Aluminum

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Aluminum prices have increased since April 1999, reaching a two-and-one-half-year high in early 2000 after reaching a five-year low in March 1999. Although demand for primary aluminum in Europe and South America decreased, increased consumption in North America and Asia resulted in more than a 2% increase in consumption worldwide. The increase in demand is partly responsible for increased primary aluminum production rates in 1999, reflecting "capacity creep" or "debottlenecking" in existing smelters and decisions by producers to restart idled capacity and to add new capacity.

Primary aluminum cash settlement prices on the London Metal Exchange (LME) started 1999 at US$1214/t (US55¢/lb), declined to a low of US$1140/t(US52¢/lb) by March, and then increased to US$1630/t (US74¢/lb) by the end of 1999. The average price during the year was US$1362/t (US62¢/lb) compared to an average of US$1355/t in 1998.

Primary aluminum stocks on the LME started the year at 636 000 t, increased steadily to 822 000 t at the end of March, and then fell to 775 000 t at the end of the year. The International Primary Aluminium Institute (IPAI) reported that unwrought aluminum inventories held by IPAI members decreased to 1.549 Mt in December 1999, compared to 1.682 Mt in December 1998. Together the aggregated unwrought IPAI and LME stocks decreased from 3.161 Mt at the end of 1998 to reach a low of 2.923 Mt in June 1999, the lowest level since November 1988. Stocks then increased to end the year at 2.959 Mt (approximately 48 days of primary metal consumption). (For further information on the IPAI, visit its web site at http://www.world-aluminum.org.)

CANADIAN DEVELOPMENTS

The production of primary aluminum increased 0.7% to 2.390 Mt in 1999, compared to 2.374 Mt in 1998. Canada ranks fourth after the United States, Russia and China in terms of world production. The value of Canadian production is estimated at $4.8 billion, as was the case in 1998, reflecting the similar production totals and average prices for the year.

Canada is the second largest aluminum-exporting country in the world after Russia. Canadian exports of primary smelter products in 1999 increased to 1.862 Mt valued at $4.065 billion, compared with 1.856 Mt valued at $4.273 billion (revised) in 1998. Of this amount, exports to the United States totaled 1.51 Mt valued at $3.34 billion, compared to 1.44 Mt valued at $3.38 billion (revised) in 1998.

Total reported Canadian consumption of aluminum metal at the first processing stage, including secondary aluminum, was 902 514 t in 1998, up from 781 268 t in 1997. Part of this increase was due to an increase in the number of companies reporting.

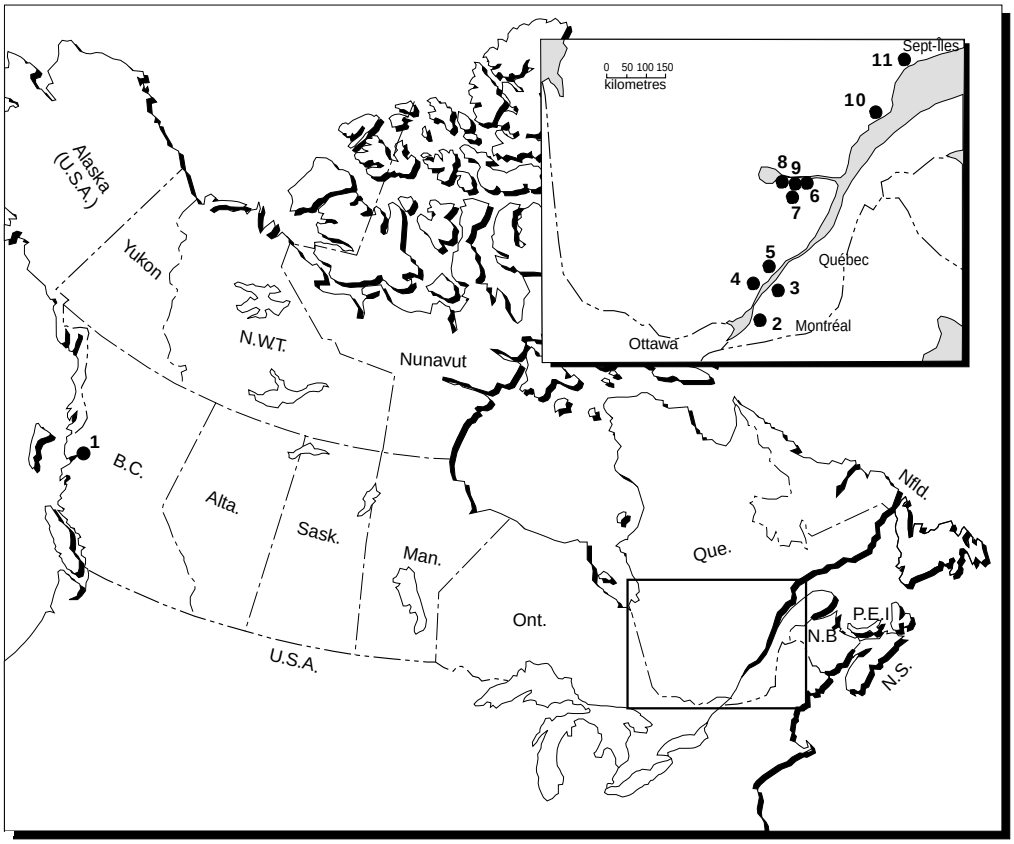
British Columbia's Power for Jobs Strategy makes surplus electrical power available to industry, under flexible terms and conditions, to create jobs and investment. One of the industries the Province has targeted is aluminum. The Province is continuing discussions that began in 1998 with aluminum producers to undertake planning and feasibility studies that will lead to the development of smelters and value-added facilities in British Columbia. (For further information visit the Government of British Columbia's web site at http://www.gov.bc.ca.)

CANADIAN PRIMARY ALUMINUM, 1997-2000

	1997	1998	1999[p]	2000[f]
	(000 tonnes)			
Production	2 327	2 374	2 390	2 500[f]
Apparent consumption	628	734	840	950

[f] Forecast; [p] Preliminary.

Figure 1
Aluminum Smelters, 1999



SMELTER	COMPANY	CAPACITY (t/y)
1. Kitimat	Alcan	272 000
2. Beauharnois	Alcan	48 000
3. Bécancour	A.B.I.	372 000
4. Shawinigan	Alcan	84 000
5. Lauralco	Alcoa Lauralco	225 000
6. Grande-Baie	Alcan	180 000
7. Laterrière	Alcan	204 000
8. Isle-Maligne	Alcan	21 000[a]
9. Arvida	Alcan	232 000
10. Baie-Comeau	Canadian Reynolds Metals	400 000
11. Alouette	Alouette	237 000

a In 1999, two of three potlines were shut down. The third line closed in March 2000.

Alcan Aluminum Corporation continues to maintain its position as a low-cost supplier of bauxite, alumina and aluminum. In March 1999, Alcan reorganized into two global operating business groups, the Primary Metal Group and the Global Fabrication Group, to better reflect its operations. In a further step to maintain its prominent position in the global aluminum industry, Alcan, along with Pechiney Corporation of France and Alusuisse Lonza Group Limited (Algroup) of Switzerland, proposed a merger on August 11, 1999. This merger would have created one of the largest aluminum companies in the world. Together the three companies have 91 000 employees, produce approximately 18% of world primary aluminum production, and have combined sales of approximately US$22 billion. Although shareholders have voted to approve it, the merger was still subject to regulatory and other approvals at year-end. Early in 2000, the European Commission indicated the merger with Algroup could go ahead with the sale of assets in the alumina trihydrate, lithographic sheet and laminated container areas. However, Alcan and Pechiney subsequently withdrew their proposed merger. For further information visit the Commission's web site at http://europa.eu.int or Alcan's web site at http://www.alcan.com.

In March 1998, Alcan started construction of a new 375 000-t/y primary aluminum smelter at Alma, Quebec, to replace the 73 000-t/y Isle-Maligne smelter and to add new capacity. The smelter was approximately 40% completed at the end of 1999. It will create employment for 650 people (including 425 employees who will transfer from the Isle-Maligne smelter) and will cost approximately $2.2 billion. The smelter is expected to start producing metal in the fall of 2000 and is expected to reach full capacity in mid-2001. In conjunction with this expansion, Alcan announced the staged closure of the Isle-Maligne smelter and began shutting down the first potline in April and the second in August, and is expected to close the third potline in early 2000.

Alcan has continued to upgrade its Canadian facilities. In addition to ongoing expenditures aimed at reducing emissions in its operations, work includes: a $165 million modernization program at the Vaudreuil plant, announced in late 1998, that is under way and expected to be completed in 2002/03; an additional investment of $200 million in the new Alma smelter for a casthouse; and US$46 million to expand capacity by 40% in Kingston for the production of aluminum rolled sheet for the automotive and distribution markets.

Early in 2000 Alcan announced that it had signed a multi-year supply agreement with Ford Motor Company. This agreement provides for the supply of 50% of Ford's aluminum body sheet requirement and 25% of its wheel alloy needs. The agreement follows a similar one signed in 1998 with General Motors.

In October 1999, Corus Group Plc, the company resulting from a merger of British Steel Plc and Koninklijke Hoogovens, agreed to acquire 60% of Reynolds Aluminum Co. of Canada Ltd. (Reycan) from Reynolds Metals Company (50%) and SGF Mineral Inc. (10%) for $103 million. SGF Mineral Inc. retains the remaining 40%. Reycan produces aluminum foil and sheet, as well as aluminum coated products, and has facilities in Cap-de-la-Madeleine, Quebec, and North York, Ontario. Further information on Corus can be obtained from its web site at http://www.corusgroup.com.

Once the proposed Alcoa/Reynolds Metals Company merger is completed, Alcoa will become the second largest primary aluminum producer in Canada with 903 000 t/y of capacity. Alcoa will own the 230 000-t/y Lauralco smelter located in Deschambault, Quebec, the 400 000-t/y Baie-Comeau smelter in Baie-Comeau, Quebec, and have a 74.95% interest in the 372 000-t/y Aluminerie de Bécancour Inc. (A.B.I.) smelter located in Bécancour, Quebec. Alcoa's other corporate partner in A.B.I. will be Pechiney Corporation of France (25.05%). A.B.I. would like to add a fourth potline to increase capacity; however, plans are on hold pending the mergers of its partners and the negotiation of a contract for an additional power supply.

Partners in the 230 000-t/y Alouette smelter at Sept-Îles, Quebec, would also like to increase its capacity. However, plans are on hold pending negotiation of a power contract. Partners in the smelter include: Aluminium Austria Metall Québec (20%), VAW Aluminium Canada (20%), Hoogovens Aluminium Québec Inc. (20%), Société générale de financement du Québec (20%), Kobe Aluminium Canada Inc. (13.33%), and Marubeni Québec Inc. (6.66%).

The Aluminium Association of Canada is a non-profit organization supported by Canada's five aluminum producers: Alcan Aluminium Limited, Aluminerie Alouette Inc., Aluminerie de Bécancour Inc., Alcoa Aluminerie Lauralco Inc., and Canadian Reynolds Metals Company, Limited. The Association provides a link between the Canadian aluminum industry, aluminum users, the public and governments. The Association's web site, located at http://www.aac.aluminium.qc.ca, has links to all of Canada's primary aluminum producers.

CANADIAN OUTLOOK

Canada is forecast to produce 2.5 Mt of primary aluminum in 2000. Canada produced 2.39 Mt of primary aluminum in 1999 valued at an estimated $4.8 billion, compared to 2.374 Mt in 1998 valued at an estimated $4.8 billion. Canada now ranks fourth after the United States, Russia and China. Further details on Canadian production statistics can be

obtained through Natural Resources Canada's web site at http://www.nrcan.gc.ca/mms/efab/data. Although Canadian aluminum production capacity increased substantially during the latter half of the 1980s, it remained relatively stable during the 1990s. Canada's production capacity is forecast to increase to 2.7 Mt/y in 2001 with the completion of Alcan's Alma smelter. Other smelter expansion projects in Quebec (at Alouette, A.B.I. and Lauralco) are dependent on the negotiation of additional long-term power supply contracts with Hydro-Québec. Decisions on possible new capacity in British Columbia are still pending. Canada's reported consumption of primary aluminum in 2000 is expected to increase to about 700 000 t.

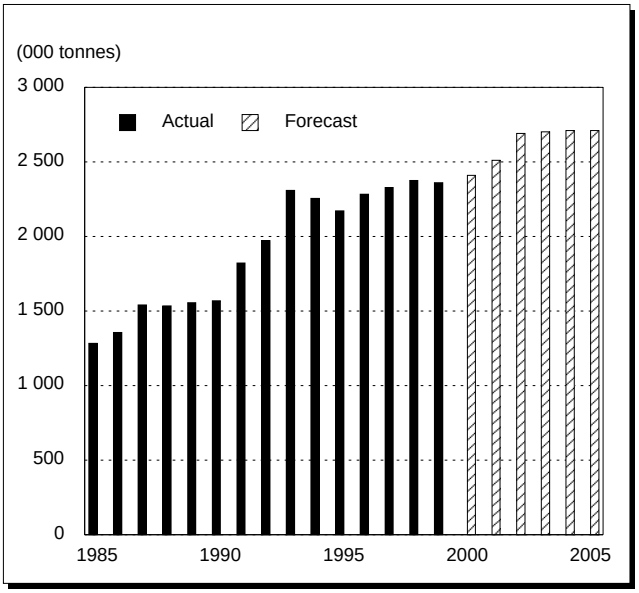
WORLD DEVELOPMENTS

World production of primary and secondary aluminum reached an estimated 31.3 Mt in 1999, up from 29.7 Mt in 1998. Of this, 23.4 Mt was primary material, compared to 22.6 Mt in 1998. This production is more than the total production of all other nonferrous metals combined.

Among IPAI members, the primary aluminum daily production rate increased 3.6% during the year from an average of 55 700 t/d in January to 57 700 t/d in December. The average rate for all of 1999 was 56 600 t/d, compared with an average rate of 54 700 t/d in 1998, an increase of 3.5%. This average daily production rate has been growing about 3% per year since 1980.

