TRADE NEGOCIATIONS STUDIES:

DOCUMENTS RELEASED UNDER THE ACCESS TO INFORMATION ACT, MAY 21, 1986

STUDY NO. 18:

Sectoral profile: energy products. (Dept. of Energy, Mines and Resources. August 1985)

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SECTORAL PROFILES

Energy, Mines and Resources
CANADA

August, 1985

Sectoral Profile: Energy Products

1. Scope of the Sector and its Place in the Economy

The energy products sector's contribution to GDP (current$) in 1982 was $25.8 billion, approximately 8% of total GDP. Crude petroleum and natural gas industries accounted for 4% of total GDP, electrical power 3% and the remaining sectors less than 1% each.

The sector's contribution to real GDP was less, at 5%. However, the large relative increases in crude oil prices since 1973 result in the understatement of the crude oil and natural gas industries' importance if real GDP figures are used as indicators. Therefore, nominal GDP figures are a better indicator of this sector's importance to the Canadian economy.

Employment in all sectors of the energy products grouping totals about 185,000, approximately 2% of total employment. Eighty-three thousand people were employed in the electrical power sector in 1984, 43,000 in crude petroleum and natural gas industries, 22,000 in petroleum and coal products industries, 10,000 in coal mines, with the sectors of gas distribution, pipeline transport and uranium accounting for the remainder.

Table 1.1 to 1.7 show real and nominal GDP for the various components of the sector from 1973 to 1984. Employment data at this level of disaggregation are only available for 1983 and 1984.

Energy exports totalled $15.6 billion in 1984, 13.8% of total merchandise exports. Energy imports were a lesser $6.2 billion (6.4% of total merchandise imports). The surplus on energy trade represents 56% of the total merchandise trade surplus.

Tables 2.1 and 2.2 show exports and imports of energy commodities from 1973 to 1984.

The export of natural gas, surplus to future Canadian requirements has been the country's largest energy export in terms of value in the 1980's contributing approximately $4 billion to Canada's trade balance in 1984. All gas was exported to the U.S.

Crude oil exports from Canada ($4.4 billion in 1984) were exported to the U.S., while crude oil imports ($3.4 billion in 1984) came from a variety of countries. (see Table 3.1).

In terms of coal trade, 44% of Canadian production, valued at $1.8 billion at the port was shipped overseas. The bulk of exports went to Japan (65.8%) and to Korea (14.2%). Exports to the U.S. were only 0.7% of the total in 1984 and no significant change in this is expected.

Electricity exports ($1.4 billion in 1984) have been steadily increasing over the 1973-1984 period, with all export going to the U.S.

Table 3.1 indicates sources of crude oil imports and Table 3.2 shows destinations for coal exports. Where commodities are wholly or primarily sent to or received from the U.S. no separate table is given.

Scope of the Energy Sector and its Place in the Economy

Summary

1) Energy Sector GDP

Tables 1.1 to 1.7 show real and nominal GDP for the various components of the sector from 1973 to 1984. Employment data at this level of disaggregation are only available for 1983 and 1984.

A description of the SIC for each industry is included at the end of this section.

2) Energy Sector Exports and Imports

Tables 2.1 and 2.2 show exports and imports of energy commodities from 1973 to 1984.

3) Sources of Imports and Destinations of Exports

Where commodities are wholly or primarily sent to or received from the United States no separate table is given. Table 3.1 indicates sources of crude oil imports, table 3.2 shows destinations for coal exports.

Table 1.1

Crude Petroleum and Natural Gas Industries
1970 SIC: 064

	Real GDP		Nominal GDP	
	million of 1971 $	% of total	million of current $	% of total
1973	1559	1.6	2007	1.8
1974	1489	1.5	2932	2.2
1975	1312	1.3	3567	2.4
1976	1245	1.2	4194	2.5
1977	1263	1.2	5166	2.8
1978	1262	1.1	5503	2.6
1979	1422	1.2	7450	3.1
1980	1386	1.2	9498	3.5
1981	1282	1.1	10282	3.4
1982	1253	1.1	12832	4.0
1983	1289	1.1	N/A	N/A
1984	1372	1.1	N/A	N/A

Employment

		% of total
1983	42768	0.4
1984	43441	0.4

Source: Statistics Canada, Gross Domestic Product by Industry, 61-213, 61--005; Employment Earnings and Hours, 72-002.

Table 1.2

Petroleum and Coal Products
1970 SIC: 365,369

	Real GDP		Nominal GDP	
	million of 1971 $	% of total	million of current $	% of total
1973	358	0.4	343	0.3
1974	359	0.4	461	0.4
1975	344	0.3	454	0.3
1976	314	0.3	558	0.3
1977	291	0.3	722	0.4
1978	294	0.3	634	0.3
1979	256	0.2	827	0.3
1980	259	0.2	999	0.4
1981	265	0.2	1231	0.4
1982	224	0.2	1062	0.3
1983	216	0.2	N/A	N/A
1984	221	0.2	N/A	N/A

Employment

		% of total
1983	23,001	0.3
1984	21,779	0.3

Source: see table 1.1

Table 1.3

Coal Mines
1970 SIC: 061

	Real GDP		Nominal GDP	
	million of 1971 $	% of total	million of current $	% of total
1973	103	0.1	135	0.1
1974	104	0.1	214	0.2
1975	123	0.1	398	0.3
1976	112	0.1	409	0.2
1977	122	0.1	444	0.2
1978	134	0.1	476	0.2
1979	150	0.1	529	0.2
1980	165	0.1	527	0.2
1981	173	0.1	559	0.2
1982	194	0.2	674	0.2
1983	200	0.2	N/A	N/A
1984	273	0.2	N/A	N/A

Employment

		% of total
1983	10,070	0.1
1984	10,240	0.1

Source: see table 1.1

Table 1.4

Electric Power
1970 SIC: 572

	Real GDP		Nominal GDP	
	million of 1971 $	% of total	million of current $	% of total
1973	2060	2.2	2145	2.0
1974	2227	2.2	2514	2.0
1975	2222	2.2	2774	1.9
1976	2478	2.4	3419	2.0
1977	2630	2.4	4357	2.3
1978	2801	2.5	5231	2.5
1979	2977	2.6	6059	2.5
1980	3099	2.6	6909	2.5
1981	3183	2.6	7867	2.6
1982	3194	2.8	8928	2.8
1983	3364	2.8	N/A	N/A
1984	3625	2.9	N/A	N/A

Employment

		% of total
1983	82477	0.8
1984	82792	0.8

Source: see table 1.1.

Table 1.6

Pipeline Transport
1970 SIC: 515

	Real GDP		Nominal GDP	
	million of 1971 $	% of total	million of current $	% of total
1973	536	0.6	530	0.5
1974	534	0.5	574	0.4
1975	515	0.5	613	0.4
1976	498	0.5	666	0.4
1977	503	0.5	751	0.4
1978	489	0.4	866	0.4
1979	539	0.5	1025	0.4
1980	499	0.4	1111	0.4
1981	486	0.4	1416	0.5
1982	475	0.4	1721	0.5
1983	480	0.4	N/A	N/A
1984	534	0.4	N/A	N/A

	Employment	
		% of total
1983	7854	0.07
1984	7487	0.07

Source: see table 1.1

Table 1.7

Uranium

	Nominal GDP Millions of Dollars	% of total GDP	Employment	% of Total Employment
1976	196	0.1	3430	less than 0.1
1977	300	0.2	4140	less than 0.1
1978	502	0.2	4965	0.1
1979	525	0.2	5858	0.1
1980	559	0.2	6304	0.1
1981	610	0.2	6869	0.1
1982	600	0.2	6035	0.1

Source: Canadian Minerals Yearbook and Statistics Canada 26-223 Annual

1970 SIC's for the Energy Sector

Major Group 2 – Mineral Fuels

Major Group 13 – Petroleum and Coal Products Industries

Major Group 4 – Electric Power, Gas and Water Utilities

Table 7.1

ENERGY EXPORTS

(million of $)

Period	Crude Oil	Petroleum Products	Natural Gas	Coal	Coal Products	Electricity	Radioactive[1] Products	LPG[2]	Total	Energy as a % of Total Merchandise Export
1973	1 482	301	151	165	11	109	93		2 512	9.9
1974	3 420	598	494	251	12	175	99		5 051	15.5
1975	3 052	632	1 092	478	5	104	133		5 496	16.4
1976	2 287	549	1 616	557	10	162	253		5 434	14.3
1977	1 751	615	2 028	596	11	177	236		5 636	12.7
1978	1 577	991	2 190	690	14	479	658		6 599	12.4
1979	2 404	1 861	2 889	712	10	729	981		9 614	14.7
1980	2 899	1 992	3 904	794	30	771	856		11 128	14.8
1981	2 615	2 611	4 330	1 037	29	1 123	850		12 636	15.1
1982	2 729	2 489	4 755	1 136	27	1 120	791		13 089	15.5
1983	3 537	1 750	3 958	1 232	15	1 228	430	1051	13 201	14.5
1984	4 417	2 057	3 886	1 821	30	1 379	875	1106	15 571	13.8

1) Includes uranium concentrates, uranium hexafluoride, radio isotopes for industrial and medical use, heavy water, and miscellaneous radio elements and isotopes.

