7

SECTOR PROFILE

DISCUSSION PAPER

THE CANADIAN ELECTRICAL PRODUCTS INDUSTRY

Government of Canada
Industry, Trade and Commerce

Gouvernement du Canada
Industrie et Commerce

SECTOR PROFILE

THE CANADIAN ELECTRICAL INDUSTRY

PROFILE OF THE ELECTRICAL INDUSTRY IN CANADA

The electrical manufacturing industry in Canada consists of a number of diverse subsectors. This profile is, therefore, divided into two main sectors. The first provides an overview of the industry's subsectors and sets out some of its general characteristics. Included is a comparison of the performance of the Canadian industry in the aggregate with that of Canada's main competitors. The second section covers each of the main subsectors of the industry, highlighting the problems and prospects of each.

AN OVERVIEW OF THE ELECTRICAL INDUSTRY

The electrical industry produces three classes of equipment: equipment which generates electricity (hydro and thermal generators, batteries); equipment which transmits and distributes electricity (wire and cable, transformers, conduit, switches); and equipment which uses electricity to perform some other function (light bulbs, appliances, motors).

For practical and analytical purposes these three classes of equipment have traditionally been assigned to six industry subsectors: (1) industrial electrical equipment; (2) wire and cable; (3) major appliances; (4) small appliances; (5) miscellaneous electrical products; and (6) batteries (see Canadian Electrical Industry chart). Each subsector differs markedly from the others in terms of the technology employed, production techniques and markets served. In these circumstances, the material set forth in the overview part of the profile should be treated with caution. In particular, it should be noted that, while it is possible to make statements of general validity about the industry as a whole, there will frequently be exceptions to these at the subsector level.

GENERAL CHARACTERISTICS OF THE ELECTRICAL MANUFACTURING INDUSTRY IN CANADA

Growth

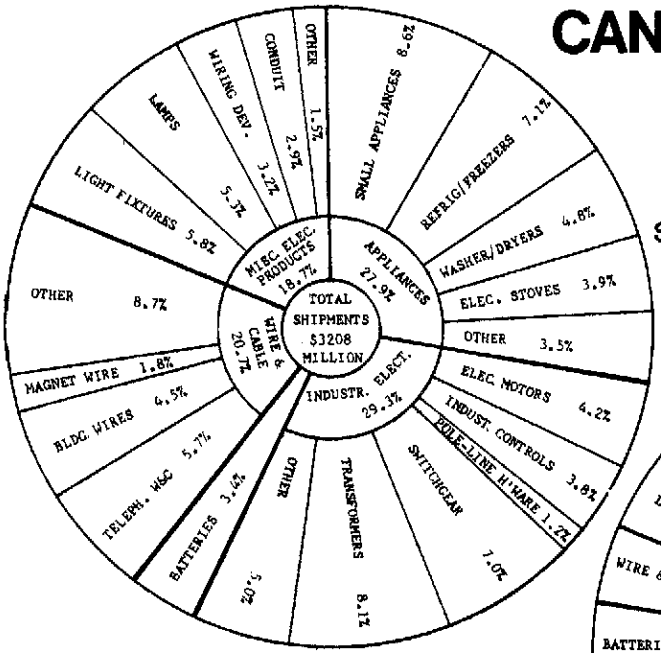
As a point of reference for what follows, Table I sets out the electrical industry's growth in Canada for the years 1971–1976.

TABLE I

Growth of Canadian Electrical Industry 1971–76

	1971	*1976*		*Av. ann. Growth Rate*	
	current $ (millions)	*current $ (millions)*	*1971 $ (millions)*	*current $*	*1971 $*
Shipments	1,878	3,208	2,212	11.3%	3.4%
Imports	487	1,143	788	18.6%	10.1%
Exports	155	266	183	11.4%	3.4%
App. Dom. Mkt.	2,210	4,085	2,817	13.1%	4.9%
Trade Balance as percentage of App. Dom. Mkt.	−15.0	−21.5			
GNP	94,450	190,027	118,464	15.0%	4.6%
Shipments/GNP	1.99%	1.69%	1.87%		

CANADIAN ELECTRICAL INDUSTRY – 1976



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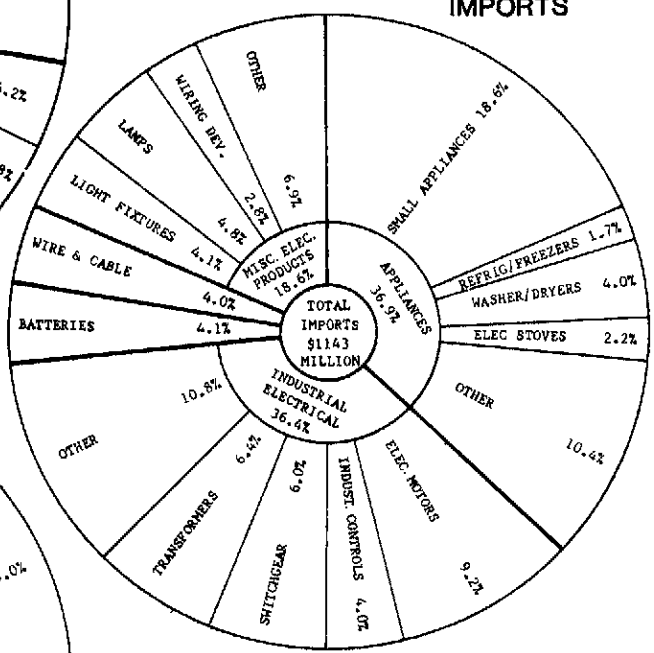

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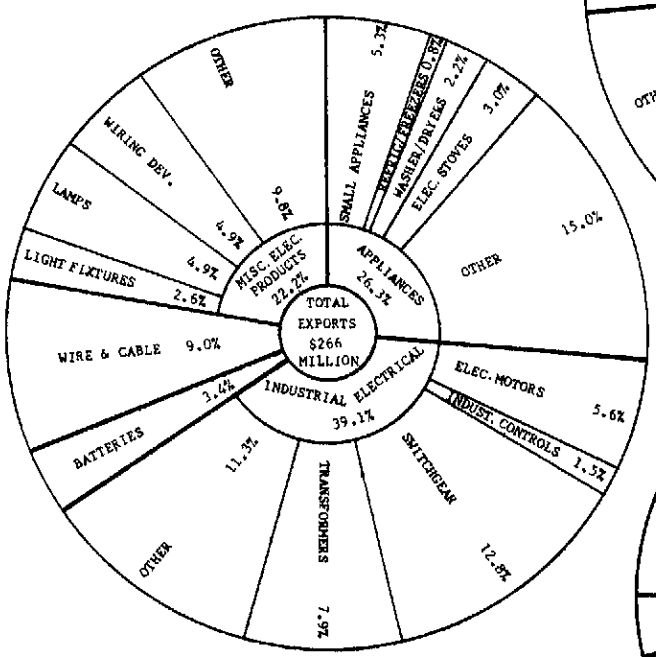