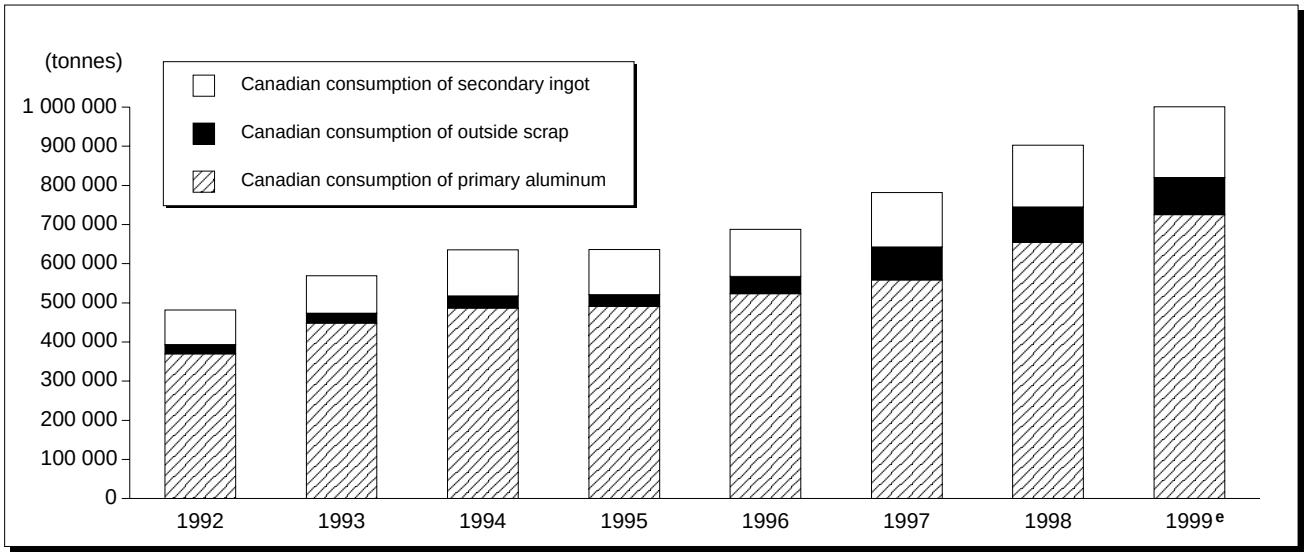
The IPAI also reported that members' alumina production capacity increased to 48.55 Mt in December 1999 from a revised 48.47 Mt in 1998, while alumina production also rose to 45.8 Mt in 1999 from 45.0 Mt in 1998. (For further information on the IPAI, visit its web site at http://www.world-aluminum.org.)

Figure 2
Canadian Primary Aluminum Production, 1985-2005



Source: Natural Resources Canada.

Figure 3
Reported Canadian Consumption of Aluminum, 1992-99



Source: Natural Resources Canada.
e Estimated.

In 1999, producers continued to focus on cost reduction and to increase competitiveness through economies of scale by mergers and acquisitions. In general, companies continued to increase productivity and production, partly in response to the low prices of late 1998 and early 1999.

While the 1998 merger between Alcoa and Alumax Inc. was completed in 1999, the merger proposed by Viag and Alusuisse did not materialize in 1999 due to differences in the valuation of the companies. Another two large merger proposals were announced in 1999 and were awaiting regulatory decisions at year-end (expected in mid-2000). Alcan, Alusuisse and Pechiney proposed a merger, as did Alcoa with Reynolds in mid-1999. If completed, these mergers would result in continued readjustment among affected operations during the coming year, due in part to changes in the proposals that could be required by the regulators.

A July 5, 1999, explosion at Kaiser Aluminum and Chemical Corporation's Gramercy, Louisiana, 1-Mt/y alumina refinery resulted in the closure of that facility; reconstruction is expected to take until mid-to-late 2000. As a result, alumina supplies became more difficult to obtain for plants without long-term contracts or captive sources as production increases in Australia, Brazil, China, India and Russia were not sufficient to balance the lost production in the short term. Although the alumina market was weak earlier in 1999, spot prices moved up sharply in the cash market from around US$125/t early in the year to peak at above US$500/t early in 2000.

Large consumers of aluminum often invest in smelters on a joint-venture basis, taking a share of the metal proportional to their ownership for their own use. These arrangements and long-term supply agreements between non-related producers and consumers, such as those between the primary producers and the automotive industry, have changed traditional supply arrangements and restructured parts of the supply chain. Through these initiatives and by focusing on value-added operations to produce metal products with higher margins, primary producers are stabilizing the often short-term volatility of primary aluminum prices to reduce the risk in investment decisions. One side effect of this longer-term planning is that production may be allocated and can make the availability of metal unpredictable on a short-term basis to consumers with unforeseen needs or to those without such sources.

United States

The Aluminum Association reported that the United States, the world's largest producer of primary and secondary aluminum, produced a total of 3.779 Mt of primary aluminum in 1999, up from 3.7 Mt in 1998. Secondary aluminum production in the United States is estimated at 3.5 Mt in 1999, representing roughly 45% of the total secondary aluminum (7.6 Mt) produced worldwide. (Further information on the U.S. aluminum industry can be found at the Aluminum Association's web site at http://www.aluminum.org.)

In June 1999, aluminum producers, through the Aluminum Association and the U.S. Automotive Materials Partnership (USAMP), a research consortium of the U.S. Council for Automotive Research (USCAR), announced the formation of an inter-industry alliance. The alliance will seek to improve the efficiency of aluminum use in automotive applications, including ways to increase efficiencies for recovery of material from scrapped vehicles. Further information is available on the Internet at http://www.auto-aluminum.org and http://www.uscar.org.

Alcoa and Reynolds Metals Company announced a proposed merger of their respective companies on August 11, 1999. If completed, this merger would create one of the largest aluminum companies in the world. The two companies currently have 123 500 employees, combined production that amounts to approximately 24% of world primary aluminum production, and combined sales of US$21.5 billion. On September 29, 1999, the Antitrust Division of the Department of Justice requested further information from the companies under the *Hart-Scott-Rodino Antitrust Improvements Act of 1976*. Early in 2000, both companies agreed to allow the Department of Justice additional time to complete its review of the merger. Reynolds' stockholders met on February 11, 2000, and approved the merger.

At the time of writing, the merger remained subject to regulatory approvals, but the companies hope that it will be completed in mid-2000. In Europe, Alcoa filed notification of the proposed merger on November 18, 1999, with the Commission of the European Communities. The European Commission subsequently notified Alcoa that the merger required a more complete review and that a final determination would be made in early May 2000. In addition, filings with the Canadian Competition Bureau also resulted in a review, which is expected to be completed by the end of May 2000. (Additional information can be obtained by visiting Alcoa's web site at http://www.alcoa.com.)

The Board of the New York Mercantile Exchange (NYMEX) approved aluminum futures and options contracts late in 1998. Futures contracts started trading in May 1999 and options began trading in July 1999. (Further information can be obtained by visiting the Exchange's web site at http://www.nymex.com.)

Kaiser Aluminum and Chemical Corporation notified customers on July 7, 1999, that a July 5 explosion at

its Gramercy, Louisiana, alumina refinery required it to declare *force majeure* on its commitments for alumina deliveries. The Kaiser Board of Directors approved reconstruction of a new plant and the environmental permit was received in February 2000. The company expected to have the plant operating at a reduced level by mid-year with full operation expected by the end of 2000. The company also indicated early in 1999 that it would restart 50 000 t/y of idled capacity at the Mead smelter. (Additional information can be obtained by visiting Kaiser's web site at http://www.kaiseral.com.)

Early in 2000, Alcoa announced that it would restart 200 000 t/y of idled smelter capacity in the United States and Australia in 2000. This represents about one half of the idled capacity remaining from closures in the early 1990s when world production capacity and production increased more than consumption. At the time of writing, Alcan had not announced plans to re-open its 140 000 t/y of idled capacity at its U.S. and U.K. smelters.

In 1999, Alcan completed the sale of its Shelbyville, Tennessee, aluminum alloys plant to Imco Recycling Inc. The plant has a capacity to produce 55 000 t/y of alloys. Alcan signed a five-year labour agreement with the United Steelworkers Union at its 186 000-t/y Sebree, Kentucky, smelter, which has been operating only two of three potlines. Alcan also made improvements at its joint-venture rolling mill in Logan, Kentucky, and at its Greensboro, Georgia, can recycling plant.

National Southwire Aluminum Co. completed an expansion of the 186 000-t/y Hawesville, Kentucky, smelter. A fifth potline and solid waste disposal facility were added to expand its capacity by 50 000 t to 236 000 t/y. The company has been trying to sell the smelter and is expected to complete the sale in 2000.

In late 1999, Noranda Aluminum Inc. (Norandal) started production from a US$73 million expansion program at its New Madrid, Missouri, smelter. Capacity at the smelter was increased by 15% to reach 253 000 t/y. Improvements were also made to the plant to reduce costs and emissions, and a new 30 000-t/y rod mill was opened. Norandal is also expanding its foil facilities and is constructing a US$238 million, 90 000-t/y mill in Huntingdon, Tennessee, to produce heavy-gauge foil. Commercial production at the mill is expected to begin in 2001.

Golden Northwest Aluminum started construction for an expansion of its smelter in Goldendale, Washington. Norsk Hydro has agreed to help finance a 15% increase in smelter production capacity (from the current capacity of 168 000 t/y) and a 50 000-t/y increase in casting facilities. Work is expected to be completed in 2000.

Glencore AG agreed to acquire Columbia Falls Aluminum Co., which owns a 163 000-t/y smelter in Columbia Falls, Montana. The company and the Aluminum Workers Trades Council agreed to a new five-year labour contract in October.

Hydro Aluminum started construction of an aluminum remelt facility in Henderson, Kentucky, that will recycle scrap. The US$33 million plant will produce primary-quality billet and have an initial capacity of 90 000 t/y. The plant will be constructed to be easily expanded to 120 000 t/y and is expected to start processing scrap in mid-2000. The company also announced early in 2000 that it plans to buy Wells Aluminum Corp., based in Baltimore, which produces 75 000 t/y of extrusions.

Pechiney SA purchased Century Aluminum Company's fabrication businesses, including one in Ravenswood, West Virginia (with a capacity to produce 270 000 t/y of rolled products for the aerospace and transportation markets) and a 7000-t/y cast plate unit in Vernon, California. Pechiney spun off its U.S. packaging group, completing the sale in August 1999 of about 55% of the shares of American National Can Group, Inc. (ANC). ANC is the second largest producer of aluminum cans in the United States with approximately 24% of the market. In the fourth quarter of 1999, ANC announced that it would close its Piscataway, New Jersey, can manufacturing plant in early 2000 to remove excess capacity from its operations.

New Alcoa indicated in the last half of 1999 that it was considering the closure of the Badin, North Carolina, smelter if costs at that location could not be reduced. Alcoa was working, and continues to work, with the United Steel Workers (USW) to reduce costs. The smelter has a total capacity of 115 000 t/y, but one of two potlines was shut down in 1993 due to the surplus world production at that time. The smelter has been producing at a level of approximately 60 000 t/y. In late 1999, Alcoa also completed the purchase of Golden Aluminum Company from ACX Technologies Inc. after Alcoa agreed to sell a can lid sheet plant in Fort Lupton, Colorado. Alcoa plans to re-open Golden's plant in San Antonio, Texas, and convert it to a sheet rolling mill.

Jamaica

The alumina refining and bauxite mining operations in Jamaica continued to reduce costs, improve the efficiency of operations, and increase overall capacity during 1999. However, bauxite production at Kaiser Aluminum's operations was reduced during the year as a result of the closure of its Gramercy plant in mid-1999.

Early in 2000, the Jamaican government signed an agreement with Alcoa for increased cooperation in

developing local industry in Jamaica and for the supply of 400 000 t/y of bauxite for 25 years. The government and Alcoa are equal partners in an alumina refinery operated by Jamalco at Clarendon Parish. The plant's capacity was to be increased from 800 000 t/y to 1 000 000 t/y by the end of 1999.

Jamalco and Aluminium Partners of Jamaica (Alpart, a Kaiser Aluminum/Norsk Hydro A.S. joint venture) agreed in 1999 to merge mining operations to cut costs and improve efficiency. The alumina refining operations owned by Jamalco and Alpart will remain separate.

Alpart is conducting a feasibility study into expanding alumina production capacity at its plant in Nain from the current 1.5 Mt/y to 2 Mt/y. The study of the proposed US$200 million project is expected to be completed in early 2000. If positive, construction could be completed by 2002.

Alcan Jamaica continued to work on reducing costs and improving efficiency at its alumina plants at Kirkvine and Ewarton. Its alumima production was at a record high, up 100 000 t as a result of this work. A similar increase is expected in 2000.

Trinidad and Tobago

In 1998, Norsk Hydro Produksjon A.S. signed an agreement with the Government of Trinidad and Tobago to study a 474 000-t/y smelter at Point Lisas on the west coast of Trinidad. At the end of the year, Norsk Hydro indicated that it was still working on the environmental studies for the project, but that the company was several years away from a decision. For further information on Norsk Hydro, visit its web site at http://www.hydro.com.

South America

In **Argentina**, Aluar Aluminio Argentino SAIC completed a US$320 million expansion of its smelter in Puerto Madryn, Chubut, from 185 000 t/y to 260 000 t/y. Most of the production is exported. The company is also considering a US$2 billion expansion program consisting of two projects: a new 250 000-t/y smelter in either Bahia Blanca or Puerto Madryn, and an additional 140 000-t/y expansion of the Puerto Madryn smelter. The decision is expected in the spring of 2000 and, if favourable, construction could be completed by 2003.

In January 2000, as part of the ongoing privatization of **Brazil**'s Companhia Vale Rio Doce (CVRD), Hydro Aluminium A.S. bought 25.25% of Alumina do Norte do Brasil SA (Alunorte) from Vale do Rio Doce Alumínio S.A. (Aluvale). Alunorte owns a 1.5-Mt/y alumina refinery in Barcarena, Pará. Hydro and Aluvale also agreed to study the expansion of capacity at the Alunorte alumina refinery and to cooperate in other areas. The study should be completed early in 2000; if positive, the expansion could increase alumina production from 1.6 to 2.3 Mt/y with construction starting in 2000 and completion in 2002. CVRD plans to expand the Albras aluminum plant by 2001 from 355 000 t/y to 400 000 t/y and is also considering a further expansion to 580 000 t/y.