2) Liquified petroleum gases, ethane exports included with petroleum products.

Source: Statistics Canada, Exports by Commodities (65-004), Imports by Commodities (65-007).

Table 2.2

Energy Imports

(million of $)

Period	Crude Oil	Petroleum Products	Natural Gas	Coal	Coal Products	Electricity	Radioactive[1] Products	LPG[2]	Total	Energy as a % of Total Merchandise Import
1973	942	194	8	166	19	6	24		1 359	6.0
1974	2 646	323	6	801	46	5	16		3 349	10.8
1975	3 302	211	8	536	61	11	12		4 189	12.1
1976	3 280	180	9	541	33	9	12		4 070	11.1
1977	3 209	242	-	611	58	15	28		4 169	8.1
1978	3 470	297	-	683	39	2	12		4 491	9.2
1979	4 478	120	-	864	30	1	12		5 745	9.4
1980	6 877	610	-	810	35	2	17		8 391	12.3
1981	7 840	787	1	814	94	4	15		9 537	12.1
1982	4 974	779	1	912	85	5	17		6 793	10.0
1983	3 275	750	-	840	101	1	15	196	5 180	6.8
1984	3 336	1 407	1	1 094	109	11	15	116	6 150	6.4

1) Primarily uranium concentrates to be toll-refined in Canada for re-export to third countries.

2) Liquified Petroleum Gases, ethane imports included with petroleum products.

Source: see table 2.1.

3) Sources of Imports and Destinations of Exports

I. Imports

Crude Oil	-	see table 3.1
Natural Gas	-	small amount imported from United States
Electric Power	-	all imports from United States
Coal	-	almost all imports from the United States
Petroleum & Coal Products	-	50 to 60 per cent imported from the United States
Uranium	-	small amount imported from South Africa

II. Exports

Crude Oil	-	close to 100% exported to the United States
Natural Gas	-	100% exported to the United States
Electric Power	-	100% exported to the United States
Coal	-	See table 3.2
Petroleum & Coal Products	-	80 to 90 per cent exported to the United States
Uranium	-	primarily to Japan, Western Europe, and the United States.

Source: Bank of Canada Review, June 1985

Table 3.1

Major Sources of Crude Oil Imports (% of total crude imports)

	Iran	Mexico	Nigeria	Saudi Arabia	U.A.E.	Venezuela
1974	24	0	2	13	10	43
1975	25	0	3	20	10	31
1976	23	0	4	15	8	37
1977	18	0	1	24	2	40
1978	19	0	0	22	0	34
1979	8	0	0	32	1	35
1980	0	0	1	39	1	30
1981	0	10	1	32	1	27
1982	3	16	1	16	1	34
1983	18	23	6	3	0	23

Source: Energy Statistics Handbook, E.M.R.

Table 3.2

Canadian Coal Exports
(kilotonnes)

	1980	1981	1982	1983	1984
Japan	11,123	10,486	10,757	10,845	16,543
South Korea	1,296	1,733	2,276	2,313	3,583
Europe	1,434	1,444	1,971	1,549	2,229
Latin America	953	1,470	338	1,167	1,360
United States	1	67	71	137	191

Canadian Coal Exports
(% of total)

	1980	1981	1982	1983	1984
Japan	73	67	67	64	66
South Korea	8	14	14	14	14
Europe	9	9	12	9	9
Latin America	6	9	2	7	5
United States	0.01	0.4	0.4	1	1

Source: Statistical Review of Coal in Canada, 1984, Energy, Mines and Resources.

SECTORAL PROFILE: URANIUM

II Structural Characteristics

Canada produced some 11200 tonnes of uranium in 1984, equivalent to some 30 per cent of the western world's total production. Only five producers account for the total. Two of these operate large tonnage, low-grade, labour intensive, underground operations in the Elliot Lake area of Ontario, while the remaining three produce primarily by open pit methods from relatively high grade deposits in Northern Saskatchewan. Over 50 per cent of Canada's total production comes from Saskatchewan. Total employment at producing operations in 1984 was 5800, of which 82 per cent was associated with the Elliot Lake operations. Principal statistics for uranium are incorporated in those for the total minerals and metals sector.

Canada is currently the leading uranium producer in the western world. The industry is cost competitive and expected to remain so for sometime, particularly with respect to the production from the recently discovered very high grade deposits in Northern Saskatchewan.

The existing uranium producing industry is largely Canadian owned. Three of the five producers, Denison Mines Limited, Key Lake Mining Corporation (KLMC) and Eldorado Resources Limited are Canadian companies, the latter being a federal Crown Corporation. A provincial Crown Company, Saskatchewan Mining Development Corporation (SMDC), holds the majority interest in KLMC; a significant share of KLMC is also held by German interests and a small share by Eldorado. The two remaining producers, Rio Algom Limited and Cluff Mining are controlled by British and French interests, respectively.

In contrast to the situation in the uranium producing industry, uranium exploration activity is currently dominated by foreign interests. In 1983, almost two-thirds of uranium exploration expenditures in Canada was attributable to foreign companies. French, German, British, Japanese, South Korean, Italian and US firms were represented.

Eldorado operates the only uranium refinery in Canada, which is one of only five in the western world.

In 1984 Canadian producers made total shipments of 9693 tonnes of uranium, valued at some $916 million. Over 85 per cent of this total was destined for export, an approximate ratio that has been maintained for several years. Japan has been Canada's most important single customer, receiving about 32 per cent of Canada's total exports since the beginning of the commercial contract era. Most of the remaining exports have gone to the European Economic Community (33 per cent), the United States (18 per cent), and other countries in Western Europe (16 per cent).

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III Market Access Impediments and Vulnerabilities

A.United States restriction on the enrichment, in USDOE enrichment facilities, of uranium intended for domestic use provided an effective import embargo on non-US uranium for almost 10 years, beginning in the late 1960s. Although the restriction was phased out by 1984, there is currently renewed pressure within the US for some sort of import restrictions, in response to declining US uranium production.

An amendment to the Nuclear Regulatory Commission (NRC) Authorization Act of January 4, 1983, requires that the US Secretary of Energy submit to Congress an annual assessment of the viability of the domestic mining and milling industry. A mechanism also provides for the initiation of an investigation by the US International Trade Commission if it is determined that the level of uranium imports will be a substantive cause of serious injury to the US uranium industry, and by the Secretary of Commerce, if imports exceed 37.5 per cent of domestic uranium requirements for two consecutive years, or if the level of imports threatens or impairs national security. The actual determination of viability rests with the Secretary of Energy.

The Secretary of Energy's first annual determination of viability was released in December 1984, based on the criteria of resource capability, supply response capability, financial capability, and import commitment dependency. This first determination found the US uranium industry to be viable. The Secretary's second annual determination is expected to be released in the fall of 1985, and may well find the industry to be not viable. Such a determination would trigger investigations by the US International Trade Commission and the Secretary of Commerce, followed by the imposition of import restrictions.

SECTORAL PROFILE: NATURAL GAS

Structural Characteristics

The export of natural gas surplus to future Canadian requirements has been the country's largest energy export in terms of value in the 1980's, contributing approximately $C 4 billion to Canada's trade balance in 1984. Approximately one-third of Canada's natural gas production is exported to numerous U.S. interstate pipelines and distributors by eleven exporters who purchase the volumes from more than 700 producers in Alberta and British Columbia. Only production from these two provinces is exported with Alberta gas representing more than 90 percent of the exported volumes. Although there are more than 700 gas producers, approximately 25 companies account for the majority of gas production. The level of Canadian ownership varies on a company-to-company basis, but overall the energy industry's ownership level is less than 50 percent. Tables 1 through 3 provide statistics on export/import volumes and gas production levels by province and by major producer.

