt/y at the end of 2002. (The IAI has an Internet site at www.world-aluminium.org.)

IAI total inventories started the year at 3.0 Mt and then declined to 2.86 Mt in July, remaining at that level until November, with a slight increase to 2.9 Mt in December. LME primary aluminum inventories continued to increase, continuing a trend that started in 2000. High-grade inventories started the year at 824 000 t and increased steadily to peak at 1.30 Mt in September, declining slightly thereafter to end the year at 1.24 Mt. Similarly, aluminum alloy stocks in LME warehouses in January 2001 were approximately 86 000 t and increased during the year to 121 000 t in December. Aluminum alloy stocks in LME warehouses started in January 2002 at about 122 000 t and declined throughout the year to 35 000 t at the end of December.

The IAI also reported that members' refined⁵ alumina production capacity increased from a revised 53.305 Mt/y in December 2001 to 53.615 Mt/y in December 2002, while alumina production also rose from 48.488 Mt in 2001 to 49.785 Mt in 2002.

WORLD DEVELOPMENTS

China continues to expand production capacity; it became the largest producer of primary aluminum in the world in 2001 and increased its lead in 2002 when it produced 4.2 Mt. This rapid increase in production has placed upward pressure on alumina prices globally and has increased power costs within China. Government pressure continues on older smelters to close or modernize. Chinese primary aluminum production is expected to be above 5 Mt in 2003, firming up China's global lead.

In the northwestern United States, questions about power availability and costs continue to be issues for smelters. Financial strains on the Bonneville Power Authority (BPA) have continued and this has led BPA to announce in early 2003 that it intends to increase rates to large customers by 15% in late 2003. While BPA power costs and availability have been an issue for the last two decades, the recent increases may be the final straw for a number of smelters. Reports of permanent and indefinite closures have started to appear. Kaiser Aluminum's plants in Mead and Tacoma have been closed and Alcoa's plans in Ferndale (Intalco) to re-open a third potline have been put on hold. About 1 Mt/y of the total U.S. annual primary capacity of approximately 3.7 Mt/y remains closed.

A lack of rainfall in Brazil forced rationing of power in mid-2001, resulting in temporary closure for about 350 000 t/y of the country's capacity of 1.38 Mt/y. By year-end, however, restarts had begun and were nearly completed by the end of the first quarter of 2002. Production in 2002 was approximately 1.3 Mt.

The Russian parliament proposed an end to tax exemptions on the tolling of aluminum.⁶ If implemented, this change in taxation could result in a slowing of expansions and modernization in Russian smelters.

Expansions, proposals and studies for new mines, refineries and smelters have been announced in many countries. Although the current high spot alumina prices (US\$240-\$270/t in early 2003) may delay some projects in China, a significant amount of new production capacity is expected in the near future. These new projects are expected to place increasing pressure on both operating and proposed plants with higher costs to reduce those costs or close. A partial listing of changes is tabulated in Tables 11 and 12.

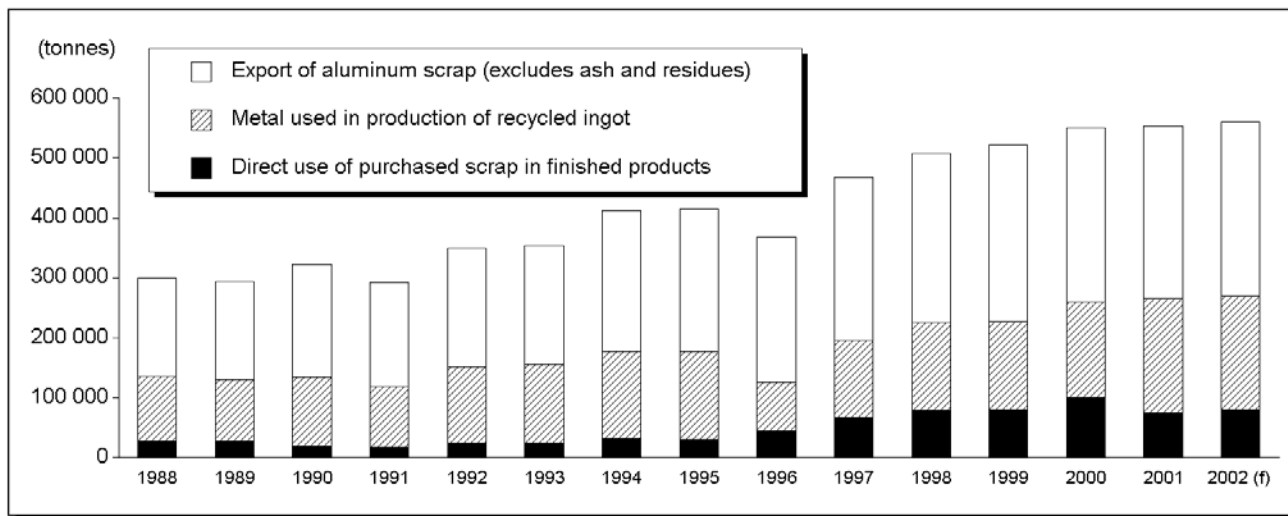
The Federation of Aluminium Consumers in Europe (FACE) continued its efforts to stimulate aluminum demand by promoting the use of aluminum, assessing the impact of new technologies, and reducing the costs of primary metal through tariff reductions. FACE was formed in 1999 and has 42 members from European aluminum-using companies from 11 countries. As the European Union (EU) uses more than double the amount of primary aluminum it produces, FACE estimates that the EU's 6% duty on unwrought aluminum imports costs European consumers US\$475 million per year. In 2002, FACE investigated the possibilities for legal action in the EU Court of Justice and continued its lobbying efforts in the EU, concentrating on the World Trade Organization to remove the tariffs. (FACE has an Internet site at www.facealuminium.com.)

RECYCLING

The WBMS reports Western World production of recycled aluminum metal increased to 7.9 Mt in 2002 from 7.7 Mt in 2001. This reflects a combination of the increased prices and demand for aluminum alloys. U.S. production, at 3 Mt, was the largest amount in any one country and represented almost 40% of recycled aluminum production worldwide. The U.S. Geological Survey has an Internet site at <http://minerals.usgs.gov/minerals/pubs>.)

Hydro Aluminium has opened a new 90 000-t/y plant producing primary-quality billet in Commerce, Texas, using a feed of high-quality scrap aluminum. The plant was expected to reach full capacity early in 2003. Its opening follows the completion of another recycling plant in Henderson, Kentucky, in 2000. The Texas plant expands

Figure 8
Canadian Recycling of Aluminum, 1988-2002



Source: Natural Resources Canada, Annual Survey of Aluminum Metal Use in Canadian Establishments.

(f) Author forecast for 2002.

Notes: Export figures are obtained from Canadian government trade data. Data on metal use are obtained from responses to questionnaires sent to aluminum-using companies. In 2001, 185 Canadian companies reported the use of primary, recycled and scrap aluminum. Companies surveyed include primary metal producing, recycling, casting, rolling, extruding and foundry operations.

Hydro Aluminium's recycling capacity in North America to over 400 000 t/y.

Reported Canadian use of outside scrap (scrap aluminum obtained from other companies) for the direct production of semi-finished or finished products was 74 923 t in 2001, down approximately 25% from the 100 294 t reported in 2000. The reported use of aluminum metal, including scrap used in the production of recycled aluminum ingot, was 175 470 t in 2001, up from the 159 419 t reported in 2000. The reported use of purchased recycled aluminum ingot was 134 483 t in 2001, down from the 190 026 t reported in 2000 (see Table 3b and Figure 5 on Canadian Recycling of Aluminum, and Figure 4 on Canadian Use of Aluminum).

A study of available data on Canadian used beverage can (UBC) recycling was conducted for the Aluminium Association of Canada in 2002. The 4.8 billion aluminum cans sold in Canada in 2001 contained approximately 72 000 t of aluminum.⁷ The report indicates that about 72% of this aluminum was recovered through residential curbside and deposit systems. Provincial recovery rates range from 71% to 94%. Much of the material is lost through disposal at purchases and activities away from home where collection and separation problems hamper metal recovery. UBCs, now sent for disposal, represent a potential income opportunity through the development of new or improved collection systems. Over the last year, the price of alloyed aluminum has risen compared to the price of primary alu-

minum. If this relative increase in value is maintained in the longer term, there may be an increased payback and incentive for recycling programs to be extended to commercial events.

Nova Pb Inc. is a Canadian recycler of lead, oil filters and petrochemical wastes located in Ville Ste-Catherine, Quebec. Nova received environmental approvals and an operating permit to expand its operations to include the recycling of spent potliners from aluminum smelters. The company has developed a proprietary process to recycle spent potliners using a long rotary kiln and converting the lining to an inert material called CAISiFrit™. CAISiFrit™ is used in concrete where it partially replaces the cement, improving the rheological and mechanical properties of the resulting concrete and reducing permeability by as much as 50%. The company plans to recycle 35 000 t of this material in 2003 and could expand this to 70 000 t in 2004. Nova has an Internet site at www.novapb.qc.ca.

Statistics Canada, Natural Resources Canada and the Canadian Association of Recycling Industries (<http://cari.recycling.org>) are managing a process to improve Canadian recycling data. The existing data collection is being examined so that information presently collected can be integrated into a collection of statistics on recycling. In addition, work is also under way on determining the feasibility of obtaining new data regarding the composition and sources of discarded materials (www.recycle.nrcan.gc.ca/stats_e.htm).

Metals recycling information can be obtained through Natural Resources Canada's web site at www.recycle.nrcan.gc.ca. The web site includes a listing of companies involved in recycling activities and provides an opportunity for recycling companies to add themselves to the list.

PRICES AND OUTLOOK

For alumina, IAI figures show that the alumina production capacity of its members is expected to increase from 53.6 Mt/y in December 2002 to 55.3 Mt/y in December 2003.

Primary-grade aluminum has established a longer-term price range, ranging between approximately US\$1200 and \$1800/t (US55¢ and 82¢/lb) since 1993. More recently, London Metal Exchange (LME) cash settlement prices have trended down from a peak above US\$1700/t in early 2001 to trade in a range between US\$1276 and US\$1438/t (US58¢ and 65¢/lb) during 2002. The 2002 average of US\$1349/t (US61¢/lb) was lower than the 2001 average of US\$1444/t (US66¢/lb).

Aluminum alloy daily settlement prices on the LME increased during 2002 and have surpassed prices for primary material early in 2003. The increase in prices for longer contracts, however, has approached the price of primary material. Aluminum alloy settlement prices started 2002 at US\$1035/t (US47¢/lb) and increased to end the year at US\$1337/t (US61¢/lb). For 2002, alloy prices averaged approximately US\$1234/t (US56¢/lb) compared to an average of approximately US\$1174/t (US53.3¢/lb) in 2001 (see Figures 9 and 10).