Early in 2000, Nippon Amazon Aluminium Co. Ltd., a part owner in Alumínio Brasileiro SA, indicated that it would increase production capacity at its smelter in northern Brazil from the current capacity of 360 000 t/y to 405 000 t/y. The expansion, at a cost of US$90 million, is expected to be completed in 2001.

Alcan Aluminium completed its expansion of the Pindamonhangaba rolling mill in Brazil from 120 000 t/y to 280 000 t/y. In addition, Alcan indicated that it would also double the capacity of its recycling centre at that location.

Also in Brazil, Alcoa Aluminio S.A. invested in new projects, including electric power projects and a refinery expansion. Alcoa Aluminio manages the Alumar Consortium smelting and refining plants near Sao Luis, Maranhao, which completed a 260 000-t/y expansion of the alumina refinery to 1.25 Mt/y. Alcoa Aluminio also operates a 270 000-t/y refinery at Pocos de Caldas and is participating in a consortium that is building a new hydro-electric power plant in southern Brazil.

Noranda continued environmental and permitting work for its Alumysa hydro-electric and aluminum smelter project in Aisen, **Chile**. The company is currently looking for partners for the US$1.6 billion, 440 000-t/y smelter and hydro plant, which is expected to be operational some time after 2005.

In March 1999, Alcoa announced the indefinite closure of the 30 000-t/y smelter operated by Suriname Aluminium Co. (Suralco) in Paranam, **Suriname**. The smelter was closed due to high costs and an uncertain power supply due to low rainfall.

In March 2000, Pechiney announced an agreement with the Suriname government to study a new bauxite mine and alumina plant. The Bakhuis bauxite deposit in western Suriname would form the base for a potential 1-Mt/y alumina plant. Pechiney would have 49% of the project and the Suriname government would have the remainder. Studies are expected to start in 2000 and construction of the plant could start in 2002.

After three attempts in 1998 to privatize Corporacion Venezolana de Guayana (CVG), the Government of **Venezuela** indicated in early 1999 that it was planning to invest US$200 million to make its Puerto Ordaz aluminum complex more saleable to private investors. Puerto Ordaz is owned by Corporacion

Aluminios de Venezuela, a part of CVG. After negotiations with a number of companies and an election, the Government indicated early in 2000 that it had decided not to sell off the complex and that, instead, the Government wished to attract new private investment to modernize and expand operations at Puerto Ordaz. CVG also wishes to increase capacity of both the bauxite mines and the alumina refinery in Bolivar.

In October, Pechiney announced a proposal for a US$1 billion smelter in Venezuela. The study of a 250 000-t/y smelter, with a possibility for expansion to 500 000 t/y, is expected to be completed in mid-2000. Construction of this smelter in the Guayana Region of Bolivar could start in late 2000.

Europe

A merger of Alusuisse Lonza Group Ltd. (Algroup) of Switzerland and Viag Aktiengesellschaft (Viag) of Germany, proposed in November 1998, was not completed in 1999 due to problems between the parties with the relative value of the companies. Algroup then became part of a proposed merger with Alcan and Pechiney. This merger, discussed above, was reviewed by the European Commission. The Alcan/Algroup portion was approved in early 2000 with some conditions. The portion of the merger with Pechiney was withdrawn.

The above-noted merger of Alcoa with Reynolds was also reviewed by the European Commission, which expressed some concern about the concentration of ownership of alumina and alumina hydrate production facilities. A decision by the Commission is expected in May 2000.

On May 19, 1999, the Federation of Aluminum Consumers in Europe (FACE) was formally launched in Brussels. FACE was formed by 32 European aluminum-using companies from seven member states. The Federation's goals are to promote the use of aluminum, assess the impact of new technologies, and to reduce the costs of primary metal to stimulate demand. The European Union (EU) consumed 5.3 Mt of primary aluminum in 1999, but produced only 2.5 Mt.

FACE estimates that a 6% duty imposed by the EU on the imports of primary aluminum costs European consumers US$475 million per year. The Gulf Arab States have been lobbying against this duty. In February 2000, Britain formally submitted a request to the European Commission to suspend the duty on part of these imports. The Commission reviewed the request in late February but did not reach consensus on a decision. The matter is to be revisited in May 2000.

In **Sardinia**, Eurallumina S.p.A. is expanding capacity at its alumina plant at Porto Vesme from 920 000 t/y to over 1 000 000 t/y. As a result, alumina production in 1999 was reported up by about 50 000 t.

Elkem a/s undertook feasibility studies for brownfield expansions at its two aluminum smelters at Farsund and Mosjoen, **Norway**, which are co-owned with Alcoa. The current combined capacity at these smelters of 245 000 t/y would be increased by 105 000 t/y.

In June, Hydro Aluminium A.S., the Government of **Iceland** and Landsvirkjun signed an agreement to study a new smelter. Early in 2000, Norsk Hydro and Haefi, a group of Icelandic investors, formed a new company, Reydaral, to prepare for construction of this smelter at Redarfjördur in eastern Iceland. The Noral project calls for construction of a smelter of up to 480 000 t/y of capacity that would use power from the proposed Fljotsdalur hydro power plant. If positive, construction of the first phase of 120 000 t/y of capacity could start in 2001 with production starting in 2003. A decision is expected in mid-2000. Further information can be obtained on the Internet at http://www.lv.is and at http://www.hydro.com.

Early in 2000, Columbia Ventures' Nordic Aluminum Corp. (Nordurál) in Iceland indicated that it had problems with premature failure of several of its pots. As a result, production may be slightly reduced in 2000. The company expects to complete studies in early 2000 on financing and power supplies for a 30 000-t/y expansion to bring the smelter's capacity to 90 000 t/y. Construction would be completed in 2001. Columbia Ventures has also presented a proposal to the Icelandic government for a new smelter in Redarfjördur in eastern Iceland. However, only one proposal could go ahead in that location and it appears likely that the previously noted Norsk Hydro-Haefi proposal will proceed. Information on Nordurál can be obtained by visiting its web site at http://www.nordural.is.

In **Turkey**, Eti Holding evaluated ways to modernize and expand its Konya Seydisehir aluminum plant. Eti wishes to expand the 60 000-t/y smelter to 100 000 t/y and move to a pre-baked anode system from the Soderberg technology currently used. The company mines bauxite and refines the alumina used by the smelter. Further information can be obtained by visiting Eti's web site at http://www.etiholding. gov.tr.

The Government of **Romania** is planning the privatization of a number of state-owned companies, including the ALRO Slatina smelter, in 2000. Slatina has a nameplate capacity of 265 000 t/y, but was producing at a level of approximately 175 000 t/y in 1999. The smelter continued to modernize its operations to increase efficiency and to reduce emissions.

Russia

The Russian aluminum industry remained in a state of flux as ownerships of former state-run enterprises continued to change. Although some plants had difficulty paying for power and supplies, production of both alumina and aluminum increased during the year. Alumina production is estimated to be up by almost 8% to 2.7 Mt and production of aluminum is estimated to be up by almost 5% to 3.1 Mt.

The Russian Tax Ministry adjusted the duties and taxes on metal exports and proposed the phase-out of tolling operations. As a large portion of Russia's production is currently tolled, considerable debate and uncertainty have resulted. In a tolling agreement, the plant processes material owned by others for a fee. In April 1999, the Russian government announced that a 5% export duty would be applied to the aluminum sector. The sector was subsequently temporarily exempted from this duty until June 2000. Import duties and a 20% value-added tax were also imposed on companies tolling aluminum and a deposit was required until export of the product. This will create the need for increased operating capital and may therefore slow expansion and modernization in the Russian industry.

Bratsk Aluminum, the largest smelter in the world, will increase its production capacity in 2000 to 900 000 t/y from the current 870 000 t/y. The company plans to raise its capacity to 1 000 000 t/y by 2003 and is upgrading its operations to reduce pollution and increase the cell current to 105 000 amps. The company is participating in planning and feasibility studies for a new smelter in the Irkutsk region. This smelter, proposed for Taishet, would have a capacity of 250 000-300 000 t/y.

Krasnoyarsk Aluminium increased capacity at its Krasnoyarsk smelter to 835 000 t/y by adding a new potline using pre-baked anodes. The company plans to invest $100 million to upgrade other lines to pre-baked anodes by 2010.

In late 1998, Siberian Aluminium completed an expansion of its smelter in Sayanogorsk to reach a capacity of 380 000 t/y and produced metal at that level in 1999. The company plans to increase capacity further to produce 397 000 t/y in 2000 and subsequently to 620 000 t/y. The cost of the new expansion would be about US$480 million, and, once funds are obtained, construction would start almost immediately and take three years to complete.

The Siberian-Urals Aluminum Company (SUAL), which operates the Irkutsk and Urals aluminum smelters, held discussions in 1999 with European banks about loans for upgrading and expanding the capacity of its operations. The company is developing a new bauxite mine at Sredne-Timan in the Komi Republic that will reach an expected capacity of about 500 000 t/y in 2000 once year-round access to the deposit is achieved. SUAL is expanding its alumina operations to reach a capacity of 700 000 t/y by 2002.

The government approved construction of a second alumina unit at the Bogoslovsky Aluminum plant in the Sverdlovsk region. The plans are to increase alumina production capacity by 1 Mt/y from the current 950 000 t/y. The company is seeking loans to carry out the work.

Slovakia

Slovakia's Slovalco A.S. aluminum smelter at Ziar-nad-Hronom completed a feasibility study for a US$80 million expansion to 144 000 t/y from the current 105 000 t/y. Once a final decision is reached, construction could begin in 2000 and would take two years to complete. Slovalco is owned by Zavod Slovenskeho Narodneho Povstania (ZSNP), 75.5%; Norsk Hydro, 14.5%; and the European Bank for Reconstruction and Development (EBRD) (10%). Further information can be obtained on the Internet by visiting http://www.slovalco.sk, http://www.zsnp.sk and http://www.ebrd.com.

Ukraine

The Ukraine government plans to partly privatize the State-owned aluminum producer, Zaporizky Aluminiyevy Kombinat (Zaporozhye). In early 2000, the government announced that it was also considering privatizing 30% of the Mykolayivsky Hlynozemny Zavod alumina plant (Nikolaev). Parliamentary approval for the sale would be required. The company has installed a new facility to filter and stack bauxite tailings that will be operational in early 2000. Current plans are to raise alumina production capacity at the plant to 1.5 Mt/y by 2003 from its current capacity of 990 000 t/y. Production will also be changed from a powder alumina to a sandy alumina. The government expects that new investors in the smelter will also build a new 150 000-t/y smelter in Ukraine. Zaporozhye received a grant of US$240 000 in 1999 from the U.S. government and Kaiser Aluminum and Chemical Corporation to draft a business plan for upgrading its facilities. Further information is available on the Internet at http://packet. zp.ua/online/zalk/index.html or http://www.tda.gov.

Kazakstan

The Government of Kazakstan plans to privatize its remaining 31.7% ownership in Aluminum of Kazakhstan as part of its privatization program. In 1999, the company lowered costs and increased production at the Pavlodar refinery by 6% by streamlining production. The company also indicated in late 1999 that the plans to build a new US$1.2 billion,

215 000-t/y smelter in Pavlodar had been postponed due to a lack of financing.

Turkmenistan

In early 1999, Reynolds Metals and Bechtel Corporation started a US$750 000 feasibility study for a new 162 500-t/y smelter using Reynolds' technology in southern Turkmenistan. The study for the proposed US$570 million smelter would be completed in early 2000. The U.S. Agency for Trade and Development (http://www.tda.gov) provided a US$450 000 grant for this work.

Middle East

In August 1999, Alcoa and **Egypt** Aluminum Company (Egyptalum) announced a Memorandum of Understanding to form a strategic alliance based on Egyptalum's smelting, rolling and extrusion operations in Egypt and on Alcoa's expertise. Egyptalum has a 180 000-t/y smelter and a rolling mill at Aluminium City in Nag-Hammadi, Egypt. A definitive agreement will now be negotiated to modernize Egyptalum's operations and to make the company more competitive.

Dubai Aluminium Company Limited (Dubal) completed its Condor project to increase the capacity of the smelter at Jebel Ali by 35% to 536 000 t/y. The company indicates that the US$725 million project was completed early and under budget. Dubal is now considering a further US$1.8 billion proposal for expansion of this smelter to 936 000 t/y.

W.J. Towell and The National Trading Company have indicated that a feasibility study for a proposed US$2.5 billion aluminum smelter in Sohar, **Oman**, has been completed. Second-stage studies and work on obtaining partners and financing are under way.

Work on a proposed 440 0000-t/y smelter near Ras Laffan, **Qatar**, the subject of a 1997 agreement between Norsk Hydro and Qatar General Petroleum, has now been postponed.

In **Iran**, a new alumina refinery at Jajarm, Khorasan Province, was expected to start producing in late 1999 and to reach full production of 280 000 t/y in 2000 using bauxite mined nearby. Consideration is being given to a prefeasibility study for a new 220 000-t/y smelter.

Aluminium **Bahrain** B.S.C. is constructing a 450 000-t/y coke calcining plant and upgrading other facilities in Ras Zurrayed. The company is also studying an expansion of its 500 000-t/y smelter to 750 000 t/y. If the study is positive, construction would start in late 2000 with completion in 2004. Further information on the company is available on the Internet at http://www.aluminiumbahrain.com.

Asia

China's production of primary aluminum for 1999 is estimated at 2.6 Mt, up 11% from 1998. This increase follows a 12.3% increase in 1998 to 2.3 Mt from a revised 2.0 Mt in 1997. As a result, this increase has now firmly established China as the third largest primary producer in the world. Expected production increases will continue to close the gap with Russia, the second largest producer. Should announced increases in capacity be implemented, China could become the second largest producer in the next three to four years. Exports of unwrought aluminum in 1999 were reported to be down approximately 40% to about 300 000 t compared to the previous year, while imports were up almost 50% from last year. As China is a net importer of alumina, much of which is bought on the spot market, the sharp increase in the price for alumina has placed some constraints on those Chinese smelter operations without longer-term contracts.