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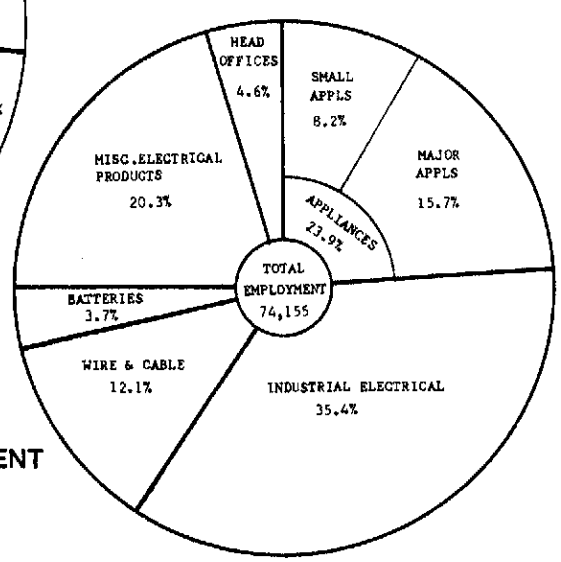


EMPLOYMENT

ELECTRICAL & ELECTRONICS BRANCH

Although in real terms the market for electrical products in Canada has grown more rapidly than GNP, the prime beneficiaries have been foreign suppliers. During this period import penetration grew from 22 to 28 per cent of the domestic market while exports remained at a constant 8.2 per cent of shipments. As a result, the trade deficit grew from $332 million to more than $600 million (1971 constant dollars).

The performance of the industry over the last five years is in marked contrast to the preceding five-year period (1965-1970). During the 1965 to 1970 period exports more than doubled from $78 million to $191 million (current dollars) or from 5.9 per cent of shipments to 10.9 per cent. Import penetration increased from 17.7 per cent to 21.2 per cent. The trade deficit increased slightly in absolute terms — from $190 million to $227 million — and relative to the domestic market, the imbalance actually fell from 12.6 to 11.5 per cent. During the period 1971-76 the trade imbalance relative to domestic market grew from 15.0 per cent to 21.5 per cent.

The picture that emerges is one of the electrical industry slowly losing its market share. Unlike some other industries, there is no simple explanation for such difficulties as a sudden tide of low-cost imports or a domestic market decline. The factors at work are many and varied and often differ from one subsector to another. They will be explored in the following sections of the profile.

Company Size and Ownership

In 1975 there were 532 electrical manufacturers in Canada employing 77,000 workers. These manufacturers operated 670 establishments and generated gross revenues of $3.55 billion. Ten years earlier the industry's gross revenues amounted to $1.5 billion and employment was 68,000.

There is a reasonably high degree of concentration in the industry. The seven largest firms (1.3 per cent of the total number) account for more than 35 per cent of employment and more than 40 per cent of sales. As illustrated in Table 2, 55 firms, each with sales of more than $10 million annually, account for more than 70 per cent of total employment and 80 per cent of gross revenue.

TABLE 2

Employment and Revenues by Company Size — 1975

	Companies		*Employees*		*Gross Revenues**	
	number	%	*number*	%	*million*	%
Large, more than $100 m	7	1.3	28,100	36.6	1,515	42.6
Medium, $10 m-$100 m	48	9.0	26,900	35.0	1,304	36.7
Small, $1 m-$10 m	409	39.3	18,600	24.3	661	18.6
Very Small, less than $1 m	268	50.4	3,100	4.1	76	2.1
TOTAL	532	100.0	76,700	100.0	3,556	100.0

*It should be noted that gross revenues is a different measure than shipments or domestic market used elsewhere in this profile and thus the three sets of figures do not correspond to each other.

In spite of a relatively high degree of concentration, even the largest of Canadian electrical firms is small by international standards. In 1975, Canada's largest electrical producer, Canadian General Electric, manufactured and sold more than $500 million of electrical products out of total company sales of $820 million. Throughout the world there are between 15 and 20 manufacturers larger than CGE, many with sales larger than Canada's total demand for electrical products. (Appendix I lists some the the world's more important electrical producers.)

Most of Canada's electrical manufacturing industry is foreign-owned. Although Canadian-controlled companies (274) number more than half of all electrical manufacturers with operations in Canada, they generate only 30 per cent of the industry's gross revenue and employ only 30 per cent of the industry's work force. American-controlled companies are responsible for 60 per cent of industry revenues and employment, while companies owned in other countries (mainly British, Dutch, French and German) are responsible for 10 per cent of revenue and employment.

Of the 55 largest companies, 41 are foreign-controlled and foreign control is strongest in the industrial electrical sector. In only one sector — wire and cable — do Canadians have a controlling interest.

Regional Distribution

At least 90 per cent of the industry's activity and employment is in Ontario and Québec. (See Appendix II for distribution of activity by province.) The distribution of the industry reflects concern for production efficiency, the continuing importance of the Québec and Ontario markets, and the location decisions of the pioneer firms in the industry. While the prominence of the market in central Canada has diminished over the years, it was this region that provided the industry with its first significant market in Canada. Once established, these early facilities have, by and large, stayed in place and attracted new investments.

With the increasing importance of economic activity in other parts of the country, however, Ontario's share of industry employment declined by 6 per cent between 1965 and 1974. Québec increased its share marginally, but the largest increase went to the other eight provinces which increased their employment share by 4.4 per cent, primarily in industrial electrical equipment and wire and cable.

Employment

Employment in the electrical industry has shown considerable annual variation since 1965 when it was 63,000, but in general, it increased until 1974 when it peaked at 80,700. Since that time employment has dropped by more than 10,000 to an estimated 70,500 in mid-1977.

Variations in employment have closely followed changes in the rate of growth in industry shipments. In the period 1965 to 1968, for example, employment fell by 5.8 per cent. During this three-year period there was virtually no growth in the Canadian market or in shipments by Canadian manufacturers. On the other hand, between 1970 and 1974 when electrical shipments grew by more than 60 per cent (current dollars), employment increased by almost 20 per cent.