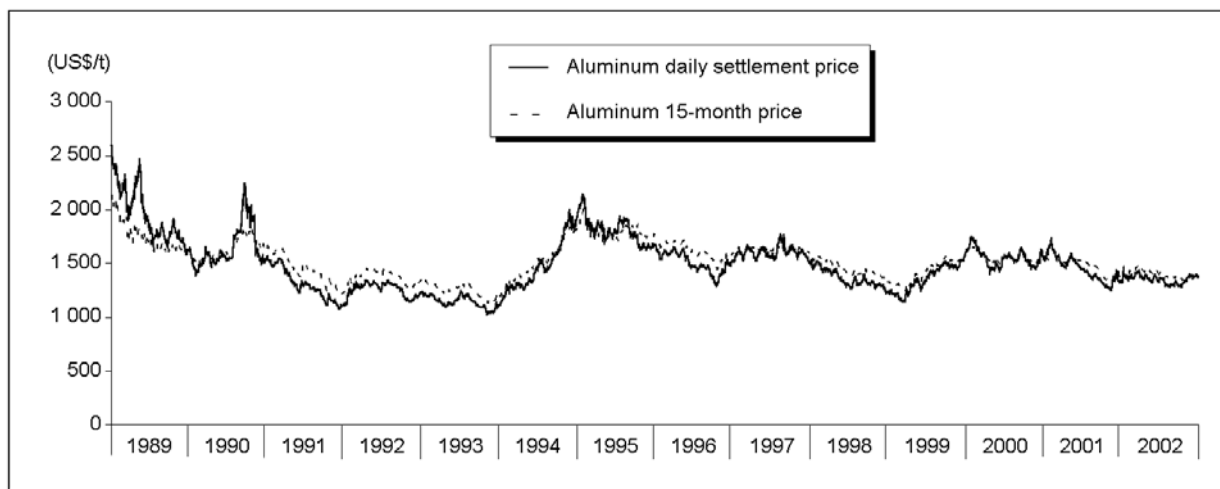
IAI figures show that the world primary production capacity of its members is expected to increase by about 1.8% to 23.5 Mt in December 2003 from 23.1 Mt at the end of 2002, with a slightly higher increase (3.4%) in 2004.

Taking into account the projected increases from non-IAI members, world primary production is expected to rise by approximately 5% to about 27.2 Mt in 2003. This increase and that of 6% in 2002 followed a half of a percent decline in 2001, and the increase is slightly above the long-term rate. The projected increases in production suggested by Table 12 indicate that this production increase may continue at a rate of 5% for 2004 and 2005. It is possible that the declines in prices since 1994 have supported an increased long-term growth rate in aluminum production.

Over the long term, the increasing production from larger, more efficient smelters is likely to continue the long-term trend to lower production costs and prices. Given the increases in production capacity planned over the next three years, it is probable that prices will remain under pressure, which will likely further stimulate additional demand, particularly in the transportation sector.

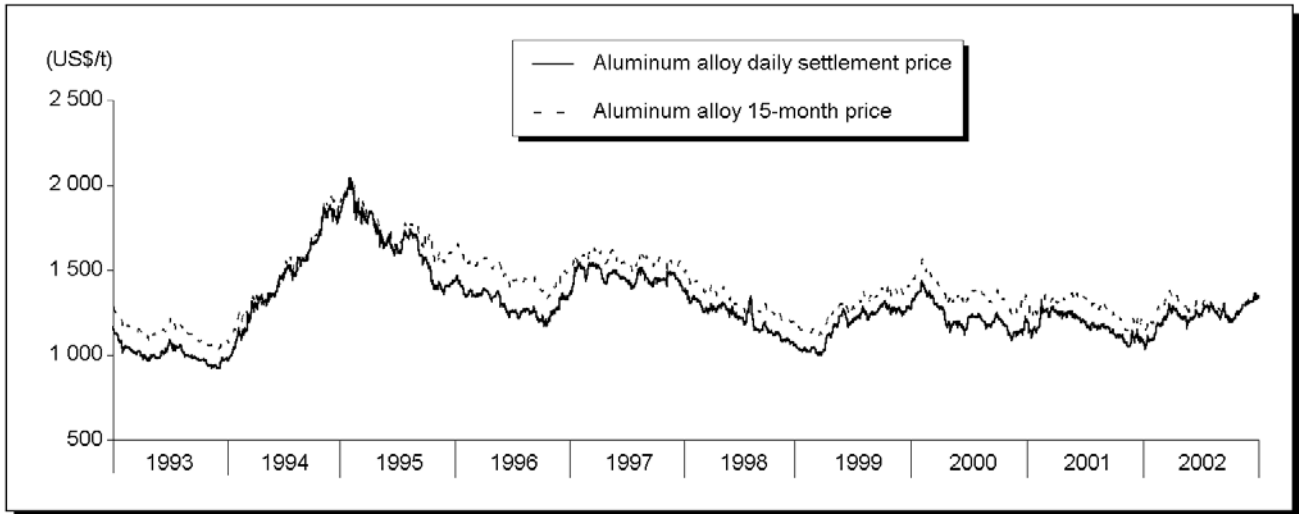
Canadian installed capacity for the production of primary aluminum is almost 2.8 Mt/y. With the announced expansions at Alouette and announcements on Baie Comeau and Deschambault, Canadian production rates are expected to increase to about 3.1 Mt/y in 2006. Studies have been undertaken on other Canadian brownfield expansions and new smelters. Should economic conditions warrant, further expansion in production could be possible.

Figure 9
London Metal Exchange Aluminum Prices, 1989-2002



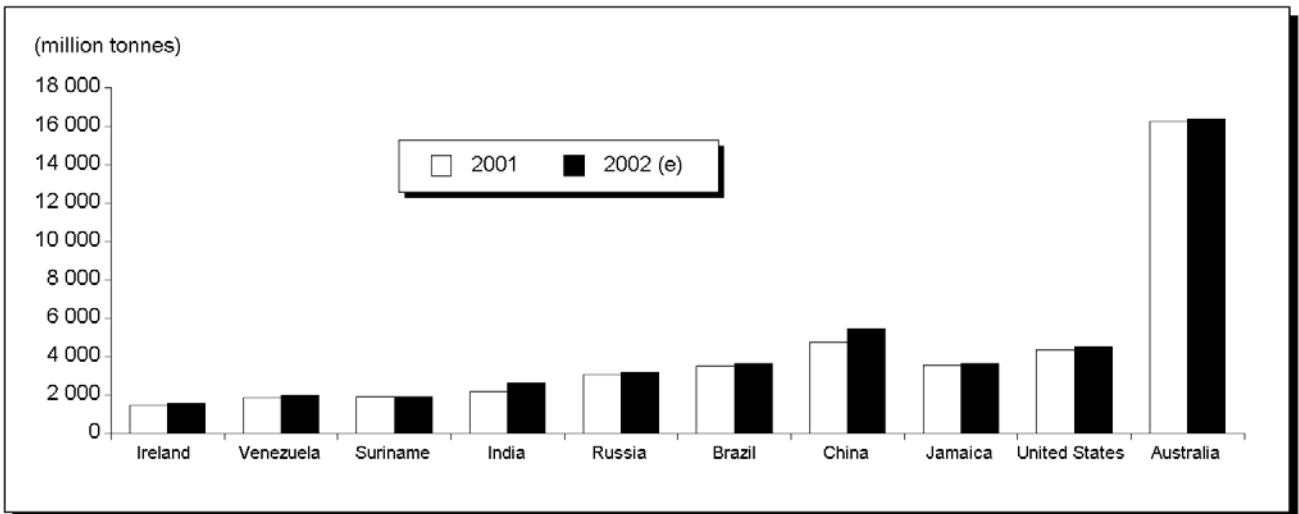
Sources: Natural Resources Canada; London Metal Exchange; Reuters; Metalprices.com.

Figure 10
Aluminum Alloy Prices, London Metal Exchange, 1993-2002



Sources: Natural Resources Canada; London Metal Exchange; Reuters; Metalprices.com.

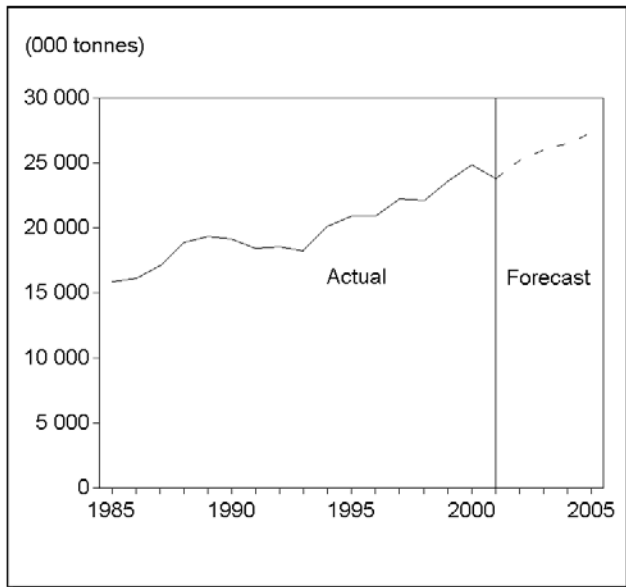
Figure 11
Alumina Production, 2001 and 2002 (e)
 Top Ten Producers - 80% of Total Production of 55.7 Mt in 2002



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

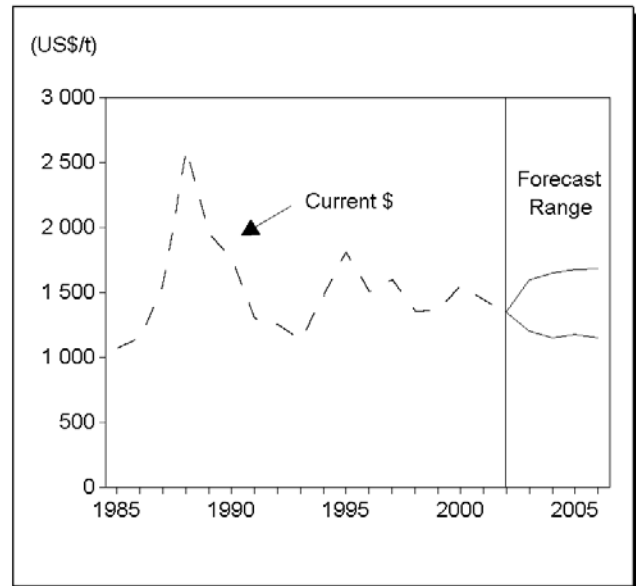
(e) Estimate.

Figure 12
World Primary Aluminum Demand,
1985-2005



Sources: Natural Resources Canada; World Nonferrous Metal Statistics Group.

Figure 13
Aluminum Settlement Prices, 1985-2006



Source: Natural Resources Canada.

REFERENCES

¹ In the classification of export statistics, Harmonized System Chapter 76 includes codes for identifiable aluminum products including primary metal, semi-fabricated products and products made of aluminum. See Table 1 for a listing of the main codes. Export data can be obtained at http://strategis.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html or from Statistics Canada at www.statcan.ca/trade/scripts/trade_search.cgi.

² NRCan Canadian aluminum use data for 2001 are from survey-based responses from 185 Canadian companies using primary and recycled aluminum in scrap, ingot or liquid metal form. Scrap used in the production of recycled ingot is not included in "use."

³ Emissions from aluminum smelters include greenhouse gases other than CO₂ each with different amounts of global warming potential. CO₂ equivalents are calculated taking those factors into account.