Canadian exports have historically supplied four to five percent of the U.S. market with the key market areas being the Midwest and Pacific states. Canadian exports have generally followed changes in the U.S. market. As U.S. demand has declined since 1979, export volumes in the 1980's have been substantially below authorized levels. Exports in the 1984-85 contract year may only be in the range of 25,300 $10^6 m^3$ or 57 percent of licenced exports.

Canada has allowed short-term exports of gas to U.S. customers on a best-efforts, interruptible basis since November 1984, however, these volumes remain insignificant at less than two percent of projected 1984-85 exports.

The natural gas industry has invested approximately $C 6 billion in production and transmission facilities to provide natural gas to export markets. Despite efforts to seek new markets, Canadian gas exports are solely to the United States. Although exports are below authorized limits, pipeline capacity would limit exports to approximately 42.5 to 48.2 $10^6 m^3$ annually. Substantial volumes authorized to flow to the U.S. Northeast will require in excess of $C 1.2 billion in facilities additions before the exports can occur.

Construction and operating costs are estimated to be higher in Canada than in most areas in the U.S. because of our severe winter climate and transportation distances to markets. It is estimated that Canada's reserve replacement costs are lower than those in the U.S.

The Canadian gas industry differs from the U.S. gas industry in two ways. First, Canada has a significant reserves to consumption ratio, 30 years to 9 years for the United States, providing a substantial security of supply to both domestic and export consumers. Second, gas sales contracts in Canada tend to be reserves based while U.S. contracts are based on well deliverability. The former contracts are viewed as representing a more secure supply source due to the emphasis on production at a constant rate rather than production at a well's economic limit. This difference has not, however, been translated into a price premium for Canadian gas.

The structure of government/regulatory approvals also merits note. In Canada, gas volumes proposed for export must receive an energy removal permit from the producing province and an export licence from the National Energy Board with Governor in Council approval. The export price must be approved by the Governor in Council. Where new facilities are required, a certificate of public convenience and necessity must be issued by the NEB with Governor in Council approval and the NEB must establish tolls and tariffs.

In the U.S., import authorization must be obtained from the Economic Regulatory Administration and approval to pass through imported gas costs in pipeline resale rates from the Federal Energy Regulatory Commission (FERC). If an import project involves pass-through of gas costs by state distributors to specific end-use customers, state public utility commission approval is required. All approval processes on both sides of the border may involve public hearings.

Market Access Impediments and Vulnerability

There are no tariffs associated with Canadian gas exports, however, government and regulatory processes noted above dictate export volumes. Additionally, under Canada's new export policy, gas exports must conform to established criteria relating to price, volume assurances, producer support for the export and enhanced economic return to Canada. The criterion setting a minimum export price equal to the Eastern Canadian wholesale price may serve as an impediment to increased exports as natural gas prices in the U.S. continue to decline.

With Canadian prices rendered increasingly competitive, U.S. producers are beginning to voice concerns over increased Canadian exports at a time when their own production is being shut-in. U.S. producers may seek government initiatives to protect their market.

Two interrelated U.S. regulatory actions may also render Canadian exports vulnerable to declines. The first relates to ongoing FERC rate hearings to determine the appropriate method of incorporating Canadian gas charges into U.S. pipeline tariffs. With Canadian fixed costs incorporated into U.S. pipelines' demand charges and commodity charges listed separately (as is the regulatory practice for U.S. pipeline supply), Canadian gas is highly competitive with U.S. supplies. However, if, as proposed by staff of the FERC, Canadian costs must be included on an average cost basis, Canadian volumes will be much less competitive.

The second regulatory action relates to the FERC's Notice of Proposed Rulemaking (NOPR). The rulemaking, designed to make the U.S. gas industry more competitive, would create pricing blocks for gas depending on vintage. New gas, which would include Canadian volumes, is priced on average above market clearing levels, thus it may not be able to effectively penetrate new markets. In addition, the FERC has asked for comment on whether import prices should be treated on a single part basis, or separated into gas and non-gas costs. The former approach would seriously impede the ability of Canadian supply to compete with U.S. supply. The outcome of the NOPR and the rate hearings should be known by November, 1985.

TABLE 1

Canadian Natural Gas Exports and Imports

Year	Exports(a)(b) Volume ($10^6 m^3$)	Imports (b) Volume ($10^6 m^3$)	U.S. Consumption (c) ($10^6 m^3$) (d)	% of Cdn. Exports to U.S. Consumption
1973	29,206	425	624,628	4.7%
1974	27,223	255	601,116	4.5
1975	26,883	283	553,525	4.9
1976	27,025	255	563,140	4.8
1977	28,156	-	552,959	5.1
1978	25,013	-	556,075	4.5
1979	28,179	3	573,355	4.9
1980	22,966	3	563,157	4.1
1981	21,690	4	549,560	3.9
1982	22,075	3	509,901	4.3
1983	20,023	1	476,757	4.2
1984	21,061	1	495,170	4.3

Notes:

(a) All Exports to the United States
(b) Source - Statistics Canada
(c) Source - U.S. Energy Information Administration
(d) Conversion factor - 1 $10^6 m^3$ = 0.035301 Bcf

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TABLE 2

Production of Marketable Natural Gas by Province

($10^6 m^3$)

Year	Alberta	B.C.	Sask.	Other	Canada
1974	56,493	10,371	1,456	246	68,566
1975	57,498	10,006	1,473	321	69,298
1976	58,446	9,571	1,480	151	69,648
1977	62,242	9,553	1,353	249	73,397
1978	59,963	8,552	1,265	324	70,104
1979	64,151	9,830	1,057	306	75,344
1980	60,517	7,741	1,203	374	69,826
1981	59,229	7,103	1,096	430	67,848
1982	61,272	6,593	976	447	69,277
1983	57,336	6,407	909	479	65,114
1984	62,476	6,600	1,225	669	70,970

Source: Energy Statistics Handbook, Energy, Mines and Resources Canada

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EXEMPT.

SEC. 24

CRUDE OIL/PETROLEUM PRODUCTS

II. Structural Characteristics

The Canadian oil industry, while it has many participants, is also quite concentrated. According to the PMA, its 115 reporting companies accounted for 89 percent of the crude oil produced in Canada in 1984. The 14 companies comprising its group of "Integrateds and Refiners" accounted for 99 percent of downstream revenues.

Over 80 percent of the upstream production activity occurs in Alberta (see annex for details by province), although exploration activity is relatively dispersed. Refining is also spread across the country from Halifax to Vancouver, although several refineries have been closed in the past few years.

A list of the top 25 crude oil producers in Canada is attached. Of the refiners, Imperial Oil, Petro-Canada, Gulf Canada, Shell and Texaco account for much of the activity, although regional refiners such as Irving, Ultramar, Turbo and Chevron are important in their respective markets.

The foreign ownership of the combined upstream and downstream petroleum industry was estimated by the PMA at 60.5% at the end of 1984. Based upon downstream revenues alone, the foreign ownership is 62.2% while a comparable figure for crude oil production alone is 60.7%. There are no known policies or constraints governing where Canadian-based producers obtain their inputs or sell their output, other than profit maximization to the Canadian profit centre.

In 1984, the PMA reported that the industry spent about $203 million on in-house R & D, of which $63 million was in the refining area. Less than 30 firms accounted for all of the expenditures, indicating that large, foreign-owned firms performed most of the R & D. The industry also relies upon licencing technologies from abroad, particularly in the refining area. Given the nature of the products, Canadian-based producers do not have a comparative advantage.

Canadian refiners essentially produce for the local market and import/export product as required to offset supply/demand imbalances. Some processing for export takes place on tidewater to maintain refinery utilization rates. Exchange rate fluctuations would impact both input and output prices roughly proportionally. There are no major strengths or weaknesses other than a lack of economies of scale such as those of the large OPEC export refineries coming on stream.

III. Market Access Impediments and Vulnerabilities

Canada does not levy any tariffs on crude oil or products. The U.S. has very low import fees ($0.11/bbl on light crudes and $0.05/bbl on heavy crudes; product tariffs range from $0.525/bbl on gasoline and jet fuel to $0.105/bbl on distillates and fuel oil). As a possible revenue measure, there is a Congressional move to increase the import fees to $3 - $5/bbl to offset OPEC price decreases. The ban on exports of crude has recently been removed by a "Presidential Finding" as part of the oil trade liberalization agreed to at the Quebec summit. There is still a ban on Alaskan and naval reserve exports, but this has very little impact on Canada.

