

CANADA

Industry mulls **OPPORTUNITY** for new feedstock sources

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THE CANADIAN chemical industry had another good year in 2006. But with high energy prices cutting into industry profitability and a couple of prominent plant closures, the year wasn't as good as it could have been.

Industry observers expect another profitable year in 2007. Longer term, the Canadian petrochemical industry will need access to additional feedstocks if it is to expand.

According to C&EN projections based on figures culled from Statistics Canada, Canadian chemical shipments increased by 3.6% in 2006, hitting \$45.9 billion. Certain individual sectors, however, beat that pace: Basic chemicals grew at a robust 11.6% rate, and resins and synthetic fibers increased at a 9.7% clip. Chemical prices, meanwhile, inched up by only 1.4% during the year.

Projections by the Canadian Chemical Producers Association shed more light on last year in Canada's chemical sector. CCPA projects that Canadian sales of basic chemicals and resins grew by 10% in 2006, hitting \$25.9 billion. Volumes, meanwhile, increased by 6.0%, and prices increased by 4.0%.

According to CCPA, before-tax operating profits for Canadian chemical manufacturers declined by 7.0% in 2006 to \$1.5 billion. David Shearing, the association's senior manager of business and economics, explains that the industry didn't keep up with rising energy prices. "Prices went up to cover a lot of the cost, but they couldn't recover all of it," he says.

A couple of Canadian industry bellwethers, however, posted large profit gains for the first three quarters of 2006. Nova Chemicals' olefins segment, which operates solely in Ontario and Alberta, reported a 35% gain in before-tax profits to \$633 million for the first nine months of 2006 versus the year-earlier period. Sales increased 20% to \$3.2 billion. Nine-month chemical profits at Imperial Oil, ExxonMobil's Canadian affiliate, jumped 21% to \$95 million.

Val Mirosch, Nova's president of olefins and feedstocks, attributes the strength, a record for the olefins segment in the third quarter, to strong ethylene demand and

prices. Moreover, the "Alberta advantage," the cost benefit that ethane-based ethylene crackers in Alberta enjoy versus similar plants on the Gulf Coast, almost tripled from its usual 6-7 cents per lb to a record 17 cents. Mirosch credits a wide natural gas price differential between the Gulf and Alberta.

Observers expect 2007 to be another good year for chemicals. On the basis of surveys of its members, CCPA forecasts chemical sales to increase by 1% this year on flat volumes and a moderate increase in selling prices. Operating profits are expected to surge by 18% to \$1.8 billion. Capital expenditures are forecast to rise by 17% to \$1.2 billion, their highest level since 2000.

Mirosch expects Nova to have a year similar to 2006. "We don't see anything that wouldn't mirror 2006 in terms of our economics and maintaining our costs," he says.

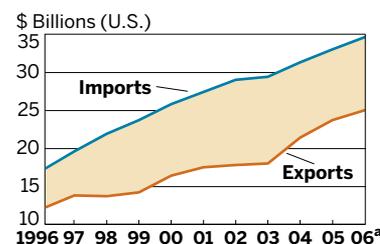
J. S. (Steve) Griffiths, vice president and general manager of petrochemicals at Imperial Oil's products and chemical division, agrees. "We're looking for a strong year again in 2007," he says. "There should be a couple more years of strength for the chemical business."

But Griffiths warns of changes for the North American petrochemical industry by about 2011 as plants start up in the Middle East and Asia. These facilities will gradually

undermine the ability of the North American industry to export overseas and could also generate imports of downstream chemical products such as polyethylene film. "Every year, there will be a little more of a margin squeeze as a result of imports," he says.

Plant closures put a damper on Canadian chemicals in 2006. In particular, a seemingly obscure

TRADE Chemical trade deficit grew once again in 2006



NOTE: All data were converted at the exchange rate of \$1.00 U.S. = \$1.133 Canadian.

a C&EN estimates.

SOURCES: Statistics Canada, Industry Canada

PRODUCTION

Canadian chemical output largely declined in 2006

THOUSANDS OF METRIC TONS	2002	2003	2004	2005	2006 ^a	CHANGE 2005-06
Ammonia	4,501	4,455	4,996	4,607	4,444	-3.5%
Ammonium nitrate	1,152	1,031	1,096	1,206	1,120	-7.2
Benzene	849	843	915	798	724	-9.3
Butadiene	276	276	289	245	251	2.6
Chlorine	1,095	994	1,057	1,004	988	-1.6
Ethylene	4,734	4,729	5,095	na	na	na
Hydrochloric acid (100%)	151	153	149	141	162	14.6
Nitric acid	1,143	1,105	1,219	1,147	1,121	-2.2
Polyethylene ^b	3,330	3,083	3,587	3,366	3,613	7.3
Polystyrene ^c	195	183	207	198	194	-2.0
Propylene	956	938	939	737	755	2.5
Sodium chlorate	1,055	1,029	1,183	1,169	1,125	-3.8
Sodium hydroxide	1,111	1,059	1,146	1,117	1,071	-4.2
Sulfuric acid	3,887	3,465	3,933	3,755	3,828	1.9
Toluene	256	289	na	na	na	na
Urea	3,436	3,311	3,654	3,549	na	na
Xylenes	294	336	351	na	na	na

a C&EN estimates. **b** Includes low-, linear low-, and high-density resins. **c** Includes acrylonitrile-butadiene-styrene resins. **na** = not available. **SOURCE:** Statistics Canada

event early in 2006 had drastic effects on the industry by year's end.

In March, BP's Cochin Pipeline System, a 1,800-mile natural gas liquids pipeline connecting Fort Saskatchewan, Alberta, to Sarnia, Ontario, suspended shipments of ethylene "at least" until fall 2007. BP said it needed to lower the pressure in the pipeline "to ensure a proper safety margin for operations." Ethylene, the company explained, has a higher vapor pressure than other products in the pipeline such as ethane, propane, and butane.