⁴ Capacity creep results from incremental expansion from removing bottlenecks in existing plants.

⁵ Aluminum is different from some other metals in that it is refined before it is smelted.

⁶ In a tolling agreement, a plant processes material owned by others for a fee.

⁷ The report indicates that, in Canada, cans ranged in weight from 14 grams to 36 grams, with an average of 26 grams.

Notes: (1) Most information in this review was current as of March 31, 2003. (2) Lorraine Ralph of the Minerals and Mining Statistics Division prepared Tables 1, 3a and 3b, and she and others in that Division have provided assistance in generating the summary tables on Canadian aluminum. (3) Various Internet sites have been identified in this article. Please note that Natural Resources Canada has no control over the content of the web sites of other organizations, which may be modified, updated or deleted at any time. (4) This and other reviews, including previous editions, are available on the Internet at www.nrcan.gc.ca/mms/cmy/com_e.html.

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TARIFFS

Item No.	Description	Canada			United States	EU	Japan
		MFN	GPT	USA	Canada	MFN	WTO (1)
2606.00.00	Aluminum ores and concentrates	Free	Free	Free	Free	Free	Free
2818.20.00	Aluminum oxide, other than artificial corundum	Free	Free	Free	Free	4%	Free
7601.10	Unwrought aluminum, not alloyed	Free	Free	Free	Free	6%	Free
7601.20	Unwrought aluminum alloys	Free	Free	Free	Free	6%	Free
7602.00	Aluminum waste and scrap	Free	Free	Free	Free	Free	Free
76.03	Aluminum powders and flakes	3.5-5%	Free	Free	Free	5.1-5.3%	3%
76.04	Aluminum bars, rods and profiles	Free-5%	Free	Free	Free	7.5%	7.5%
76.05	Aluminum wire	Free-4%	Free	Free	Free	7.5%	7.5%
76.06	Aluminum plates, sheets and strip, of a thickness exceeding 0.2 mm	Free-6.5%	Free-5%	Free	Free	7.5%	Free-2%
76.07	Aluminum foil not exceeding 0.2 mm	Free-6.5%	Free-5%	Free	Free	7.5-10%	7.5%
76.08	Aluminum tubes and pipes	Free-5%	Free	Free	Free	Free-7.5%	7.5%
7609.00	Aluminum tube or pipe fittings	5.5%	3%	Free	Free	7%	3%
76.10	Aluminum structures (excluding prefabricated buildings of heading no. 94.06) and parts of structures, aluminum plates, rods, profiles, tubes and the like, prepared for use in structures	6.5%	5%	Free	Free	6-7%	Free-3%
7611.00	Aluminum reservoirs, tanks, vats and similar containers, for any material	Free-6.5%	Free-5%	Free	Free	6%	3%
76.12	Aluminum casks, drums, cans, boxes and similar containers, for any material, of a capacity not exceeding 300 litres	6.5%	2.5-5%	Free	Free	6%	3%
7613.00	Aluminum containers for compressed or liquefied gas	6.5%	5%	Free	Free	6%	3%
76.14	Stranded wire, cables, plaited bands and the like, of aluminum, not electrically insulated	4.5%	3%	Free	Free	6%	3%
76.15	Table, kitchen or other household articles and parts thereof, of aluminum	6.5%	Free-5%	Free	Free	6%	Free
76.16	Other articles of aluminum	Free-6.5%	Free-5%	Free	Free	6%	3%

Sources: Canadian *Customs Tariff*, effective January 2003, Canada Customs and Revenue Agency; *Harmonized Tariff Schedule of the United States*, 2003; *Worldtariff Guidebook on Customs Tariff Schedules of Import Duties for European Union* (42nd Annual Edition: 2002); *Customs Tariff Schedules of Japan*, 2003.

(1) WTO rate is shown; lower tariff rates may apply circumstantially.

TABLE 1. CANADIAN ALUMINUM PRODUCED AND TRADED, 2001 AND 2002

Item No.	2001		2002 (p)	
	(tonnes)	(\$000)	(tonnes)	(\$000)
PRODUCTION	2 582 746	..	2 708 910	..
IMPORTS				
2606.00 Aluminum ores and concentrates				
Brazil	1 496 401	56 860	1 112 748	56 488
Guinea	478 332	23 511	836 187	40 488
Ghana	281 805	10 594	514 483	19 581
Australia	79 648	2 820	234 375	7 330
United States	67 937	5 208	37 467	5 226
Bermuda	67 000	1 451	6 680	1 482
Guyana	222 501	8 343	16 193	1 145
Greece	12 484	800	18 280	773
China	25 665	2 615	2 722	404
Other countries	129 855	6 549	1 051	147
Total	2 861 628	118 751	2 780 186	133 064
2620.40 Ash and residues containing mainly aluminum	5 747	5 013	6 204	5 449
2818.20 Aluminum oxide (excluding artificial corundum)				
Australia	1 671 455	478 407	1 877 625	488 043
United States	1 202 861	358 791	1 215 765	317 396
Jamaica	1 019 870	286 859	810 324	236 279
Brazil	681	549	65 809	24 186
Suriname	–	–	33 409	7 898
Venezuela	51 921	14 688	26 172	6 898
Germany	2 138	4 215	7 666	5 324
China	11 356	7 124	7 112	2 448
Austria	2 254	2 316	1 831	1 183
France	1 524	1 856	737	917
Other countries	7 653	5 594	2 500	2 141
Total	3 971 713	1 160 399	4 048 950	1 092 713
2818.30 Aluminum hydroxide	5 451	7 306	5 650	6 465
7601.10 Unwrought aluminum, not alloyed				
United States	21 054	47 647	23 702	56 214
Australia	62	141	430	1 031
France	–	–	55	169
Other countries	438	1 204	59	98
Total	21 554	48 992	24 246	57 512
7601.20 Unwrought aluminum, alloyed				
United States	193 009	339 093	163 885	315 544
Russia	5 245	10 305	4 148	9 514
United Kingdom	647	1 402	905	2 108
Canada	53	186	342	1 487
United Arab Emirates	1 313	3 395	460	1 157
Netherlands	240	520	558	1 142
Germany	33	70	325	739
Other countries	1 835	4 232	1 213	2 648
Total	202 375	359 203	171 836	334 339
7602.00 Aluminum waste and scrap	114 179	158 358	137 872	197 560
76.03 Aluminum powders and flakes	2 069	8 591	1 937	8 210
76.04 Aluminum bars, rods and profiles				
7604.10 Of aluminum, not alloyed				
United States	4 611	25 479	4 111	23 527
Belgium	772	4 097	1 067	5 624
China	102	377	1 238	4 520
Canada	209	1 383	274	1 856
Austria	343	1 335	286	727
Other countries	509	2 348	429	2 049
Total	6 546	35 019	7 405	38 303

TABLE 1 (cont'd)

Item No.	2001		2002 (p)		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
IMPORTS (cont'd)					
7604.21	Of aluminum alloys				
to 7604.29	United States	25 897	131 879	25 975	129 195
	China	5 216	19 530	5 119	21 006
	South Korea	1 847	6 481	2 099	7 546
	Germany	254	1 870	234	1 728
	France	312	1 648	219	1 291
	Italy	122	669	143	1 048
	Russia	180	826	225	990
	United Kingdom	280	1 976	154	973
	Other countries	522	3 065	560	3 107
	Total	34 630	167 944	34 728	166 884
76.05	Aluminum wire	8 466	33 686	10 354	37 447
76.06	Aluminum plates, sheets and strip, of a thickness exceeding 0.2 mm	444 096	1 595 642	462 800	1 677 951
76.07	Aluminum foil not exceeding 0.2 mm	48 630	237 924	53 134	262 489
76.08	Aluminum tubes and pipes	12 285	62 425	14 138	73 812
76.09	Aluminum tube or pipe fittings	9 084	61 030	7 016	46 628
76.10	Aluminum structures and parts of structures, aluminum plates, rods, profiles, tubes and the like, prepared for use in structures	..	104 160	..	121 327
		(number)		(number)	
76.11	Aluminum reservoirs, tanks, vats and similar containers, for any material, of a capacity exceeding 300 litres	2 300	35 376	511	1 562
76.12	Aluminum casks, drums, cans, boxes and similar containers, for any material, of a capacity not exceeding 300 litres	1 104 243 318	192 332	1 439 261 603	253 447
76.13	Aluminum containers for compressed or liquefied gas	99 888	10 129	104 146	22 126
		(tonnes)		(tonnes)	
76.14	Stranded wire, cables, plaited bands and the like, of aluminum, not electrically insulated	632	2 394	887	3 395
76.15	Table, kitchen or other household articles and parts thereof, of aluminum	..	89 032	..	99 629
76.16	Other articles of aluminum	..	287 289	..	297 559
EXPORTS					
2606.00	Aluminum ores and concentrates				
	United States	20	14	-	-
	Cuba	6	5	-	-
	Total	26	19	-	-

TABLE 1 (cont'd)

Item No.	2001		2002 (p)		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
EXPORTS (cont'd)					
2620.4	Ash and residues containing mainly aluminum				
	United States	17 425	11 094	48 515	27 904
	Sweden	—	—	166	78
	Switzerland	1 436	653	155	73
	Other countries	1 265	602	41	41
	Total	20 126	12 349	48 877	28 096
2818.20	Aluminum oxide (excluding artificial corundum)				
	United States	47 223	43 584	51 432	48 529
	Israel	64	106	63	62
	Other countries	1 282	2 184	28	33
	Total	48 569	45 874	51 523	48 624
7601.10	Unwrought aluminum, not alloyed				
	United States	934 170	2 169 494	629 027	1 404 015
	Netherlands	133 784	283 027	187 611	392 573
	South Korea	40 417	103 001	45 516	107 837
	Germany	15	178	37 505	83 103
	Mexico	10 677	24 832	35 458	80 558
	France	24 817	51 864	21 346	45 216
	Japan	22 357	46 413	15 771	37 456
	Other countries	5 521	13 929	35 383	76 889
	Total	1 171 758	2 692 738	1 007 617	2 227 647
7601.20	Unwrought aluminum alloys				
	United States	756 106	1 935 398	984 087	2 376 646
	Japan	86 628	201 615	79 915	194 210
	Mexico	17 727	28 556	29 960	55 652
	South Korea	18 207	47 465	14 517	35 616
	United Kingdom	5 629	16 104	4 950	13 721
	Israel	1 081	2 686	3 414	8 337
	Hong Kong	25	85	2 207	5 288
	Ireland	1 379	3 897	1 652	4 243
	Other countries	4 479	11 734	4 861	15 359
	Total	891 261	2 247 540	1 125 563	2 709 072
7602.00	Aluminum waste and scrap				
	United States	267 557	467 709	266 776	446 007
	China	9 147	13 101	17 814	24 509
	Japan	6 476	14 817	3 654	7 620
	Taiwan	1 300	1 582	1 158	1 899
	South Korea	744	1 081	872	1 423
	United Kingdom	—	—	189	367
	Other countries	2 408	3 331	428	548
	Total	287 632	501 621	290 891	482 373
76.03	Aluminum powders and flakes	804	1 864	126	627
76.04	Aluminum bars, rods and profiles	73 526	358 800	88 697	413 789
76.05	Aluminum wire	86 627	229 601	116 364	296 815
76.06	Aluminum plates, sheets and strip, of a thickness exceeding 0.2 mm	327 258	1 044 309	364 985	1 120 497
76.07	Aluminum foil not exceeding 0.2 mm	42 033	223 171	51 318	270 259
76.08	Aluminum tubes and pipes	5 484	30 254	4 495	28 858
76.09	Aluminum tube or pipe fittings	..	11 445	919	10 499

TABLE 1 (cont'd)

Item No.		2001		2002 (p)	
		(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS (cont'd)					
76.10	Aluminum structures and parts of structures, aluminum plates, rods, profiles, tubes and the like, prepared for use in structures	..	346 972	..	380 953
		(number)		(number)	
76.11	Aluminum reservoirs, tanks, vats and similar containers, for any material, of a capacity exceeding 300 litres	230	1 613	426	881
76.12	Aluminum casks, drums, cans, boxes and similar containers, for any material	551 513 302	100 565	580 168 555	102 882
76.13	Aluminum containers for compressed or liquefied gas	730 529	3 677	633 156	2 470
		(tonnes)		(tonnes)	
76.14	Stranded wire, cables, plaited bands and the like, of aluminum, not electrically insulated	9 826	36 224	14 372	47 642
76.15	Table, kitchen or other household articles and parts thereof, of aluminum	..	71 326	..	63 729
76.16	Other articles of aluminum	..	200 101	..	208 998

Sources: Natural Resources Canada; Statistics Canada.

