



# Canada: Electrical Power Systems

June 2008 – Toronto, Canada

Stefan Popescu  
August 08

## Summary

The Canadian Electrical Power System (EPS) industry plays an important part in the Canadian economy and was valued at an estimated US\$ 18.0 billion in 2007. EPS shipments represent over 22 percent of total Canadian fabricated metal, machinery, equipment and appliances manufacturing and is concentrated in Ontario, which accounts for approximately two-thirds of the total.

The Canadian EPS industry is highly integrated globally, with about 80 percent of Canadian manufacturing sales attributable to export, while 85 percent of the Canadian market is supplied by imports. U.S. equipment has a dominant share of the imports with a total value of US\$ 8.2 billion in 2007.

After several years of solid growth, the Canadian EPS industry recorded a decrease of about 6 percent in 2007. This was due to slower investment activities as a response to overall concerns about the lower Canadian GDP growth rate. The industry is expected to remain relatively stagnant in 2008 and 2009 but, for the long term, 1.5 percent growth is expected due to demand for electricity.

The scope of this report is to evaluate the status, the trend and the opportunities in the Canadian EPS sector. As defined by the ITA classification, this sector encompasses the following types of equipment, identified with the corresponding NAICS codes, and grouped in the following main segments:

Power Generation - Boilers, Nuclear and Thermal, Power Generation Equipment – 33241;  
Power Conversion - Turbines Hydro, Steam and Gas, Engines, Mec. Power Equipment – 33261;  
Electricity Generation (and conversion) – Generators, Transformers, Motors – 335311, 335312;  
Switchgear – all Switching Equipment, Relays, Controls – 335315;  
Other Electrical Equipment and Components including Lighting – 33590, 33510

## Market Demand

In Canada, electricity consumption continues to rise, requiring both additional installed capacity and the replacement of existing equipment with more efficient equipment that meets higher environmental standards. Modest annual growth rates of one to three percent are forecasted for increased consumption. However, the need to replace existing equipment, due either to the completion of its life cycle or the need for more efficiency, is expected to accelerate over the medium and long term.

The strong Canadian economy and its dependence on electricity are driving the **demand for electricity**. From manufacturing to mining to agricultural processing, nearly all sectors of the

economy rely essentially on electric energy. The real GDP growth rate provides a good indication of the growing needs in electricity. After a 2.7 percent rate in 2007, a slower rate of 1.7 percent is forecasted for 2008 and 2.3 percent for 2009 (RBC Economics, Apr. 2008).

Canada's population is projected to grow by 20 percent (from 32 million inhabitants) in the next 12 years, also increasing electricity demand.

Energy saving and conservation are heavily promoted in the consumer and industrial sectors of Canada. While important, they have not slowed the increase in electricity consumption. An example in the consumer side is the promotion of higher efficiency products like the fluorescent lighting. Replacing every incandescent bulb with a compact fluorescent would reduce electricity consumption by about 4 percent in the next period, but this is far from the population's growing rate. Saving and conservation measures are also promoted in the industrial/commercial sector to the extent that government programs are designed and implemented with defined targets. For example, the Ontario Power Authority already has an ambitious saving and conservation program, having a very challenging target to offset up to 75 percent of the increase in peak demand for electricity. Similar programs in the USA are targeting to offset only 25 to 50 percent of the increase in peak demand, and even that is considered a challenge.

While a consistent increase in electricity demand is forecasted, the actual growth rate of the EPS sector is, however, not necessarily constant but more of an average rate over the long term. The national electric system is designed to have reserve installed power capacity in order to cope with possible unexpected situations of spike demands or shutdown of some generating capacity, as well as with the normal increase in demand, until additional generating capacities are developed.

Another fundamental factor in determining opportunities for EPS equipment **is the need to replace the existing capacities**. Power generation capacities are designed to run for 30 to 40 years. According to the Ontario Power Authority (OPA), the Ontario power generation facilities were built about 30 years ago and 80 percent of them have to be replaced within a period of 10 to 15 years from now. OPA estimates that over US \$ 60 billion investment is necessary over that period and is working on programs to secure the required power capacities. The aging situation is similar across Canada, which means that over US\$ 100 billion will be invested over the respective period.

