

# Lime

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## **INTRODUCTION**

**L**ime is a versatile chemical that is derived from the burning of high-purity calcitic or dolomitic limestone. High-calcium quicklime contains less than 5% MgO and is the most common type of lime produced. Magnesium quicklime contains 5-35% MgO and dolomitic quicklime (also referred to as do-lime) contains 35-45% MgO. Hydrated lime (calcium hydroxide,  $\text{Ca}(\text{OH})_2$ ), also known as slaked lime, is a dry powder manufactured by adding water to quicklime, converting the oxide to hydroxide. To produce lime, crushed limestone is burned in a kiln at temperatures ranging from 890° to 1340°C. A dissociation reaction, termed calcination, takes place when the limestone is broken down, releasing  $\text{CO}_2$  and producing high-calcium quicklime (CaO) or dolomitic quicklime ( $\text{CaO}\cdot\text{MgO}$ ). Type N lime is made up of  $\text{Ca}(\text{OH})_2$  and MgO, whereas type S lime consists of  $\text{Ca}(\text{OH})_2$  and  $\text{Mg}(\text{OH})_2$ . Approximately two tonnes of limestone are required to produce one tonne of quicklime.

## **CANADIAN INDUSTRY**

In Canada, the lime industry is divided into merchant producers and captive producers. Merchant lime production is destined for a variety of customers and industrial processes whereas captive production is a specific process requirement at one industrial plant. Lime for the merchant market is produced at 11 plants in six provinces (New Brunswick, Quebec, Ontario, Manitoba, Alberta, and British Columbia). Captive production is confined to two plants in Ontario and one in Alberta. Figure 1 shows the location of all lime plants in Canada as of December 31, 2006.

In 2006, Canadian captive and merchant lime producers shipped 2.211 Mt of quicklime and hydrated lime valued at \$271.7 million, based on preliminary data. Shipments

in 2005 were 2.288 Mt, based on final data. This represents a 3.4% decrease in shipments, which is similar to the decrease between 2004 and 2005. Table 1 provides statistics on Canadian production and trade while Table 2 shows apparent lime use in Canada for the period 1988-2006. Based on calculations in Table 2, apparent lime use has decreased 3.1% in the past year. Canada maintained its tenth-place ranking among major lime-producing countries in 2006, according to global production estimates by the U.S. Geological Survey. Quicklime accounted for 92.5% of the total volume and for 90.5% of the value of shipments in 2005 (does not include some captive production from pulp and paper plants). The capacity utilization rate in 2006 was 63.1% (based on merchant and captive production and published plant capacities). In terms of production trends, Figure 2 shows quicklime and hydrated lime production for the period 1994-2006. Total published calcining capacity for active plants stands at 3.571 Mt/y, as shown in Table 3. The industry employed about 700 people in 2006.

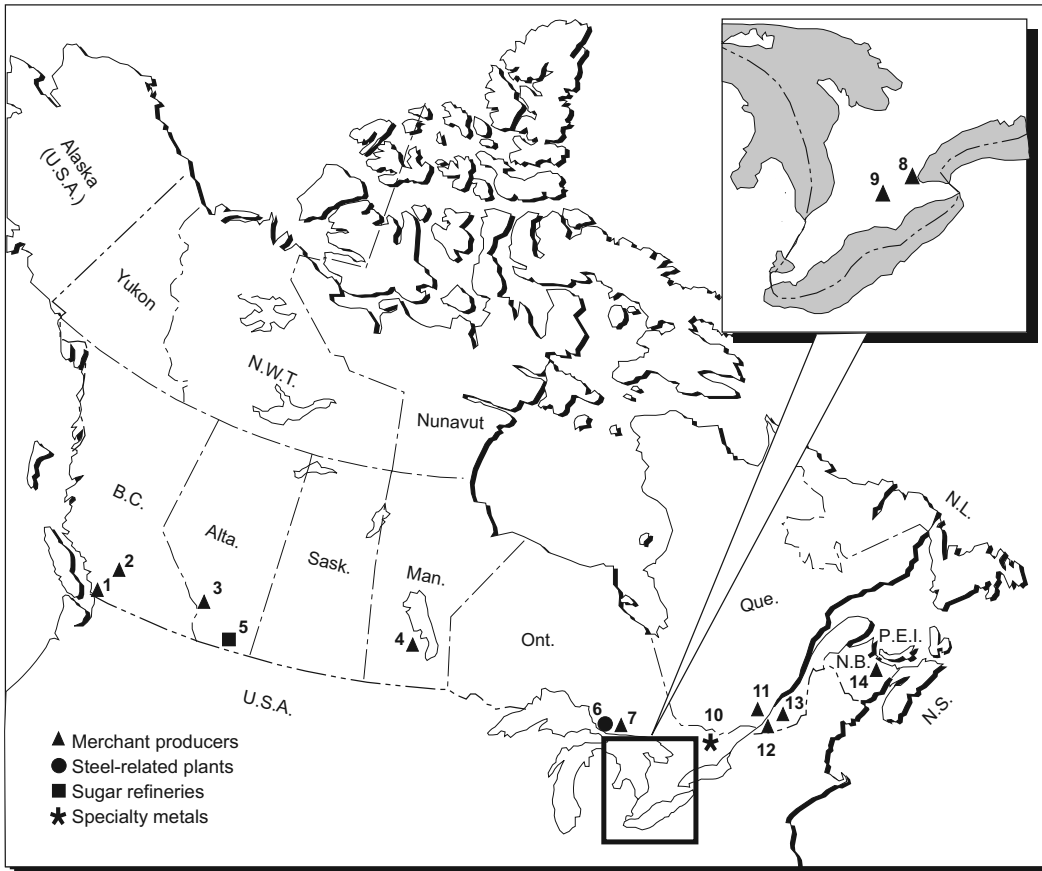
The main lime-producing companies in Canada are Graymont Limited, Carmeuse North America, and Chemical Lime Company of Canada Inc. Graymont operates seven lime plants across Canada, as well as plants and quarries in Ohio and Pennsylvania. It is the largest producer of lime products in Canada and the third largest in North America.