Like the drop in employment between 1965 and 1968, the decline in employment over the last 2½ years can also be traced to weak markets and no real growth in shipments. However, the current fall in employment appears to be somewhat more serious than previous declines, since it is far larger in both relative and absolute terms.

Technology

The technological intensity of the electrical industry varies by sector but, taken as a whole, it employs a higher than average number of technically skilled workers as illustrated by the following table:

	Electrical Equipment	*All Manufacturing*
Managerial	22%	18%
Sales	5%	6%
Science and Engineering	7%	4%
Production	62%	66%

Most of the industry's fundamental technology on standard products is provided by parent corporations. Canadian efforts are, in large part, directed at custom engineering; new product developments and modifications to meet Canadian standards and unique Canadian conditions and market preferences; and product or process redesign necessitated by shorter production runs. Examples of new product developments are wire and cable; extra high voltage utility equipment such as 745 kV transformers, air blast breakers and line reactors, advanced hydraulic turbine and generator designs; and industrial drive systems for industry and marine propulsion. However, in general the industry's overall existing capacity for original product development is weaker than that of its large international competitors. Agreements with parents to take responsibility for certain product lines is a potential method of increasing manufacturing with an accompanying upgrading of design and development activities. This is a particularly attractive method since it allows companies to meet stiffer competition and also acts to increase the depth of R&D activities.

Prices, Productivity and Return on Investment

Given the heterogeneous nature of the industry, it, is difficult to give a composite picture of the industry's price productivity and profit performance. (The task is also made difficult because of technical problems in measurement.) Nevertheless, these factors generally attract widespread interest and are among the more important measures for comparing various sectors of industry. In the circumstances, the following observations, while far from definitive, are offered in order to give some indication of the electrical industry's performance compared with other Canadian manufacturing industries.

Although the electrical manufacturing industry has been subject to the same inflationary pressures as other industries, its rate of price increase, in the aggregate and for each of its subsectors, has been lower than the average for all manufacturing. After the relative stability of the 1960s, when the industry selling price index increased by 14 per cent, the price index increased by 45 per cent between 1971 and 1976. One-half of this increase took place in 1974 alone. In spite of this rapid increase in prices, it was considerably lower than the 67 per cent increase in prices for all manufacturing. In fact, only one manufacturing industry had a lower price increase than the electrical industry between 1971 and 1976. During 1976, the industry's prices increased at slightly more than one-half the rate for all manufacturing.

Part of the industry's price performance may be explained by its relatively high level of productivity. In a study by the Department of Industry, Trade and Commerce of productivity in 20 Canadian manufacturing industries, the electrical and electronics industry placed fourth overall in terms of primary factor productivity (i.e. the combination of labour and capital productivity). These results must be treated with some caution since they combine the electronics industry with the electrical industry.

However, productivity in the Canadian electrical industry was almost 12 per cent lower in 1972 than it was the the U.S. electrical industry. On a subsector basis, this disadvantage ranged from 4 per cent for industrial electrical production to more than 30 per cent for major appliances and lighting fixtures.

The combination of lower price increases and higher relative productivity did not result in superior corporate performance for the whole sector measured in terms of Return on Total Assets and Profit on Net Worth. In 1974 (the latest year for which figures are available) Return on Total Assets and Profit on New Worth for the electrical industry were 7.7 per cent and 13.5 per cent respectively, while the figures for all manufacturing were 9.1 per cent and 16.2 per cent.

Prices and profits have been constrained by the pressures of capacity under-utilization resulting from the economic slowdown. Price levels have not kept pace with rising costs and this has led to low rates of return. Low price level effects have not been offset by volume, productivity or product mix. This low return will have a long-term adverse effect on the industry.

THE CANADIAN ELECTRICAL MANUFACTURING INDUSTRY IN AN INTERNATIONAL CONTEXT

Among the 20 countries of the OECD, three countries — the U.S., Japan and Germany — dominate the electrical industry. Collectively they account for between 70 and 80 per cent of the market and output of electrical products. Remaining production, exports and markets are shared among a further seven "important" producers — Britain, France, Italy, Canada, The Netherlands, Switzerland and Sweden. Production, trade and market data for the five largest producers plus Canada are provided in Table 3.

General Developments

As recently as 1965, the export of electrical products from western industrialized countries and Japan amounted to little more than 8.5 per cent of shipments and no major producer relied on the export market for more than 18 to 20 per cent of sales. The Japanese industry was then the world's third largest, 4/5 the size of the German industry and only 1/5 the size of the American. Then as now, Japan, Germany and the U.S. held the lion's share of production but in the export market Britain and France were also important. Although Japan was the third largest producer, it ranked only on a par with France as an exporter, trailing well behind the U.S., Germany and Britain.

In general terms, the industry appears to have changed little over the last decade, except that it now has a much higher level of output. The major producers are the same, as are the main exporters. The export intensity of the industry has increased very little (from 8.8 per cent of shipments in 1965 to only 13.3 per cent in 1974). But these general appearances mask developments which could have a fundamental bearing on the future of the industry. The most important has been the extraordinary growth of the German and Japanese industries. The German electrical industry during the late 60's and early 70's grew at almost twice the growth rate of the industry in most other industrialized countries. But the Japanese industry grew almost twice as fast again, at an average annual rate of 23.4%. (See Table 4). The Japanese industry is now the world's second largest well over one and a half times as large as the German and over 4/5 the size of the U.S. industry.

Table 3.

Electrical Industry: Six Countries

Country	*Year*	*Shipments $ M*	*Imports $ M*	*Exports $ M*	*ADM $ M*	*Trade Balance $ M*	*Imports % of ADM*	*Exports % of Ship.*	*Trade Balance % of ADM*
U.S.	65	18789	286	831	18244	+545	1.6	4.4	+3.0
	74	34900	1637	2764	33773	+1127	4.8	7.9	+3.3
Japan	65	4245	57	348	3954	+291	1.4	8.2	+7.0
	74	28200	400	1998	26602	+1598	1.5	7.1	+6.0
F.R.G.	65	5390	284	905	4769	+621	6.0	16.8	+13.0
	74	17600	1524	4334	14790	+2810	10.3	24.6	+19.0
Britain	65	3279	183	585	2877	+402	6.4	17.8	+14.0
	74	5436	1060	1363	5133	+303	20.7	25.1	+5.9
France	65	1999	247	340	1906	+93	13.0	17.0	+4.9
	74	4100	1273	1653	3720	+380	34.2	40.3	+10.2
Canada	65	1317	242	75	1484	−167	16.3	5.7	−11.3
	74	2656	945	239	3362	−706	28.1	9.0	−21.0

Source: Shipments: The Engineering Industries in OECD Member Countries, Volume I, Deliveries of "100" Selected Products.
Imports/Exports: UN Trade Data Bank.