Early in 2008, the federal government set out an aggressive plan to reduce Canada's greenhouse gas and air emissions with very challenging targets. A significant responsibility falls on the power generation industry, thus accelerating the demand for replacement EPS equipment.

Environment Canada's fourth *Sustainable Development Strategy* (2007-2009) promulgates the Federal government's intention to undertake and support operations that target specific sustainable development practices across Canada. The document focuses on building energy (energy efficiency in buildings), vehicle fleets, green procurement, and waste management, with government-led legislative and public initiatives – such as the Strategic Environmental Assessment (SEA) – to ensure acquiescence. Components of this strategy affect also the EPS sector and given the fervor with which the government(s) in Canada is pursuing “green” initiatives, and the consequent compliance by Canadian industry, the outlook for eco-friendly equipment will grow continually hereafter. American suppliers, manufacturers, and R&D

specialists will find their prospects in Canada improved over the coming years; particularly given Canada’s present inability to fund adequate development in this sector.

The Industry Canada study “Canadian Electric Power Technology Roadmap: Forecast – 2000” identified fundamental changes that will affect the power industry by 2020 and beyond: cost/competitiveness; environmental issues; and customer choice. These changes will impact the EPS sector by driving demand for new equipment of higher efficiency and improved environmental integration.

The Canadian Electricity Association (CEA) noted that high levels of investment for new and replacement infrastructure are required to meet the future electricity needs of Canadians. According to CEA, between 1990 and 2005, electricity demand in Canada increased by 24 percent, and is expected to continue this trend going forward with an average annual growth rate of between 1 and 1.5 percent<sup>1</sup>.

Despite a short-term slowdown, given the evaluations stated above, the outlook for the Canadian Electrical Power Systems (EPS) sector in the medium and long term is for solid growth, although the growth rate may have some fluctuations on year-by-year bases. Fuelled by a growing economy and expanding population, along with subsequent energy demands, the market is expected to show growth in all sub-sectors through 2030.

### Market Data

	2005	2006	2007	2008 (Estimate)
Total Market Size	17,998	19,174	18,015	17,976
Total Local Production	10,975	11,738	12,076	11,715
Total Exports	10,160	10,677	11,343	11,432
Total Imports	17,183	18,113	17,282	17,694
Imports from the U.S.	9,983	10,630	9,425	9,543

(In Millions of U.S. Dollars. Exchange rate: \$1.00 US = \$1.00 CDN)

The decrease in market size in 2007 represented a 6 percent decrease from 2006. Eliminating re-export and counting the shipments for domestic use, the market development by the main sources of supply is illustrated in the following chart:

EPS Market Development by Source of Supply [US\$ billion]



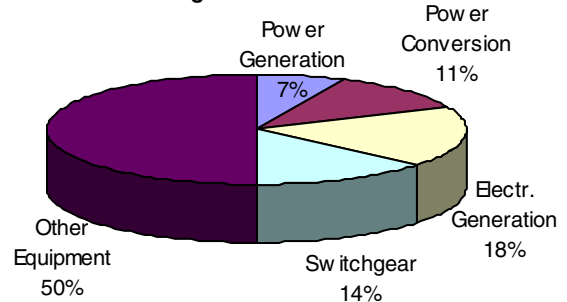
<sup>1</sup> Canadian Electricity Association. *Addressing Challenges to Electricity Infrastructure Development*. September 2007. [www.canelect.ca](http://www.canelect.ca)

(Source of Data: Statistics Canada- CANSIM Tables Manufacturing sales by industries, Industry Canada – Trade Data Online by Industry)

Imports from U.S. were valued at US\$ 8.2 billion in 2007 and represent a 46 percent share of the Canadian EPS market and almost 53 percent of total imports. The import from U.S. recorded in 2007 a significant decrease of almost 15 percent against previous year, after several years of solid growth. Being the dominant share of the market it was directly affected by the market decrease.