Graymont Western Canada Inc. has signed an agreement with Syncrude Canada Ltd. for the supply of high-calcium quicklime for a future flue gas desulphurization plant to be located at Syncrude's Mildred Lake site near Fort McMurray, Alberta. The plant is scheduled for completion in 2009. The company concluded a supply agreement with Nexen Inc., owner of the Long Lake bitumen production facility near Fort McMurray. It also announced that it had finalized an agreement with Athabasca Northern Railway that would see the construction of a new product transfer terminal located immediately south of Fort McMurray.

Carmeuse North America operates three plants in Canada and is owned by Carmeuse SA of Belgium. It also produces lime in Pennsylvania, Ohio, Alabama, Michigan, Indiana, Illinois, Kentucky, and Louisiana.

Chemical Lime Company of Canada Inc., owned by Lhoist Group of Belgium, is the second largest lime producer in

**Figure 1**  
**Lime Producers in Canada, 2006**



#### MERCHANT PRODUCERS

1. Chemical Lime Company of Canada Inc., Fort Langley
2. Graymont Western Canada Inc., Pavilion Lake
3. Graymont Western Canada Inc., Exshaw
4. Graymont Western Canada Inc., Faulkner
7. Carmeuse North America, Spragge
8. Lafarge Lime (Canada) Inc., Dundas Division
9. Carmeuse North America, Ingersoll
11. Graymont (QC) Inc., Joliette
12. Graymont (QC) Inc., Bedford
13. Graymont (QC) Inc., Marbleton
14. Graymont (NB) Inc., Havelock

#### STEEL-RELATED PRODUCERS

6. Algoma Steel Inc., Sault Ste. Marie

#### SUGAR REFINERIES

5. Rogers Sugar Ltd., Taber

#### SPECIALTY METALS

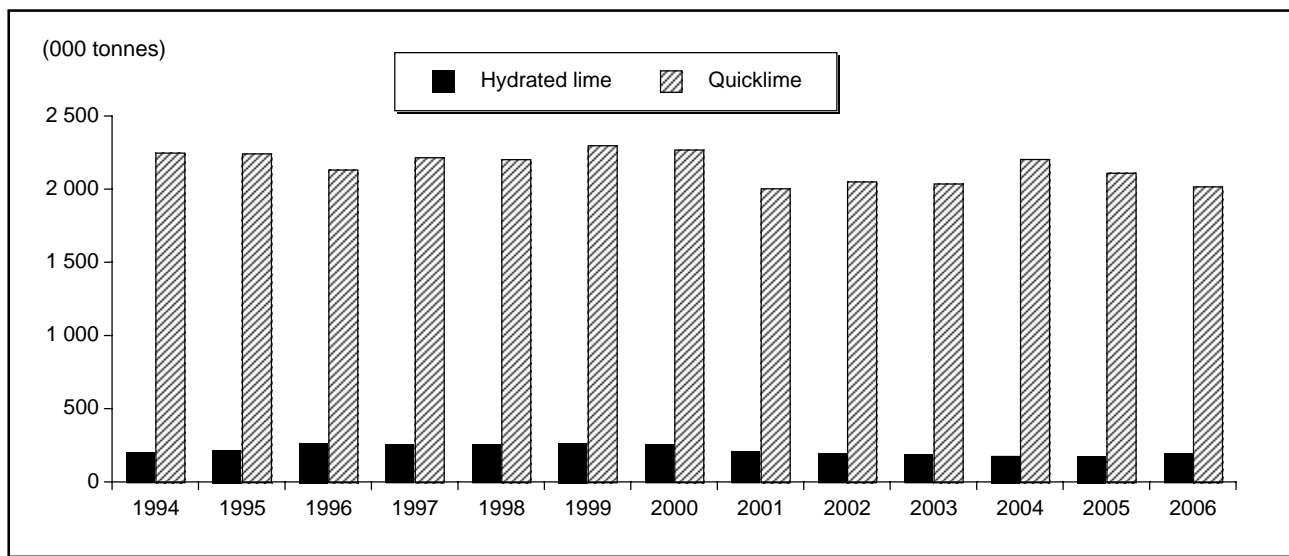
10. Timminco Limited, Haley Station

North America. It operates a lime plant at Fort Langley, British Columbia.

Birch Mountain Resources Ltd. is developing the Hammerstone project adjacent to its operating Muskeg Valley aggregate quarry operation near Fort McMurray, Alberta. The company submitted a revised prefeasibility report that includes plans to construct a 200 000-t/y quicklime

plant to be commissioned in 2009. In addition, it would install a limestone activation plant designed to remove bitumen from calcinable limestone, a process step that would allow the lime kilns to be equipped with preheaters. The company has submitted a revised Application and Environmental Impact Assessment to the provincial government. It has already purchased three rotary kilns, preheaters and other equipment from Northwest Alloys, Inc.

**Figure 2**  
**Canadian Lime Production, 1994-2006**



Source: Natural Resources Canada.

in Addy, Washington. The equipment will be stored in Fort McMurray pending regulatory approval for construction of its lime plant.

## USE

The use of quicklime, based on reported shipments for the merchant market, amounted to an estimated 1.883 Mt in 2006, compared to 1.970 Mt in 2005, a decrease of 4.4%. Hydrated lime shipments in the merchant market amounted to an estimated 178 505 t in 2006, compared to 163 255 t in 2005, an increase of 9.3%. Hydrated lime is used for environmental control, road construction and soil stabilization, and other industrial uses.