– Nil; .. Not available or not applicable; (p) Preliminary.

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

TABLE 2. CANADA, ALUMINUM SMELTER CAPACITY

Company	As of December 31, 2002
	(t/y)
Alcan Aluminium Inc.	
Quebec	
Grande-Baie	196 000
Arvida, Jonquière	248 000
Alma	400 000
Shawinigan	91 000
Beauharnois	50 000
Laterrière	219 000
British Columbia	
Kitimat	275 000
Alcoa Inc.	
Quebec	
Baie-Comeau	
Aluminerie de Baie-Comeau	437 000
Deschambault	
Aluminerie Luralco Inc.	240 000
Aluminerie de Bécancour Inc.	
Quebec	
Bécancour	390 000
Alcoa, 74.95%	
Pechiney, 25.05%	
Aluminerie Alouette Inc.	
Quebec	244 000
Sept-Îles	
Alcan, 40%	
Aluminium Austria Metall Québec, 20%	
Hydro Aluminium, 20%	
Société Générale de Financement du Québec, 13.33%	
Marubeni Québec Inc., 6.66%	
Total Canadian capacity	2 790 000
Total Alcan, 56.51%	1 576 000
Total Alcoa, 34.74%	969 305
Total other, 8.75%	244 095

Source: Natural Resources Canada.

TABLE 3a. USE⁽¹⁾ OF ALUMINUM METAL⁽⁴⁾ IN CANADA AT FIRST PROCESSING STAGE, 1999-2001

	1999 (r,a)	2000 (a,5)	2001 (p,a,6)			
	(tonnes)					
METAL USED IN CASTINGS						
Permanent mould	129 574	(r) 132 891	100 420			
Sand	4 442	4 460	4 372			
Die and other	205 781	(r) 205 031	181 109			
Total	339 797	(r) 342 383	285 900			
METAL USED IN WROUGHT PRODUCTS						
Sheet, plate, coil and foil	229 139	(r) 214 775	223 864			
Extrusions, including tubing	234 843	230 063	217 562			
Other wrought products (including rods, forgings and slugs)	153 936	(r) 184 392	179 212			
Total	617 918	(r) 629 229	620 638			
METAL USED IN OTHER PRODUCTS						
Destructive uses (deoxidizer), non-aluminum base alloys, powder and paste and other uses	41 526	(r) 41 204	38 789			
Total used	999 242	(r) 1 012 816	945 336			
Aluminum metal used for the production of recycled aluminum (2)	145 959	(r) 159 419	190 893			
	Metal Entering Plant		On Hand at December 31			
	1999	2000	2001 (p)	1999	2000	2001 (p)
Primary aluminum and alloys	733 569	(r) 733 232	747 437	21 340	(r) 17 476	15 657
Recycled aluminum	198 370	(r) 191 326	134 800	5 415	(r) 6 672	5 652
Scrap originating outside plant	253 985	(r) 279 190	289 455	13 833	(r) 13 971	13 037
Total	1 185 925	(r) 1 203 748	1 171 693	40 588	(r) 38 120	34 347
Aluminum shipments (3)				33 674	34 525	42 295

Source: Natural Resources Canada.

(r) Revised; (p) Preliminary.

(a) Increase in number of companies being surveyed; therefore, the closing inventory of the previous year does not equal the opening inventory of the current year.

(1) Available data as reported by users. (2) Aluminum metal used in the production of recycled aluminum is not included in usage totals. (3) Aluminum metal shipped without change. Does not refer to shipments of goods of own manufacture. (4) Aluminum metal refers to primary aluminum and alloys, purchased recycled aluminum, and outside aluminum scrap. (5) For 2001 this table is compiled from Natural Resources Canada's annual survey, "Use of Aluminum Metal" from data for 185 Canadian users. (6) Some totals prior to 2001 contained runaround aluminum scrap. In 2001 runaround scrap was removed where known from totals.

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

TABLE 3b. USE⁽¹⁾ OF ALUMINUM METAL⁽²⁾ IN CANADA, BY TYPE AT FIRST PROCESSING STAGE, 1989-2001

	1989 (a)	1990 (a)	1991 (a)	1992 (a)	1993 (a)	1994 (a)	1995	1996 (a)	1997 (a)	1998 (a)	1999 (a)	2000 (a,4)	2001 (p,a,5)
	(tonnes)												
TYPE OF ALUMINUM METAL USED IN PRODUCTS OTHER THAN RECYCLED ALUMINUM													
Primary aluminum and alloys	393 027	351 877	355 010	369 185	447 997	485 845	490 000	512 865	558 139	653 320	719 124	(r) 722 496	735 931
Purchased recycled aluminum	75 031	82 763	73 461	87 896	95 774	117 710	114 961	119 515	138 852	158 355	199 429	(r) 190 026	134 483
Outside aluminum scrap	27 306	18 617	17 768	24 009	25 084	31 469	30 441	44 555	67 447	78 298	80 689	100 294	74 923
Total used in products other than in recycled aluminum	495 363	453 257	446 239	481 089	568 854	635 024	635 402	676 935	764 438	889 973	999 242	(r) 1 012 816	945 336
TYPE OF ALUMINUM METAL USED IN RECYCLED ALUMINUM (3)													
Primary aluminum and alloys	22 383	x	x	x	x	x	x	x	14 650	x	10 879	13 765	15 423
Outside aluminum scrap	79 716	x	x	x	x	x	x	x	113 865	x	135 081	(r) 145 654	175 470
Total used in recycled aluminum (3)	102 098	115 112	101 503	127 818	131 174	145 661	146 987	81 629	128 515	147 847	145 959	(r) 159 419	190 893

Source: Natural Resources Canada.

(p) Preliminary; (r) Revised; x Confidential.

(a) Increase in number of companies being surveyed.

(1) Available data as reported by users. (2) Aluminum metal refers to primary aluminum and alloys, purchased recycled aluminum, and outside aluminum scrap. (3) Aluminum metal used in recycled aluminum is not included in "Total used in products other than in recycled aluminum" above. (4) For 2001 this table is compiled from Natural Resources Canada's annual survey, "Use of Aluminum Metal" from data for 185 Canadian users. (5) Some totals prior to 2001 contained runaround aluminum scrap. In 2001, runaround scrap was removed where known from totals.

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

TABLE 4. AVERAGE ALUMINUM PRICES

Year	Month	LME Cash Settlement (1)		<i>Metals Week</i>
		(US\$/t)	(US\$/lb)	U.S. Markets (1) (US\$/lb)
ANNUAL AVERAGES (2)				
1992		1254.60	0.57	0.58
1993		1139.40	0.52	0.53
1994		1477.20	0.67	0.71
1995		1806.10	0.82	0.86
1996		1506.00	0.68	0.71
1997		1599.70	0.73	0.77
1998		1357.80	0.62	0.66
1999		1361.09	0.62	0.66
2000		1549.14	0.70	0.75
2001		1443.63	0.65	0.69
2002		1349.34	0.61	0.65
MONTHLY AVERAGES				
2001	January	1615.65	0.73	0.75
	February	1604.36	0.73	0.76
	March	1509.17	0.68	0.72
	April	1496.91	0.68	0.71
	May	1538.77	0.70	0.73
	June	1466.13	0.67	0.70
	July	1416.39	0.64	0.68
	August	1377.08	0.62	0.66
	September	1344.56	0.61	0.65
	October	1282.50	0.58	0.62
	November	1327.46	0.60	0.63
	December	1344.63	0.61	0.64
2002	January	1368.59	0.62	0.65
	February	1369.34	0.62	0.64
	March	1405.00	0.64	0.67
	April	1369.99	0.62	0.66
	May	1343.30	0.61	0.66
	June	1353.97	0.61	0.66
	July	1338.09	0.61	0.65
	August	1291.60	0.59	0.63
	September	1304.25	0.59	0.63
	October	1310.58	0.59	0.63
	November	1372.20	0.62	0.66
	December	1375.07	0.62	0.66

Sources: Natural Resources Canada; *Metals Week*.

(1) Highest grade sold. (2) Primary ingots, minimum 99.7% purity.

**TABLE 5. AVERAGE ALUMINUM ALLOY
(RECYCLED) PRICES**

Year	Month	LME Alloy (1) Cash Settlement	
		(US\$/t)	(US\$/lb)
ANNUAL AVERAGES			
1993		1 005.2	0.46
1994		1 452.9	0.66
1995		1 656.0	0.75
1996		1 302.8	0.59
1997		1 461.0	0.66
1998		1 203.8	0.55
1999		1 191.2	0.54
2000		1 216.9	0.55
2001		1 172.1	0.53
2002		1 234.2	0.56
MONTHLY AVERAGES			
2001	January	1 150.3	0.52
	February	1 258.6	0.57
	March	1 258.0	0.57
	April	1 239.6	0.56
	May	1 233.3	0.56
	June	1 194.2	0.54
	July	1 164.8	0.53
	August	1 164.6	0.53
	September	1 131.9	0.51
	October	1 095.4	0.50
	November	1 087.5	0.49
	December	1 087.4	0.49
2002	January	1 083.30	0.49
	February	1 172.40	0.53
	March	1 248.30	0.57
	April	1 245.80	0.57
	May	1 206.00	0.55
	June	1 235.80	0.56
	July	1 271.00	0.58
	August	1 250.50	0.57
	September	1 235.30	0.56
	October	1 227.50	0.56
	November	1 295.50	0.59
	December	1 335.00	0.61

Sources: Natural Resources Canada; *Metals Week*.

(1) Alloy ingots, meeting LME specifications.