TABLE 4

Average Annual Growth Rate — 1965-1974
(Based on current dollars)

	Production	*Imports*	*Exports*	*App. Dom. Market*
U.S.	7.1%	21.4%	14.3%	7.1%
Japan	23.4%	24.2%	21.4%	23.6%
Germany	14.1%	20.6%	19.0%	13.4%
Britain	5.7%	21.6%	9.8%	6.7%
France	8.3%	20.0%	19.2%	7.7%
Canada	8.1%	16.4%	13.7%	9.5%

In export markets, both Japan and France have overtaken Britain which has dropped to fifth position. Germany has consolidated its position as the leading exporter of electrical products by increasing its share of world markets. For Britain, Germany and France, export dependency has grown to between 25 per cent and 40 per cent of output (from less than 20 per cent in 1965).

The industry in the United States, while still the world's leading producer, has grown much more slowly than its closest rivals and threatens to be overtaken by Japan within a few years. Britain which, in a relative sense, has the most favourable balance of trade in electrical products a decade ago may become a net importer.

Over the last decade there has, therefore, been a significant shift in the relative importance of the world's leading producers of electrical equipment. Propelled by rapid growth in their domestic markets,

Japan and Germany have greatly increased their share of world output. They have also increased their share of international trade but by a less striking amount. All countries have, to a certain extent, felt the impact of German and Japanese growth but it has been particularly pronounced for the U.S. and Britain which have seen their shares of export markets steadily eroded.

For the future, it is difficult to foresee the Japanese and German markets maintaining their historical growth rates. When their domestic market growth falls to more moderate levels, it is not unreasonable to expect that they will look to foreign markets for growth and will put greater pressure on electrical manufacturers in other countries than has already been the case.

Canada's Position

Among OECD countries, Canada occupies seventh position in the production of electrical products accounting for about 2.5 per cent of the total output of these countries. It ranks behind the U.S., Japan, Germany, Britain, France and Italy. Ten years ago, Canada was in sixth position but was overtaken by Italy in 1970. As an exporter, Canada ranks eleventh in absolute terms behind countries with much smaller electrical industries such as Belgium and The Netherlands. It is a major importer, however, and as shown in Table 5 is by far the largest net importer of electrical products among the major and minor producers of electrical products in the OECD.

TABLE 5

Dollar of Exports/Dollar of Imports, 1974

Japan	$3.75
Germany	2.73
U.S.	2.08
Britain	1.35
Switzerland	1.28
France	1.24
Italy	1.02
Denmark	.92
Austria	.84
The Netherlands	.82
Sweden	.81
Belgium	.57
Canada	.33
OECD average	1.32

It is, therefore, not surprising that Canada has a large and growing deficit in electrical products, as illustrated in Figure 1.

While Canada has always been a net importer of electrical products, its agregate deficit was only moderately important until the early 1970s. Since that time it has grown steadily. In 1965, for example, it was $189 million. By 1970 it had reached $227 million, and in 1976 was $877 million. In each year since 1970 without exception, the Canadian industry has lost about one per cent of its share in the domestic market and has failed to make up this lost ground through increasing the share of production going to exports. In fact, exports fell from 10.9 per cent of shipments in 1970 to 8.3 per cent in 1976.

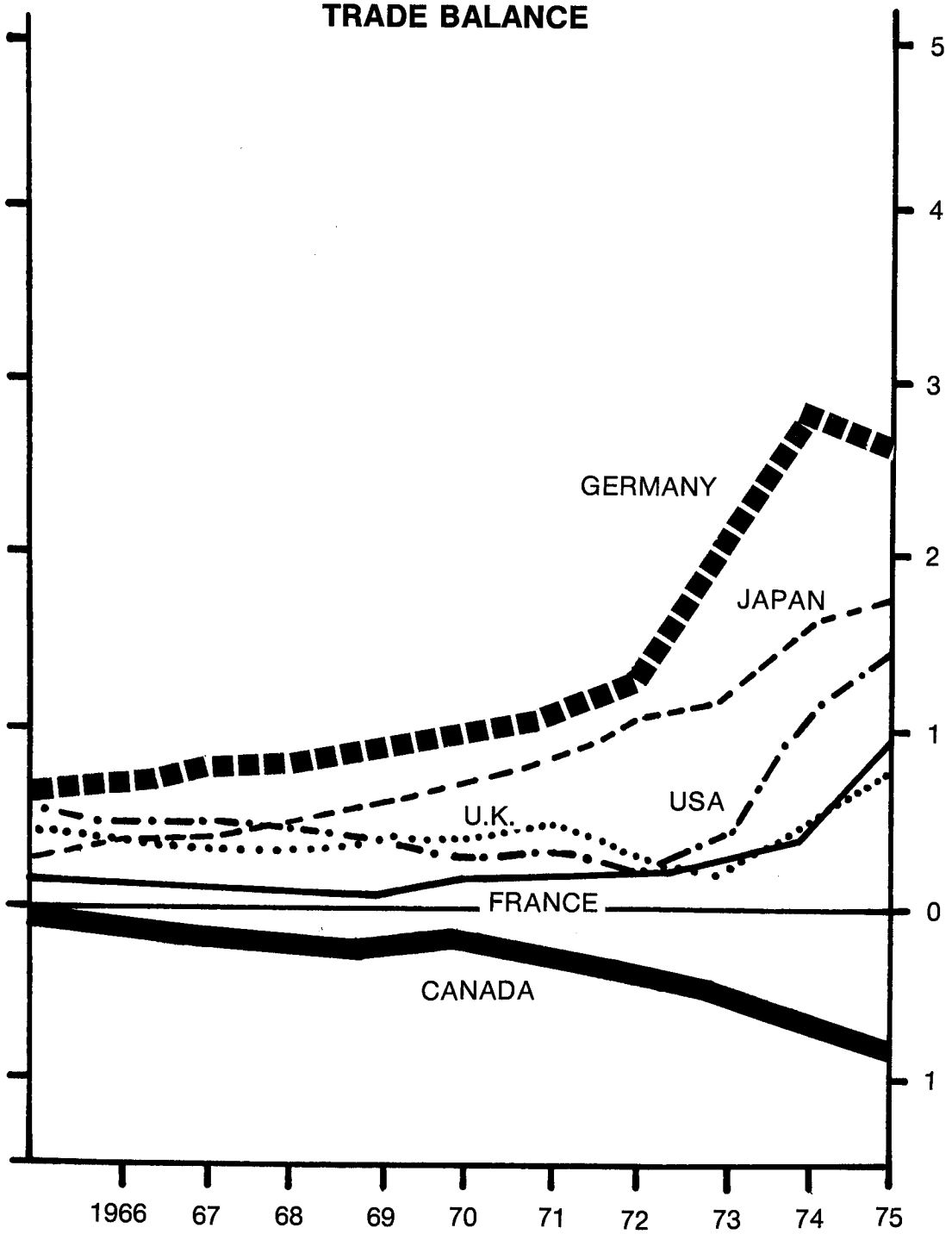
The superior performance of the world's three leading producers may be explained, at least partially, by their large size and consequent advantages in undertaking large R&D projects, achieving production efficiencies and mounting worldwide marketing efforts. However, these factors cannot explain why Canada trails other countries in trade performance — many with much smaller electrical industries — by such a wide margin, and why the industry's performance deteriorated so markedly during the 1970s.