Table 4 shows a breakdown of uses for quicklime and hydrated lime in Canada for the period 1999-2006. Major uses for lime in Canada continue to be steel-making (43.4%), pulp and paper manufacturing (12.7%), water and sewage treatment (14.3%), and nonferrous metallurgy (7.9%). Figure 3 compares lime use data for 2004-06 in different industrial applications. The trend in recent years has seen an increase in demand for lime in the steel-making and pulp and paper industries and a slight decrease in the water treatment and nonferrous metallurgy sectors.

Data from the U.S. Geological Survey show lime consumption by major industries in the United States is: metallurgical (36.5%), flue-gas desulphurization (14.4%), water and sludge treatment (9.4%), chemical/industrial (22.3%), construction (14.4%), and refractory (1.5%).

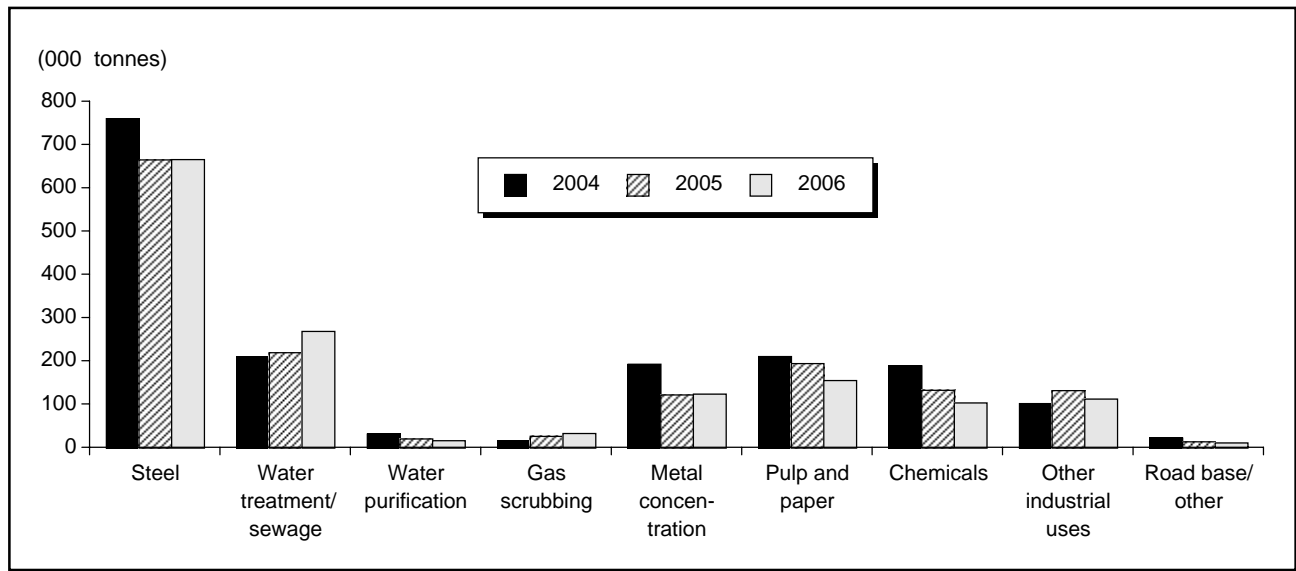
Lime is used in both ferrous and nonferrous metallurgical processes. In ferrous metallurgy applications (steel-making), high-calcium quicklime is used as a flux to remove impurities such as phosphorus and sulphur. Dolomitic quicklime, or do-lime, is of particular use in steel-making as it has the additional benefit of prolonging refractory brick life. In the basic oxygen furnace, up to 70 kg of lime is used per tonne of steel ingot produced. Often a blend of high-calcium and dolomitic quicklime is used as a flux and the total flux amount varies from 25 kg to 60 kg per tonne of steel produced in the electric arc process.

For nonferrous ores, lime is used in copper beneficiation to maintain the proper pH in the flotation process. It is also used in metallurgical processes that extract uranium, gold, nickel, aluminum, and silver. In the production of metallic magnesium, lime is used as the magnesium oxide is reduced using ferrosilicon.

In the pulp and paper industry, lime is used in sulphate process paper plants to reconvert sodium carbonate into sodium hydroxide (caustic soda) in the kraft pulping process. The by-product calcium carbonate is recalcined in a kiln to recover lime for re-use. Most plants operate their own kilns and the merchant producers, therefore, only supply make-up lime. Lime is also used to produce calcium bisulphite, an acid cooking liquor used to digest wood fibres, although this process is used less than the sulphate process due to environmental issues.

In the environmental sector, lime is used to control acid mine drainage in the vicinity of metal mines. Lime is

**Figure 3**  
**Lime Use (Quick and Hydrated) by Canadian Industry, 2004-06**



Source: Natural Resources Canada.

important for the treatment of municipal sewage and potable water. Lime is consumed in the flue gas desulphurization (FGD) process at coal-fired generating stations for the control of SO<sub>2</sub> emissions. It is consumed in dry and wet lime scrubbers and produces either calcium sulphite or calcium sulphate (gypsum). It is also added as a stabilizer to waste sludges before disposal. Other uses for lime include: sugar refining, where lime acts to precipitate out colloidal impurities (essentially captive production within the specific industrial plant), the production of precipitated calcium carbonate (PCC), and as an additive in hot-mix asphalt pavements.

In the road-paving industry, new high-performance asphalt mixtures, such as Superpave, use hydrated lime as an anti-stripping agent. Hydrated lime acts to reduce the incompatibility between the bitumen used as a cementing agent and the coarse aggregates. The lime improves the mechanical and chemical bonding properties between the bitumen and aggregate, reducing rutting and mechanical abrasion. Studies have shown that hydrated lime added to hot-mix asphalt adds 12% to the cost of construction, but increases the lifespan of the highway by 38%. The use of hydrated lime also allows for less asphalt cement in the paving mix.