There is a relatively stable distribution within the EPS market segments. The power generation segment includes equipment generating the primary power like boilers, heat exchangers, and nuclear reactors. The power conversion segment includes equipment that transforms primary power into mechanical power, like turbines and engines. The electricity generation segment includes primarily equipment converting mechanical power into electricity (generators), but also changing electricity parameters (transformers) and converting back in mechanical power. Switchgear and Other equipment include a large variety of components for electricity handling (transport, control, interrupting, storage, etc).

2007 EPS Market - Segment Distribution



The Electricity Generation Equipment segment was valued at US\$ 3.3 billion in 2007 and represents 18 percent of the market. Imports were valued at US\$ 2.6 billion. The main market sub-segment is for electrical generators of all types with imports valued at US\$ 1.3 billion, of which US\$ 780 million came from the U.S. Electrical transformers represent the second sub-segment but the import share is considerably lower, valued at US\$ 496 million, of which US\$ 212 million came from the U.S. The remainders US\$ 590 million were electric motors and parts of equipment.

The Power Conversion Equipment segment was valued at US\$ 1.9 billion and represents 11 percent of the market but recorded a drop of 45 percent in 2007. It was almost entirely from Imports, of which 50 percent originate in the U.S.

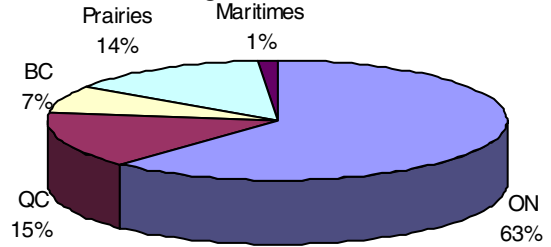
The Power Generation Equipment segment was valued at US\$ 1.15 billion in 2007 and represented 7 percent of the market. Total imports were US\$ 457 million, of which US\$ 329 million came from the U.S.

The Switchgear Equipment segment was valued at US\$ 2.5 billion in 2007 and represented 14 percent of the market and recorded a 9 percent increase. Imports are dominant in this segment with US\$ 2.2 billion, of which US\$ 1.3 billion came from the U.S.

The rest of the market was valued at US\$ 9.1 billion, with an increase of about 7 percent. This segment consists of various electric equipment and components, like lighting, cables, batteries, etc. Imports were valued at US\$ 7.1 billion, of which US\$ 3.5 billion came from the U.S.

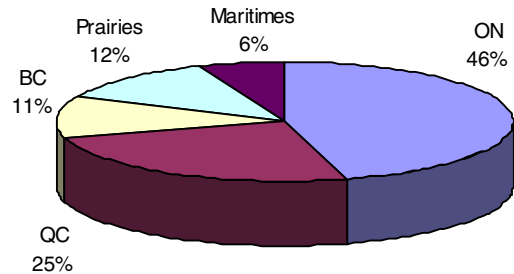
The regional market distribution shows a high concentration in Ontario with 63 percent. The distribution is calculated based on imports, which have by far the biggest weight in the total market. The export distribution, which illustrates relatively well the local manufacturing, is 25 percent for Quebec and 58 percent for Ontario. Over the past several years the market is showing a relatively stable distribution with these percentages.

2007 EPS Market - Regional Distribution



The number of active Canadian manufacturers, registered federally with Industry Canada is 1015. According to Scott's Directory there are 2590 companies recorded for Canada. A large number of smaller companies are registered only provincially. The distribution in territory has also a high concentration in Ontario.

EPS Manufacturers - Regional Distribution



Although U.S. companies continue to make up a majority share of Canadian EPS imports, foreign competition in this sector is growing rapidly and gained ground in 2007. In particular, emerging market countries have made significant inroads into Canada's EPS sector.

The trend for the short time period may be estimated from the monthly development of the major product groups. Their annual volumes (12 months rolling) both for the manufacturing and for imports are generally showing stagnation or a slight decrease during the most recent 6 months.