The China Aluminium Corporation (Chalco) replaced the China National Nonferrous Metals Corp. (CNNC) as the controlling corporation for most of China's alumina production and nearly 50% of its aluminum production. In November, following up on an earlier agreement with China's State Nonferrous Metals Industry Administration, Alcoa signed a Memorandum of Understanding to form a strategic partnership with Chalco. The agreement outlines further negotiations between the two parties that are expected to be completed in mid-2000. Included in the initiatives were discussions on primary smelting operations with Pingguo Aluminium, Shanxi Aluminium, Qingtongxia Smelter and Qinghai Aluminium.

The government policy to reduce pollution has resulted in the closure of some small plants, while other small plants have expanded or are planning to expand. Reported increases in primary smelting capacity in 1999 included: Danjiangkou Aluminium Works in Hubei from 23 000 t/y to 53 000 t/y, Emeishan Aluminium Industry in Sichuan from 8000 t/y to 22 000 t/y, Pingguo in Guangxi Province from 100 000 t/y to 127 000 t/y, and Xin'an in Lianoming Province from 25 000 t/y to 55 000 t/y. An additional 500 000 t/y of additional capacity is planned for existing smelters in 2000 and 2001; for 2002 and beyond, companies have indicated that more than 780 000 t/y of additional capacity may be in the works.

Shandong Aluminium Plant expanded its alumina refining capacity from 560 000 t/y to 650 000 t/y and plans to expand to 770 000 t/y in 2000. Pingguo, in Guangxi Province, is increasing its capacity from 350 000 t/y to 650 000 t/y and has plans for a further increase to 950 000 t/y.

In **Indonesia**, water shortages again reduced the power available to Nippon Asahan Aluminum Co.'s

Indonesian smelter. Its production in 1999 was expected to be around 125 000 t, or about one half of the smelter's capacity.

In **South Korea,** Alcan and Taihan Electric Wire Co. Ltd. signed an agreement in principle in May 1999 to form a new company to produce aluminum rolled products for the Asia-Pacific region. In September, the companies announced that Alcan Taihan Aluminum Limited had been formed, with Alcan having a 56% interest in the new company. The capacity of the existing rolling facilities in Youngju in central Korea is expected to increase from 100 000 t/y to about 300 000 t/y over the next five years.

The Hyundai Group is restructuring its operations and signed an agreement in November 1999 with Alcoa for the sale of Aluminium of Korea Co. Ltd., which has a capacity of 120 000 t/y of sheet aluminum products. After discussions broke down with Alcoa, Hyundai began discussions with Alcan.

Early in 1999, Pechiney signed an agreement with the Government of **Vietnam** for a US$4 million prefeasibility study on a bauxite mine and a 1-Mt/y alumina refinery near Ho Chi Minh City, Landong. The study had not started by the end of 1999 but, once it does, is expected to take two years to complete.

Africa

Higher water levels in **Ghana** alleviated conditions at Kaiser Aluminum & Chemical Corporation's 90%-owned Volta Aluminium Company Limited (Valco) smelter. Rainfall late in 1998 increased available power supplies from the Volta River Authority, allowing Valco to increase output. The company operated three of five potlines during 1999, and expected to operate four lines in 2000. This will allow production of 160 000 t at the 200 000-t/y smelter in 2000.

Construction on the 250 000-t/y Mozal smelter in Maputo, **Mozambique**, was approximately three quarters completed at year-end. The US$1.3 billion smelter is expected to start producing aluminum in June 2000 and to reach full production in 2001. The smelter will use Pechiney AP30 technology, duplicating Billiton's Alusaf Hillside smelter in South Africa. It has been designed to easily add a second potline to double its capacity to 500 000 t/y. The smelter is owned by a joint venture comprising Billiton plc (47%), Industrial Development Corporation of South Africa (24%), Mitsubishi Corporation (25%) and the Mozambique government (4%). (Further information on the Mozal project is available on the Internet at http://www.mozal.com.)

After acquiring 100% ownership in 1998 of the Kimbo bauxite mine and the 600 000-t/y Fria alumina refinery, the Government of **Guinea** signed an agreement in July 1999 with Reynolds Metals Co. on the sale of the facilities. New investment is required to reduce operating costs and to bring the facilities up to current standards.

After encountering difficulties in completing construction of its Ikot Abasi smelter, the Aluminum Smelter Co. of **Nigeria** (Alscon) suspended production at the smelter in mid-1999. The smelter, with a design capacity of 193 000 t/y, started production with one potline in 1997 and operated at approximately 25% of planned capacity. Alscon has started a search for additional partners or a loan for additional funds to complete the facility.

India

Most producers in India have joined producers elsewhere to look for increased efficiency and capacity at their operations. Aluminum production is estimated to have increased 16% to 604 000 t in 1999. This increase was achieved as a result of restarting capacity at National Aluminum Company Ltd.'s (Nalco) smelter at Angul and increased capacity utilization from other operations. Alumina production has also increased due to actions taken by companies to increase efficiency and to benefit from the increased prices for alumina.

The government indicated that a number of state-owned companies, including National Aluminium Company Limited (Nalco) and Bharat Aluminum Co. Ltd., may be privatized. The expansion of the government-owned Nalco's smelter capacity to 345 000 t/y from 230 000 t/y, at a cost of US$528 million, was under way in 1999. The company also plans to increase its capacity for power generation, double the capacity of its bauxite mines at Panchpatmalli to 4.8 Mt/y from 2.4 Mt/y, and increase the capacity of its alumina refinery at Damanjodi to 1.58 Mt/y from 0.8 Mt/y. Work on these expansions is expected to be completed in 2003, and the expected surplus alumina production before the smelter is completed will be exported.

Early in 1999, Indian Aluminium Company, Limited (Indal) announced the closure of its 70 000-t/y smelter in Belgaum, Karnataka, as part of a restructuring. Indal also began improving the efficiency of its Muri and Belgaum alumina plants. The work at Muri was expected to increase capacity from 82 000 t/y to 101 000 t/y by mid-2000 and work was also under way on feasibility studies for an expansion to 300 000 t/y. At Indal's Belgaum plant, capacity will be increased from 280 000 t/y to 365 000 t/y in 2000 with an increase in capacity to 510 000 t/y expected to follow once the first expansion is completed. The company also planned to develop a new captive power plant at Hirakud in eastern Orissa to allow it to expand the smelter at Hirakud from 30 000 t/y to 90 000 t/y. Early in 2000, Hindalco agreed to purchase Alcan's interest in Indal.

Alcan, its subsidiary Indal, and Hydro Aluminium a.s. continued work on the proposed US$1 billion Utkal export-oriented alumina project for which approvals were received from the government. Alcan has provided the technical services for the feasibility study and the technology for the proposed joint venture to be known as Utkal Alumina International Ltd. The proposal is to mine bauxite at Baphilmalli, set up a power plant, and construct a first-phase, 1-Mt/y greenfield alumina plant in the Rayagada region of Orissa. A second phase would see an increase in alumina production capacity to 2.5 Mt/y. Detailed feasibility studies were under way at the end of 1999. Construction could start in 2001 and production could begin in 2002.

Hindalco Industries Limited completed a feasibility study with Kaiser Aluminium and Bechtel Inc. for the Aditya project in Orissa. After consideration of the results of the study, Hindalco shelved the project, which included a bauxite mine, alumina refinery and a 250 000-t/y smelter. Hindalco then focused on expansion of its Renukoot smelter and alumina facilities in Uttar Pradesh State. The Renukoot aluminum smelter will be expanded from its current 240 000 t/y to 342 000 t/y, and the alumina capacity will be raised by 210 000 t/y from its current capacity of more than 400 000 t/y. The US$575 million expansion is expected to be completed in 2002.

Early in 2000, Sterlite Industries (India) Limited started a review of operations for a potential restructuring of its business. Sterlite had signed a Memorandum of Understanding with the Orissa State government in 1997 on a new 250 000-t/y smelter, a 1-Mt/y alumina refinery, and a 720-MW power plant. Although feasibility studies were completed, plans were subsequently shelved to allow the company to focus on other projects. In 1999, Sterlite completed a feasibility study and started work on increasing Madras Aluminium Co. Ltd.'s smelter from its original capacity of 25 000 t/y to 50 000 t/y; it has reached a capacity of 32 000 t/y. The company also completed a feasibility study to increase alumina capacity at its Mettur plant from the current 60 000 t/y to 200 000 t/y. Construction of the plant is expected to be completed in 2001.

Australia

In 1999, Comalco Aluminium Ltd. completed upgrading the Weipa bauxite mine and processing operations in Northern Queensland to reduce costs. As a result, the company achieved record production of bauxite in 1999, up more than 22% to 11.4 Mt. The company also made a decision in early 2000 to proceed with its proposed 1.4-Mt/y alumina refinery in Gladstone, Queensland, rather than the alternate site in Sarawak, Malaysia. Production from the A$1.4 billion new plant is expected in mid-2003. The company resolved problems at its Boyne Island smelter and achieved record aluminum production at all three of its smelters. Further information is available on the Internet at http://www.comalco.com. au/, http://www.isr.gov.au, and http://www.riotinto.com.

In February 2000, Alcoa World Alumina announced that it had decided to restart idled capacity at the 345 000-t/y Portland aluminum smelter in Victoria; 40 000 t/y of capacity will be brought back online in mid-2000, bringing the smelter operation back up to its full capacity.

In early October, Alcoa World Alumina - Australia (AWA) announced the completion of the first-stage upgrade of its Wagerup alumina refinery in Western Australia. This boosted production capacity from 1.7 to 2.19 Mt/y. With this increase, AWA has alumina production capacity of 7.24 Mt/y in Australia. The company has environmental approvals for an expansion to 3.3 Mt/y at Wagerup, but a decision on the further expansion had not been made by the end of 1999. Further information can be obtained on the Internet at http://www.alcoa.com.

Also during 1999, the expansion of the 1.8-Mt/y Worsley Alumina Pty. Ltd. alumina refinery in Western Australia was under way with capacity expected to reach 3.1 Mt/y in mid-2000. When completed, the company expects this facility to be the lowest-cost alumina refinery in the world. For further information visit the company's web site at http://www.wapl.com.au.

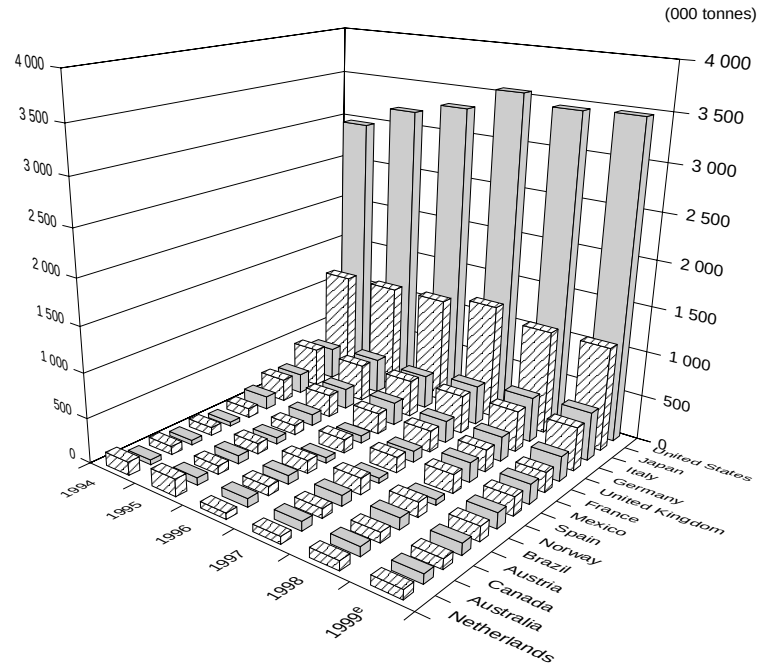
In November 1999, Capral Aluminium Limited restructured its operations to separate the primary metal smelting operations from its fabrication/ distribution operations. In February 2000, Capral announced that it was exploring the possible sale of the company's Kurri Kurri smelter. The company has been improving overall performance by modernizing the casting plant and upgrading its potlines, and has been considering further upgrades, including a 50 000-t/y expansion. However, the expansion is conditional upon obtaining a longer-term supply for power, and work is currently on hold. Further information on Capral can be obtained by visiting its web site at http://www.capral-aluminium.com.au.

In December 1998, the Government of New South Wales announced a feasibility study to build a 500 000-t/y smelter at Lithgow, located approximately 50 km west of Sydney. The feasibility study is expected to be completed in mid-2000. If power supplies can be contracted and if results are positive, construction could take two to three years.

RECYCLING

The World Bureau of Metal Statistics reports Western World production of secondary aluminum on a

Figure 4
Production of Secondary Aluminum, 1994-99
Top 14 Producers (96% of Total Production)



Sources: Natural Resources Canada; World Bureau of Metal Statistics.
e Estimated.

monthly basis. Production has increased to an estimated 7.6 Mt in 1999, compared to 7.5 Mt in 1998. There has been a general increase in secondary production attributable to continued improvements in scrap collection systems and increased recycling of consumer products. Additional information is available on the Internet at http://www.wbms.dircon.co.uk.

The recycling of aluminum requires less than 5% of the energy used to make the original metal. As a result, energy represents only 2% of a secondary aluminum smelter's operating cost, compared to about 26% for a primary smelter. The automotive industry is the largest consumer of secondary aluminum, consuming some 80% of secondary production. As requirements for lighter vehicles increase, it is likely that demand for secondary aluminum will also increase significantly.

In 1999, the largest secondary aluminum producers were the United States at 3.5 Mt, Japan at 1.2 Mt, and Italy and Germany at 0.5 Mt each. Reported Canadian consumption of secondary aluminum metal (including the direct use of scrap) increased to 248 391 t in 1998 from 222 891 t in 1997. (Part of this increase is due to an increase in the number of companies reporting.)

In Canada, there are no facilities to recycle aluminum beverage cans into new cans. However, about 1.5 billion scrap aluminum cans were recovered in 1999 and exported to the United States to be recycled into can sheet. This represents approximately 45 000 t of aluminum.