Cochin supplied ethylene to Dow Chemical's 220 million-lb low-density polyethylene (LDPE) plant in Sarnia. Citing the lengthy ethylene outage, Dow announced in late August that it would permanently shutter the unit over the following weeks.

Jeff Johnston, president of Dow Chemical Canada, says the company exhausted all of its options in securing a supply of ethylene to keep the LDPE plant running, including buying ethylene from competitors in the Sarnia area. "We were never able to come up with other sources of ethylene that made any economic sense," Johnston says.

With the LDPE closure also came news that the company was closing all its other units at the site, including a polystyrene unit, slated to close in September, and acrylic latex and propylene oxide derivatives units, set to close in 2008. In addition, the company is planning to sell its hydrocarbon storage caverns and permanently shut down its Sarnia product development plant. All told, some 340 Dow employees and 40 contractors in the Sarnia area are affected.

JOHNSTON EXPLAINS that losing the LDPE plant, Dow's most profitable unit in Sarnia, caused a "domino effect" and made the entire complex uncompetitive. "We determined that without that major participant at the site, it became very hard to maintain long-term competitiveness," he says.

For Imperial, the Cochin pipeline bridged the supply gap between the company's 1 billion-lb polyethylene plant and 600 million-lb ethylene cracker in Sarnia. Griffiths says Imperial has so far been able

to work around the Cochin outage with ethylene purchases.

When it announced the Sarnia closures, Dow said it would also close its Fort Saskatchewan chlor-alkali facility and a downstream ethylene dichloride (EDC) plant by the end of October. Last year, the company closed a vinyl chloride plant downstream

as an industry, we have to understand what we want to do with that position."

In the short term, Nova's Mirosh says, there is more ethane available in Alberta because Dow isn't converting as much into ethylene as it had been. During this time of the year, he adds, Nova typically supplements its ethane feedstock with propane.

"We have had to do less propane cracking than we otherwise would have been doing in this situation," he says.

Longer term, the chemical industry in Alberta, which today runs mostly on ethane extracted from local natural gas, has pinned its hopes on extracting ethane from natural gas pipelines that would come down from the North Slope of Alaska or the Northwest Territories' Mackenzie Delta sometime in the next decade. It is also looking increasingly at northern Alberta's burgeoning tar sands industry, which may yield enough by-product ethane, propane, ethylene, and propylene to support petrochemical production.

In the meantime, the industry is eyeing extracting ethane from natural gas liquids that are already leaving the province and being burned as fuel in the U.S. The government of Alberta has proposed offering incentives of up to \$31 million in royalty credits on new ethane supplies.

According to Mirosh, the proposed policy is a step in the right direction. "Those types of dollars are fairly significant and would encourage the extractors of

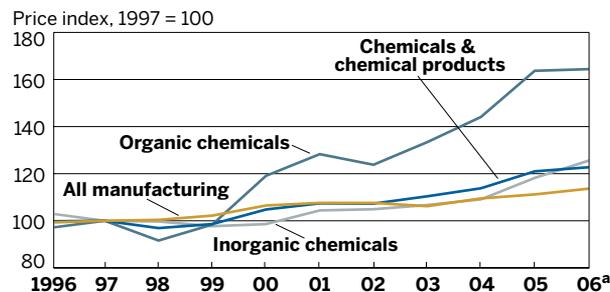
ethane to look at projects that to date they haven't looked at," he says. The proposals, he adds, could unlock another 50,000 barrels of ethane a day, enough to support an ethylene cracker expansion in Alberta.

Chemical expansions may get under way in the Sarnia area as well. Shell Canada is spending about \$43 million on a study for a heavy-oil refinery based on tar-sands-derived feedstocks. A Shell spokesman says it is too soon to tell if the project will yield chemicals. The final decision for the plant is expected within the next two to three years.

But such a plan, if it moves forward, would mark a new era for the Canadian chemical industry, one in which it grows beyond dependence on conventional oil and natural gas as feedstocks. ■

PRICES

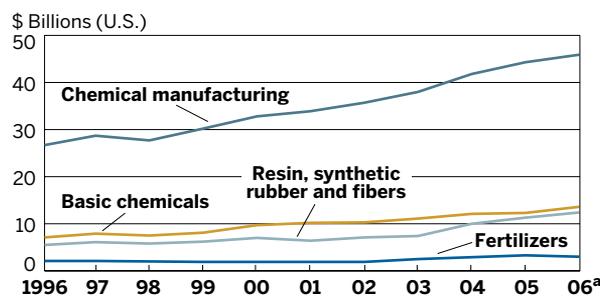
Canadian chemical prices increased only slightly in 2006



^a C&EN estimates. SOURCE: Statistics Canada

SHIPMENTS

Canadian firms' sales increased despite soft volumes



NOTE: All data were converted at the exchange rate of \$1.00 U.S. = \$1.133 Canadian. ^a C&EN estimates. SOURCE: Statistics Canada

from the EDC unit. Johnston says the chloro-vinyls production at the site was no longer globally competitive. "That was a decision that started with vinyl chloride and worked its way up," he says.

Although a blow to the Alberta industry, the closure of the EDC and LDPE units may create other opportunities by freeing up more than 600 million lb of annual ethylene capacity. Johnston hasn't ruled out Dow or another company building a polyethylene plant or other derivatives unit to soak up that excess capacity. "If you look at the overall balances in the market that were brought on by the Cochin shutdown and our EDC facility shutdown, the province of Alberta is long on the ethylene side right now," he says. "As we move forward