High-calcium quicklime is commercially available in a variety of sizes, including lump (>6.3 cm), crushed or pebble (0.63-5.8 cm), ground (<2.4 mm), and pulverized (<0.84 mm). Slaked lime, also known as hydrated lime (Ca(OH)<sub>2</sub>), is produced by mixing quicklime with water, and it can be purchased as a putty, dry powder, or slurry.

Aglime, or agricultural lime, is pulverized limestone that is used for acid neutralization in soils.

## TRADE

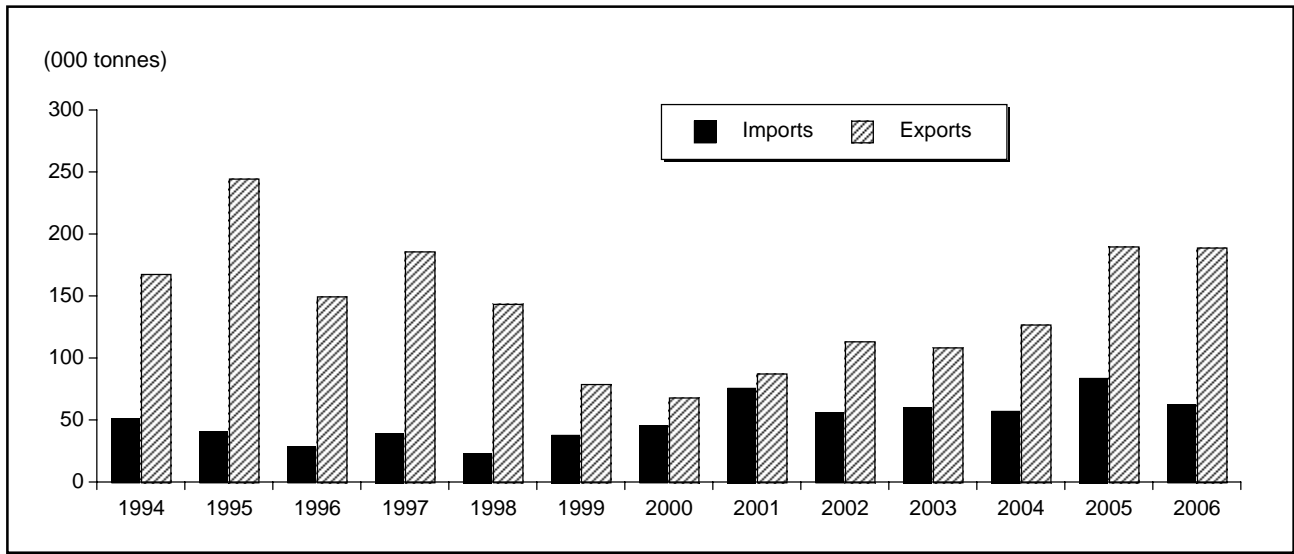
Total lime exports to the United States in 2006 were 201 346 t valued at \$28.5 million, up from 199 928 t valued at \$26.9 million in 2005 (Table 1). This represents about 73% of total lime imports into the United States. Canada imported 106 125 t of lime from the United States in 2006, compared to 95 053 t in 2005, an increase of 11.6%. Figure 4 shows imports and exports of quicklime for the period 1994-2006. Figure 5 shows hydrated lime trade data for the same period. Imports and exports of quicklime and hydrated lime with the United States vary from year to year depending upon local market demands in the industrial sectors that consume lime.

## INTERNATIONAL OVERVIEW

World lime production, based on figures from the U.S. Geological Survey, is estimated at 130 Mt in 2006, compared to 127 Mt in 2005 (Table 5, Figure 6). Production was led by China (25 Mt), followed by the United States (21.2 Mt). Other leading countries included Japan, Russia and Germany with 8.9 Mt, 8.5 Mt and 6.8 Mt, respectively.

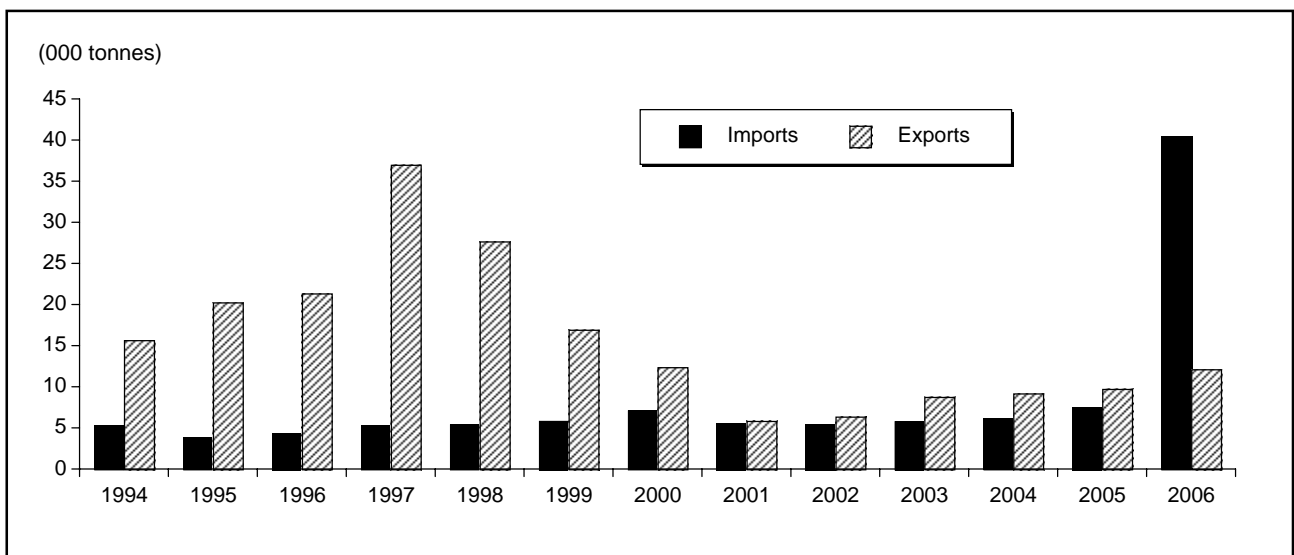
The United States produced 21.2 Mt of quicklime and hydrated lime in 2006, up 6% over 2005 production, from 95 plants, based on data from the U.S. Geological Survey.