### Best Prospects

Traditional equipment for the EPS market segments remains high. However, within this sector, the implementation of "green" or environmentally friendly technologies represents an increasing portion of the market, with inroads into each major segment. Given current public support for environmentally sustainable initiatives and improving Federal and provincial government(s) funding for "green" projects, the Canadian electrical industry seeks to employ this technology in its new products.

Earlier this year, the federal government set out an aggressive plan to reduce Canada's greenhouse gas and air emissions. In addition, many provinces have established their own plans to improve air quality and tackle climate change.

The Ontario government plan to pursue total elimination of coal based electricity generation within the next 15 years. This will impact the manufacturers of components and subassemblies for existing equipment designed for direct use of coal, like coal-burning boilers, and will practically eliminate such equipment on new investment projects.

At the same time, the ban creates new opportunities for manufacturers whose equipment have less environmental impact, both in the technologies of manufacturing them as well as in operation emissions and end of life recycling.

With the Canadian capacity for R&D on the decline, the introduction of new, improved, environmentally sustainable technologies will fuel new prospects for American imports.

Significantly, opportunities exist in the nuclear power plants sub-segment that is, in fact, already advanced for new projects. The Ontario Government is in the process of selecting a vendor for new nuclear reactors. At the time of the release of this report, the Ontario Government, who invited the well-known U.S. manufacturers of nuclear power projects to submit proposals, is in the second stage of the process of selecting a vendor. Furthermore, three nuclear reactor units are being refurbished. In Alberta an application to build a nuclear reactor unit was just submitted (June 2008).

Some of the best prospects from the top 50 product groups (HS codes) by import volume in 2007, showing significant increases over previous years, include:

- ELECTRIC STATIC CONVERTERS, INCL POWER SUPPLIES, RECTIFIERS AND INVERTERS (HS 850440) – import is valued at US\$ 753 million in 2007, a 7 percent increase over previous year. The U.S import is US \$332 million with a solid 14 percent increase over previous year, and represents a share of 35 percent.
- DC MOTORS, DC GENERATORS - OUTPUT NOT EXCEEDING 750 W (HS 850131) – import is valued at US\$ 182 million in 2007, a staggering 30 percent increase over previous year. The U.S. import is US \$66 million, recording a 15 percent decrease over previous year, and represents a share of 36 percent.
- AUTOMATIC CIRCUIT BREAKERS - VOLTAGE NOT EXCEEDING 1,000 VOLTS (HS 853620) – import is valued at US\$ 148 million in 2007, a 6 percent increase over previous year. The U.S. import is US \$53 million recording a 5 percent decrease over previous year, and represents a share of 36 percent.
- GENERATING SETS WITH DIESEL/SEMI-DIESEL ENGINES - OUTPUT EXCEEDING 375 KVA (HS 850213) – import is valued at US\$ 104 million in 2007, a staggering 40 percent increase over the previous year generated by the U.S import, which is US \$102 million and represents a share of 98 percent.
- LIQUID DIELECTRIC TRANSFORMERS - POWER HANDLING CAPACITY NOT EXCEEDING 650 KVA (HS 850421) – import is valued at US\$ 64 million in 2007, a staggering 71 percent increase over the previous year, with U.S. import of US \$59 million, which tripled over the previous year and represents a share of 83 percent.
- GENERATING SETS WITH DIESEL/SEMI-DIESEL ENGINES - OUTPUT NOT EXCEEDING 75 KVA (HS 850211) – import is valued at US\$ 64 million in 2007, a 24 percent increase over the previous year. The U.S import is US \$ 47 million, recorded a 17 percent increase, and represents a share of 74 percent.