TABLE 6. WORLD MINE PRODUCTION OF BAUXITE, 1996-2001

	World Rank in 2001	1996	1997	1998	1999	2000	2001 (p)
(000 tonnes)							
Australia	1	43 063.0	44 465.0	44 553.0	48 416.0	53 802.0	53 285.0
Guinea	2	18 282.0	19 250.0	17 000.0	(r) 17 419.1	(r) 17 991.9	17 312.1
Brazil	3	11 060.1	11 162.8	11 961.1	(r) 14 371.5	(r) 14 290.3	13 178.4
Jamaica	4	11 828.6	11 987.3	12 646.4	11 688.5	11 126.5	12 369.6
China	5	8 878.8	9 000.0	6 400.0	7 100.0	7 900.0	7 900.0
India	6	5 757.5	(r) 5 985.0	5 980.1	6 712.2	(r) 7 562.1	7 863.9
Bosnia and Herzegovina	7	—	—	—	—	(r) 2 066.1	7 699.5
Russia	8	3 928.0	(r) 3 988.0	(r) 4 092.0	(r) 4 513.0	(r) 5 000.0	4 805.0
Venezuela	9	4 834.1	4 966.8	4 825.6	4 166.5	4 360.7	4 526.5
Suriname	10	3 702.5	3 877.2	(r) 3 931.1	3 714.6	(r) 3 610.3	4 393.7
Kazakhstan	11	3 345.9	3 416.0	3 436.8	3 606.5	3 729.6	3 685.1
Guyana	12	2 475.5	2 467.3	2 266.7	2 359.3	2 689.5	2 012.7
Greece	13	2 451.7	1 876.6	1 823.0	1 882.5	(r) 1 965.6	1 931.5
Indonesia	14	842.0	808.7	1 055.6	1 116.3	1 150.8	1 237.0
Hungary	15	1 055.8	742.6	1 138.8	941.0	1 046.5	1 000.0
Ghana	16	473.2	519.2	442.5	353.1	424.6	715.5
Yugoslavia	17	323.0	470.0	226.0	500.0	630.0	610.0
Iran	18	230.4	245.0	336.0	(r) 461.6	(r) 440.0	450.0
Turkey	19	544.5	369.5	458.0	207.7	458.5	242.0
United States	20	200.0	200.0	200.0	200.0	200.0	200.0
France	21	165.0	169.0	170.0	170.0	185.0	153.0
Malaysia	22	218.7	279.1	160.3	223.7	123.3	66.1
Vietnam	23	30.0	30.0	30.0	30.0	(r) 16.0	20.0
Mozambique	24	11.5	8.2	6.1	7.9	8.1	8.6
Pakistan	25	4.1	4.9	5.0	11.2	(r) 10.4	3.7
Albania	26	3.4	4.5	4.1	4.6	3.0	3.0
Romania		175.2	127.5	161.9	—	—	—
Total world		123 884.5	(r) 126 420.2	(r) 123 310.1	(r) 130 176.8	(r) 140 790.8	145 671.9
% change from previous year		4.8	2.0	-2.5	5.6	8.2	3.5

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics; World Bureau of Metal Statistics, media reports.
— Nil; (p) Preliminary; (r) Revised.

TABLE 7. PRODUCTION OF ALUMINA (HYDRATE), 1997-2002

	World Rank in 2001	World Rank in 2002	1997	1998	1999	2000	2001	2002 (e)
(000 tonnes)								
Australia	1	1	(r) 13 384.0	13 853.0	14 532.0	(r) 15 037.0	16 271.0	16 390
China	2	2	2 922.8	3 340.0	3 822.0	(r) 4 326.7	4 729.1	54 440
United States (3)	3	3	5 093.0	5 654.0	5 144.0	(r) 4 786.0	4 340.0	4 500
Jamaica	4	4	3 394.2	3 440.2	3 569.6	3 600.1	3 542.4	3 650
Brazil	5	5	3 088.0	3 322.1	3 515.1	(r) 3 751.0	3 519.7	3 650
Russia	6	6	2 379.8	2 465.4	2 657.1	(r) 2 856.0	3 048.0	3 200
India	7	7	1 940.0	1 855.0	1 930.0	2 107.0	2 170.0	2 600
Venezuela	9	8	1 730.4	1 553.4	(r) 1 469.0	1 755.3	1 833.2	2 000
Suriname	8	9	1 725.9	1 771.9	1 853.1	1 906.1	1 893.3	1 900
Ireland (1)	10	10	(r) 1 272.9	(r) 1 395.7	(r) 1 95.7	(r) 1 410.7	1 448.7	1 540
Ukraine	11	11	1 074.5	1 290.7	1 230.2	1 360.0	1 340.0	1 350
Spain	13	12	1 110.3	1 110.0	1 112.0	1 123.0	1 199.0	1 350
Kazakhstan	12	13	1 094.2	1 084.5	1 157.7	(r) 1 216.7	1 231.1	1 300
Canada (2)	14	14	1 165.0	1 229.0	1 233.0	(r) 1 023.0	1 036.0	1 050
Italy	15	15	914.0	935.0	973.0	1 022.0	993.0	1 010
Germany	16	16	850.0	778.3	806.0	826.0	836.0	850
Japan	17	17	728.0	737.6	736.6	781.7	739.1	775
Greece	18	18	615.7	649.4	633.0	690.0	709.0	750
Guinea	19	19	527.0	500.0	(r) 568.5	541.0	674.3	698
France	20	20	589.0	520.0	556.0	600.0	598.0	610
Yugoslavia	22	21	159.5	(r) 152.5	156.0	186.1	200.7	225
Romania (1)	21	22	279.5	250.2	277.4	416.6	319.4	200
Hungary	23	23	350.0	(r) 138.0	(r) 156.4	(r) 204.3	200.0	200
Turkey	24	24	164.3	156.8	159.1	155.4	185.0	190
Bosnia and Herzegovina	25	25	—	—	(r) 37.0	(r) 219.4	100.0	100
Azerbaijan	27	26	—	—	(r) 76.0	(r) 217.0	95.0	100
United Kingdom	26	27	100.0	115.0	94.0	89.0	98.0	85
Slovakia			46.8	—	—	—	—	—
South Korea			70.0	—	—	—	—	—
Total world			(r) 46 768.8	(r) 48 224.5	(r) 49 849.5	(r) 52 207.1	53 349.0	55 713.00
% change from previous year			4.5	3.1	3.4	4.7	2.2	4.4

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics, International Aluminium Association; media reports.
— Nil; (r) Revised.

(1) Calcined. (2) Alumina equivalent. (3) Calcined equivalent.

TABLE 8. WORLD PRODUCTION OF PRIMARY ALUMINUM, 1997-2003

	World Rank in 2001	World Rank in 2002	1997	1998	1999	2000	2001	2002 (e)	2003 (f)
(000 tonnes)									
China	1	1	2 035.0	2 335.7	2 598.5	(r) 2 794.1	3 424.6	4 270.0	5 100.0
Russia	2	2	2 906.0	(r) 3 010.0	3 149.0	3 247.0	3 302.0	3 350.0	3 400.0
Canada	4	3	2 327.2	2 374.1	2 389.8	2 373.5	2 582.7	2 710.0	2 730.0
United States	3	4	3 603.4	3 712.7	3 778.6	3 668.4	2 637.0	2 700.0	2 650.0
Australia	5	5	1 490.1	1 626.2	1 719.3	1 761.5	1 784.1	1 850.0	1 875.0
Brazil	6	6	1 189.1	1 208.0	1 249.6	(r) 1 271.4	1 132.0	1 320.0	1 375.0
Norway	7	7	918.6	994.2	1 009.0	1 031.1	1 034.2	1 050.0	1 150.0
India	10	8	544.9	(r) 542.0	594.0	646.3	624.1	690.0	840.0
South Africa	8	9	682.9	692.5	(r) 689.2	(r) 674.2	663.0	676.0	685.0
Germany	9	10	571.9	612.4	633.8	643.5	651.6	650.0	660.0
Venezuela	11	11	(r) 642.0	586.5	(r) 570.3	(r) 570.9	570.6	610.0	620.0
Dubai	12	12	379.2	386.6	440.7	536.0	536.0	540.0	545.0
Bahrain	13	13	489.9	501.3	502.7	509.0	522.1	525.0	530.0
France	14	14	399.4	423.6	455.1	441.2	460.9	460.0	410.0
Spain	15	15	359.9	360.4	363.9	365.7	376.4	380.0	385.0
United Kingdom	16	16	247.7	258.4	272.2	305.1	340.8	345.0	345.0
New Zealand	17	17	310.3	(r) 317.5	326.7	(r) 328.4	322.3	334.0	340.0
Tajikistan	18	18	188.9	195.6	229.1	(r) 300.0	324.0	325.0	325.0
Netherlands	19	19	231.8	(r) 264.7	287.4	301.7	293.2	295.0	295.0
Mozambique	21	20	–	–	–	(r) 63.8	270.2	270.0	300.0
Argentina	20	21	187.2	186.7	206.4	261.8	245.1	265.0	265.0
Iceland	22	22	122.9	173.4	221.5	225.7	242.6	265.0	275.0
Egypt	25	23	178.2	187.2	186.7	188.9	190.8	195.0	195.0
Italy	24	24	187.7	187.0	187.2	189.2	187.4	190.0	190.0
Romania	26	25	161.9	174.0	174.1	179.0	179.8	185.0	200.0
Indonesia	23	26	(r) 217.4	(r) 134.3	(r) 112.3	(r) 192.3	208.8	160.0	180.0
Greece	27	27	132.6	146.1	159.9	162.6	162.0	160.0	160.0
Iran	29	28	(r) 91.0	(r) 111.0	(r) 138.0	139.5	145.2	160.0	160.0
Slovakia	30	29	110.2	108.0	109.2	109.8	122.0	144.0	150.0
Yugoslavia	35	30	(r) 80.6	(r) 76.7	(r) 80.9	(r) 95.5	108.1	116.0	118.0
Ukraine	31	31	100.5	106.7	112.4	103.6	106.1	112.0	112.0
Ghana	28	32	151.6	56.1	114.2	155.5	162.3	100.0	50.0
Sweden	32	33	98.4	95.7	98.5	100.1	101.8	100.0	100.0
Bosnia	34	34	8.0	(r) 38.0	70.0	94.5	95.6	100.0	100.0
Slovenia	36	35	74.4	70.8	77.2	(r) 75.6	76.6	90.0	125.0
Cameroon	33	36	90.9	81.6	91.9	94.9	80.5	70.0	70.0
Turkey	38	37	62.0	61.8	61.7	61.5	61.7	60.0	60.0
Poland	39	38	51.5	51.5	51.6	(r) 55.5	54.6	50.0	50.0
Mexico	37	39	66.4	61.8	62.7	(r) 61.2	51.5	50.0	50.0
Switzerland	40	40	27.3	32.1	34.4	35.5	36.2	36.0	36.0
Hungary	41	41	32.5	33.7	33.6	33.9	34.6	35.0	35.0
Japan	42	42	16.7	16.3	10.9	6.5	6.6	7.0	7.0
Suriname			23.1	27.1	6.6	–	–	–	–
Azerbaijan			–	–	–	–	–	–	–
Nigeria			2.5	25.5	15.9	–	–	–	–
Total world			(r) 21 793.7	(r) 22 645.5	(r) 23 676.7	(r) 24 455.4	24 511.7	25 999.9	27 248.0
% change from previous year			4.5	3.9	4.6	3.3	0.2	6.1	4.8

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics; World Bureau of Metal Statistics; International Aluminium Institute; media reports.