**Figure 4**  
**Canadian Quicklime Trade, 1994-2006**



Source: Natural Resources Canada.

**Figure 5**  
**Canadian Hydrated Lime Trade, 1994-2006**



Source: Natural Resources Canada.

This increase is in part due to strong steel production. The top five lime producers in the United States were Carmeuse Lime Co., Chemical Lime Company, Graymont Inc., Mississippi Lime Company, and O-N Minerals.

Graymont Western US Inc. has concluded a deal with Ash Grove Cement Company to lease a lime hydration plant in Portland, Oregon. Graymont plans to supply the hydrator with quicklime from existing plants in Washington, Montana, Utah, and Nevada.

Chemical Lime Company announced plans to construct a lime hydration facility in Louisville, Kentucky, to serve a growing market for calcium hydroxide emission control reagents in the Ohio River area. It is also going ahead with construction of a new rotary preheater kiln and air emission controls at its New Braunfels, Texas, facility to be commissioned in 2008.

Carmeuse North America completed the acquisition of Rockwell Lime, of Manitowac, Wisconsin. The former company operated two rotary kilns with a combined annual capacity of 135 000 t that produced dolomitic lime and hydrated lime products.

## PRICES

Prices for lime produced in Canada vary according to region, company marketing strategies, and supply and demand forces in effect. The average reported values (f.o.b. plant) for 2006, based on producers' shipments

as listed in Table 1, were \$119.60/t for quicklime and \$157.32/t for hydrated lime. This represents an increase of 6.8% for quicklime and 8.9% for hydrated lime. Price increases have reflected increases in energy, raw materials, and labour costs. The U.S. Geological Survey reported an average value of US\$80.50/t for quicklime (an 11.7% increase) and US\$93.00/t for hydrated lime (a 2.1% increase) f.o.b. plant for 2006. Price increases in the 8-12% range were reported by most companies during 2006.

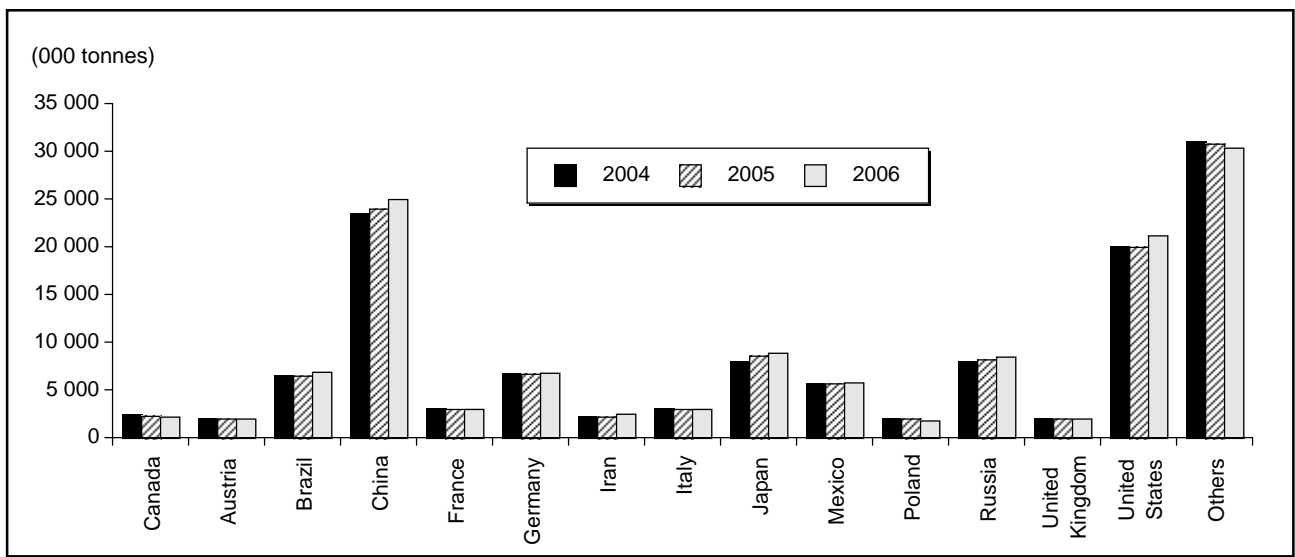
## ENERGY AND TECHNOLOGY

Table 3 lists the 14 lime plants in Canada along with kiln capacities and types. Most plants burn a combination of coal and petroleum coke and consume about 6-7 gigajoules of energy per tonne of lime produced.

About 60% of CO<sub>2</sub> emissions from lime kilns are related to the calcination process, but this figure varies somewhat depending upon the chemical composition of the limestone used. Reductions in CO<sub>2</sub> emissions will be achieved through advancements in kiln efficiencies that reduce the fuel requirements per tonne of lime produced and the implementation of CO<sub>2</sub> sequestration processes.