- GENERATING SETS WITH DIESEL/SEMI-DIESEL ENGINES - OUTPUT 76-375 KVA (HS 850212) – import is valued at US\$ 56 million in 2007, a 22 percent increase over the previous year. The U.S import is US \$ 47 million, recorded a 20 percent increase, and represents a share of 84 percent.
- LIQUID DIELECTRIC TRANSFORMERS - POWER HANDLING CAPACITY 651-10,000 KVA (HS 850422) – import is valued at US\$ 43 million in 2007, a 25 percent increase over the previous year. The U.S import is US \$ 36 million, having recorded a 16 percent increase, and represents a share of 85 percent.
- Nuclear reactors – while there was practically no market for several years due to a lack of projects, the Ontario Government announced in March 2008 the start of the process to select a vendor for a new reactor. Regardless of who will be the successful vendor, a large variety of components and auxiliary equipment will be subcontracted.
- Parts of equipment – imports of parts for various types of equipment represent significant opportunities for the respective OEMs and other suppliers. The value of the 2007 import of parts for generators, generating sets, converters and motors was US\$ 548 million (55 percent from U.S.), parts for transformers were US\$ 89 million, (44 percent from the U.S.), and parts of steam and vapour turbines were US\$ 53 million (44 percent from the U.S.).

## Key Suppliers

Most of the major global manufacturers of power generation and electrical equipment have a presence in the Canadian market, including the following companies.

ABB Inc  
AECL  
Areva T&D Canada Inc.  
Babcock & Wilcox Power Generation Group  
Bemag Transformers  
Eaton  
Ferraz Shawmut Canada Inc.  
GE Canada  
Hammond Power Solutions  
Marcus Transformer of Canada Ltd.  
Schneider Electric  
Siemens Canada Limited  
Teco-Westinghouse Motors Inc.

## Prospective Buyers

Generally, companies involved in the development of the projects as well as contractors or equipment manufacturers are the primary purchasers of EPS products. For smaller scale projects the buyers may be the engineering companies that are also system integrators. The

market is highly consolidated and the higher the level of complexity and technology of the equipment, the lower the number of market players.

The importers active on the market give a synthetic view of the prospective buyers. The imports of the above main product groups are covered as follows:

ELECTRIC STATIC CONVERTERS – there are over 290 importers purchasing 80 percent of all imports in this product group and 25 of them are purchasing over 40 percent of all imports.

DC MOTORS, DC GENERATORS under 750 W – there are only 39 importers covering over 80 percent of all imports and just 10 companies purchasing over 60 percent of all imports.

AUTOMATIC CIRCUIT BREAKERS, under 1,000 V – just 10 companies are purchasing over 80 percent of all imports.

DIESEL GENERATING SETS under 75KVA are purchased by 29 importers that cover 80 percent of all imports; 19 companies cover 80 percent of all imports of sets with output between 76 KVA and 375 KVA while for sets over 375 KVA just 9 companies purchase 80 percent of all imports.

LIQUID DIELECTRIC TRANSFORMERS each group of under 650 KVA as well as over 650 KVA up to 10,000 KVA are purchased by approximately 11 companies covering 80 percent of all respective imports.

The U.S. Commercial Service can provide such lists of importers for above products as well as for most product groups in the EPS sector.

## Market Entry

The United States and Canada enjoy a long tradition of co-operative and lucrative trade. The North American Free Trade Agreement (NAFTA) provides a very favorable framework with no significant trade barriers such as tariffs or import quotas impeding imports of EPS equipment into Canada.

With most electrical system equipments and components there are no significant labeling and regulatory issues, the requirements being similar to those in U.S. However, for products destined to be marketed to consumers, labeling issues are to be considered, mainly language regulations (bilingual English, French requirement), imposed by the Consumer Packaging and Labeling Act.

Standards used in Canada are the same or similar to the ones used in U.S. Certifications are, however, required, mainly the CSA (Canadian Standard Association) and the ULC (Underwriter Laboratories of Canada). The process of obtaining the certifications does not represent a significant difficulty. For example in many cases the certification from Underwriter Laboratories of Canada may be a very simple process, provided the product has already the UL certification in U.S. Additional information on standardization and labeling regulations including web addresses for Canadian standard and certification organizations are available in the Country Commercial Guide at [Doing Business in Canada - CCG 2008](#) Chapter 6: Trade Regulations and Standards.



In addition, further information on market access can be found on Industry Canada's website at <http://www.ic.gc.ca/>.