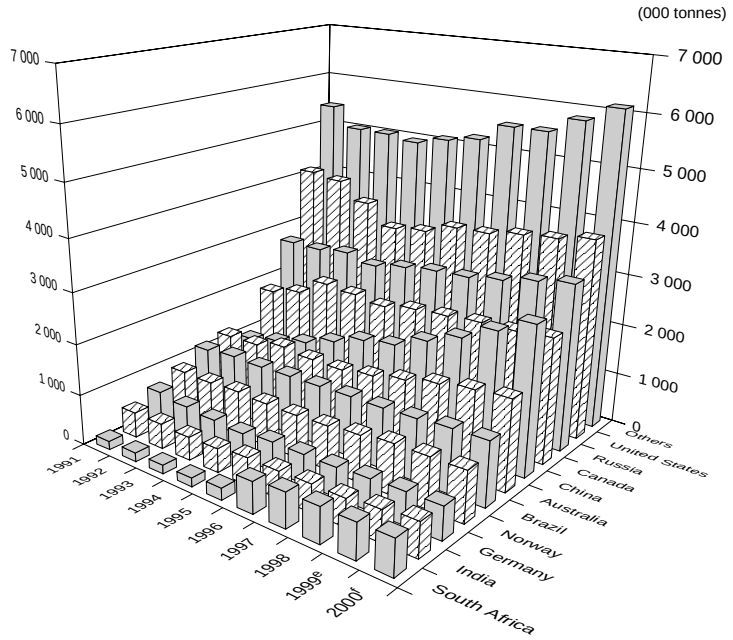
Continuing the trend for longer-term contracts between producers and consumers, General Motors (GM) and IMCO Recycling signed a 13-year contract for aluminum alloys. IMCO will process scrap produced by GM on a toll basis. This type of closed loop system, where scrap and waste are returned to the metal producer, is becoming more common due to the increased efficiencies that can be obtained.

PRODUCTION AND CONSUMPTION

World primary aluminum production is estimated to have increased more than 4% to 23.6 Mt in 1999 from 22.6 Mt in 1998. Aluminum production in 1999 is expected to reach 3.8 Mt in the United States, 3.7 Mt in Western Europe, and 3.1 Mt in Russia. Recent production and capacity increases have occurred in China, Russia and Australia (see Table 8).

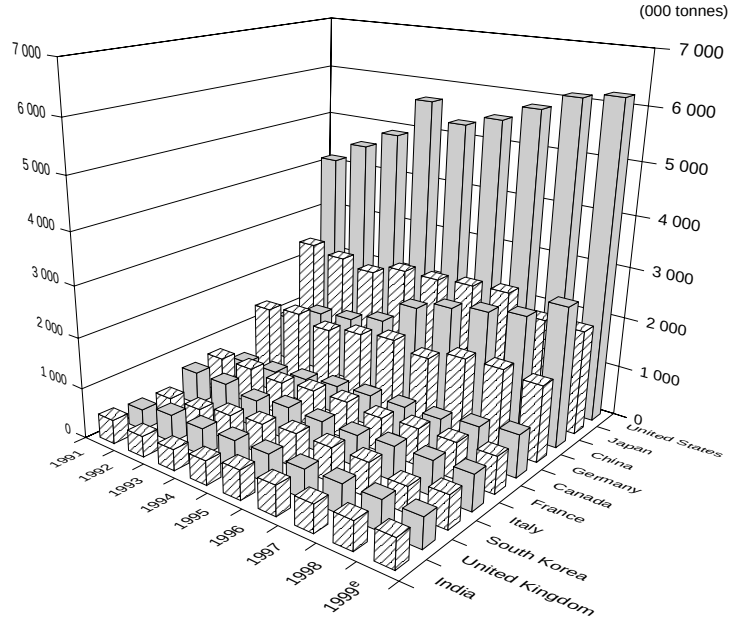
Total world consumption of primary aluminum was an estimated 22.7 Mt in 1999, about 5% higher than the 22.1 Mt recorded in 1998.

Figure 5
Primary Aluminum Production, Top 10 Producers, 1991-2000



Sources: Natural Resources Canada; World Bureau of Metal Statistics; International Consultative Group on Nonferrous Metals Statistics; International Primary Aluminium Institute.
e Estimated; **f** Forecast.

Figure 6
Apparent Consumption of Primary Aluminum, Top 10 Countries, 1991-99



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

OCCURRENCE, CHARACTERISTICS AND USES

Aluminum is the most abundant metal in the earth's crust (estimated at 8% of the earth's crust). Aluminum does not occur naturally in its native or pure state, but is found in oxides, hydroxides, halides, sulphates, silicates and as complexes with organic matter.

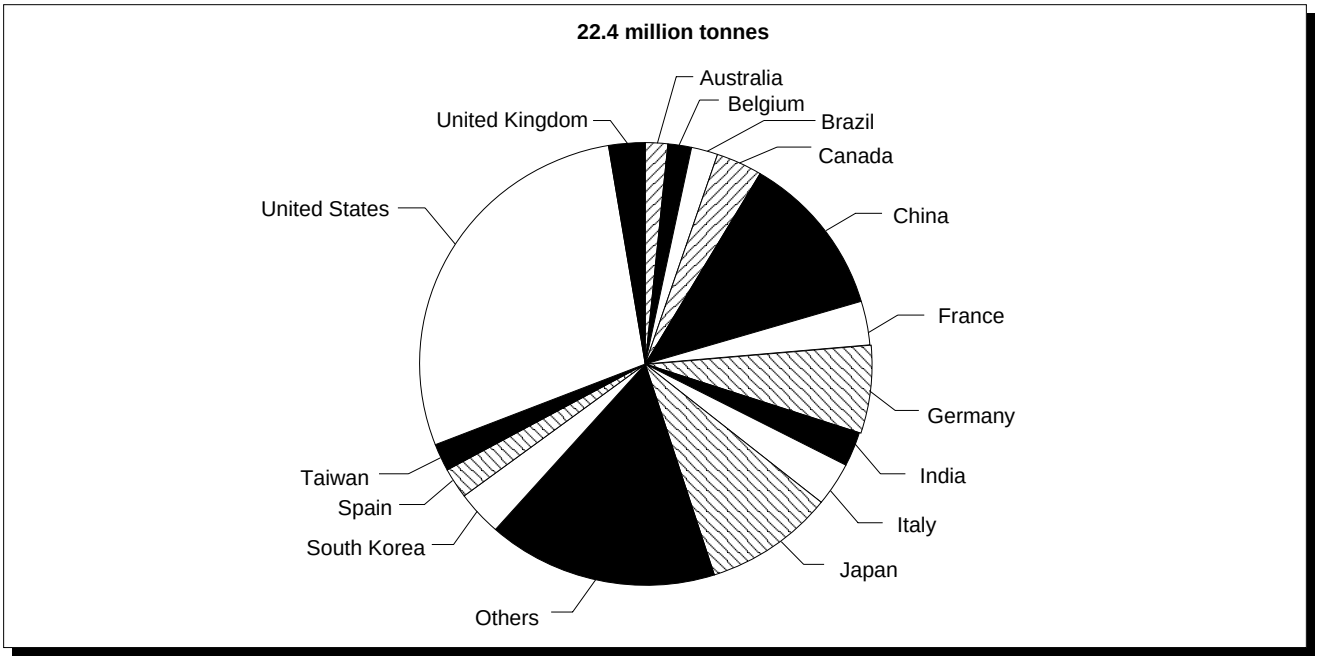
Both igneous rocks and sedimentary rocks can contain up to 20% aluminum. Aluminum silicates are a major component of soils (contained in clay minerals, sand and rock fragments), glacial tills and the bedrock underlying much of Canada. The aluminum contents of C horizon soils and glacial tills average approximately 8% and range from 3.5% to more than 10%. Aluminum oxide, combined with water and other impurities, is the main ore of aluminum and is known as bauxite.

Aluminum compounds move through the environment by both anthropogenic (human) activities and natural processes. The quantity of aluminum moved by natural processes far outweighs the direct anthropogenic redistribution of nonmetallic aluminum in the environment. The chemistry of aluminum in the environment is complex and dependent on many factors. The mobility and subsequent transportation of aluminum ions and compounds are dependent on various factors, including the geological weathering environment, chemical speciation (form), soil-water interaction, other elements and compounds present, and composition of the underlying bedrock. The mobilization of aluminum in the environment by human activity results predominantly from often distant activities that produce acidic precipitation. In general, a lowering of pH results in the increased mobility of some forms of aluminum.

Pure aluminum is a silver-white, malleable, ductile metal with one third the density of steel. Aluminum's dull lustre results from a thin coating of oxide that forms instantly when it is exposed to air. The oxide, which adheres tightly to the metal, accounts for aluminum's resistance to corrosion. Gram for gram, aluminum has twice the electrical conductance of copper. Aluminum is also an efficient conductor of heat and a good reflector of light and radiant heat.

Combining aluminum with other metals produces alloys with enhanced characteristics and increased versatility. The most common metals used in aluminum alloys are copper, magnesium, manganese, silicon, lithium and zinc. Aluminum's tensile strength, hardness, corrosion resistance, and heat-treatment properties improve when alloyed with one or more of these metals. The tensile strength of some copper-aluminum alloys, for example, can exceed that of mild steel by as much as 50%.

Figure 7
Major Aluminum-Consuming Nations, Total Estimated Consumption, 1999



Sources: Natural Resources Canada; World Bureau of Metal Statistics.

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 (22%), building and construction (13%), electrical (7%), consumer goods (7%), and machinery and equipment (6%). Geographically, North America is the largest consuming region in the world, accounting in 1999 for 32% of total world demand. Asia accounts for 31% and Europe accounts for another 29%. The United States is the largest consuming country followed by China and Japan.

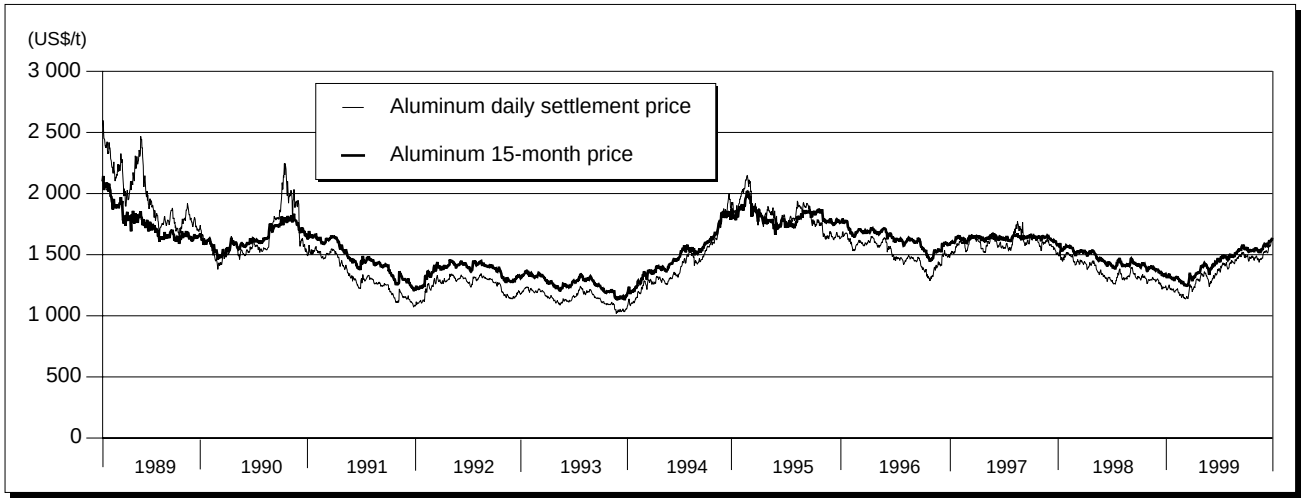
The substitution of aluminum for steel in automobile manufacturing helps reduce weight while maintaining vehicle size. Fuel consumption and, consquently, greenhouse gas emissions are decreased. The lowered weight can also increase safety by reducing stopping distances and improving cornering. Transportation uses are one of the fastest-growing areas of aluminum use, growing at a rate of about 4%/y. Demand for automotive aluminum is expected to increase from about 110 kg of aluminum per vehicle used now to over 150 kg or more within 10 years. This demand will likely be fueled by petroleum price increases and by the number of government and joint government-industry initiatives around the world to focus attention on the ways to reduce automotive weight. Initiatives include the Canadian Lightweight Materials Research Initiative (http://climri.nrcan.gc.ca/about_climri.htm), the Partnership for a New Generation of Vehicles (PNGV), The Auto Aluminum Alliance (http://www.uscar.org/), the Aluminum Association's Auto and Light Truck Group and the U.S. Automotive Materials Partnership (USAMP) (http://www.autoaluminum.org/), and the European Council for Automotive Research and Development Agreement (EUCAR).

PRICES AND STOCKS

Metal prices have been volatile over the last few years; in 1999, prices for aluminum were no exception. The economic recovery in Asia resulted in increased demand in that region. This demand, coupled with that in America, resulted in a rebound from a low established in early 1999 from a downward trend in prices that started in late 1997. Cash settlement London Metal Exchange (LME) prices started the year at US$1214/t (US55¢/lb), fell to a five-year low of US$1140/t (US52¢/lb) in March, then increased to US$1630 (US74¢/lb) at the end of 1999. The average for the year was US$1362/t (US62¢/lb). Metal prices can be obtained from various news services, journals and newspapers, as well as from the LME's web site at http://www.lme.co.uk and from http://metalprices.com.