The U.S. Department of Energy is supporting a project to explore the viability of using direct causticizing in a circulating fluidized bed reactor instead of using lime to regenerate caustic soda in the pulp-making process. If this process change was made, pulp mills would no longer have to oper-

**Figure 6**  
**World Lime Production, 2004-06**



Source: U.S. Geological Survey.

ate an energy-intensive lime kiln. This would also reduce the demand for make-up lime from merchant producers.

Energy companies in the United States continue to make major investments in flue gas desulphurization equipment in order to comply with new emissions legislation, such as the Clean Air Interstate Rule (CAIR). It is reported that companies will spend US\$2 billion per year over the next five years on flue gas scrubber systems. A typical scrubber installation at a 1000-MW power plant is reported to cost in the US\$300 million range.

For example, Duke Energy of Charlotte, North Carolina, is constructing scrubber systems at the 1140-MW Allen Station in Belmont, North Carolina, at a cost of US\$425 million. The new scrubber systems will be designed to remove about 90% of the mercury from flue gases, helping utilities comply with the upcoming Clean Air Mercury Rule. Some of these installations use pebble lime as a reagent.

## OUTLOOK

Lime production in Canada is expected to decrease slightly in 2007 due to continuing lacklustre growth in the steel sector and plant closures in the pulp and paper sector. Some steel producers had already experienced a downturn in demand in late 2006 and this is expected to continue into 2007, along with larger steel inventories. The mining and nonferrous metallurgy sector remains in a growth pattern globally with record high commodity prices, which will increase demand for lime in that sector as new mines come on stream. Demand for scrubber lime for the electricity sector will stay on a growth trend. Canadian producers may benefit from this trend by exporting more lime south of the border. High energy costs will continue to put upward pressure on lime prices. Price increases in the

5-10% range can be expected for 2007, with quicklime prices around \$128/t and hydrated lime at \$168/t in 2007.

## RELEVANT CANADIAN LIME INDUSTRY WEB SITES

Canadian Lime Institute  
www.canadianlimeinstitute.ca  
Carmeuse North America  
www.carmeusena.com  
Chemical Lime Company of Canada Inc.  
www.chemicallime.com  
Graymont Limited  
www.graymont.com  
National Lime Association  
www.lime.org

*Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 65. (2) Information in this review was current as of June 29, 2007. (3) This and other reviews, including previous editions, are available on the Internet at [www.nrcan.gc.ca/mms/cm/com\\_e.html](http://www.nrcan.gc.ca/mms/cm/com_e.html).*

### NOTE TO READERS

**The intent of this document is to provide general information and to elicit discussion. It is not intended as a reference, guide or suggestion to be used in trading, investment, or other commercial activities. The author and Natural Resources Canada make no warranty of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.**

### TARIFFS

Item No.	Description	Canada			United States	EU	Japan
		MFN	GPT	USA	Canada	Conventional Rate (1)	WTO (2)
2518.20	Dolomite, whether or not calcined or sintered, including dolomite roughly trimmed or merely cut, by sawing or otherwise, into blocks or slabs of a rectangular (including square) shape; dolomite ramming mix: calcined or sintered dolomite	3%	3%	Free	Free	Free	Free
25.22	Quicklime, slaked lime and hydraulic lime, other than calcium oxide and hydroxide of heading no. 28.25						
2522.10	Quicklime	Free	Free	Free	Free	1.7%	Free
2522.20	Slaked lime	Free	Free	Free	Free	1.7%	Free
2522.30	Hydraulic lime	Free	Free	Free	Free	1.7%	Free

Sources: Canadian *Customs Tariff*, effective January 2007, Canada Border Services Agency; *Harmonized Tariff Schedule of the United States*, 2007; *Official Journal of the European Union* (October 17, 2006 Edition); *Customs Tariff Schedules of Japan*, 2007.

(1) The customs duties applicable to imported goods originating in countries that are Contracting Parties to the General Agreement on Tariffs and Trade or with which the European Community has concluded agreements containing the most-favoured-nation tariff clause shall be the conventional duties shown in column 3 of the Schedule of Duties. (2) WTO rate is shown; lower tariff rates may apply circumstantially.