– Nil; (e) Estimated; (f) Forecast; (r) Revised.

TABLE 9. APPARENT USE OF PRIMARY ALUMINUM, 1997-2001

	World Rank in 2001	1997	1998	1999	2000	2001
(000 tonnes)						
Albania	76	1.0	1.0	1.0	1.0	1.0
Algeria	69	5.0	5.0	4.1	(r) 4.1	4.1
Argentina	38	94.9	106.3	82.9	(r) 80.2	70.6
Australia	16	352.0	370.3	344.4	350.5	320.0
Austria	22	162.0	159.8	142.6	168.2	201.0
Bahrain	17	(r) 191.1	(r) 200.3	(r) 226.2	(r) 239.2	261.0
Bangladesh	57	14.2	17.8	18.0	18.0	18.0
Belarus	64	7.4	9.1	9.0	9.0	9.0
Belgium	14	345.0	370.0	350.0	341.0	345.0
Brazil	12	478.6	521.4	463.1	513.7	552.8
Bulgaria	65	7.8	8.0	8.0	8.6	8.1
Cameroon	53	24.7	24.9	22.0	24.8	24.0
Canada	9	643.5	720.6	777.2	(r) 799.5	759.6
Chile	60	15.5	(r) 14.6	11.2	(r) 14.5	14.5
China (1)	2	2 289.0	2 421.0	2 914.0	(r) 3320	3 450.0
Colombia	49	42.8	36.3	27.4	(r) 32.1	30.0
Croatia	44	22.0	24.0	(r) 29.5	28.4	37.1
Cuba	77	1.0	1.0	1.0	1.0	1.0
Czech Republic	37	62.8	78.9	65.7	77.6	88.3
Denmark	41	36.0	38.9	39.4	41.2	44.0
Dubai	54	32.1	18.5	20.0	(r) 17.9	20.0
Egypt	34	97.9	91.6	82.7	81.8	96.5
Finland	45	33.1	36.2	37.1	38.5	36.9
France	7	724.2	733.8	774.2	(r) 781.4	760.9
Germany	4	1 558.0	1 520.0	1 446.0	(r) 1542	1 550.0
Ghana	58	16.0	16.0	16.0	16.0	16.0
Greece	21	203.8	212.7	212.5	(r) 230	217.5
Hungary	20	183.4	163.7	171.3	210.1	222.7
Iceland	70	1.7	3.0	3.0	3.0	3.0
India	10	553.4	566.5	569.5	602.4	589.2
Indonesia	26	203.0	75.4	138.7	145.8	162.9
Iran	30	(r) 103.9	(r) 103.1	(r) 123.2	(r) 116.8	120.0
Iraq	78	1.0	1.0	1.0	1.0	1.0
Ireland	66	5.8	6.6	8.2	10.2	7.8
Israel	43	39.5	45.9	44.0	44.8	38.0
Italy	8	671.0	674.0	734.6	(r) 762	760.0
Japan	3	2 433.5	2 082.0	2 112.3	(r) 2224.9	2 014.0
Kazakhstan	73	1.6	1.7	2.0	2.0	2.0
Lebanon	59	17.0	20.9	14.2	(r) 16	15.6
Macedonia	74	(r) 5	(r) 5.6	(r) 2.5	(r) 2.4	1.8
Malaysia	36	147.8	64.7	130.6	115.0	92.2
Mexico	32	83.2	91.1	89.6	(r) 101.5	114.0
Morocco	68	2.0	(r) 3.7	3.5	5.7	5.7
Netherlands	29	155.0	155.0	155.0	155.0	155.0
New Zealand	46	37.0	34.2	42.8	42.7	35.6
Nigeria	67	7.0	7.0	7.0	7.0	7.0
North Korea	55	20.0	20.0	20.0	20.0	20.0
Norway	18	197.0	155.0	217.0	(r) 231	240.0
Other Africa	62	12.0	10.0	12.0	12.0	12.0
Other America	51	25.0	25.0	25.0	25.0	25.0
Other Asia	42	35.0	30.0	35.0	(r) 35	40.0
Other Europe	72	2.0	1.5	2.0	(r) 2	2.0
Pakistan	63	15.0	15.0	9.4	10.0	10.0
Peru	75	2.5	2.5	0.9	1.3	1.1
Philippines	50	34.2	24.0	33.6	32.8	25.2
Poland	28	101.5	107.8	133.0	149.9	159.2
Portugal	39	75.4	68.3	82.0	78.0	66.9
Romania	33	70.6	87.7	113.6	125.7	112.5
Russia	6	(r) 469.2	489.2	(r) 562.8	748.4	786.2
Saudi Arabia	52	25.0	25.0	25.0	25.0	25.0
Singapore	61	15.0	33.5	4.3	4.1	13.6
Slovakia	47	4.6	22.2	(r) 34.1	(r) 36.4	34.9
Slovenia	35	(r) 51.8	74.6	(r) 75.5	(r) 81.7	96.1
South Africa, Rep. of	23	124.4	142.8	125.0	(r) 186.3	198.2
South Korea	5	666.3	505.7	813.9	(r) 822.5	849.6
Spain	13	430.0	435.5	494.0	525.6	507.8
Sweden	31	142.0	177.0	(r) 133	147.0	118.6
Switzerland	27	144.0	165.9	157.0	(r) 165	161.2
Taiwan	15	374.3	300.7	464.1	501.6	321.3

TABLE 9 (cont'd)

	World Rank in 2001	1997	1998	1999	2000	2001
(000 tonnes)						
Thailand	19	232.8	128.4	155.3	195.2	227.0
Tunisia	71	2.1	4.4	2.6	3.0	3.0
Turkey	24	160.8	180.7	169.4	211.2	175.7
United States	1	5 800.0	6 100.0	(r) 6372	(r) 6275	5 420.0
Ukraine	40	50.0	50.0	50.0	50.0	50.0
United Kingdom	11	583.0	579.0	581.0	588.0	560.0
Venezuela	25	193.4	(r) 206.2	(r) 154.8	(r) 183.4	164.7
Vietnam	48	8.4	15.6	(r) 17.6	(r) 20.3	30.9
Yugoslavia	56	23.7	19.2	13.1	16.0	18.7
World Total		(r) 22 204.2	(r) 22 065.5	(r) 23 566.2	(r) 24 856.9	23 760.8
% change from previous year		6.6	-0.6	6.8	5.5	-4.4

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

(r) Revised.

(1) Starting in 1997, Hong Kong is included with China.

TABLE 10. ABBREVIATIONS OF COMPANY NAMES AND INSTITUTIONS USED IN THIS REPORT

Company	Abbreviation	Web Site Address
Alcan Inc.	Alcan	www.alcan.com
Alcoa Inc.	Alcoa	www.alcoa.com
Alcoa World Alumina and Chemicals	AWAC	www.alcoa.com
Alumina do Norte do Brasil S.A.	Alunorte	www.vale.com.br
Aluminerie Alouette Inc.	Alouette	www.alouette.qc.ca
Aluminerie de Bécancour Inc.	A.B.I.	www.alcoa.com
Aluminium Association of Canada	The Association	www.aia.aluminium.qc.ca
Aluminium Corp. of China	Chalco	..
Alumina Partners of Jamaica	Alpart	www.kaiseral.com
Cambior Inc.	Cambior	www.cambior.com
Columbia Ventures Corporation	Columbia Ventures	www.nordural.is
Comalco Ltd.	Comalco	www.riotinto.com
CVG Alcasa	Alcasa	www.aluminio.com.ve
Dubai Aluminium Company Limited	Dubal	www.dubal.co.ae
Aluminum Company of Egypt	Egyptalum	www.egyptalum.com.eg
Elkem ASA	Elkem	www.elkem.com
Federation of Aluminium Consumers in Europe	FACE	www.facealuminium.com
Hindalco Industries Limited	Hindalco	www.adityabirla.com
International Aluminium Institute	IAI	www.world-aluminium.org
KTD L.L.C.	KTD	www.ktdal.com
Minmetals Nonferrous Metals Co., Ltd.	Minmetals	www.minmetals.com
National Aluminium Company Limited	Nalco	www.nalcoindia.com
Norsk Hydro A.S.A / Hydro Aluminium a.s.	Norsk Hydro or Hydro Aluminium	www.hydro.com
Pechiney SA	Pechiney	www.aluminium-pechiney.com
Russian Aluminium (Rusky Aluminium)	Rusal	www.rusal.com
Sibirsky Aluminium	Sibirsky (Russian Aluminium)	www.sibirskyaluminium.com
Société Générale de financement du québec	SGF	www.sgfqc.com
Tomago Aluminium Pty Ltd	Tomago	www.tomago.com.au
The Aluminum Association Inc.	Aluminum Association	www.aluminum.org
Vietnam National Mineral Corp.	Vimico	..

Source: Natural Resources Canada.

.. URL not available.

