

- ♦ identify sectors in which Canadian trade efforts can be linked with Chinese education and training needs (e.g., health, environment, agriculture, energy, telecommunications); and
- ♦ identify opportunities for distance learning and sales of educational software.

Electric Power

Business Environment

Mainland China

China's power sector has developed at a breathtaking pace during the 1980s and 1990s, making it the second-largest power-producing country in the world, after the United States. China has largely achieved a demand-supply balance, fostered by slowing economic growth and a decline in traditional industrial activity. Emphasis will be placed on improving efficiencies and expanding and improving the country's transmission and distribution systems. Environmental considerations are also becoming more apparent, resulting in the shut down of small and old generating facilities, an indefinite ban on new small (below 300 MW) thermal plants (co-generation excepted), a temporary ban (estimated to 2001) on "conventional" thermal power plants, and new demands for upgrading of technologies. Some analysts caution that power demand is still growing at 10 percent or more in several parts of the country, raising the

prospect once again of regional shortages if new generation capacity is not selectively developed.

Installed capacity, at 270 GW at the end of 1998, has more than doubled over 1990-1998 alone, expanding by 400 percent since 1980. However, an estimated 70 million people are still without access to power, and per capita consumption is 1/28th of Canada's rate, ranking China 80th in global consumption terms. A relatively high percentage of power consumption, at 58 percent, is still borne by heavy industry, with residential demand only 12 percent.

Thermal power is China's main source at 81.6 percent of total power generation. Hydro accounts for 17.2 percent, followed by nuclear and other sources at about 1.3 percent. Efforts are under way to significantly expand reliance on hydroelectricity over the long run, supported by the eventual output of the Three Gorges Dam (18 200 MW by 2009), the world's largest hydroelectric project.

China's nuclear energy program currently consists of three operating reactors with an installed capacity of 2100 MW. With an additional 6600 MW under construction, including two CANDU units (1450 MW), the contribution of nuclear energy to China's power supply will increase threefold by the middle of the next century. However, as a result of a slowdown in the growth of the electricity market, China's ambitious plans for nuclear power development are currently being re-evaluated. Unless there is a dramatic turnaround in the electricity

supply situation, it is not likely that there will be any further nuclear projects approved within the next few years.

As part of the Chinese government's ongoing efforts to establish a more rational commercial footing for power development as well as management, the operating assets of the Ministry of Electric Power have been transferred to the newly established State Power Corporation. In addition, the former China Power Grid has recently been integrated into the new State Power Corporation to give greater impetus to power grid integration and expansion.

Regulatory developments have been slower. China is now placing significant emphasis on the development of new regulations governing power pricing and rules for accessing the power market. Long awaited new guidelines for build-own-operate (BOO) projects appear to have been de-emphasized in line with weaker government support of new generation capacity.

Hong Kong

Hong Kong has surplus generating capacity until the year 2006. Nevertheless, the Hong Kong Electric Ltd. (HEC) is still planning to install new gas-fired generators in its Lamma power plant. China Light and Power Ltd. (CLP) and HEC spent more than \$38.5 million to renew their equipment or to procure parts and components in 1998. Canadian companies will find opportunities to supply auxiliary equipment, for example, for the management and control of the distribution system.

HEC and CLP are trying to diversify their business by pursuing overseas opportunities through their engineering and investment branches. Canadian firms can form strategic partnerships with their subsidiaries to pursue projects in other countries.

Market Opportunities

Canada has long made a contribution to the development of China's power sector, particularly in niche areas. China's local production capacity for conventional power sector equipment is strong, with fierce competition among domestic Chinese and joint venture (JV) enterprises. Consequently, the Chinese government has placed a high priority on local sourcing and new advanced technology transfer linkages.

China is placing a growing priority on flood-prevention projects. In several instances, multipurpose hydro projects are still actively being planned on the upper reaches of the Yellow and Yangtze rivers, as well as on other major waterways. Timing for new developments has been delayed as a result of lower power demand, but some of these plans may be re-evaluated early in the new millennium.

Following recent reorganization, local governments and organizations are being called on to take a more proactive role in the development and financing of power projects, although approvals from central levels will still be required for larger projects (i.e. over US\$30 million). Financing for these projects continues to pose a challenge. Although international financial institutions (IFIs) have been a major source of funding for the sector in the past, their involvement is decreasing.

While there are still opportunities for independent power projects (IPPs), these should be considered carefully, with due diligence accorded to the unpredictable regulatory environment. IPP developers are increasingly focussing on co-generation and small hydro projects, as well as opportunities for rehabilitation of existing infrastructure.

Due to unreliable supply, the fastest-growing segment of the Chinese power-generating market is that of back-up and reserve systems for large buildings, factories and industrial parks. These systems make up nearly one third of new power-generating capacity in some parts of China.

Potential for Canadian equipment and services suppliers, particularly those that provide financing, enter into JVs, establish local production facilities, and transfer advanced technology or expertise, continues to exist in the following subsectors:

- ♦ transmission and distribution consulting and specialty equipment;
- ♦ large project-management services and training; and
- ♦ equipment that will still be imported:
 - power systems/controls/instrumentation/simulation equipment (large units over 600 MW);
 - gas turbines over 100 MW, including combined cycle;

China Power Generation, 1995-97 (billion kwh & %)

Source	1995		1996		1997	
	kwh	%	kwh	%	kwh	%
Thermal	756.06	79.3%	805.30	80.5%	925.22	81.6%
Hydroelectric	184.93	19.4%	181.27	18.1%	194.57	17.2%
Nuclear	12.38	1.3%	13.62	1.4%	14.42	1.3%
Total	953.37	100.0%	1000.2	100.0%	1134.2	100.0%

Source: The Economist Intelligence Unit Limited and the State Power Corporation