Many representatives of the Canadian electrical industry have claimed that the industry lost more than it gained following the Kennedy Round. No detailed studies are available to substantiate this thesis. As it happens, the onset of the steady decline in the industry's trade balance coincides with the beginning of tariff cuts under the Kennedy Round. By itself, however, this does not explain why more ground was lost than gained. Even after the Kennedy Round, Canadian tariffs were still higher than those in many other industrialized countries. It might have been expected, therefore, that the Canadian

FIGURE 1

ELECTRICAL INDUSTRY

TRADE BALANCE



industry would have fared better rather than worse from moderately high protection at home and lower tariffs abroad. Other factors at work seem to have precluded that possibility.

Among many factors presented in explanation of this situation, the four below, not in order of importance, stand out above all others:

(1) the effects of the ownership pattern and structure of the Canadian industry;
(2) the fragmented production and small scale combined with the effects of rapid inflation and the increased value of the dollar when it was initially floated in the late 1960s;
(3) non-tariff barriers to trade with other industrialized countries;
(4) pricing practices of and foreign government support for foreign competitors in exporting.

As indicated earlier, more than 70 per cent of the output of the Canadian electrical manufacturing industry is produced by foreign-controlled firms. Most of these companies were established in Canada to serve the domestic market behind high levels of tariff protection. Frequently, export marketing rights were denied the Canadian subsidiary. Even if they were not, there was little incentive to export as long as the protected Canadian market provided an adequate level of plant loading and a satisfactory return on investment.

Since many of the facilities in Canada were miniature replicas of much larger and more efficient foreign plants, Canadian producers were simply not price-competitive in many product lines. By way of contrast, many of the moderately sized electrical industries in foreign countries have at least one large domestically-owned manufacturer (e.g. Britain, France, Sweden, Switzerland, Italy). They have the freedom to enter the export market and can rationalize their production to become internationally competitive in at least some products. The Canadian industry was not in a position to do so and, in face of rapid inflation in factor costs and the upward movement of the Canadian dollar when it was floated, the industry's balance of trade progressively declined.

Any assessment of international trading relationships must acknowledge the overwhelming importance of the U.S. to the Canadian electrical industry. In agregate, over the period 1965–75, 70 to 80 per cent of electrical imports came from the U.S., while exports to the U.S. market varied between 50 and 70 per cent of Canadian exports. Performance of individual subsectors, of course, varied but it is unusual if the imports from or exports to the U.S. are less than 50 per cent of the external trade of any subsector, while levels of 80 to 90 per cent are not uncommon. The trade balance is negative in every subsector and the overall trade imbalance with the U.S. in 1976 was approximately $700 million. The U.S. market, despite the existance of some non-tariff barriers (NTBs), is by no means as tightly closed as other developed countries. For example, electrical power utilities number more than 1,000 with some 70 per cent of these under federal or municipal control, but about 50 per cent of this market is considered to be open. There is, then, considerable opportunity for Canadian suppliers in the American market, but the effects of extensive U.S. ownership of the Canadian industry must also be considered. To the extent that U.S./Canadian corporate relationships are supportive of rationalization and specialization efforts to benefit Canadian subsidiaries, the corporate connections will be a positive factor. If not, then those ties will be negative influences in the development of the Canadian electrical industry and its subsectors.

While the effects of foreign ownership may provide a partial explanation for the relatively low level of Canadian exports, non-tariff barriers in many industrialized countries are probably at least as important an explanation for certain classes of electrical products. As mentioned, international trade in electrical products grew from only 8.8 per cent of shipments in 1965 to 13.3 per cent of shipments in 1974, much of it with non-OECD countries. (By comparison in 1974, international trade in electronics products amounted to 30 per cent of shipments.) That the increase in trade has not been more substantial is a reflection, in large measure, of the continuation of significant non-tariff barriers. The most important of these are the procurement practices of foreign government-owned utilities which affect the industrial electrical equipment sector and, to a lesser extent, the wire and cable sector. Also of importance are standards which affect trade in miscellaneous electrical products (wiring devices and lamps) and in appliances.

Although, following the Kennedy Round, Canadian tariffs on electrical products remained higher than those in many other industrialized countries, the Canadian market proved to be more accessible to suppliers in many of those countries than their markets were to Canadian exporters. This is due, in part, to (a) the greater importance of non-tariff barriers to imports of electrical equipment in most other industrialized countries than in Canada; and (b) the difference between tariffs and non-tariff barriers in that tariffs are relative barriers while non-tariff barriers tend to be absolute. While the tariff can often be absorbed by the foreign supplier, there is little, if anything, the supplier can do to overcome a non-tariff barrier such as discrimination in favour of indigenous suppliers in purchases by government-owned

utilities with no opportunity for foreign suppliers to bid. The non-tariff barriers in many otherwise attractive industrialized markets are such that Canadian suppliers generally cannot bid. On the other hand, foreign suppliers have won contracts in Canada. Their ability to compete on the basis of lowest price, despite the tariffs, may be due to marginal pricing in which fixed costs are covered by sales in their protected home markets and, in some instances, government support measures. Moreover, in the industry's view tariffs represent a relatively stable barrier whereas non-tariff barriers can be exercised with great flexibility. In these circumstances, it is difficult to develop a long-term export marketing plan for a country with significant non-tariff barriers because access to that market can be totally denied at any time.