There is a potentially strong lobby in Washington which would like to have the federal government impose product import controls and/or duties to protect domestic refiners from potential new competition from the OPEC refineries. Unless Canada is exempted or granted some recognition of a special status such as common protective walls in a North American zone, Canadian refiners would suffer financially.

3.13

PETROLEUM
PETROLE

CRUDE OIL AND EQUIVALENT PRODUCTION BY PROVINCE
PRODUCTION PAR PROVINCE DE PETROLE BRUT ET EQUIVALENTS

PERIOD / PERIODE	ONTARIO / ONTARIO	MANITOBA / MANITOBA	SASK. / SASK.	ALBERTA / ALBERTA	B.C. / C.-B.	N.W.T. YUKON / T.N.-O. YUKON	CANADA / CANADA
			THOUSAND CUBIC METRES PER DAY / EN MILLIERS DE METRES CUBES PAR JOUR				
1974	0.3	2.1	32.3	249.2	8.7	0.4	293.0
1975	0.3	1.9	25.8	215.7	6.8	0.4	250.9
1976	0.3	1.7	24.4	195.8	7.0	0.4	229.5
1977	0.3	1.7	26.8	194.7	6.6	0.4	230.5
1978	0.3	1.6	26.5	192.8	8.0	0.4	229.6
1979	0.3	1.6	25.8	222.0	6.5	0.4	256.6
1980	0.3	1.5	25.6	210.8	5.9	0.4	244.6
1981	0.3	1.5	20.4	191.6	6.0	0.5	220.1
1982	0.2	1.6	22.3	166.8	6.1	0.5	217.6
1983	0.2	2.0	26.0	195.2	6.1	0.5	230.0
1984 JAN / JAN	0.3	2.2	28.1	194.7	6.4	0.5	232.2
FEB / FEV	0.3	2.1	29.0	205.5	7.5	0.5	244.8
MAR / MAR	0.3	2.2	27.9	212.1	6.1	0.5	249.1
APR / AVR	0.3	2.0	27.6	204.9	6.3	0.5	241.6
MAY / MAI	0.3	2.0	28.6	202.5	5.9	0.4	239.6
JUNE / JUIN	0.3	2.1	29.3	209.5	5.9	0.4	247.0
JULY / JUIL	0.3	2.2	29.8	216.5	6.0	0.4	255.2
AUG / AOUT	0.3	2.2	30.7	202.8	6.0	0.5	242.5
SEPT / SEPT	0.3	2.3	30.2	185.9	6.2	0.5	225.3
OCT / OCT	0.3	2.3	31.8	206.6	6.0	0.5	246.4
NOV / NOV	0.3	2.3	30.7	205.0	6.1	0.5	247.8
DEC / DEC	0.2	2.3	30.0	212.6	6.2	0.5	251.8
AVERAGE/MOYENNE	0.2	2.2	29.4	205.0	6.2	0.5	243.5
1985 JAN / JAN	0.2	2.0	29.4	207.6	6.2	0.5	241.9
FEB / FEV	0.2	1.8	29.4	211.6	6.0	0.5	249.5
MAR / MAR	0.2	2.2	30.0	217.3	4.1	2.1	255.9
AVERAGE TO DATE / MOYENNE A CE JOUR 1985	0.2	2.0	29.2	212.2	5.5	1.1	249.2
1984	0.2	2.1	28.3	204.1	6.7	0.5	242.0
% CHANGE / VAR. EN %	0.2	-5.7	-0.3	4.0	-18.2	125.4	3.0
METRIC / METRIQUES	VCRPN01 / VCRPN0M	VCRPN0A / VCRPN0B	VCRPN5A / VCRPN5M	VCRPN4A / VCRPN4M	VCRPN8A / VCRPN8M	VCRPN1A / VCRPN1M	VCRPNCA / VCRPNCM

Canada's top 100 oil and gas producers

Changes at top in liquids, gas producers' rankings

ALTHOUGH CHANGES in the rankings of Canada's top oil liquids and gas producers were only moderate in 1984 compared to the prior year there were new leaders in production.

Imperial Oil, which had held the number one ranking in oil and liquids since Oilweek commenced this survey more than a decade ago, surrendered its top position to Texaco Canada, while Dome Petroleum replaced Shell Canada as the top gas producer.

On the following pages, tables show rankings in five categories: top liquids producers, gas producers, top in liquid and gas reserves and the top land holders. In addition there is an alphabetical listing of the top 100 producers in liquids, gas, reserves and land holdings.

Assessing the performance of the top 25 liquids producers, 20 reported gains in output compared to the prior year, while 19 of the top 25 gas producers recorded increases, mirroring increased natural gas sales, particularly in the export sector. Of the 20 companies that reported increased output of liquids, nine were Canadian controlled.

The elevation of Texaco to the number one position is attributed to oil production from the West Pembina area being increased as a result of a full year of production from two miscible floods implemented in late 1983. As a result this area contributed 12% of the company's total production in 1984.

CANADA'S TOP OIL AND GAS LIQUIDS PRODUCERS

Company	1984 Gross Can Liquids Production m³/d	#	1983 Gross Can Liquids Production m³/d	#
Texaco Canada Inc	24 100	1	23 402	2
Imperial Oil Limited	23 700	2	24 830	1
Gulf Canada Ltd	19 074	3	18 823	3
Dome Petroleum Limited	18 700	4	16 700	4
Petro-Canada	16 700	5	16 300	5
Chevron Canada Resources Ltd	14 822	6	14 459	7
Mobil Oil Canada Ltd	13 700	7	15 000	6
Amoco Canada Petroleum Co	11 869	8	11 231	8
Shell Canada Resources Limited	11 406	9	10 083	9
PanCanadian Petroleum Limited	10 352	10	9 354	11
Suncor Inc	9 765	11	9 855	10
Husky Oil Operations Ltd	6 789	12	6 103	12
Norcen Energy Resources Ltd	5 516	13	4 910	14
Canadian Superior Oil Ltd	5 378	14	4 764	15
Canterra Energy Ltd	4 734	15	5 003	13
Home Oil Co Ltd	4 244	16	4 103	16
Canadian Occidental Petroleum Ltd	3 534	17	1 788	22
Union Oil Company of Canada Ltd	3 456	18	3 077	17
BP Canada Inc	2 960	19	2 752	18
Saskatchewan Oil & Gas Corp	2 244	20	2 049	19
ICPL Resources Ltd	2 217	21	1 927	21
Canadian Reserve Oil and Gas Ltd	1 897	22	1 374	26
Dome Canada Limited	1 765	23	1 389	25
Aquitaine Energy Co Ltd*	1 641	24	1 927	20
Causeway Petroleums Ltd	1 582	25	1 470	23

Out of the top 25 oil and liquids producers, 20 companies were also ranked among the top producers of natural gas. The 1984 top 25 accounted for 75.2% of gross gas deliveries of 141.69 million cubic metres per day compared to 133.73 x 10^6 m^3 d in the previous year.

Dome, in attaining the number one gas production spot, said its move upwards was the result of exports going to free market pricing which improved volumes moving to the U.S.A. while Shell explained that sales failed to match the prior year, particularly during the first three quarters.

Imperial continues to hold the number one slot in oil and liquids reserves, but out of the top 25 reserves owners, 13 companies changed positions in 1984 compared to the prior year. Surprisingly, Shell, ranked number 10 in 1983, climbed up two notches to the number eight position. Imperial increased its liquids reserves by 26.9 million m^3 last year, largely due to developments at Cold Lake and Judy Creek as well as Norman Wells.

Dome holds the honor as the owner of the largest volume of natural gas reserves replacing Petro-Canada which occupied the number one slot in 1983. Despite the Dome achievement, the company actually reduced its ground levels by 1.2%. If there were a big winner in the race for additions to gas reserves it was Ocelot Industries which moved up to the number 11 rank from its 1983 posting of number 16.

Petro-Canada is the largest land holder in the country duplicating its 1983 achievement. It lists some 23 million hectares in inventory, a reduction of about 5.2 million ha, while the number two land holder, Dome, claims some 9.9 million ha compared to 10.8 million ha in the prior year. Of the 23.0 plus ha listed by Petro-Canada 20.5 million ha are located on the frontiers.