TABLE 1. CANADA, LIME PRODUCTION AND TRADE, 2004-06

		2004		2005		2006 (p)	
		(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
<b>PRODUCTION (1)</b>							
By type							
	Hydrated lime	178 371	24 192	175 564	25 355	191 895	30 190
	Quicklime	2 207 465	232 750	2 113 259	236 493	2 019 508	241 523
	<b>Total</b>	<b>2 385 836</b>	<b>256 942</b>	<b>2 288 823</b>	<b>261 848</b>	<b>2 211 403</b>	<b>271 713</b>
By province							
	New Brunswick	x	x	x	x	x	x
	Quebec	x	x	x	x	x	x
	Ontario	1 129 783	122 412	1 021 331	117 613	976 042	119 982
	Manitoba	x	x	x	x	x	x
	Alberta	x	x	x	x	x	x
	British Columbia	x	x	x	x	x	x
	<b>Total</b>	<b>2 385 836</b>	<b>256 942</b>	<b>2 288 823</b>	<b>261 848</b>	<b>2 211 403</b>	<b>271 713</b>
<b>EXPORTS</b>							
2518.20	Calcined or sintered dolomite United States	21 590	2 743	43 682	5 247	45 950	5 368
2522.10	Quicklime						
	United States	127 085	20 760	189 987	25 569	189 017	26 905
	Malaysia	-	-	22	7	23	10
	Bermuda	-	-	...	...	-	-
	China	-	-	20	7	-	-
	Saint Pierre and Miquelon	-	-	7	2	-	-
	<b>Total</b>	<b>127 085</b>	<b>20 760</b>	<b>190 036</b>	<b>25 585</b>	<b>189 040</b>	<b>26 915</b>
2522.20	Slaked lime						
	United States	9 196	1 261	9 735	1 282	12 115	1 555
	Saint Pierre and Miquelon	2	1	5	3	7	4
	Cuba	-	-	-	-	4	3
	Thailand	-	-	-	-	4	1
	Israel	-	-	-	-	...	...
	<b>Total</b>	<b>9 198</b>	<b>1 262</b>	<b>9 740</b>	<b>1 285</b>	<b>12 130</b>	<b>1 563</b>
2522.30	Hydraulic lime						
	China	82	29	82	29	134	45
	United States	4	3	30	3	...	10
	Bermuda	-	-	39	9	43	8
	Jamaica	332	85	-	-	-	-
	Singapore	4	1	-	-	-	-
	<b>Total</b>	<b>422</b>	<b>118</b>	<b>151</b>	<b>41</b>	<b>177</b>	<b>63</b>
	<b>Total exports</b>	<b>158 295</b>	<b>24 883</b>	<b>243 609</b>	<b>32 158</b>	<b>247 297</b>	<b>33 909</b>
<b>IMPORTS (2)</b>							
2518.20	Calcined or sintered dolomite						
	United States	52 739	6 733	60 507	7 250	60 923	7 415
	Australia	-	-	-	-	15	2
	Denmark	-	-	-	-	9	1
	Germany	-	-	-	-	...	...
	Bhutan	...	...	-	-	-	-
	China	...	...	1	...	-	-
	<b>Total</b>	<b>52 739</b>	<b>6 733</b>	<b>60 508</b>	<b>7 250</b>	<b>60 947</b>	<b>7 418</b>
2522.10	Quicklime						
	United States	57 083	6 349	83 618	8 546	62 002	7 926
	France	3	...	-	-	345	244
	Switzerland	98	16	141	25	45	34
	China	-	-	1	...	5	4
	Germany	-	-	-	-	2	3
	Canada	106	29	137	32	3	1
	India	1	...	1	...	-	-
	<b>Total</b>	<b>57 291</b>	<b>6 394</b>	<b>83 898</b>	<b>8 603</b>	<b>62 402</b>	<b>8 212</b>
2522.20	Slaked lime						
	United States	6 113	1 198	7 500	1 340	40 438	2 066
	Germany	9	3	-	-	-	-
	Israel	30	5	-	-	-	-
	Taiwan	...	...	-	-	-	-
	Canada	-	-	...	...	-	-
	Italy	-	-	...	10	-	-
	<b>Total</b>	<b>6 152</b>	<b>1 206</b>	<b>7 500</b>	<b>1 350</b>	<b>40 438</b>	<b>2 066</b>

TABLE 1 (cont'd)

	2004		2005		2006 (p)	
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)
<b>IMPORTS (cont'd)</b>						
2522.30 Hydraulic lime						
United States	6 796	1 254	3 360	737	3 286	571
France	966	248	285	322	–	–
Italy	1	...	–	–	–	–
United Kingdom	–	–	9	393	–	–
Total	7 763	1 502	3 654	1 452	3 286	571
Total imports	123 945	15 835	155 560	18 655	167 073	18 267

Sources: Natural Resources Canada; Statistics Canada.

– Nil; ... Amount too small to be expressed; (p) Preliminary; x Confidential.

(1) Producers shipments and quantities used by producers. (2) Includes re-imports. HS code 2522.30, as interpreted, applies mainly to hydrated lime.

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

TABLE 2. CANADA, LIME PRODUCTION, TRADE AND APPARENT USE, 1988-2006

	Production (1)			Imports	Exports	Apparent Use (2)
	Quick	Hydrated	Total			
	(tonnes)					
1988 (a)	2 306 831	211 151	2 517 982	32 543	122 899	2 427 626
1989	2 349 312	202 622	2 551 934	39 096	83 607	2 507 423
1990	2 137 996	202 741	2 340 737	43 715	138 410	2 246 042
1991	2 184 836	190 424	2 375 260	45 011	134 405	2 285 866
1992	2 193 752	190 592	2 384 344	55 706	173 249	2 266 801
1993	2 186 749	192 247	2 378 996	52 690	190 068	2 241 618
1994	2 250 205	198 818	2 449 023	66 885	193 902	2 322 006
1995	2 244 800	216 916	2 461 716	52 883	266 476	2 248 123
1996	2 134 437	267 595	2 402 032	36 640	216 849	2 221 823
1997	2 219 385	257 186	2 476 571	47 382	224 233	2 299 720
1998	2 204 957	256 086	2 461 043	34 031	171 447	2 323 627
1999	2 299 705	265 746	2 565 451	54 535	96 058	2 523 928
2000	2 271 277	254 092	2 525 369	62 296	80 630	2 507 035
2001	2 007 078	205 568	2 212 646	94 150	93 516	2 213 280
2002	2 054 443	193 089	2 247 532	70 324	120 062	2 197 794
2003	2 035 611	185 387	2 220 998	78 277	117 505	2 181 770
2004	2 207 465	178 371	2 385 836	71 206	136 705	2 320 337
2005	2 113 259	175 564	2 288 823	95 053	199 928	2 183 948
2006 (p)	2 019 508	191 895	2 211 403	106 125	201 347	2 116 181

Sources: Natural Resources Canada; Statistics Canada.

(p) Preliminary.

(a) Beginning in 1988, exports and imports are based on the new Harmonized System and may not be in complete accordance with previous method of reporting. Imports and exports include HS classes 2522.10, 2522.20 and 2522.30.

(1) Producers' shipments and quantities used by producers. (2) Production plus imports, less exports.