To the extent that the multilateral trade negotiations provide improved access to protected markets and bring greater international scrutiny and discipline to bear where there is discriminatory purchasing, or subsidization, the parts of the industry affected by these factors would benefit. Similarly, the trade distorting effects of standards will be addressed in these negotiations.

Future Developments

In view of the factors at work in the electrical industry both at home and abroad, it is perhaps not surprising that the Canadian industry has steadily lost ground in its own market and has been unable to make it up in foreign markets. Recent mergers in the applicance subsector hold promise for its future performance. Similarly, other subsectors need equally positive measures to strengthen their potential.

Nevertheless, there is widespread concern among Canadian industry executives about the impact on the electrical industry of the current round of multi-lateral trade negotiations (MTN). While the impact of the negotiations will probably vary from subsector to subsector, all parts of the industry are virtually unanimous in calling for tariffs to be maintained at existing levels. In some cases (electrical generation equipment) there appears to be a willingness to accept a drop in the level of Canadian protection in return for a real reduction in non-tariff barriers (NTBs) abroad.

The industry has doubts, however, as to the willingness of other participants in the trade negotiations to move towards freer trade, particularly in terms of reducing the effects of their non-tariff barriers. They are skeptical such trade liberalization will occur in the context of the first comprehensive negotiation of non-tariff barriers because, heretofore, there has been no evidence of unilateral opening of markets.

Implementation of the trade negotiation results is not expected to be fully carried out before the mid-to-late 1980s. The problems and opportunities of trade liberalization, while important for the medium-term, should not overshadow the basic problems of the industry nor the increasing pressures of international competition now occurring. The problems which need to be studied by the industry, to realize its full potential and exploit new market opportunities in future, include a re-orientation of attitudes and operating procedures and greater authority for the management of some important Canadian manufacturers.

With respect to structure, it is apparent that in a freer trade environment, companies will have to change their method of operations in order to remain competitive. As previously indicated, many foreign-owned companies first came to Canada to serve the domestic market which was protected by high tariffs. They established facilities appropriate to this environment, i.e. multiproduct plants with limited production runs.

In a freer trade environment, these plants will find it increasingly difficult to compete against imports produced in dedicated facilities abroad. In these circumstances, Canadian manufacturers will have to concentrate on fewer products manufactured for a world market. But to the extent that corporate structures in Canada remain substantially closed to import competition and that corporate structures in Canada impede the growth of sales in the U.S., the Canadian industry is unlikely to undertake the necessary investment in specialization. Hence, Canadian manufacturers will have to find some other means to retain an adequate share of the domestic market.

SUBSECTOR ANALYSIS

Before looking at each of the industry's subsectors, it should be noted that one common concern they share is the climate for business in Canada. This has, for a number of years, been an overriding pre-occupation of the electrical industry.

The government has recently taken budgetary action to help alleviate the concerns voiced by the business community. It is important that Canada be perceived as an attractive country in which to invest. Otherwise, the solution of the particular problems facing the various subsectors of the electrical industry may be for naught.

The Industrial Electrical Industry

Growth in Output and Market
Canada 1965–1975
$ Millions

	Domestic Market	*Shipments*	*Exports*	*Imports*	*Trade Balance*
1965	464	376	25	113	−88
1975	1,161	883	97	375	−278
% Change	150.2	134.8	288.0	231.9	215.9

The industrial electrical industry is the largest of the electrical industry's subsectors, generating about 30 per cent of total shipments and employing more than 26,000. Its products find their way into two main markets: utilities (generators and transformers), and capital equipment for other industries (motors and industrial control equipment).

The two largest firms are Canadian General Electric and Westinghouse Canada Ltd., with annual sales of $900 million and $400 million respectively. (These sales volumes include activities in areas other than industrial electrical.) While large by Canadian standards, these companies are small compared with their top international competitors (See Appendix I).

One-half of the industrys' output consists of heavy electrical equipment required by the primary and secondary manufacturing industries, examples of which are drive systems for the mining, steel, pulp and paper industries. This is a very diverse market with no single element as large or easily identified as the electrical power equipment market. Hence this profile concentrates on the problems related to electrical utility equipment.

The other half of industrial electrical industry's output is sold to the 21 electrical power utilities and companies that produce power for their own use. Of these 21 companies and utilities, six provide 77 per cent of the market as illustrated in Table 6.

TABLE 6

Installed Capacity MW

Ontario Hydro	19,289	31.5%
Hydro Quebec	11,356	18.2%
Churchill Falls Corp.	5,500	9.0%
B.C. Hydro	4,950	8.1%
Alcan	3,170	5.2%
Manitoba Hydro	2,724	5.0%

With six customers representing 77 per cent of the market, the utility market could be considered highly concentrated. While true in comparison with the Canadian market for other electrical products, it is fragmented when compared with the utility market in most other countries. In many countries, the purchasing practices of the utilities are often dictated by the industrial or economic policies of the country, with strong support given to national equipment manufacturers.

On the basis of sales in their protected domestic markets, foreign equipment suppliers can cover their fixed costs and offer low export prices. Such price offerings are difficult to refuse for Canadian utilities whose charters often require the generation of electricity at least cost to the consumer.

In contrast with the industry in most other countries, Canadian manufacturers do not, therefore, have a strong domestic base. This is a considerable handicap in competing with foreign firms in Third World countries. In approaching these markets, Canadian suppliers claim they are further hampered by the lack of measures to reduce down-side risk in major capital equipment projects, such as protection against currency fluctuations and inflation which is available to some foreign competitors.

Also, there is currently a world production overcapacity resulting from a rapid expansion of the industry in recent years, particularly in Japan and Germany. While this is causing problems for the industry throughout the world, many foreign manufacturers are strongly supported by their governments which have continued to protect the domestic market and provided financial and export support such that marginal pricing is possible. Canadian manufacturers do not have this degree of support. As already noted, such trade-distorting measures may be subject to new rules governing their use as a result of the multilateral trade negotiations.

The main strengths of the Canadian industry lie in such products as hydro generators, transformers, circuit breakers, long-distance transmission equipment and drive systems for industrial and marine applications. In all of these products the Canadian industry is generally internationally competitive and in some of them it has developed technology of the highest standards. While the Canadian industry has very real strengths in these areas, on balance the industry's weaknesses outweigh its strengths.

Its most serious deficiency is an incomplete product line and a low level of technological capability in certain product areas. While competitive in hydro and long-distance transmission, its ability to compete in thermal generators and in many industrial applications is doubtful. This is becoming a major drawback as market requirements shift. In recent years the Canadian market has shifted toward thermal generation, both fossil fueled and nuclear. Generating stations are located closer to demand centres and are thus not as dependent on long-distance, high-voltage transmission. In short, the narrow and limited capabilities of the industry are becoming an increasingly poorer match with market requirements.