Entering the Canadian market requires the manufacturer to meet the needs of the end-user, as well as all government specifications. Provided the product obtained the required certifications, a manufacturer representative is generally the best vehicle to penetrate the market and develop business.

Due to the high technical level of the equipment in the EPS sector, and the need to be designed for the project/end user technical specs, a strong presence has to be built with the engineering companies in order to secure the specification of the equipment for the pending projects. The manufacturer representative may well be such type of company. Many engineering companies are active in Canada- several large-scale organizations but also many specialized small companies. The number of small engineering companies has increased recently due to the availability of engineering personnel made redundant by the decline in manufacturing activities in Canada.

Distributors with strong relationships in the electrical industries are aptly situated to facilitate product entry, or to improve a product's presence. They are a very good vehicle for the sub-segments of standardized electrical products, small equipment and components.

Additionally, given the aforementioned advantage held by American firms in R&D, there is room for U.S.-based production companies to establish working relationships with Canadian-based companies who may have an established market share or who can impart industry knowledge.

An important role is played by industry associations representing groups of entities in the same area of interest like the regulatory level, the end-users and the suppliers. Some of these are:

APPrO, the Association of Power Producers of Ontario  
Association de l'industrie électrique du Québec (AIEQ)  
Association québécoise pour la maîtrise de l'énergie (AQME)  
Association of Canadian Engineering Companies (ACEC)  
Canadian Electricity Association  
Canadian Hydropower Association  
Canadian Nuclear Association  
Canadian Nuclear Society  
Electrofederation Canada (EFC)  
Energy Council of Canada  
National Energy Board  
Ontario Energy Associations (OEA)  
Ontario Power Authority (OPA)

Electrofederation includes divisions of:

- Electrical Equipment Manufacturers Association of Canada (EEMAC)
- Supply & Distribution (S&D) Council
- Canadian Electrical Manufacturers Representatives Association (CEMRA)

## Trade Shows/Conferences

- APPrO 2008 20th Annual Power Conference & Trade Show (Toronto, ON – Nov. 18-19, 2008). <http://conference.appro.org/conference2008/>
- ACEC Summit integrated with FIDIC Conference 2008 (Quebec City, QC - Sep. 7-10, 2008). <http://www.acec.ca/en/events/events.html>
- Canadian Nuclear Association Annual Conference and Tradeshow (Ottawa, ON – Feb. 25-27, 2009).
- OEA ANNUAL CONFERENCE 2008 (Niagara Falls, ON - Sep. 17-18, 2008). <http://www.energyontario.ca/Default.aspx?id=3>

## For More Information

The U.S. Commercial Service in Toronto, Canada can be contacted via e-mail at: [Stefan.Popescu@mail.doc.gov](mailto:Stefan.Popescu@mail.doc.gov); Phone: 1-416-595-5412 x223; Fax: 1-416-595-5419; or visit our website: [www.buyusa.gov/canada](http://www.buyusa.gov/canada).

## The U.S. Commercial Service — Your Global Business Partner

With its network of offices across the United States and in more than 80 countries, the U.S. Commercial Service of the U.S. Department of Commerce utilizes its global presence and international marketing expertise to help U.S. companies sell their products and services worldwide. Locate the U.S. Commercial Service trade specialist in the U.S. nearest you by visiting <http://www.export.gov/eac>.

**Comments and Suggestions:** We welcome your comments and suggestions regarding this market research. You can e-mail us your comments/suggestions to: [Customer.Care@mail.doc.gov](mailto:Customer.Care@mail.doc.gov). Please include the name of the applicable market research in your e-mail. We greatly appreciate your feedback.

*Disclaimer: The information provided in this report is intended to be of assistance to U.S. exporters. While we make every effort to ensure its accuracy, neither the United States government nor any of its employees make any representation as to the accuracy or completeness of information in this or any other United States government document. Readers are advised to independently verify any information prior to reliance thereon. The information provided in this report does not constitute legal advice.*

*International copyright, U.S. Department of Commerce, 2008. All rights reserved outside of the United States.*