Assessing the top 100 oil and gas companies in Canada in a composite form, in the liquids rankings, the number 100 producer is First Calgary Petroleums which occupied the number 81 slot in the prior year, while Westar Petroleum is ranked 100 in natural gas production down from the 89th position in 1983.

On the basis of net proven liquids reserves, Paloma Petroleum made it into the magical 100 although it was ranked 87 in the previous year, while in the case of net proven gas reserves, Altex Resources occupied the number 100 position, eight better than in 1983. As for the 100th top land holder, Dynex Petroleum gets this ranking, although the company was number 86 in 1983.

COAL
SECTOR PROFILE FOR TRADE LIBERALIZATION

COAL DIVISION
EMR
July 29, 1985

4347R/R218

COAL: SECTOR PROFILE

SECTION II - STRUCTURAL CHARACTERISTICS

In 1984, coal production, valued at the mine, totaled $1.8 billion, or about 0.5% of Gross Domestic Product. The sector provided an estimated 14,000 direct jobs.

In terms of 1984 coal trade, 44% of Canadian production, valued at $1.8 billion at the port, was shipped overseas. This was a major increase over 1983, and an all-time high for Canada. The increase is attributed to attainment of nearly full production from four new mines which are heavily, if not exclusively, committed to exports. The bulk of exports went to Japan (65.8%) and to Korea (14.2%). Coal represents Canada's largest export commodity to Japan. The export situation is expected to stabilize in future years, with relatively little change to the pattern and only modest increases in the tonnages shipped. Exports to the U.S. were only 0.7% of the total in 1984, and no significant change in this is expected.

Also in 1984, Canada met 36% of its coal needs by imports, valued at $1.4 billion. This coal was purchased mainly by Ontario Hydro and by Ontario steelmakers, all from the U.S.A.

SELECTED COAL INDUSTRY STATISTICS

	1980	1981	1982	1983	1984
10^6 Tonnes					
Production	36.7	40.0	42.8	44.8	57.4
Imports	15.9	14.8	15.8	14.7	18.4
Total Supply	52.6	54.8	58.6	59.5	75.8
Exports	15.3	15.7	16.0	17.0	25.1
Domestic Availability	37.3	39.1	42.6	42.5	50.7
$Million					
Production (1)	$ 942	$1,118	$1,352	$1,339	$1,813
Imports (2)	954	992	1,132	1,058	1,366
Exports (3)	923	1,026	1,184	1,210	1,804
Number of Mines	41	43	48	46	42
Direct Employment	11,416	11,182	13,113	13,200	14,000(E)

Regional Distributions (1984)	Atlantic	Quebec	Ontario	West
% Employment	35%	-	-	65%
% Production	6%	-	-	94

* Availability = Consumption - Inventory changes

(1) F.O.B. Mines

(2) F.O.B. U.S. port of exit

(3) F.O.B. port of exit

There are fewer than twenty coal mining companies in Canada, operating approximately 40 individual mines. About 94% of output is in western Canada. Most of the plains area mines are dedicated to local power generation, while coal from the foothills and mountain regions of Alberta and B.C. is mostly exported. Cape Breton coal production is mostly used within the province for power generation. During 1984, twelve companies accounted for 25.1 million tonnes shipped overseas.

EXEMPT - 20(1)(4)(c)

Virtually all of the output from B.C. is exported, making the Province's mines totally vulnerable to the vagaries of international markets.

While the 1984 weighted average foreign ownership of all coal produced in Canada was only 30%, four of the eight major exporters (more than 1 million tonnes each) had minority shareholding by the customers for the coal. In the case of several of the new mines, which were developed on the basis of contract prices that are now well above international levels, price reductions have had to be accepted, in spite of the mine equity positions held by the coal buyers.

Research and development by the industry is basically limited to mining and process improvement, and is not a significant figure relative to GDP. End use R and D is largely carried out by governments or by central agencies co-funded by governments. Total coal R & D in Canada is estimated at about $40 million per year.

Canadian coals have desirable but not unique properties in comparison with coal from major exporters such as the U.S., Australia and South Africa. The major constraint is the cost of the long rail haul from the B.C. and Alberta mines to tidewater. As a consequence, Canadian coals tend towards the upper limits of price ranges, in spite of producers' acknowledged efficiency in mining and processing, and in the use of unit

trains and modern coal handling equipment. Canada's reputation as a reliable supplier as well as the non-intervention policies of the government are pluses for the Canadian coal industry in the export market. The outlook is for slow growth in international demand for more valuable metallurgical coal, and somewhat faster growth for lower priced thermal coal. But Canadian thermal coal exports face the hurdle of rail shipping costs that can account for up to 50% of the value at the port of export. (It is this relationship that also limits the ability of Canadian thermal coals to be competitive with U.S. imports in the Ontario market.) As well, export markets are becoming even more difficult for Canadian producers as a result of Australian and South African currency devaluations.

SECTION III - MARKET ACCESS

There are no tariffs applicable to the existing coal trade. Similarly there are at present no non-tariff barriers that impair coal trade between Canada and the U.S.

There are several concerns on the Canadian side over potential U.S. moves that could, however, have serious impacts. These are mainly in the area of U.S. protectionism and trade balancing measures. As an example, the U.S. has been applying diplomatic pressure on Japan to redress their trade imbalance by importing more U.S. coal. If successful this would have reduced the market for Canadian coal in Japan. (The Japanese have resisted the pressure and insist that their trade will be guided by market forces.) Another example, with indirect impacts upon Canada, would be potential U.S. import controls or quotas, most likely triggered by the availabilitly of good quality, inexpensive coal from new mines in Colombia. Any general restrictions would snuff out Canada's hopes of increasing its small participation in the northeast U.S. market. At the

same time, U.S. concerns include the review now underway in Canada to examine the potential for increasing the use of low sulphur western Canadian coal in Ontario which could have an impact on the level of imports of US coal by Ontario Hydro.

A PROFILE OF THE ELECTRIC POWER SECTOR

R219-4352R

I. STRUCTURAL CHARACTERISTICS

A. Energy Sources of Electricity Exports

Table 8 presents the energy sources of electricity exported during 1984. Exports from Quebec, Manitoba, and British Columbia were generated almost entirely from hydroelectric stations, while exports from Ontario were generated primarily from coal-fired stations. In New Brunswick, the generation sources were nuclear, oil and coal.

In 1984, about 75 per cent of the coal Ontario uses for electricity generation was imported from the United States; the remainder came from Western Canada. The coal used by Manitoba was imported from Saskatchewan. New Brunswick and Saskatchewan both rely primarily on their own coal. The oil used by New Brunswick is imported from outside Canada.

B. Ownership of the Industry

Electric utilities in Canada are owned by all Canadians. Electrical energy in Canada is supplied by Crown corporations, investor-owned utilities, and industrial establishments such as forest and aluminum smelting companies. In 1984, government-owned utilities produced about 83 per cent of total generated electricity, investor-owned utilities about 8 per cent, and industrial establishments the remaining 9 per cent. The six electric utilities engaging in electricity exports are wholly owned by their respective provincial governments.

C. Research and Development

The electric power industry invested about $134 million in R&D in 1984. This investment accounted for about 1 per cent of total revenue of the industry. Approximately $60 million (45 per cent) of the 1984 total came from Hydro Quebec, $48 million (35 per cent) from Ontario Hydro, and the remainder from other utilities.

D. Comparative Advantage of Production Costs

Because of existing surplus capaciaty in many provinces, the marginal cost of generation is low compared with US marginal costs. Table 9 indicates that surplus hydro electricity from Quebec, Manitoba and British Columbia has a marginal cost ranging from 1 to 5 mills per kWh. In New Brunswick, Quebec, and Ontario, the variable costs range from 3 to 5 mills/kWh for nuclear. The variable costs for coal in Canada range from 8 to 27 mills/kwh. These values can be compared to the cost of fossil fuelled electricity generation in the U.S., shown in Table 10. These figures indicate that there are substantial mutual economic gains to be realized by using Canadian surpluses to displace expensive oil-fired generation in the United States.