The industry's efforts to compensate for these domestic market problems by export activity have been hampered by the lack of turnkey or systems integration capability. The principle problem is identifying and managing the high risk factors of construction and financing. In addition there are the effects of the tendency of Canadian electrical utilities to develop their own systems capability and to rely on the manufacturing industry for products only. Thus in the export market where Canadian technology might be appropriate (e.g. hydro installations in developing countries), the Canadian industry often faces difficulties because of its limited turnkey capability. One solution might be to have the utilities and the manufacturers work more closely together to strengthen the industry and reduce its costs.

By working more closely together, the Canadian utilities and the manufacturers might be able to foster development of additional product lines in Canada and enhance the systems capabilities of the manufacturers allowing them to compete more effectively for domestic and export contracts. The market for heavy electrical equipment for industrial applications also represents significant market opportunities, particularly in the resource-based industries and energy-related projects.

The Electrical Wire and Cable Industry

Growth in Output and Market
Canada 1965–1975
$ Millions

	Domestic Market	*Shipments*	*Exports*	*Imports*	*Trade Balance*
1965	263	275	21	9	12
1975	666	646	31	51	−20
% Change	153.2	134.9	47.6	366.7	

The wire and cable industry differs from all others in the electrical industry in its relatively high degree of Canadian control (60 per cent) and its more or less balance position in international trade. It is the second largest electrical subsector accounting for 22 per cent of total sector shipments and employing 9,500, down 1,000 since 1974 but up from 7,900 in 1965.

There are a variety of factors which account for the industry's relative balance of trade in wire and cable over the last 10 years. Among them are the availability and price of raw materials, particularly

copper which accounts for a substantial proportion of cost; the size of the Canadian market and the purchasing practices of the more important domestic customers; technical and management skills; and a tradition of market-located production throughout the world.

For a number of years, there has been a North American producer's price and a world price for copper. Over the period 1961 to 1970, the North American price was consistently below world prices, ranging from a few percentage points in the early 1960s to as much as 60 per cent lower in the speculative boom of 1965-66. Since 1974, the Canadian price has been an average of 10 per cent higher than world prices and is currently 20 per cent higher.

Another important factor in explaining the industry's performance is the large demand in Canada for electrical energy and telecommunications service combined within a large geographical area. The result is in a relatively large domestic market for wire and cable. With this, plus the nature of the production process used in the manufacture of wire and cable, it has been possible for cable manufacturers to decentralize their activities throughout Canada. There are now manufacturing plants in all but one province. In recognition of local production, provincially-owned utilities (telecommunications and electrical power) usually give first preference to Canadian based companies.

Management of Canadian wire and cable companies is of a high calibre. They have invested in R&D, attempted to meet provincial industrial development aspirations and have pursued international activities to a greater extent than other subsector of the electrical industry. For example, in response to the tendency of both developed and developing countries to aspire toward self-sufficiency in wire and cable, Canada Wire and Cable has established more than 20 joint ventures outside Canada.

A final factor of importance in explaining the industry's performance is the fact that wire and cable constitute a little-traded commodity. Most developed countries give a preference to domestic suppliers and even many developing countries, because of the relatively straightforward production technology employed, supply their own needs.

The wire and cable industry in Canada satisfies more than 90 per cent of domestic demand. There are, however, some potential problems for the industry. Higher material and labour costs in Canada and worldwide capacity under-utilization have contributed to turning Canada's modest surplus to a deficit. The industry's problems could become more serious if tariffs were substantially reduced since the dispersed Canadian industry would then be threatened by American imports produced in much larger production runs.

In the longer term, therefore, it will be important to reduce or offset higher costs and deal with small scale and fragmented production in order to maintain the strength of the industry.

Major Appliances

Growth in Output and Market
Canada 1965-1975
$ Millions

	Domestic Market	*Shipments*	*Exports*	*Imports*	*Trade Balance*
1965	307	284	17	40	−23
1975	610	504	46	152	−106
% Change	98.7	77.5	170.6	280.0	360.9

Employment in the major appliance subsector was about 12,000 in 1975. It has varied considerably over the decade, ranging between 10,700 in 1970 and 13,700 in 1966.

This is a relatively mature subsector in which production technology is far more important than product technology. Scale of production has become increasingly important in recent years and has resulted in a series of consolidations, both at the individual manufacturing plant level and at the corporate level. At the plant level, fewer but larger establishments now produce a larger share of the industry's output. At the corporate level, these large establishments are operated by fewer and fewer companies.

The industry is currently in the process of adapting to its most recent and significant round of consolidation. One is the acquisition by White Consolidated of the appliance business of Westinghouse Electric in the U.S., including the use of the Westinghouse trade name in Canada. The other is the joint venture comprising the appliance operations of Canadian General Electric (CGE) and GSW Limited,

which has acquired the appliance production facilities of Westinghouse Canada Limited. The new company, the Canadian Appliance Manufacturing Company (CAMCO), employs about 5,000, should account for about one-third of the Canadian market and rank fifth in North America. It has made a number of public commitments concerning its operations, including maintenance of employment, increased capital investment and efforts toward attaining international competitiveness in some products.

A firmer basis for building a more competitive industry would, therefore, appear to have been laid and, in addition to the rationalization process under way, significant capital investment is being undertaken in the industry in a drive to achieve increased productivity levels.

Export opportunities on a specialized basis are also being identified and pursued. The possibility of further consolidation in the industry remains, as does the prospect of a higher degree of vertical integration and increased sourcing of appliance components in Canada. The phasing of tariff cuts over a period of time should allow the industry to consolidate its reorganization. For smaller firms, it may also be necessary to pursue a high degree of product specialization through agreements with parent organizations or other manufacturers in order to achieve competitive and efficient production.

Small Appliances

Growth in Output and Market
Canada 1965–1975
$ Millions

	Domestic Market	*Shipments*	*Exports*	*Imports*	*Trade Balance*
1965	143	104	4	43	39
1975	400	248	19	171	−152
% Change	179.7	138.5	375.0	297.7	283:7

Imports account for more than 40 per cent of the domestic market, a share that has been increasing steadily over the past decade. Foreign ownership is high in this subsector, most of the major suppliers being divisions or subsidiaries of foreign electrical equipment suppliers. Most of the production establishments are relatively small and mainly concerned with assembling products to foreign designs for the Canadian market.