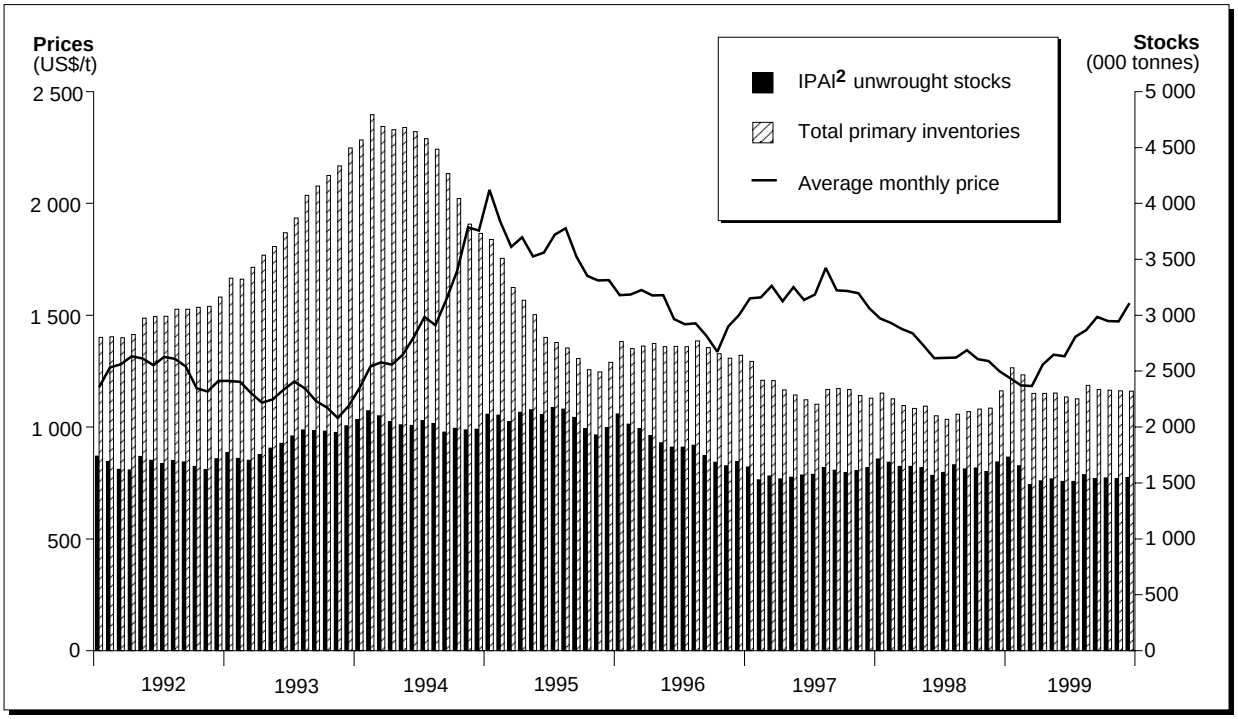
The International Primary Aluminium Institute (IPAI) reported that Western World primary aluminum inventories increased to 1.549 Mt at the end of 1999, compared to 1.682 Mt in December 1998. Total stocks, including all forms of aluminum scrap, primary and secondary ingot, and metal in process, totaled 2.959 Mt at the end of 1999, compared with 3.161 Mt at the end of 1998. Primary aluminum stocks on the LME started the year at 636 000 t and increased steadily until the end of March when they reached 822 000 t. Stocks then began to fall, reaching about 775 000 t at year-end. Total primary inventories followed the same trend as primary

Figure 8
London Metal Exchange Aluminum Prices, 1989-99



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

Figure 9
Aluminum Prices and Stocks, 1992-99
LME[1] Settlement Prices and Primary Stocks



Source: Natural Resources Canada.
[1] London Metal Exchange. [2] International Primary Aluminium Institute.

stocks, ending the year at 2.320 Mt, compared to 2.324 Mt at the end of 1998. Together the aggregated unwrought IPAI and LME stocks decreased from 3.161 Mt at the end of 1998 until June, when they reached a low of 2.923 Mt, the lowest level since November 1988. Stocks then increased to end the year at 2.959 Mt. During the year, the IPAI revised the reporting system to redefine the meaning of a producer and affiliates, which slightly expands inventories. Under the new system, the year-end unwrought inventories were 1.799 Mt, while total aggregated stocks were 3.182 Mt. Further information is available on the Internet at http://www.world-aluminium.org.

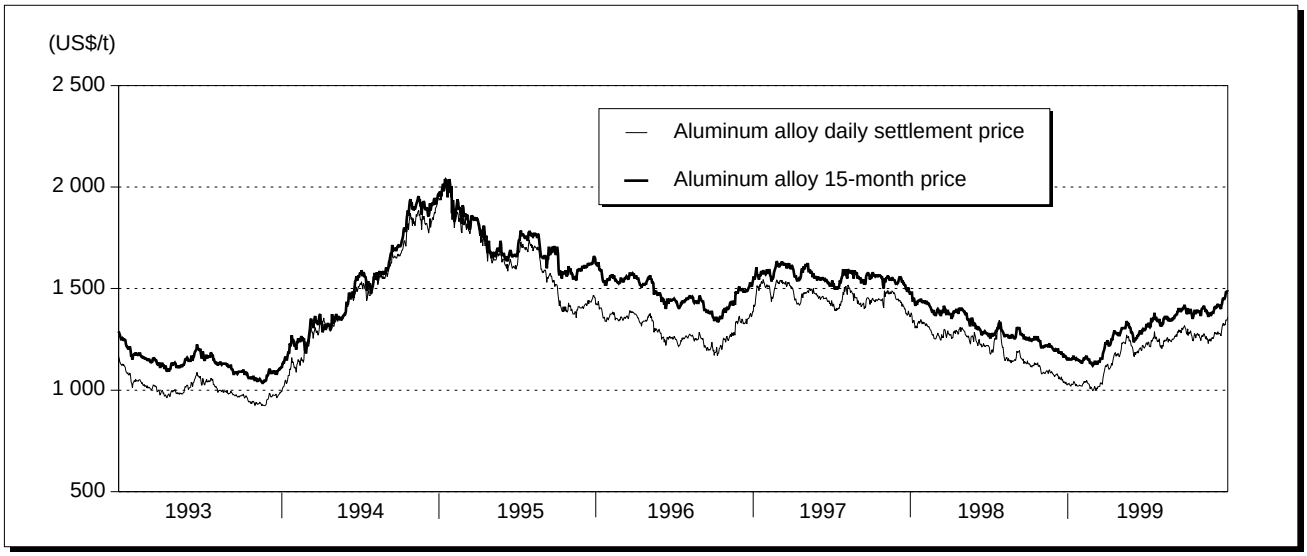
Prices on the LME for aluminum alloy reflected the general trend of primary aluminum prices. Aluminum alloy settlement prices started 1999 at US$1028/t (US47¢/lb), decreasing to US$997/t (US45¢/lb) in February, and then increasing to end the year at $1358/t (US62¢/lb). For 1999, alloy prices averaged US$1192/t (US54.1¢/lb), compared to an average of US$1204/t (54.6¢/lb) in 1998. LME aluminum alloy stocks in LME warehouses started the year at around 96 000 t and decreased steadily to end the year at approximately 78 000 t.

Although the alumina market was weak earlier in the year, alumina supplies became more difficult and more expensive to obtain for those without long-term contracts or captive sources as a result of the lost production at Gramercy. Prices for alumina moved up sharply from approximately $US150/t at the beginning of 1999 to above $US500/t in early 2000 as increases in production from other sources in Australia, Brazil, China and Russia were not sufficient to balance the lost production. During 2000, prices are expected to decline from this level due to increases in capacity at existing operations and the re-opening of Kaiser's facility later in the year.

WORLD OUTLOOK

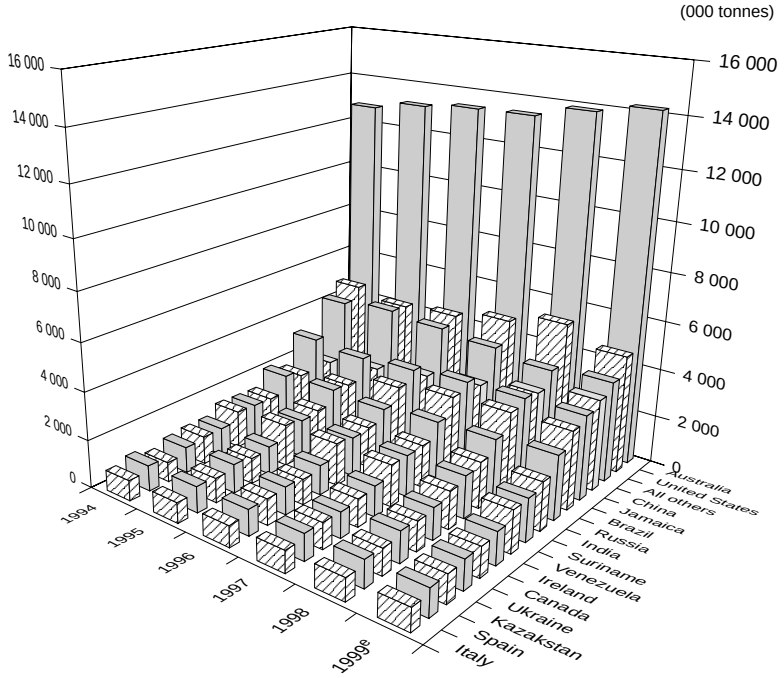
World production of primary aluminum increased to an estimated 23.6 Mt in 1999, up 4.7% from 22.6 Mt in 1998. Western World production is expected to increase to 17.2 Mt, up 3.4 % in 1999 from 16.6 Mt in 1998. Production is expected to be about 3.8 Mt in the United States, 3.9 Mt in Western Europe, and 3.2 Mt in Russia in 1999. For 2000, world production of primary aluminum is expected to again increase by about 4% to 24.7 Mt.

Figure 10
London Metal Exchange Aluminum Alloy Prices, 1993-99
Daily Settlement Prices



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

Figure 11
World Alumina Production, Top 15 Producers, 1994-99



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

e Estimated.

World consumption of primary aluminum was estimated to be 22.6 Mt in 1999, approximately 2% higher than the 22.1 Mt recorded in 1998. Western World demand also increased by approximately 3% to 19.2 Mt in 1999. In 2000, world demand for aluminum is expected to increase approximately 3% from 1999. In the longer term, annual growth of 1-3% is forecast for the early part of this decade. The packaging and particularly the transportation markets are expected to lead the increase in demand for aluminum to the year 2005. Apparent Canadian consumption of primary aluminum is expected to remain strong at about 780 000 t for 1999, increasing, over the longer term, at a rate of about 5-6% annually.

IPAI figures show that the world primary production capacity of its members is expected to rise about 2% to 22.2 Mt in 2000 from 21.9 Mt at the end of 1999, with comparable increases in the following year. The increases in Western World capacity expected in 2000 will come primarily from smelter expansions in North America, India and Dubai. With projected increases from non-IPAI members, world primary production is expected to rise more than 4% in 2000.

In the longer term, prices of primary aluminum are expected to continue in a range of between US$1200 and $1850/t (US55¢ and 84¢/lb). For 2000, prices are forecast to trend downward following the higher prices experienced in the early part of the year, assuming that there are no further disruptions in supplies and if investment funds maintain a lower profile in the aluminum markets. In this case, it is possible that prices will range from US$1300 to $1500/t from mid-2000 to early 2001. The average price in 2000 will likely be higher than 1999's average of US$1362/t (US62¢/lb), in the range of US$1450-$1550/t (US66¢-70¢/lb).

Notes: (1) Information in this review was current as of February 29, 2000. (2) 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. (3) This and other reviews, including previous editions, are available on the Internet at http://www.nrcan.gc.ca/mms/cmy/ index_e.html.

NOTE TO READERS

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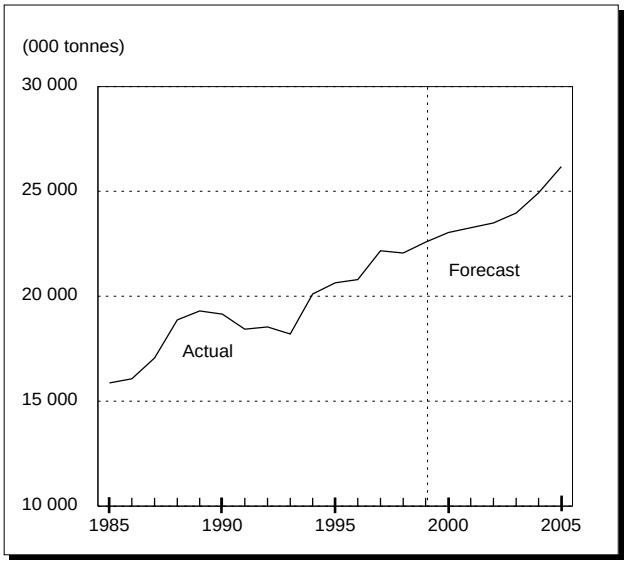
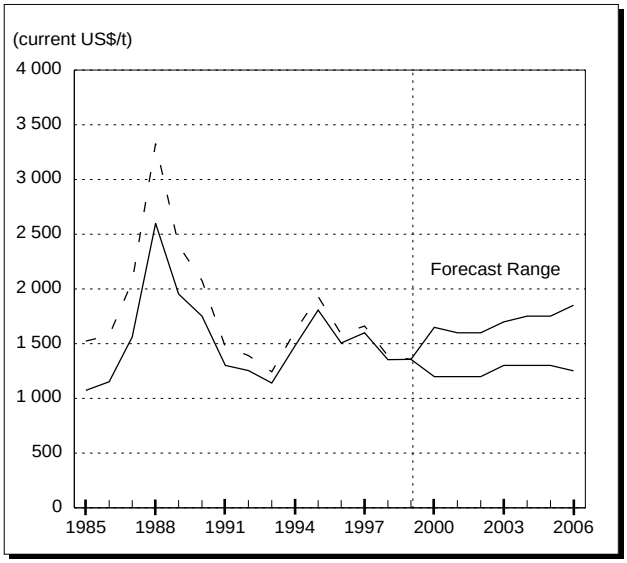
Figure 12
World Primary Aluminum Consumption, 1985-2005



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

Figure 13
LME Daily Official Aluminum Settlement Price, 1985-2006



Sources: Natural Resources Canada; metalprices.com.

TARIFFS

Item No.	Description	Canada			United States	EU	Japan[1]
		MFN	GPT	USA	Canada	MFN	WTO
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	4.0%	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%	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%	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	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: Customs Tariff, effective January 2000, Canada Customs and Revenue Agency; Harmonized Tariff Schedule of the United States, 2000; Worldtariff Guidebook on Customs Tariff Schedules of Import Duties for European Union (39th Annual Edition: 1999); Custom Tariff Schedules of Japan, 1999.