The economics of dedicating incremental Canadian capacity to export purposes is not so clear. The issue is whether the cost of building new plants in Canada is sufficiently less than the alternatives available to U.S. utilities (basically coal and nuclear). Table 11 summarizes a preliminary cost analysis. The results are only indicative because they exclude the cost of transmission facilities which may be required and because the cost of specific projects will vary from the generic estimates.

Although these estimates are preliminary, they suggest that new hydroelectric exports from Quebec, Manitoba and British Columbia are likely to be competitive with U.S. alternatives. This also appears to be true for nuclear in Ontario and, to a lesser extent, in the Maritimes.

II. MARKET ACCESS IMPEDIMENTS AND VULNERABILITIES

A. No Tariffs on Electricity Trade

Currently, there are no tariffs to impede electricity exchange between Canada and the United States. In Canada, no taxes have been levied on electricity exports since 1963. Nor does the U.S. government impose any taxes on electricity imports from Canada.

The federal government used to tax export sales. From 1925 to 1963 a tax of 0.3 mills per kWh was levied on electricity exports. The export tax was repealed in the budget of 1963 for the following reasons:

1. The tax was an obstacle to exports.

2. The revenue raised was insignificant, about $1.0 to 1.5 million per year.

3. The taxation of electricity exports was inconsistent with the treatment of other energy forms (oil and gas) which were not then taxed.

B. Regulation of Electricity Trade

Although there are no taxes levied on electricity trade between Canada and the United States, electricity exports in both countries are regulated by the two governments. Existing government regulations impede electricity trade only to a very minor extent.

A Canadian utility wishing to export electricity to the United States must obtain a certificate of public convenience and necessity for an international power and export license. Both are issued by the NEB (see the National Energy Board Act Part VI regulations). The applicant must demonstrate that the power and/or energy to be exported is surplus to Canadian requirements and that the price is just and reasonable in the public interest. While neighbouring provinces are given the right of first refusal, they must match the export price.

Applications to the Board usually require a public hearing, at which time evidence for or against an application may be presented. Under normal circumstances, it takes 12 months for the NEB to process a major application for a certificate or license.

In the United States, the Federal Power Act (enacted in 1935), established the Federal Power Commission, which was given a regulatory role in the interstate transmission and wholesale marketing of electric power. This Act prohibited the exportation of energy from the United States to a foreign country without federal authorization. Any person wishing to export energy is first required to submit an application and, if necessary, attend a hearing before a federal licensing authority. Currently, the Economic Regulatory Administration of the Department of Energy exercises the regulatory mandate.

Regulatory control over the export of electric energy from both countries is ultimately the responsibility of the respective federal governments. Neither federal government exercises any control over the import of electric energy from foreign countries, although the Canadian National Energy Board considers imports when evaluating export applications.

C. Physical Constraints

Any substantial increase in Canadian exports would require new transmission line construction and reinforcement. In the United States, transmission construction takes capital funds away from much-needed generation prospects. The situation is aggravated by over-lapping regulatory jurisdictions and by the fact that transmission lines may have to cross neighbouring states which bear some of the environmental costs but receive none of the direct benefits of the imported power.

D. Environmental Obstacles

Increased exports would impact on the environmental. Environmental impacts are assessed as part of the regulatory process. An environmental impact

statement is required whenever federal agencies propose to take any major action which may affect the quality of the human environment. Potential obstacles are created due to the volume and complexity of environmental impact statements, and the subjective nature of their assessment.

Table 1: Electric Utility Revenues and Employees

Year	Gross Domestic Product (in current million dollars)			Employment (1,000 persons)		
	Electric Utility (1)	Total Economy (2)	% Share of Electric Utility (3)=(1)/(2)	Electric Utility (4)	Total Economy (5)	% Share of Electric Utility (6)=(4)/(5)
1973	2,441	109,830	2.2	53	8,761	0
1974	2,846	132,755	2.2	55	9,125	0
1975	3,218	150,726	2.1	58	9,284	0
1976	4,076	173,512	2.3	60	9,477	0
1977	5,262	189,769	2.8	62	9,651	0
1978	6,090	212,806	2.9	62	9,987	0
1979	7,163	244,602	2.9	59	10,395	0
1980	8,149	278,083	2.9	67	10,708	0
1981	8,338	314,480	2.7	71	11,006	0
1982	9,700	329,950	2.9	69	10,648	0
1983	10,723	360,888	3.0	67	10,731	0
1984	14,040	392,369	3.6	74	10,998	0

Sources:

Column (1) and (4) Electric Power Statistics Volume II, Catalogue 57-202, Statistics Canada, various issues

Column (2) and (5) Economic Indicators and Analysis, EMR, Summer 1985

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Table 2: Values of Electricity Trade

(in current million dollars)

Year	Export Revenue			Import Cost	Net Export Revenue	Net Export Revenue as % of Total Revenue From Sale of Electricity	Net Export Revenue as % of Merchandise Trade Balance
	Firm (1)	Interruptible (2)	Total (3)=(1)+(2)	(4)	(5)=(3)-(4)	(6)	(7)
1973	20	95	115	1	114	4.7	4.
1974	21	148	169	1	168	5.9	10.
1975	20	85	105	3	102	3.3	
1976	39	135	174	7	167	4.3	10.
1977	90	329	419	13	406	8.0	13.
1978	95	384	479	2	477	7.9	11.
1979	136	603	739	1	738	10.3	16.
1980	157	637	794	3	791	9.7	15.
1981	105	1,068	1,173	6	1,167	11.8	9.
1982	242	864	1,106	5	1,101	11.4	6.
1983	446	803	1,249	6	1,243	10.2	6.
1984	493	883	1,376	10	1,366	9.7	6.

Sources:

Columns (1) - (6) Electric Power Statistics Volume II

Columns (7) Merchandise trade balance was obtained from Economic Indicators and Analysis, EMR, Summer 1985

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Table 1: Quantity of Electricity Trade (GWh)

Year	Energy Exported to U.S.				Energy Imported From U.S.			Net Exports To U.S.	Net Exports as % of Net Canadian Generation
	Firm (1)	Inter-ruptible (2)	Exchange (3)	Total (4)=(1)+(2)+(3)	Purchased (5)	Exchange (6)	Total (7)=(5)+(6)	(8)=(4)-(7)	
1973	2,637	13,649	0	16,286	2,249	0	2,249	14,037	6.2
1974	2,488	12,912	0	15,400	2,441	0	2,441	12,959	5.5
1975	2,375	9,034	0	11,409	3,972	0	3,972	7,437	4.2
1976	2,061	10,743	0	12,804	3,590	0	3,590	9,214	4.4
1977	3,727	16,230	0	19,957	2,690	0	2,690	17,267	6.3
1978	3,980	16,457	1,165	21,602	170	1,922	2,092	19,510	5.8
1979	6,692	23,766	920	31,378	24	1,769	1,793	29,585	8.4
1980	7,232	20,992	1,952	30,176	168	2,771	2,939	27,237	10.2
1981	5,008	29,722	642	35,372	466	1,031	1,497	33,875	8.9
1982	5,831	27,155	1,228	34,214	257	2,592	2,849	31,365	8.3
1983	10,569	26,689	1,723	38,981	239	2,656	2,895	36,086	9.1
1984	10,852	26,721	4,269	41,842	291	2,459	2,750	39,092	9.2

Source: Electric Power Statistics Volume II, various issues.