**TABLE 3. CANADIAN LIME INDUSTRY, 2006**

Company	Plant Location	Calcining Capacity	Kiln Type	Market	Type of Quicklime and Other Products
(000 t/y)					
<b>NEW BRUNSWICK</b>					
Graymont (NB) Inc.	Havelock	175	V	Merchant	High-calcium (1)
<b>QUEBEC</b>					
Graymont (QC) Inc.	Marbleton	330	V, R	Merchant	High-calcium (1)
Graymont (QC) Inc.	Joliette	220	R	Merchant/captive	High-calcium (1)
Graymont (QC) Inc.	Bedford	400	R	Merchant	High-calcium
<b>ONTARIO</b>					
Algoma Steel Inc.	Sault Ste. Marie	200	..	Captive	High-calcium and dolomitic
Beachville Lime Limited	Ingersoll	900	R	Merchant	High-calcium (1) and dolomitic
Northern Lime Limited	Spragge	160	R	Merchant	High-calcium and dolomitic
Lafarge Lime (Canada) Inc., Dundas Division	Dundas	400	R	Merchant	High-calcium and dolomitic
Timminco Limited	Haley Station	53	..	Captive	Dolomitic
<b>MANITOBA</b>					
Graymont Western Canada Inc.	Faulkner	117	R	Merchant	High-calcium and dolomitic
<b>ALBERTA</b>					
Rogers Sugar Ltd.	Taber	66	..	Captive	High-calcium
Graymont Western Canada Inc.	Exshaw	180	R	Merchant	High-calcium (1)
<b>BRITISH COLUMBIA</b>					
Graymont Western Canada Inc.	Pavilion Lake	235	R	Merchant	High-calcium
Chemical Lime Company of Canada Inc.	Fort Langley	135	C	Merchant	High-calcium (1)

Source: Natural Resources Canada.

.. Not available.

Kiln type: V = vertical; R = rotary; C = calcimatic.

(1) Production of hydrated lime.

**TABLE 4. CANADA, USE (1) OF DOMESTIC LIME, QUICK AND HYDRATED, 1999-2006**

End Uses	1999	2000	2001	2002	2003	2004 (r)	2005	2006 (p)
(tonnes)								
<b>CHEMICAL AND INDUSTRIAL</b>								
Steel-making	780 877	632 284	530 605	730 180	664 225	761 208	665 642	666 384
<b>ENVIRONMENTAL</b>								
Water and sewage treatment	296 053	224 074	197 817	233 036	213 391	210 869	219 792	269 125
Water purification	51 323	37 445	48 420	38 590	34 320	31 472	20 623	16 577
Gas scrubbing	16 309	7 629	6 742	22 803	30 229	16 001	26 430	33 268
Total environment	363 686	269 148	252 979	294 429	277 940	258 342	266 845	318 970
Metal concentration	138 431	153 469	176 213	141 434	152 563	193 247	122 359	124 043
Pulp and paper mills	213 627	218 878	253 287	240 646	267 072	211 214	194 902	155 629
Chemicals	194 362	161 408	163 070	167 952	156 005	189 500	133 164	103 841
Other industrial uses	101 102	109 645	44 765	88 500	108 344	102 337	132 227	112 688
<b>CONSTRUCTION</b>								
Road and soil stabilization	15 810	x	x	x	x	x	5 552	3 918
Mason and finishing lime	x	x	x	x	x	x	1 950	x
Other	22 126	11 259	x	3 754	7 351	8 683	x	6 096
Total constructions	x	21 762	x	x	x	x	x	x
<b>AGRICULTURE</b>								
	x	4 699	x	x	x	x	x	x
Total use	1 834 124	1 571 293	1 447 722	1 688 145	1 651 014	1 742 031	1 533 841	1 498 954

Source: Natural Resources Canada.

(p) Preliminary; x Confidential.

(1) Includes merchant market only; excludes companies that are completely captive producers/users.

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

**TABLE 5. WORLD PRODUCTION OF QUICKLIME AND HYDRATED LIME, INCLUDING DEAD-BURNED DOLOMITE SOLD AND USED, 2000-2006**

	2000	2001	2002	2003	2004	2005	2006 (p)
	(000 tonnes)						
Canada	2 500	2 210	2 248	2 221	2 385	2 288	2 211
Austria	..	..	..	2 000	2 000	2 000	2 000
Belgium	..	..	..	..	..	2 000	2 000
Brazil	5 700	6 300	6 300	6 500	6 500	6 500	6 900
Bulgaria	..	..	..	..	..	2 500	2 500
China	21 500	22 000	22 500	23 000	23 500	24 000	25 000
France	2 400	2 400	2 500	2 500	3 000	3 000	3 000
Germany	7 600	7 000	7 000	7 000	6 700	6 700	6 800
Iran	..	..	..	2 200	2 200	2 500	2 500
Italy (1)	3 500	3 500	3 000	3 000	3 000	3 000	3 000
Japan (2)	7 700	8 100	8 050	7 800	7 950	8 600	8 900
Mexico	6 600	6 500	6 500	6 500	5 700	5 700	5 800
Poland	2 500	2 200	2 000	1 900	2 000	2 000	1 800
Russia	(3)	8 000	8 000	8 000	8 000	8 200	8 500
United Kingdom	2 500	2 500	2 000	2 000	2 000	2 000	2 000
United States	19 600	18 900	17 900	19 200	20 000	20 000	21 200
Other countries	33 995	28 056	28 002	26 179	31 065	26 012	25 889
<b>Total</b>	<b>116 095</b>	<b>117 666</b>	<b>116 000</b>	<b>120 000</b>	<b>126 000</b>	<b>127 000</b>	<b>130 000</b>

Sources: Natural Resources Canada; Statistics Canada; U.S. Geological Survey.

.. Not available; (p) Preliminary.

(1) Includes hydraulic lime. (2) Quicklime only. (3) Included with other countries.