[1] WTO rate is shown; lower tariff rates may apply circumstantially.

TABLE 1. CANADA, ALUMINUM PRODUCTION AND TRADE, 1998 AND 1999

Item No.		1998		1999p	
		(tonnes)	($000)	(tonnes)	($000)
PRODUCTION		2 374 118	. .	2 389 834	. .
IMPORTS					
2606.00	Aluminum ores and concentrates				
	Brazil	1 584 427	59 733	1 840 420	59 773
	Australia	1 117 883	63 967	493 985	18 630
	Guyana	310 215	11 097	372 917	11 891
	Guinea	772 361	26 673	150 084	7 941
	United States	74 774r	6 048	110 841	7 519
	China	29 004	2 857	29 387	2 511
	Other countries	68	5	66 519	2 331
	Total	3 888 732r	170 380	3 064 153	110 596
2620.40	Ash and residues containing mainly aluminum	4 520	4 333	4 191	4 027
2818.20	Aluminum oxide (excluding artificial corundum)				
	Australia	1 421 628r	373 638r	1 608 614	394 694
	United States	1 046 967r	337 562r	1 098 206	324 355
	Jamaica	721 190	197 967	632 511	164 319
	Brazil	21 048	6 259	25 591	6 653
	Austria	1 631	3 136	1 214	3 552
	China	7 271	3 962	8 156	2 887
	Other countries	5 349	6 313	6 132	7 202
	Total	3 225 084r	928 837r	3 380 424	903 662
2818.30	Aluminum hydroxide	15 604	9 413	16 337	10 105
7601.10	Unwrought aluminum, not alloyed				
	United States	30 670	71 241	46 493	101 176
	Tajikistan	788	1 366	2 072	3 730
	Russia	1 052	340	968	1 686
	Other countries	129	318	466	1 121
	Total	32 639	73 265	49 999	107 713
7601.20	Unwrought aluminum, alloyed				
	United States	149 950r	307 194r	182 773	332 514
	Russia	12 691r	26 120r	9 531	16 309
	United Kingdom	2 452	5 178	1 353	2 836
	Tajikistan	2 304	4 605	1 297	2 210
	Netherlands	723	1 453	528	1 025
	Other countries	1 360	3 454	993	2 347
	Total	169 480r	348 004r	196 475	357 241
7602.00	Aluminum waste and scrap	107 855r	152 110r	123 070	168 199
76.03	Aluminum powders and flakes	2 151	8 804	2 227	8 554
76.04	Aluminum bars, rods and profiles				
7604.10	Of aluminum, not alloyed				
	United States	8 594r	33 304r	8 356	30 498
	Belgium	560	3 116	798	4 274
	Other countries	976r	3 356r	1 704	5 953
	Total	10 130r	39 776r	10 858	40 725
7604.21 to	Of aluminum alloys				
7604.29	United States	29 600r	153 366r	26 433	129 528
	South Korea	38	175	460	1 742
	China	262	1 063	491	1 614
	France	383	1 835	238	1 312
	Other countries	1 036r	6 837r	806	4 710
	Total	31 319r	163 276r	28 428	138 906
76.05	Aluminum wire	5 645r	26 444r	7 726	28 186
76.06	Aluminum plates, sheets and strip, of a thickness exceeding 0.2 mm	402 658r	1 446 635r	473 088	1 542 390
76.07	Aluminum foil not exceeding 0.2 mm	40 506r	186 766r	50 363	228 007

TABLE 1 (cont'd)

Item No.		1998		1999p	
		(tonnes)	($000)	(tonnes)	($000)
IMPORTS (cont'd)					
76.08	Aluminum tubes and pipes	9 610r	48 919r	10 747	52 836
76.09	Aluminum tube or pipe fittings	. .	29 049r	. .	38 335
		(number 000)		**(number 000)**	
76.10	Aluminum structures and parts of structures, aluminum plates, rods, profiles, tubes and the like, prepared for use in structures	. .	77 102r	. .	87 611
76.11	Aluminum reservoirs, tanks, vats and similar containers, for any material	1	8 073	8	32 143
76.12	Aluminum casks, drums, cans, boxes and similar containers, for any material	1 343 066r	214 698r	863 506	160 030
76.13	Aluminum containers for compressed or liquefied gas	108	16 591r	106	12 599
		(tonnes)		**(tonnes)**	
76.14	Stranded wire, cables, plaited bands and the like, of aluminum, not electrically insulated	317	1 110	298	1 193
76.15	Table, kitchen or other household articles and parts thereof, of aluminum	. .	86 129r	. .	88 209
76.16	Other articles of aluminum	. .	236 643r	. .	253 890
EXPORTS					
2606.00	Aluminum ores and concentrates				
	United States	47	4	523	49
	Total	47	4	523	49
2620.40	Ash and residues containing mainly aluminum	11 402r	8 122r	14 381	8 156
2818.20	Aluminum oxide (excluding artificial corundum)				
	United States	58 217	47 052	52 359	42 108
	Belgium	41	78	36	127
	Other countries	135	202	36	45
	Total	58 393	47 332	52 431	42 280
7601.10	Unwrought aluminum, not alloyed				
	United States	611 463r	1 362 434r	589 921	1 221 284
	Netherlands	174 126	368 711	129 292	259 693
	Japan	39 693	78 131	43 160	79 415
	South Korea	22 519	49 323	17 256	37 779
	Mexico	3 029	6 766	9 821	21 381
	United Kingdom	16 200	31 568	7 974	16 076
	Other countries	3 295	8 051	7 760	16 574
	Total	870 325r	1 904 984r	805 184	1 652 202
7601.20	Unwrought aluminum alloys				
	United States	824 962r	2 014 492r	920 914	2 122 779
	Japan	117 118	243 890	103 009	212 626
	South Korea	17 790	41 914	21 347	47 810
	United Kingdom	4 727	12 769	3 075	8 072
	Ireland	1 995	5 319	2 253	5 708
	Israel	2 819	7 126	2 178	5 355
	Cyprus	1 969	5 046	2 080	5 014
	Other countries	14 389	35 959	2 363	5 669
	Total	985 769r	2 366 515r	1 057 219	2 413 033

TABLE 1 (cont'd)

Item No.		1998		1999p	
		(tonnes)	($000)	(tonnes)	($000)
EXPORTS (cont'd)					
7602.00	Aluminum waste and scrap				
	United States	258 628r	438 670r	278 049	459 795
	South Korea	1 004	1 906	4 895	10 441
	China	1 980	2 438	4 508	5 224
	Netherlands	6 842	15 795	1 922	3 994
	Japan	8 367	18 822	2 152	3 206
	Other countries	4 338	6 067	2 905	4 216
	Total	281 159r	483 698r	294 431	486 876
76.03	Aluminum powders and flakes	1 363r	3 651r	1 539	3 175
76.04	Aluminum bars, rods and profiles	75 559r	345 015r	82 992	375 186
76.05	Aluminum wire	82 978	220 316	94 435	240 133
76.06	Aluminum plates, sheets and strip, of a thickness exceeding 0.2 mm	290 475r	896 069r	335 828	985 939
76.07	Aluminum foil not exceeding 0.2 mm	32 866r	142 810r	39 398	179 360
76.08	Aluminum tubes and pipes	6 110	30 893	8 158	37 761
76.09	Aluminum tube or pipe fittings	. .	12 484r	. .	15 231
76.10	Aluminum structures and parts of structures, aluminum plates, rods, profiles, tubes and the like, prepared for use in structures	. .	182 410r	. .	243 978
		(number 000)		**(number 000)**	
7611.00	Aluminum reservoirs, tanks, vats and similar containers, for any material	1	986r	. . .	1 331
76.12	Aluminum casks, drums, cans, boxes and similar containers, for any material	334 930r	79 458r	684 673	110 993
7613.00	Aluminum containers for compressed or liquefied gas	870	5 182	566	3 956
		(tonnes)		**(tonnes)**	
76.14	Stranded wire, cables, plaited bands and the like, of aluminum, not electrically insulated	7 920	27 349r	9 708	30 398
76.15	Table, kitchen or other household articles and parts thereof, of aluminum	. .	56 447	. .	67 374
76.16	Other articles of aluminum	. .	163 439r	. .	184 160

Sources: Natural Resources Canada; Statistics Canada.
– Nil; . . Not available or not applicable; . . . Amount too small to be expressed; p Preliminary; r Revised.
Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, ALUMINUM SMELTER CAPACITY

Company	As of December 31, 1999
	(tonnes/year)
Alcan Aluminium Limited	
Quebec	
Grande-Baie	180 000
Arvida, Jonquière	232 000
Isle-Maligne, Alma	21 000[a]
Shawinigan	84 000
Beauharnois	48 000
Laterrière	204 000
British Columbia	
Kitimat	272 000
Total Alcan capacity	1 041 000
Canadian Reynolds Metals Company, Limited	
Quebec	
Baie-Comeau	400 000
Aluminerie de Bécancour Inc.	
Quebec	
Bécancour	372 000
Aluminerie Alouette Inc.	
Quebec	
Sept-Îles	237 000
Alcoa Aluminerie Lauralco Inc.	
Quebec	
Deschambault	225 000
Total Canadian capacity	2 275 000

Source: Natural Resources Canada.
[a] In 1999, two of three potlines were shut down. The third line closed in March 2000.

TABLE 3. CANADA, CONSUMPTION[1] OF ALUMINUM METAL[4] AT FIRST PROCESSING STAGE, 1996-98

	1996[a]	1997[a]	1998[a]
		(tonnes)	
CASTINGS			
Permanent mould	86 766	92 288	115 002
Sand	2 742	3 351	3 262
Die and other	120 793	150 829	164 253[r]
Total	210 301	246 469	282 517[r]
WROUGHT PRODUCTS			
Sheet, plate, coil and foil	191 754	180 745	209 366[r]
Extrusions, including tubing	111 363	149 958	188 610
Other wrought products (including rods, forgings and slugs)	139 245	165 039	177 663[r]
Total	442 362	495 742	575 639[r]
OTHER USES			
Destructive uses (deoxidizer), non-aluminum base alloys, powder and paste and other uses	34 306	39 057	44 358[r]
Total consumed	686 969	781 268	902 514[r]
Aluminum metal used for the production of secondary aluminum ingot[2]	138 762	128 515	148 048

	Metal Entering Plant			On Hand at December 31		
	1996	1997	1998	1996	1997	1998
Primary aluminum ingot and alloys	560 146	572 606	665 078[r]	16 434	16 892	18 427[r]
Secondary aluminum	120 561	138 771	159 234	5 198	5 315	5 995
Scrap originating outside plant	146 198	199 926	231 681	3 958	6 902	8 052
Total	826 905	911 302	1 055 993[r]	25 590	29 109	32 474[r]
Aluminum shipments[3]				2 829	1 696	2 789

Source: Natural Resources Canada.
[r] Revised.
[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 consumers. [2] Aluminum metal used in the production of secondary aluminum is not included in consumption totals. [3] Aluminum metal shipped without change. Does not refer to shipments of goods of own manufacture. [4] Aluminum metal refers to primary aluminum ingot and alloys, purchased secondary aluminum ingot, and outside aluminum scrap.
Note: Numbers may not add to totals due to rounding.

TABLE 4. AVERAGE ALUMINUM PRICES

Year	Month	LME Cash Settlement[1]	*Metals Week* U.S. Markets[1]
		(US$/t)	(US¢/lb)
ANNUAL AVERAGES[2]			
1987		1 560.90	72.3
1988		2 597.80	110.1
1989		1 951.50	87.8
1990		1 751.80	75.0
1991		1 302.70	59.5
1992		1 254.60	57.5
1993		1 139.40	53.3
1994		1 477.20	71.2
1995		1 806.10	85.9
1996		1 506.00	71.3
1997		1 599.70	77.1
1998		1 357.80	65.6
1999		1 361.09	65.7
MONTHLY AVERAGES			
1998	January	1 486.10	71.9
	February	1 465.95	70.4
	March	1 438.02	69.2
	April	1 418.60	68.8
	May	1 365.13	66.0
	June	1 307.59	63.4
	July	1 309.57	63.5
	August	1 311.25	63.3
	September	1 342.66	65.5
	October	1 304.41	62.9
	November	1 295.29	61.9
	December	1 249.41	60.1
1999	January	1 218.46	58.8
	February	1 186.85	57.6
	March	1 181.59	58.7
	April	1 278.20	62.4
	May	1 323.46	64.5
	June	1 315.31	63.1
	July	1 403.76	67.5
	August	1 431.32	68.6
	September	1 492.48	71.3
	October	1 474.41	70.8
	November	1 472.76	70.6
	December	1 554.48	74.7

Sources: Natural Resources Canada; *Metals Week*.
[1] Highest grade sold. [2] Primary ingots, minimum 99.7% purity; prior to October 1988, minimum 99.5% purity.

TABLE 5. AVERAGE ALUMINUM ALLOY (SECONDARY) PRICES

Year	Month	LME Alloy[1] Cash Settlement
		(US$/t)
ANNUAL AVERAGES		
1993		1 005.2
1994		1 452.9
1995		1 656.0
1996		1 302.8
1997		1 461.0
1998		1 203.8
1999		1 191.2
MONTHLY AVERAGES		
1998	January	1 329.6
	February	1 291.0
	March	1 270.6
	April	1 284.3
	May	1 263.7
	June	1 223.8
	July	1 241.8
	August	1 147.5
	September	1 152.3
	October	1 112.2
	November	1 083.1
	December	1 045.3
1999	January	1 024.3
	February	1 022.7
	March	1 058.5
	April	1 161.4
	May	1 232.3
	June	1 200.8
	July	1 239.0
	August	1 240.2
	September	1 287.8
	October	1 266.3
	November	1 257.7
	December	1 303.4

Source: *Metals Week.*
[1] Alloy ingots meeting LME specifications.