The major importers are Canadian manufacturers who are finding it increasingly difficult to justify Canadian production in the face of lower priced alternatives from their parents or affiliates. Canadian production continues to exist for the more traditional small appliances such as toasters, kettles, irons, while imports are dominant in the newer type of appliances which enjoy the highest growth rates.

In addition, the industry faces difficulties with the method of application of the federal sales tax. Newly introduced small appliances require high gross margins in order to cover the heavy promotional expenses involved in new product introduction. A large proportion of this gross margin is included in the tax base if it is a product manufactured in Canada but excluded if it is manufactured abroad. As the product matures, the gross margins decline and the tax bases for both Canadian made and imported products tend to converge. However, by the time that occurs the foreign manufacturer would have had considerable production experience, providing an absolute production cost advantage that may not have been present at the time of product introduction. Hence, the sales tax tends to retard or prevent the production of new products in Canada.

With the exception of a few traditional appliances, this is a sector in which cosmetic design, packaging, advertising and the ability to respond quickly to fickle market demands are most important. Many of the new products have a short commercial life. The market expands rapidly following product introduction, has a relatively short plateau and declines rapidly. Success depends upon getting a large volume of a product through production and into distribution channels very quickly to catch the peak. The Canadian industry, fragmented and with a small market, finds it difficult to operate in such an environment.

The subsector clearly faces substantial and fundamental changes in its operation and organization. A few of the larger establishments may be in a position to modify their activities and adjust to the new environment of trade liberalization and increased international competition. For the majority, enhanced design capability, product responsibility and access to larger markets will be necessary.

Miscellaneous Electrical

Growth in Output and Market
Canada 1965–1975
$ Millions

	Domestic Market	*Shipments*	*Exports*	*Imports*	*Trade Balance*
1965	270	224	9	55	−46
1975	667	539	56	184	−128
% Change	147.0	140.6	552.2	234.5	178.2

This subsector covers a diverse range of products, the major groups being conduit and fittings, lamp bulbs, wiring devices and lighting fixtures. Total employment is more than 15,000.

The lamp bulb group is highly concentrated, with four firms, all subsidiaries of foreign-owned companies, dominating the business. Most of the products are manufactured in high volume, capital-intensive facilities. Price competition is severe among the major suppliers as they attempt to maintain market share for essentially undifferentiated products. Profit margins are depressed in some lamp bulb areas because of increasing foreign competition. Recognizing that maintaining market share is more important to them than maintaining Canadian production, Canadian manufacturers are looking to their parents or affiliates for an increasing amount of product. In fact, it is not unreasonable to expect that one or more Canadian manufacturers with smaller market shares will abandon Canadian production entirely within the next few years.

The other commodity groups have done fairly well serving the domestic market. They have been assisted by both tariff protection and to some extent by the application of standards. These groups are composed of a large number of small companies, in many cases serving localized or specialized market. All are sensitive to international competition in varying degrees. Least sensitive is the conduit and fittings group. These products, of very simple technology, have a high weight to cost ratio and accordingly tend to be produced close to the market. The residential or consumer portion of the lighting fixtures business may also be less sensitive to international competition. This is largely a fashion or style business and, to the extent that Canadian suppliers can maintain a high level of design capability, they should be able to retain their market share.

The remaining miscellaneous electrical producers, those involved in commercial and industrial lighting fixtures and wiring devices, may not be so fortunate. Their products tend to be standardized and lend themselves well to long production runs in capital-intensive factories. Few, if any, of the Canadian establishments have such facilities. Most manufacture for a small Canadian market to U.S. designs, with tooling often provided by U.S. companies.

The outlook for the miscellaneous electrical sector is therefore mixed — some product groups are able to hold their own against foreign competition but others are faced with mounting pressures from imports.

Batteries

Growth in Output and Market
Canada 1965–1975
$ Millions

	Domestic Market	*Shipments*	*Exports*	*Imports*	*Trade Balance*
1965	59	54	2	7	−5
1975	145	109	7	43	−36
% Change	145.8	101.9	250.0	514.3	620.0

This is the smallest subsector within the industry and also the one with the poorest growth record. In spite of the growth implied by the table above, there has been a decline in production, in real terms, over the past five years.

The battery industry has two distinct subsectors. The larger is the wet cell battery, typified and dominated by the automotive battery. This portion of the industry depends heavily upon the production and market for motor vehicles in Canada. Given high transportation costs for the finished product, Canadian based producers should continue to be the main supplier for Canadian manufactured automobiles.

The same is not true for the dry cell portion of the industry. Imports have made major inroads in the Canadian market. All major manufacturers supplement their Canadian production with imports from affiliates around the world. Continued Canadian production of limited product lines will depend upon achieving international cost competitiveness.

APPENDIX I

MAJOR PRODUCERS OF ELECTRICAL PRODUCTS

		1976 Sales (U.S. $ Millions)
General Electric	U.S.	15,697
Siemens	Germany	8,060
Hitachi	Japan	6,680
Westinghouse	U.S.	6,145
AEG	Germany	5,351
Toshiba	Japan	4,460
GEC	Britain	3,721
Brown Boveri	Switzerland	3,374
G.d'E.	France	3,283
Mitsubishi Electric	Japan	2,273
ASEA	Sweden	1,929
Kraftwerk Union	Germany	1,874
Alsthom Atlantique	France	1,689
CGE	Canada	892
Fuji Electric	Japan	619
Westinghouse Canada	Canada	461

APPENDIX II

DISTRIBUTION OF ELECTRICAL INDUSTRY BY PROVINCE
1975

	**Establishments*		*Employment*		*Gross Revenues*	
Province	*Units*	*% Distr.*	*Units*	*% Distr.*	*$ Millions*	*% Distr.*
Ontario	420	58.0	53,100	69.3	2,353	66.2
Quebec	189	26.1	18,000	23.4	939	26.4
Manitoba	29	4.0	1,900	2.5	88	2.5
B.C.	45	6.2	1,300	1.7	64	1.8
N.B.	9	1.3	1,000	1.2	36	1.0
Alberta	23	3.2	800	1.0	33	0.9
Sask.	3	0.4	400	0.5	27	0.8
N.S.	5	0.7	200	0.4	15	0.4
Nfld.	1	0.1	Negl.	-	NA	-
TOTAL	724	100.0	76,700	100.0	3,555	100.0

*There are approximately 670 manufacturing plants and establishments located across Canada. For analytic purposes, it has been necessary to further break these down into 724 "production units" by treating separately each of the activities of multiproduct establishments.