Table 4: Destination of Electricity Exports

Exporting Province	Importing States	Fuel Displaced
New Brunswick	New England	Oil
Quebec	New England	Oil
	New York	Oil, coal
Ontario	New York	Oil, coal
	Michigan	Coal
	Wisconsin	Coal
Manitoba	North Dakota	Coal
	Minnesota	Coal
Saskatchewan	North Dakota	Coal
British Columbia	California	Oil, coal, gas

Source: National Energy Board

Table 5: Provincial Share of Electricity Exports
(%)

Year	New Brunswick	Quebec	Ontario	Manitoba	British Columbia	Canada
1973	18	0	47	6	29	100
1974	16	6	51	9	18	100
1975	15	8	42	10	25	100
1976	19	4	49	6	22	100
1977	18	3	48	3	28	100
1978	12	7	50	14	17	100
1979	12	24	39	13	11	100
1980	13	27	38	11	11	100
1981	9	24	32	10	25	100
1982	19	25	33	15	18	100
1983	14	26	33	15	12	100
1984	15	27	27	12	19	100

Source: Energy, Mines and Resources

Table 6: Forecasts of Electricity Exports (GWh)

	1985	1986	1990	1995	2000
New Brunswick	6,889	7,664	6,051	2,692	1,544
Quebec	13,362	19,179	22,072	17,131	15,884
Ontario	9,800	9,700	11,600	10,800	5,200
Manitoba	6,727	6,442	5,009	10,025	11,447
Saskatchewan	88	88	88	88	88
British Columbia	2,845	3,005	4,385	1,830	2,605
Canada	39,711	46,078	49,205	42,566	36,768

Source: Energy, Mines and Resources

Table 7: Provincial Share of Forecast Exports (%)

	1985	1986	1990	1995	2000
New Brunswick	17	17	12	6	5
Quebec	34	42	45	40	43
Ontario	25	21	24	25	14
Manitoba	17	14	10	24	31
Saskatchewan	0	0	0	0	0
British Columbia	7	6	9	5	7
Canada	100	100	100	100	100

Source: Calculated from Table 6

Table 8: Energy Sources of Electricity Exports by Province 1984

	Oil	Coal	Nuclear	Hydro	Other	Total
New Brunswick	24.5	9.0	35.0	-	31.5	100.0
Quebec	-	-	-	100.0	-	100.0
Ontario	-	99.0	1.0	-	-	100.0
Manitoba	-	2.0	-	98.0	-	100.0
Saskatchewan	-	100.0	-	-	-	100.0
British Columbia	-	-	-	100.0	-	100.0

Source: Energy, Mines and Resources

Table 9: Marginal Cost of Electricity Generation

for Canadian Exporting Utilities
(1983 Canadian Mills/kWh

Province	Petroleum Fuel	Coal	Uranium	Hydro (1)
New Brunswick	51.63	26.65	3.08	-
Quebec	-	-	4.95	1.00
Ontario	-	24.07	3.18	-
Manitoba	-	23.57	-	2.00
Saskatchewan	-	7.81	-	-
British Columbia	-	-	-	5.00

(1) Based on water power rentals paid by the electric utilities.

Table 10: Average Cost of Fossil Fuels for U.S. Utilities (1983 Canadian[1] Mills/kWh

U.S. Region	Petroleum Fuel	Coal
New England	56.9	27.8
Mid-Atlantic[2]	60.0	20.3
East North Central[3]	78.8	22.7
West North Central[4]	65.8	17.5
Pacific	78.9	29.6

(1) Assuming an exchange rate of $1 US = $1.30 Canadian

(2) New York, New Jersey and Pennsylvania

(3) Illinois, Indiana, Michigan, Ohio and Wisconsin

(4) Iowa, Kansas, the Dakota's, Minnesota and Missouri

Table 11: Comparison of Unit Costs of Building New Power Plants (1983 Canadian Mills/kWh

Canadian Regions		Corresponding Potential U.S. Market	
1. Maritimes:		New England:	
Nuclear	42-54	Nuclear	44-66
		Coal	51-63
2. Quebec		New England (see above)	
		New York:	
Hydro	21-27	Nuclear	44-66
		Coal	45-57
3. Ontario:		New England (see above)	
Nuclear	24-31	New York:	
4. Manitoba:		Midwest:	
Hydro	20-31	Coal	47-58
		Nuclear	44-66
		West North Central Region:	
		Coal	36-45
		Nuclear	44-66
5. British Columbia:		Pacific:	
Hydro	26-36	Coal	36-46
		Nuclear	44-66
		Northwest:	
		Coal	42-52
		Nuclear	44-66

Source: Energy, Mines and Resources

Table 12: Capital Expenditures by Electric Utilities

	(Millions of Current Dollars)										Cumulativ
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1985-19
Newfoundland	75	72	201	806	1,498	1,758	1,437	1,152	571	400	7,97
P.E.I.	7	11	12	6	6	7	8	9	10	10	
Nova Scotia	57	74	86	65	147	308	383	301	277	277	1,9
*New Brunswick	55	66	94	98	99	82	71	74	75	88	8
*Quebec	1,784	1,939	1,967	1,994	2,065	1,730	1,810	1,940	2,076	2,526	19,8
*Ontario	2,833	2,538	2,476	2,280	1,953	2,094	2,030	1,807	1,877	1,890	21,77
*Manitoba	255	313	503	516	517	560	426	453	388	931	4,8
*Sask.	264	190	250	377	440	422	364	371	431	535	3,6
Alberta	656	615	661	617	702	913	790	788	801	833	7,37
*B.C.	217	124	116	145	185	230	213	202	234	294	1,9
Yukon, NWT	6	6	17	5	13	2	4	4	7	8	7
Canada	6,209	5,948	6,383	6,909	7,625	8,106	7,536	7,101	6,747	7,790	70,3

Source: Energy, Mines and Resources

* Electricity exporting provinces

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COMPETITIVENESS PROFILE OF CANADA'S MINERALS AND METALS SECTOR

Scope of Sector

Canada's mineral and primary metals sector in 1984 employed 1.5 per cent of the workforce, accounted for about 3 per cent of our GDP, about 4 per cent of new capital investment, and about 48 per cent of rail freight loadings. It produces some 50 commodities. Mining takes place in every province and territory, except Prince Edward Island where extraction is confined to sand and gravel operations. Some 175 Canadian communities are dependent upon mining, smelting and refining; they range in size from Sudbury with a population of 100,000 to Flin Flon with 10,000 inhabitants, and Canada's most northerly townsite of Polaris with 280 fly-in, fly-out temporary residents. Some industries in the sector are almost totally domestically oriented, whereas others are export oriented with as much as 95 per cent of output being sold abroad. As a whole, about one half of output is exported. Although generally regarded as a world mineral exporter, Canada is deficient in several commodities and relies on imports. The principal statistics for the sector are as follows (the sector includes uranium but excludes coal, petroleum and natural gas):

MINERALS & METALS SECTOR*	1980	1981	1982	1983	1984(E)
Establishments	706	684	656	614	634
Employment	193,720	191,772	171,061	160,300	165,350
Shipments ($000,000's)	23,600	23,522	19,662	20,804	24,724
Exports ($000,000's)	11,685	11,923	9,561	10,068	11,795
Domestic shipments ($000,000's)	11,915	11,599	10,101	10,736	12,929
Imports ($000,000's)	4,255	3,587	2,677	3,218	3,501
Canadian Market ($000,000's)	16,170	15,186	12,778	13,954	16,430
Exports - % of shipments	49.5%	50.7%	48.6%	48.4%	47.7%
Imports - % of Domestic Market	16.3%	23.6%	21.0%	23.1%	21.3%

REGIONAL DISTRIBUTION - 1984	ATLANTIC	QUEBEC	ONTARIO	WEST	TOTAL
Establishment - % of total	8.7	38.1	29.7	23.5	100%
Employment - % of total	6.4	25.4	47.4	20.8	100%
Shipments - % of total	7.8	23.6	41.7	27.0	100%

FOREIGN TRADE		USA	EEC	JAPAN	OTHERS	TOTAL
Imports - % of total	1981	77.4	2.5	1.3	18.8	100%
	1982	71.6	4.6	2.0	21.8	100%
	1983	72.3	4.3	2.0	21.4	100%
	1984(E)	71.7	5.6	2.1	20.6	100%
Exports - % of total	1981	52.8	19.6	8.7	18.9	100%
	1982	49.2	19.6	9.5	21.7	100%
	1983	53.4	17.5	9.5	19.6	100%
	1984(E)	56.7	15.1	9.6	18.6	100%

* Includes Metal Mines (SIC 051,052,057,058,059), Nonmetal Mines (SIC 071, 072,073,079), Structural Materials (SIC 083,087), Nonferrous Smelting and Refining (SIC 295), and Primary Iron and Steel Mills (SIC 291).

Structural Characteristics

The sector comprises two broad groups - metal mining and primary metals (i.e. smelting and refining) and industrial minerals; in 1984 the latter accounted for almost 40 per cent of the value of shipments.

Metal Mining and Primary Metals: Metal mining ranges from small placer gold operations to deep underground mines that extract ore at the rate of 10,000 tonnes daily to vast open pit iron ore mines that handle 100,000 tonnes of ore and waste daily. Although there are over 1,000 mining firms listed on the Canadian stock exchanges, the industry is dominated by a few large companies or integrated groups as follows (1984 output data): for copper, 8 firms accounted for 80 per cent of Canada's total output; iron ore, 2 accounted for 60 per cent; nickel mining, 2 accounted for 100 per cent; lead, 2 accounted for 94 per cent; zinc, 3 accounted for 84 per cent; molybdenum, one accounted for 54 per cent; tungsten, 2 accounted for 100 per cent; uranium, 3 accounted for 82 per cent.