TABLE 6. WORLD MINE PRODUCTION OF BAUXITE, 1996-2000

	World Rank in 1999	1996	1997	1998	1999p	2000f
				(000 tonnes)		
Australia	1	43 063.0	44 465.0	44 553.0	48 000.0	48 300.0
Brazil	3	11 060.1	11 503.8	11 704.7	12 100.0	12 400.0
China	5	8 878.8	9 000.0	9 000.0	9 100.0	9 200.0
France	22	165.0	164.0	80.0	80.0	80.0
Ghana	15	473.2	519.2	442.5	500.0	550.0
Greece	12	2 230.0	1 875.9	1 823.0	1 900.0	1 900.0
Guinea	2	18 492.6	19 250.0	17 000.0	17 500.0	17 500.0
Guyana	11	2 475.5	2 470.9	2 267.4	2 400.0	2 400.0
Hungary	14	1 055.8	742.6	1 138.8	1 100.0	1 200.0
India	6	5757.5	5 800.3	5 980.1	6 000.0	6 300.0
Indonesia	13	842.0	808.7	1 055.6	1 160.0	1 200.0
Iran	20	100.0	100.0	100.0	100.0	100.0
Jamaica	4	11 828.6	11 987.3	12 646.4	12 000.0	13 000.0
Kazakstan	10	3 346.0	3 416.0	3 436.8	3 450.0	3 500.0
Malaysia	17	218.7	279.0	160.3	160.0	160.0
Mozambique	24	11.5	8.2	6.1	7.0	7.0
Pakistan	25	4.1	4.9	5.0	5.0	5.0
Romania	18	175.2	127.5	135.2	140.0	140.0
Russia	9	3 928.0	3 991.0	3 488.4	3 800.0	4 200.0
Serbia and Montenegro	19	323.0	470.0	110.0	110.0	200.0
Suriname	8	3 695.3	3 877.2	3 889.6	3 900.0	3 900.0
Turkey	16	544.5	369.5	458.0	460.0	500.0
United States	21	100.0	100.0	100.0	100.0	100.0
Venezuela	7	4 806.9	5 083.9	4 825.6	5 000.0	5 000.0
Vietnam	23	30.0	30.0	30.0	30.0	30.0
Total world		123 605.3	126 444.9	124 436.5	129 102.0	131 872.0

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics.
f forecast; p Preliminary.

TABLE 7. WORLD PRODUCTION OF ALUMINA (HYDRATE), 1994-99

	World Rank in 1999	1994	1995	1996	1997	1998	1999e
				(000 tonnes)			
Australia	1	12 792.0	13 147.0	13 349.0	13 385.0	13 853.0	14 210.0
Azerbaijan	–	70.0	26.1r	–	–r	–	–
Brazil	5	1867.5	2 142.9	2 759.0	3 088.0	3 210.0	3 250.0
Canada	11	1170.0	1 064.0	1 060.0	1 165.0	1 229.0	1 240.0
China	3	1846.9	2 222.7	2 616.0	2 922.8r	3 327.4	3 775.9
France	20	438.0	525.0	542.0	589.0	520.0	540.0
Germany	16	950.7	994.0	792.0	850.0	778.3	800.0
Greece	18	607.5	629.7	619.8	615.7	649.4	650.0
Guinea	19	648.4	630.4	622.0	527.0	500.0	569.0
Hungary	25	243.4	353.5	358.7	111.1	100.0	100.0
India	7	1 455.8	1 672.0	1 706.0	1 765.0r	1 919.0	2 000.0
Ireland	10	1 167.4r	1 185.6r	1 233.5r	1 272.8r	1 323.0	1 350.0
Italy	15	852.1	857.0	881.0	914.0	925.6	970.0
Jamaica	4	3 221.2	3 030.2	3 199.5	3 394.2r	3 440.2	3 500.0
Japan	17	674.6	743.2	718.9	728.0r	737.6	750.0
Kazakstan	13	822.0	1 022.0	1 083.4	1 094.2	1 085.2	1 155.2
Romania	21	301.6	322.8	258.5	279.5r	250.2	260.0
Russia	6	2 168.4	2 254.3r	2 148.0	2 379.8	2 465.4	2 657.0
Serbia and Montenegro	23	60.6	35.3	105.0	160.0	130.0	150.0
Slovakia	26	90.0	65.0	56.0	46.8	26.5	30.0
South Korea	–	–	–	100.0	70.0r	–	–
Spain	14	1 070.6	1 094.8	1 094.8	1 110.3	1 128.5	1 140.0
Suriname	8	1 498.1	1 588.8	1 642.9r	1 725.9r	1761.7	1 775.0
Turkey	22	155.3	172.0	159.3	164.3	156.8	160.0
Ukraine	12	1 081.0	1 198.0	1 159.5r	1 074.5	1 290.7	1 230.2
United Kingdom	24	110.0	108.0	99.0	100.0	96.0	100.0
United States	2	4 860.0	4 533.0	4 700.0	5 093.0	5 592.0	4 900.0
Venezuela	9	1 551.5	1 742.0	1 775.0	1 730.4r	1 553.4	1 750.0
Total world		41 774.6	43 359.3	44 838.8	46 356.3	48 048.9	49 012.3

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics; World Bureau of Metal Statistics; International Primary Aluminium Institute.
– Nil; e Estimated; r Revised.

TABLE 8. WORLD PRODUCTION OF ALUMINUM, 1995-2000

	World Rank in 1999	1995	1996	1997	1998	1999[e]	2000[f]
				(000 tonnes)			
Argentina	21	185.5	183.9	183.7	186.7	205.0	265.0
Australia	5	1 292.6	1 370.3	1 490.1	1 626.2	1 725.0	1 775.0
Azerbaijan	–	11.0	–	–	–	–	–
Bahrain	12	453.9	464.5	489.9	501.3	505.0	510.0
Bosnia	–	–	–	8.0[r]	30.0	–	–
Brazil	6	1 188.1	1 197.4	1 189.1	1 208.0	1 250.0	1 300.0
Cameroon	32	79.3	82.3	90.9	81.6	92.0	92.0
Canada	4	2 172.0	2 283.2	2 327.2	2 374.1	2 390.0	2 450.0
China	3	1 676.1	1 770.9	2 035.0[r]	2 285.0	2 600.0	2 900.0
Egypt	23	180.3	179.2	178.2	187.2	187.0	187.0
France	14	364.5	380.1	399.4	423.6	455.0	450.0
Germany	9	575.2	576.5	571.9	612.4	634.0	640.0
Ghana	27	135.4	137.0	151.6	56.1	120.0	160.0
Greece	25	130.9	130.9	132.6	146.1	160.0	160.0
Hungary	39	34.9	33.5	32.5	33.7	34.0	34.0
Iceland	20	100.2	103.4	122.9	173.4	220.0	250.0
India	10	536.5	530.6	544.9[r]	541.8	604.0	670.0
Indonesia	26	228.1	223.1	217.4[r]	133.4	125.0	125.0
Iran	30	117.0	80.1	92.3	109.0	110.0	110.0
Italy	22	177.8	184.4	187.7	187.0	190.0	190.0
Japan	41	18.0	17.0	16.7	16.3	10.0	10.0
Mexico	36	10.4	61.5	66.4	61.8	62.0	62.0
Mozambique	–	–	–	–	–	–	100.0
Netherlands	18	215.6	227.0	231.8	263.7	265.0	265.0
New Zealand	16	273.3	284.5	310.3	317.4	326.0	326.0
Nigeria	40	–	–	2.5[r]	25.5	20.0	40.0
Norway	7	846.7	862.3	918.6	994.2	995.0	995.0
Poland	37	50.8[r]	51.5[r]	51.5[r]	51.5	50.0	50.0
Romania	24	140.5	140.9	161.9[r]	174.0	175.0	175.0
Russia	2	2 790.0	2 874.2	2 906.0	3 004.7	3 146.0	3 250.0
Serbia and Montenegro	33	26.0	51.1	80.6	78.0	80.0	80.0
Slovakia	29	59.0	111.5	110.2[r]	108.0	110.0	120.0
Slovenia	34	70.2	65.8	74.4	70.8	77.0	77.0
South Africa	8	233.3	617.0	682.9	692.5	690.0	700.0
Spain	15	361.9	361.8	359.9	360.4	361.0	361.0
Suriname	42	28.1	26.0	23.1	27.1	7.0	–
Sweden	31	94.5	98.3	98.4	95.7	100.0	100.0
Switzerland	38	20.7	26.6	27.3	32.1	35.0	35.0
Tadjikistan	19	237.0	198.3	188.9	195.6	230.0	230.0
Turkey	35	61.5	62.1	62.0	61.8	62.0	62.0
Ukraine	28	95.1	89.9[r]	100.5	106.7	113.0	115.0
United Arab Emirates	13	247.4	258.5	377.7	386.6	500.0	540.0
United Kingdom	17	237.9	240.0	247.7	258.4	275.0	275.0
United States	1	3 375.1	3 577.2	3 603.4	3 712.7	3 779.0	3 900.0
Venezuela	11	627.9	634.9	640.8	586.5	570.0	570.0
Total world		19 760.2	20 849.2	21 788.8	22 578.6	23 644.0	24 706.0
% change from previous year		3 .3	5.5	4.5	3.6	4.7	4.3

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics.
– Nil; [e] Estimated; [f] Forecast; [r] Revised.

TABLE 9. WORLD CONSUMPTION OF ALUMINUM, 1996-99

	World Rank in 1999	1996	1997	1998	1999e
			(000 tonnes)		
Albania	78	1.0	1.0	1.0	1.0
Algeria	71	5.0	5.0	5.0	5.0
Argentina	34	86.4	95.3	113.0	90.0
Australia	15	321.8r	352.0r	368.7	375.0
Austria	21	155.0	162.0	172.0	170.0
Bahrain	28	137.0	137.0	140.0	145.0
Bangladesh	63	10.0	10.0	10.0	10.0
Belarus	65	–	7.4r	9.1	9.0
Belgium	13	331.0	345.0	396.0	395.0
Brazil	12	497.0	478.6	521.4	475.0
Bulgaria	66	6.7	7.8r	8.0	7.5
Cameroon	51	18.0	24.7	24.9	25.0
Canada	5	619.9	628.2r	733.5	840.0
Chile	54	13.9	15.5	25.3	25.0
China	2	2 142.5r	2 262.0r	2 376.0	2 750.0
Colombia	45	35.0r	43.0r	40.0	40.0
Croatia	50	20.7	22.0r	24.0	26.0
Cuba	79	1.0	1.0	1.0	1.0
Czech Republic	37	53.0	62.8r	78.8	80.0
Denmark	43	27.0	36.0	38.9	40.0
Egypt	33	79.2	97.9	91.6	90.0
Finland	47	30.4	33.1	33.0	35.0
France	6	671.7	723.6	720.7	725.0
Germany	4	1 355.0	1 567.4	1 585.0	1 500.0
Ghana	59	16.1	16.0	16.0	16.0
Greece	16	156.4	203.8	213.0	215.0
Hong Kong	41	40.0r	40.0r	40.0	45.0
Hungary	22	158.6	183.4r	163.8	165.0
Iceland	69	1.0	1.7	3.0	5.0
India	10	584.8	544.5r	555.0	575.0
Indonesia	25	161.3	206.0	75.4	160.0
Iran	30	105.0r	105.2r	105.0	105.0
Iraq	77	1.0	1.0	1.0	1.0
Ireland	67	3.8	5.8	7.0	7.0
Israel	42	37.2r	39.5r	45.9	45.0
Italy	7	614.0	671.0	675.4	700.0
Japan	3	2 392.6	2 434.3	2 079.9	2 060.0
Kazakstan	76	–	1.6r	1.7	2.0
Lebanon	58	10.0	17.0r	17.0	17.0
Macedonia	70	2.8	2.0	3.0	5.0
Malaysia	31	115.0r	148.0r	90.0	100.0
Mexico	32	92.7	83.2	91.9	92.0
Morocco	72	1.6	2.0	3.4	4.0
Netherlands	23	145.0	155.0	160.0	160.0
New Zealand	46	38.9	37.0	34.2	36.0
Nigeria	68	7.0	7.0	7.0	7.0
North Korea	55	20.0	20.0r	20.0	22.0
Norway	17	169.0	197.0	158.7	190.0
Other Africa	61	9.9	12.0	10.0	15.0
Other Americas	64	12.0	10.0	10.0	10.0
Other Asia	48	35.0	35.0	35.0	35.0
Other Europe	75	–	2.0	1.5	2.0
Pakistan	60	15.0	15.0	15.0	16.0
Peru	74	3.6	2.5r	2.5	3.0
Philippines	52	26.3	34.2	24.0	25.0

TABLE 9 (cont'd)

	World Rank in 1999	1996	1997	1998	1999[e]
			(000 tonnes)		
Poland	35	73.2[r]	83.3[r]	86.0	90.0
Portugal	38	58.1	75.4	68.3	75.0
Romania	36	37.3	54.7[r]	71.8	90.0
Russia	26	444.1	469.2[r]	489.2	150.0
Saudi Arabia	53	25.0[r]	25.0[r]	25.0	25.0
Serbia and Montenegro	56	17.3	22.2[r]	20.6	20.0
Singapore	44	40.0	15.0[r]	33.5	40.0
Slovakia	57	25.0	25.0	22.2	20.0
Slovenia	39	46.5[r]	51.8[r]	60.0	65.0
South Africa	27	101.6	126.0	142.8	145.0
South Korea	8	674.3	666.3	505.7	650.0
Spain	11	360.0	430.0[r]	434.5	500.0
Sweden	19	129.0	142.0	177.0	177.0
Switzerland	24	140.2	169.0[r]	164.9	160.0
Taiwan	14	310.3	374.3	300.7	375.0
Thailand	18	220.2	232.8	129.0	190.0
Tunisia	73	3.5	1.0	3.8	4.0
Turkey	20	136.0	164.8[r]	180.7	175.0
United States	1	5 500.0	5 800.0	6 100.0	6 200.0
Ukraine	40	51.0	60.0	60.3	60.0
United Arab Emirates	49	19.4[r]	32.1[r]	26.0	30.0
United Kingdom	9	570.0[r]	585.0[r]	590.0	590.0
Venezuela	29	206.9	193.4	179.7	130.0
Vietnam	62	15.0	15.0	12.6	14.0
Total world		20 797.7	22 164.3	22 066.5	22 674.5

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metals Statistics; World Bureau of Metals Statistics; International Primary Aluminium Institute.
– Nil; [e] Estimated; [r] Revised.