TABLE 11. BAUXITE AND ALUMINA PROJECTS

Country	Project/Company	Remarks	Near-Term Change (t/y)
Australia	Pechiney, SA	Studies for potential 1.5-Mt/y refinery with associated mine on Cape York Peninsula.	
	Gladstone alumina refinery - Comalco	First stage of proposed A\$1.4 billion refinery in central Queensland under construction; production expected in late 2004. Requires expansion of the Weipa bauxite mine proposed to 16 Mt/y from 11.5 Mt/y. Potential to increase refinery capacity to 4 Mt/y.	1 400 000
	Gove alumina refinery - Alcan	Proposed expansion of refinery from 2 Mt/y to 3.5 Mt/y. Engineering studies in 2003 with environmental approvals expected in 2004; construction expected to take three years.	
	Queensland Alumina Ltd. refinery	Potential to expand capacity from 3650 t/y to 4350 t/y.	
	WMC Limited	Aluminum interests transferred to new operating company.	
	Wagerup - Alcoa/WMC	Decision pending on increase in capacity of refinery.	
	Pinjarra - Alcoa	Government approvals pending on increase in capacity of refinery to 4 Mt/y from 3.4 Mt/y.	
	Worsley	Expansion of refinery to 3.7 Mt/y from 3.1 Mt/y expected by 2008.	
Azerbaijan	Sumgait nonferrous metals plant	Expansion of alumina refinery from 300 000 t/y to 450 000 t/y.	150 000
Brazil	Barcarena alumina refinery - Alunorte CVRD and Norsk Hydro	Expansion completed from 1.5 to 2.3 Mt/y in late 2002. Feasibility study on further expansion to 5 Mt/y. Studies for a new bauxite mine to support additional expansions.	800 000
	Alunorte refinery CVRD	Expansion to 800 000 t/y expected to be completed in early 2003; studies under way for further expansion.	
	Para State mine - CVRD	Studies under way for potential new 5-Mt/y mine in 2005.	
	Trombetas mine - Mineracao Rio do Norte	Expansion of mine to support Alunorte and Alumar alumina refinery expansions expected to be completed in late 2002. Production at capacity dependent on markets.	5 200 000
China	Baise Yinhai - Pechiney and Minmetals	Discussions on possible new 400 000-t/y alumina refinery in Guangxi, with later expansion potential to 2 Mt/y.	
	Denfeng Aluminium Plant	Plans postponed for a new 100 000-t/y refinery.	
	Guangxi Guixi Huayin Aluminium Corp - Chalco/MinMetals	Feasibility studies for new 800 000-t/y refinery in Guangxi region. Construction could start in late 2003.	800 000
	Guizhou refinery - Chalco	Expansion by 300 000 t/y expected to be completed by end of 2003.	300 000
	Guizhou - Zunyi Aluminium	Plans for new 300 000-t/y refinery.	
	Huanghe Aluminium and Power Group	Plans to start up new 100 000-t/y refinery in 2003. Potential expansion to 500 000 t/y.	
	Henan Dengfeng Aluminium Industry Co. Ltd	Delayed plans for construction of 100 000-t/y alumina refinery to feed its planned smelter expansion.	
	Pingguo refinery joint venture with Alcoa - Chalco	Joint venture delayed. Construction to finish in 2003 for doubling the capacity of refinery to 850 000 t/y.	400 000
	Pingguo bauxite mine	New 1.1-Mt/y mine start-up expected in June to take mining capacity to 2 Mt/y.	250 000
	Shanxi - Chalco	Potential new 800 000-t/y alumina refinery with Shandong Electric Power. Co.	
	Zhongzhou refinery - Chalco	Expansion by 300 000-t/y expected to be completed by end of 2003.	300 000
Guinea	Dian-Dian - Russian Aluminium	Government approval of bauxite mine and refinery. Port and rail facilities to be constructed. Proposed capacity up to 11 Mt/y of bauxite and 1.2 Mt/y of alumina. Potential 240 000-t/y smelter.	
	Guinea Aluminium Products Co. (Gapco)	Discussions on expansion of Friguia alumina plant by 350 000 t/y, hydro dam and 240 000-t/y smelter. Possible new 2.6-Mt/y refinery.	
Guyana	Linden Mining Enterprises	Government in discussions with Cambior to manage its bauxite mine. Government wishes to construct new 600 000-t/y refinery.	
India	Gujarata Alumina Bauxite Ltd.	Proposal for 750 000-t/y refinery in Gujarat. Production would not start until after 2005.	
	Korba - Bharat Aluminium	Expansion of refinery from 180 000 t/y to 830 000 t/y approved. Project expected to be completed in 2005.	
	Renukoot - Hindalco	Expansion and debottlenecking of refinery under way from 450 000 t/y to 700 000 t/y. Completion expected in 2003.	250 000
	Pechiney, SA	Interested in constructing a 1-Mt/y alumina refinery in Orissa, India; feasibility study under way; decision expected in 2003.	
	Korba - Bharat Aluminium	Possible expansion of refinery from 180 000 t/y to 800 000 t/y by 2005.	

TABLE 11 (cont'd)

Country	Project/Company	Remarks	Near-Term Change (t/y)
	Utkal - Alcan, Hindalco	Bauxite mine and alumina refinery in Orissa. Initial refinery capacity of 1.5 Mt/y; second stage to 3 Mt/y. Construction planned for 2003 may be delayed.	
Jamaica	Alumina Partners of Jamaica - Kaiser and Hydro Aluminium	Expansion of Alpart refinery from 1.45 Mt/y to 1.65 Mt/y in 2003.	200 000
	Clarendon refinery - Alcoa and Jamalco	Agreement reached on 250 000-t/y expansion of Woodside refinery by 2004.	250 000
Russia	Timan bauxite mine - Sual Group	Mine at Sredne-Timan in Komi Republic under development. Expected capacity to eventually reach 3 Mt/y of bauxite. Plans production of 950 000 t in 2003. Possible new 1.4-Mt/y refinery and smelter to be associated with mine. Rail line completed. Hatch and Associates awarded contract for prefeasibility and engineering work on alumina refinery and smelter. Cooperation agreement with Pechiney in early 2003.	750 000
Suriname	Suralco refinery - Alcoa/BHP Billiton	Agreement signed on expansion of refinery by 250 000 t/y to 2 Mt/y.	250 000
United Kingdom	Scotland - Bruntsland Refinery - Alcan	Closure of 120 000-t/y chemical-grade alumina refinery in November 2002.	-120 000
United States	Alcoa - Point Comfort	Alumina output to increase in 2003.	300 000
Vietnam	Government of Vietnam	Seeking foreign investors in bauxite and alumina refineries. Plans construction of a 300 000-t/y alumina refinery; production possible in 2006.	
	Dac Nong - China Non-Ferrous Corp./Vimico	Memorandum of Understanding on a new feasibility study for a potential new 1-Mt/y refinery and bauxite mine. Production for export and a possible local 75 000-t/y smelter. Decision expected in early 2003.	
Venezuela	Bauxilium - CVG Bauxilium/Pechiney	Refinery expansion under way to 2.2 Mt/y.	200 000
	Bauxilium - CVG Bauxilium/Pechiney	Potential second-phase expansion of refinery capacity from 2.2 Mt/y to 3 Mt/y.	

Source: Natural Resources Canada, based on published reports.

TABLE 12. SMELTER PROJECTS

Country	Project/Company	Remarks	Near-Term Change Amount (t/y)
Australia	Boyne Island - Comalco	Deferred expansion of smelter (by 200 000 t/y).	
	WMC Alumina Limited Limited	Aluminum interests transferred to new operating company.	
	Kurri Kurri smelter	Hydro Aluminium to upgrade smelter. Capacity to increase by 15 000 t/y.	15 000
	Aldoga Consortium	Proposed 560 000-t/y smelter near Gladstone received major project status. Letter of intent with Russian Aluminium on a joint venture feasibility study. Work on feasibility studies. Construction expected to start in 2003; production to start in 2005.	
	Tomago smelter - Tomago Aluminium Pty Ltd.	Partners approved upgrades resulting in 70 000-t/y expansion in capacity to 530 000 t/y. Completion expected in 2006.	
Azerbaijan	Azerbaijan Aluminum	Continued work toward restart of smelter in 2002 with reduced capacity of 30 000 t/y. New smelter proposed with capacity of 150 000-200 000 t/y.	30 000
Brazil	Albras - CVRD	Expanded capacity became operational in early 2002.	45 000
	Sorocoba smelter - Cia Brasileira de Alumínio	Expansion of smelter under way from 230 000 t/y to 340 000 t/y. To be completed in 2003.	110 000
	Cataguazes, Minas Gerais - Cia Brasileira de Alumínio	Proposed new smelter with capacity of 500 000 t/y.	
Bahrain	Aluminum Bahrain	Expansion under way from 520 000 t/y to 820 000 t/y. Construction to start in early 2003.	300 000
	Aluminum Bahrain - Alcoa	Agreement on an additional expansion (200 000 t/y) with Alcoa to bring total capacity to 1 Mt/y by 2005.	
Bosnia	Aluminij Mostar	Plans feasibility study for second potline to expand capacity from 110 000 t/y to 220 000 t/y.	
Canada	Alma smelter - Alcan	To start construction on potlining centre in 2003.	
	Alouette smelter expansion - Alouette Inc.	Expansion approved; completion expected in 2005. Discussed in text.	300 000
	Baie Comeau - Alcoa	Modernization planning under way. Capacity to be raised in longer term by 110 000 t/y. Completion in 2010.	
	Deschambault smelter (Lauralco) - Alcoa	Expansion by 330 000 t/y. Discussed in text.	
Chile	Alumysa proposed smelter - Noranda	Environmental and social studies under way for a proposed US\$2.75 billion hydro-electric project and smelter near Puerto Aisen.	

TABLE 12 (cont'd)

Country	Project/Company	Remarks	Near-Term Change Amount (t/y)
China	Baiyin aluminum smelter	Expected completion of expansion to 100 000 t/y in 2002 from 72 000 t/y. Expects to expand to 130 000 t/y in 2003.	50 000
	Baotou Aluminium	Construction under way of a 50 000-t/y expansion to 180 000 t/y. Potential modernization with further expansion to 250 000 t/y.	50 000
	Baise Yin Hai Aluminium Co.	Delays in start-up of new 50 000-t/y smelter. Planned expansion to 100 000 t/y in 2003.	50 000
	Jiangsu - Datun Gas and Power	Construction of a new 100 000-t/y smelter started in 2002. Phase one to be 50 000 t/y with expected completion in 2003.	50 000
	Fushun Aluminium Company	Replacement smelter started up in late 2002. Capacity now 160 000 t/y. Second phase expansion of 50 000 t/y expected to be completed in 2003.	50 000
	Guangxi - Baise Yin Hai Aluminium Co.	Completed construction of new 50 000-t/y smelter in 2002, but delayed metal production to 2003. Plans to double capacity to 100 000 t/y by 2004.	50 000
	Guizhou - Chalco	Expansion of smelter under way to reach 395 000 t/y by 2004.	160 000
	Guizhou - Zunyi aluminum plant	Expansion from 32 000-t/y to 132 000-t/y capacity started in 2001; to be completed in 2003.	100 000
	Henan Dengfeng Aluminium Industry Co. Ltd.	Planned to complete new power generation facilities by 2003 for an eventual expansion of capacity to 100 000 t/y from 40 000 t/y. Seeking funding for smelter expansion.	
	Henan Wanji Aluminium Co.	Completed expansion from 60 000 t/y to 180 000 t/y.	120 000
	Inner Mongolia - East Hope Group	Planning a 1-Mt/y smelter in Baotou. Construction of first phase of 150 000 t/y started in late 2002.	150 000
	Jiaozuo Wanfang Aluminium Co.	Smelter expansion to 180 000 t/y from 110 000 t/y approved and under way. Further expansion expected to 300 000 t/y in 2004.	70 000
	Jiamusi aluminum smelter	Seeking investors for 100 000-t/y expansion.	
	Lanzhou Aluminium Co.	Expansion of capacity by 100 000 t/y. Agreement in principle with Pechiney on technical cooperation and studies to be carried out in 2003 for a proposed 260 000-t/y smelter and associated electrical generation facilities in Gansu province.	100 000
	Lintao aluminum plant	Company expects to modernize and expand smelter located in Gansu from 10 000 t/y to 50 000 t/y in 2003.	40 000
	Nantun Shandong smelter -Yankuang Group	Construction under way of 140 000-t/y smelter; expected to be in operation in 2004.	140 000
	Ningxia Zhongning aluminum smelter	Construction to start on smelter expansion in 2003. Possible expansion to 300 000 t/y.	70 000
	Pingguo - Chalco - joint venture with Alcoa	Waiting for approvals for proposed tripling of capacity of the Pingguo aluminum smelter from 130 000 t/y to 380 000 t/y.	250 000
	Qinghai Qiaotou Aluminum and Electricity Co.	New 150 000-t/y smelter in Qinghai expected to be completed in 2004. Possible second phase to double capacity.	50 000
	Qingtongxia aluminium smelter	Plans to expand existing plant by 150 000 t/y. In 2001, Alcan signed a Memorandum of Understanding on a joint venture to have a 50% interest in the smelter and planned expansion. Discussions are continuing.	150 000
	Shandong Aluminium	Soderberg potline closed.	-35 000
	Rizhao smelter -Yankuang Group	Potential new 400 000-t/y smelter. Work on financing and approvals under way.	
	Shanxi smelter - Chalco/Shanxi Zhangze Electric Power Co.	New 280 000-t/y smelter planned for 2005 in Hejin with new 600-MW power plant. Replaces proposal with Beijing Datang Power Co.	
	Shanxi - Shanxi Guanlu Co. Ltd.	Company started construction of 200 000-t/y expansion of smelter; final capacity of 320 000 t/y. First metal expected in mid-2003.	200 000
	Shijiazhuang Aluminium Co.	Feasibility study for modernization and expansion by 20 000 t/y.	
	Tongchuan Xinguang Aluminium Industry Co.	Modernization to phase out Soderberg pots and expansion under way. Capacity to double from 60 000 t/y to 120 000 t/y.	
	Xinfa Aluminium Co.	Plans to expand Shandong smelter capacity from 100 000 t/y to 420 000 t/y. Possibility for an additional 600 000-t/y smelter.	
	Yangxin aluminium smelter	Expansion of 10 000 t/y to 20 000 t/y.	10 000
	Yichang, Hubei Smelter - Chalco	Letter of intent with partners on a feasibility study for a new 500 000-t/y smelter near Three Gorges Dam. First phase 250 000 t/y construction expected in 2004.	
	Yuci Hengyu Aluminium Industry	Seeking investors for new 100 000-t/y smelter.	
	Yugang Lonquan Aluminium Co. Ltd.	Expanded capacity in 2002 from 55 000 t/y to 200 000 t/y.	145 000
	Yunnan Aluminium - Kunming smelter	Planned modernization of smelter from Soderberg to prebake technology postponed.	