- The next stage, primary smelting and refining, is even more concentrated: 18 of the 30 primary nonferrous metal smelters and refineries in Canada are owned or controlled by seven corporations: Cominco Ltd., Falconbridge Nickel Mines Ltd., Hudson Bay Mining & Smelting Co. Ltd., Inco Ltd., and Noranda Mines Ltd., Kidd Creek Mines Ltd. and Aluminum Company of Canada Limited. Eldorado Resources Limited operates Canada's only uranium refinery, which incidentally is one of only five in the western world. There is a relatively high degree of concentration in Canada and throughout the world, but there is a lower degree of concentration today than 20 years ago.

Canada's mining industry is now largely domestically owned - 60 per cent in 1978 compared with 38 per cent in 1970. Canadian iron ore mines are owned mainly by Canadian and U.S. steel companies. Canada's 6 integrated iron and steel mills (i.e. the domestic users of iron ore) are Canadian owned.

Canadian mining firms have been in the forefront of technological advancement in exploration, mining and processing. There has, however, been a relative decline during the past decade or so, in Canada and worldwide, on product research and market development/promotion. The difficult marketing situation for the past three years has prompted world producers to begin devoting more funds toward market development and promotion.

Productivity in Canada's metal mining industry stagnated in the period 1968-73, fell markedly from 1974-82, and then rose sharply in 1983-84. While there is some scope for further advances, future changes are expected to be gradual.

The export orientation of many Canadian metal producing industries dictates that it be cost competitive. Factors influencing international comparative advantages fall into three categories: those related to the ore deposit and the firm (e.g., grade, metal mix, size, location, productivity); those that are largely external to the firm but

internal to the country (e.g., labour, capital, energy, taxes); and those that are largely international in scope (e.g., exchange rates, tariffs). Canadian metal producers have some advantages in both the first two categories but none in the third, except perhaps for the Canada-U.S. dollar exchange rate.

Take copper, for example, despite wide variations from one mine to another, Canada had traditionally ranked amongst the world's lower cost producers. However, Canadian copper producers' competitiveness slipped sharply by 1982 largely due to currency realignments, but through productivity improvements has subsequently regained a position commensurate with the average cost of non-socialist world producers. Canadian copper remains more cost competitive than that produced in the U.S.A.

For other metals both worldwide and with the U.S.A., Canada is very cost competitive for aluminum, nickel and uranium, and generally cost competitive for lead, zinc, molybdenum, cobalt, magnesium, tungsten, gold, silver, platinum and a variety of minor metals. For iron ore where transportation costs are critical in international trade, Canada is generally competitive with U.S. producers but marginally competitive with the world's largest exporters, Australia and Brazil.

Industrial Minerals: Most minerals in this group fall into two categories, agro-chemicals commodities and construction materials. They tend to be large volume, low-unit value minerals although prices can reach $3000 a tonne for some asbestos fibres and much higher for industrial diamonds. Transportation costs have a strong bearing on markets, particularly for the construction materials. Most processing (generally grinding, milling, refining, or shaping) takes place at the mine or quarry site. Although some 3,000 firms scattered across Canada are in the industrial minerals business, industry concentration is high in a few commodities (e.g., asbestos, talc, cement, calcite, gypsum, potash, salt, silica and sulphur) and in others there is only one or two producers (e.g., magnesite and nepheline syenite). For asbestos, the Quebec government-owned Société Nationale de l'Amiante is one of the dominant firms and in potash, the provincially-owned Potash Corporation of Saskatchewan is the dominant firm.

Canada's strengths lie in the variety, quality and abundance of reserves in readily accessible areas generally close to water, rail and electrical energy. As a group, industrial minerals have demonstrated relative stability and a constantly growing sector of the Canadian mineral industry.

Canada is a recognized leader and internationally competitive in several industrial minerals such as asbestos, potash, sulphur, and nepheline syenite, for which most of our output is exported. We also export gypsum, lime and cement, salt, sodium sulphate, talc and pyrophyllite. Canada depends entirely on imports, largely from the U.S.A., for phosphate rock, kaolin, industrial diamonds, perlite, vermiculite and zeolites.

Market Access Problems

Metal Mining and Primary Metals: With the exception of uranium, Canada's share of world metal markets has declined over the past 15 years. Most of the decline can be attributed to an expansion of mining in Third World countries but there are other factors as well, including slower growth rates in metal demand and, since the 1982 recession, a reluctance of state-owned enterprises in the Socialist and Third World countries to scale down output schedules in the face of worldwide excess supply, protectionist (particularly in the U.S.A.) or trade diversionary tactics adopted by some of Canada's trading partners, and appreciation of the Canadian dollar vis à vis most other currencies.

Market access problems fall into three broad categories: tariffs (both nominal levels and tariff escalation), non-tariff measures (NTMs), and tariff preferences or trading blocs.

Iron ore, uranium and most nonferrous metal ores and concentrates have for years enjoyed duty free entry into most developed countries, with the exception of lead, molybdenum, tungsten, zinc and some other metal bearing ores into the U.S.A. For Canada, the U.S. tariffs on molybdenum and tungsten concentrates pose a problem.

For unwrought metals, tariffs range generally from zero to 10 per cent for developed country markets (with a few exceptions such as a 19 per cent tariff on zinc alloys into the U.S.A.) and as high as 50 per cent for some developing countries. Even a relatively low tariff can be a prohibitive trade barrier. In zinc, for example, the EC allows duty free entry for zinc concentrates and applies a 3.5 per cent duty on refined zinc, which translates into a 9 per cent effective tariff protection for EC zinc smelters and refiners. For the ferroalloys and steel additive intermediate compounds, tariffs range generally from zero to 10 per cent for developed country markets.

NTMs include quotas, Buy American restrictions, frequent U.S. Trade Act Section 201, 232 and 332 investigations, subsidies and countervail actions, marks of origin requirements for the U.S.A., environmental and health regulations, customs classification, import licensing, port taxes, surcharges, and prior deposits on goods to be imported.

U.S. restrictions on uranium enrichment in the 1960s amounted to an effective import embargo for almost 10 years thereby causing several billion dollars of trade damage to Canadian exporters. Although the restriction was phased out by 1984, there is renewed pressure in the U.S. for import curbs on uranium and indeed legislation is currently in place that could cause imports to be curtailed when they exceed 37.5 per cent of U.S. requirements.

Preferential tariff access takes three forms - the GSP, Article XXIV arrangements such as between the EC and EFTA countries, and trading blocs such as the expanded European Community and Latin American Integration Association. With respect to the GSP, it is generally recognized that this mechanism has not been a satisfactory means to foster

expansion of capital intensive industries such as smelting and refining in Third World countries. Hence, there should be no need in trade negotiations to preserve GSP margins for unwrought metals. With the help of the EC-EFTA free trade linkages, EFTA exporters have captured upwards to 24 per cent of the EC mineral and metal import market compared with 8 per cent from Canada.

There are other advantages that some of Canada's mineral and metal competitors enjoy, particularly Third World producers. These include bilateral and multilateral concessional financing for mining projects, export credit financing for mining machinery and equipment, less restrictive environmental regulations, and export incentives.

Industrial Minerals: Except for a few items (e.g. some clay and stone products in the U.S.A.), tariffs are not a major problem for industrial minerals. Most agro-chemical items trade worldwide duty-free and for many construction materials transportation costs are a more important factor than tariffs. Nevertheless, the removal of some residual tariffs, particularly in the U.S.A., could improve the profitability of some Canadian exporters (e.g., asbestos products, calcite and magnesite products).

A variety of NTMs are much more serious, mainly in the U.S.A. where the problems are often transportation related. For example, Buy-American provisions of the Surface Transportation Assistance Act initially restricted access for Canadian cement, and railway de-regulation (with alleged rebates and kick-backs) has put Canadian exporters at a disadvantage. Moreover recent U.S. anti-dumping investigations on commodities such as salt and potash have in large measure dealt with transportation parameters.

For asbestos, although there are some tariffs, the most serious market access threats are related to environmental and health regulations including a pending ban by Sweden on automobiles and motorcycles having asbestos brake linings.