TABLE 12 (cont'd)

Country	Project/Company	Remarks	Near-Term Change Amount (t/y)
China (cont'd)	Zhengzhou Longxian Aluminium Power Co.	Planning for expansion in 2004 to 150 000 t/y from 50 000 t/y.	
	Zhengzhou Shangjie aluminum plant	Planning to increase capacity in 2005 from 26 000 t/y to 100 000 t/y.	
	Zhenxing Group Co.	Completed construction of a 40 000-t/y expansion to total capacity of 60 000 t/y in mid-2002.	20 000
	Zouping Aluminium Co. Ltd.	Doubling capacity to 66 000 t/y by mid-2002. Plans thereafter to boost production to 200 000 t/y.	33 000
Dubai	Dubal	Upgrade approved by government. Work under way to expand capacity from 535 000 t/y to 710 000 t/y.	175 000
Egypt	Egyptalum	Expansion and modernization - progress slower than expected but work now under way. Capacity to be raised by 50 000 t/y by 2004 along with conversion of potline #5 to prebake technology.	50 000
France	Auzat - Pechiney	Smelter closure in early 2003.	-48 000
Ghana	Volta - Kaiser	Two potlines closed due to lack of power in 2002.	-80 000
Guinea	Guinea Aluminium Products Co.	Discussions on possible 240 000-t/y smelter.	
Iceland	Straumsvik - Icelandic Aluminum (ISAL)	Environmental studies for a possible expansion to 460 000 t/y from 160 000 t/y.	
	Fjarðaal - Alcoa	Joint Action plan and agreement with Icelandic government on new 322 000-t/y smelter (replaces the Noral project). Construction expected to start in 2005; metal production in 2007.	
	Norðurál - Columbia Venture Corp.	Planning expansion from 90 000 t/y to 180 000 t/y by 2006.	
	Atlantsal Ltd.	Feasibility studies to be completed in 2003 for a proposed 360 000-t/y smelter.	
India	Angul - Nalco	Completed expansion in 2002 to 345 000 t/y from 230 000 t/y.	115 000
	Alupurram - Indian Aluminium	Smelter to be closed.	-14 000
	Renukoot - Hindalco	Expansion by 120 000 t/y to 360 000 t/y expected to be completed in 2003.	120 000
	Korba - Bharat Aluminium	Possible expansion of smelter from 100 000 t/y to 300 000 t/y by 2005. Signed power contract to increase production to 125 000 t/y by 2003.	25 000
	New smelter - Chalco and Kutch Alumina Power and Coke Company Limited	Discussions on possible 120 000-t/y smelter.	
Indonesia	PT Indonesia Asham Aluminium	New power plant to ease current power shortages delayed. Once completed, planning to expand from 225 000 t/y to 300 000 t/y.	
Iran	Iran Aluminium Company	Continued work on proposal for new Arak smelter (110 000 t/y).	
Kazakhstan	Pavlodar - Aluminum of Kazakhstan	Planning for a new 240 000-t/y smelter associated with the Pavlodar alumina refinery.	
Malaysia	Bintulu - Sarawak - Dubai Aluminium	Proposed 500 000-t/y smelter, based on new hydro-electric project. Construction expected to start in 2004; metal production in 2007. Agreement between Gulf international Investment Group and Dubai Aluminium Co.	
	Perak State Development Corporation/Malaysia Aluminium Smelting Co. (Charus Development Corporation)	Potential new smelter to start construction in 2003. First stage 230 000 t/y with potential expansion to 690 000 t/y. Proponents seeking funding and approvals.	
Mozambique	Mozal - Billiton and partners	Expansion of capacity of the Mozal smelter under way from 250 000 t/y to 500 000 t/y. Management contract awarded to SNC Lavalin of Canada and Murray and Roberts Engineering Solutions of South Africa. Initial production expected in mid-2003.	250 000
Nigeria	Ikot-Abasi	Work under way to re-open the 193 000-t/y smelter. Government sale of interest expected in 2003.	
Norway	Karmøy, Årdal - Hydro Aluminium	Higher power costs resulted in reductions in planned production at Karmøy. Soderberg technology to be phased out by 2006 at Årdal; by 2009 at Karmøy.	-10 000
	Mosjøen - Elkem	Modernization and expansion under way; 60% complete in early 2002. Expansion to be completed in 2003.	68 000
	Soeral	Alcan/Norsk Hydro expansion of 44 000 t/y to be completed first quarter of 2003.	
	Sunndal - Hydro Aluminium	New prebake potline nearing completion; closure of older potline advanced due to higher power costs. Capacity to reach 330 000 t/y in 2004.	168 000
Qatar	Ras Laffan - United Development Co, Ferrostaal, and JGC Corp.	Consortium's proposal for smelter in NE Qatar; has licence to build smelter, contract for gas supply. Smelter capacity is 500 000 t/y. Production expected in 2006.	
Russia	Irkutsk-Alucom-Taishet	Pilot smelter built in 2002. Proposal for new 250 000-t/y smelter and difficulty with power for pilot plant. Russian Aluminium in discussions for purchase of interest. Project may be merged with Russian Aluminium proposal.	

TABLE 12 (cont'd)

Country	Project/Company	Remarks	Near-Term Change Amount (t/y)
Russia (cont'd)	Irkutsk - Sual Group	Potential new 200 000-t/y smelter at Irkutsk.	
	Komi smelter and refinery - Sual	Hatch and Associates awarded contract for prefeasibility and engineering work on alumina refinery and smelter. Smelter capacity expected to be 300 000-500 000 t/y.	
	Leningrad - Vsevolozhsk aluminum smelter	Feasibility studies and decision on environmental approvals on a proposed 147 000-t/y smelter with associated rolling plant expected in 2003.	
	Leningrad - Sosnovy Bor Aluminum Works - Alutec Inc.	Studies continue on proposed new smelter; USTDA grant for research and design. Construction could start in 2003 on smelter. First stage of 60 000 t/y could be operational in 2004 with expansions thereafter to 360 000 t/y.	
	Leningrad - Metallurg (Volkhov Aluminum and Glinozyom)	Possible expansion from 20 000 t/y to 60 000 t/y.	
	Primoriye - Russian Aluminium	Discussions on a potential new smelter to be associated with new hydro-electric power project.	
	Sayansk - Russian Aluminium	SNC Lavalin-Russian Aluminium Memorandum of Cooperation on expansion study and feasibility study for expansion of smelter from 400 000 t/y to 660 000 t/y. Loan obtained for modernization.	
	Kandalaksha smelter - Sual Group	Replacement of older cells with prebaked anode cells to start in 2003. Work to be done over four years increasing cap to 114 000 t/y.	
	Murmansk (Kola Peninsula) - Russian Aluminium	Studies for a possible new 300 000-t/y smelter.	
	Sayanogorsk - Russian Aluminium	Upgrading expected to boost capacity by 30 000 t/y in 2003. Planning for second phase increase in production by 290 000 t/y. Cooperation agreement with Norsk Hydro on modernization of cast house and increase in billet capacity.	30 000
	Uralsky smelter - Sual Group	Potlines being replaced/upgraded; completion expected in 2003 to raise capacity to 105 000 t/y.	36 000
Slovakia	Ziar-nad-Hronom - Svalco A.S.	Expansion of smelter under way; completion expected in 2003.	40 000
Slovenia	Kidricevo Talum d.o.o. smelter	Expansion of smelter under way; completion expected in 2003.	50 000
South Africa	Coega - Pechiney and others	Proposed smelter likely to be constructed near Port Elizabeth in South Africa. New US\$2.2 billion 460 000-t/y AP50 smelter planned. Pechiney seeking financing partners.	
	Hillside smelter - BHP-Billiton	Expansion expected to produce first metal in early 2004.	132 000
Ukraine	Pervomaisk - Russian Aluminium	Planning under way for a new smelter, part of agreement for purchase of existing facilities. Capacity 120 000-180 000 t/y.	
United States	Golden Northwest Aluminum	Restarted closed potline in September (50 000 t/y).	50 000
	Badin - Alcoa	Production temporarily suspended in August (120 000-t/y capacity but operating at 90 000 t/y).	-90 000
	Ferndale (Intalco) - Alcoa	Plans to re-open third potline have been shelved due to power increases.	
	Tacoma - Kaiser	Property and smelter sold to Port Authority. Plant was closed in 2000 due to high power costs. Capacity was 73 000 t/y.	
	Mead - Kaiser	Announced indefinite closure in January 2003. Plant was closed in 2000 due to high power costs. Capacity was 200 000 t/y.	
	Rockdale - Alcoa	Announced permanent closure of idled capacity in July (76 000 t/y).	
	Troutdale - Alcoa	Announced permanent closure in July (120 000 t/y).	
	Columbia Falls Aluminum Co	Closing two of three potlines in 2003.	-67 000
Venezuela	Alcasa - CVG	Modernization and restarting of potlines to production of 210 000 t/y. Expanding anode capacity and plans new potline with additional 240 000-t/y capacity. Contracts awarded in early 2003 with construction to start in 2003; production expected in 2006.	50 000
	Venalum - CVG	Plans new potline with additional 160 000-t/y capacity.	
	Aleaciones Ligeras, Alisa, SA	Planning for new smelter in the Guayana region. First stage of 55 000 t/y would be part of an eventual 220 000-t/y plant.	
Total			3 923 000

Source: Natural Resources Canada, based on published media reports.