



The Shawinigan Engineering Company supplied Canadian expertise to develop the Temangor hydroelectric project – currently Malaysia's largest, generating 340 megawatts of power – on the Upper Perak River, Perak.

Electric Power

Within Canada electric power generation is efficient and highly reliable. Hydro-electric generation alone accounts for an output capability in excess of 34 million kilowatts. Fossil-fuelled thermal and nuclear power plants, with a significant contribution from gas turbine stations, add an additional output capacity of some 20 million kilowatts to Canadian power systems.

The advanced designs and techniques used to achieve this production at the best possible cost-benefit relationship are now being used to advantage in more than 30 countries throughout the world. As a result, Canada is today among the leaders in the design and construction of power stations, turbines, generators and auxiliary equipment, as well as in electrical transmission and distribution systems.

Extra High Voltage Transmission Systems

Canadian electrical engineers were among the first to develop the use of increasingly higher voltages in primary transmission lines.

As the development of hydroelectric power sites moved further and further north into the more remote areas of Canada, the question of how best to transmit electric power over long distances became an important one. Canadian engineers, manufacturers and contractors were forced to pioneer tech-

niques in both alternating current (AC) and direct current (DC) high voltage transmission.

The size of northern hydro developments, their distance from load centres and the solutions found to the problems of inaccessibility, terrain and environment have put Canada at the forefront of transmission line design and construction methods.

Tar Sands

Canada has enormous reserves – amounting to several Saudi Arabias – of crude oil in the form of tar sands and heavy oils. These reserves are found in northern Alberta, at Athabasca and Cold Lake.

Canada is one of the world leaders in tar-sands technology. With the completion of the second commercial processing facility in the Athabasca tar sands (the Syncrude plant), Canada now produces 170,000 barrels of synthetic crude oil per day, that is, approximately 20 per cent of current Canadian oil imports.

Nuclear Energy

Canada possesses approximately one-fifth of the world's known uranium resources, and is a major exporter of this commodity. Nuclear power has the potential of becoming a major supplier of domestic energy.

The Canadian designed and built CANDU reactor has proven to be a safe, dependable and low-cost source of electricity. Currently, CANDU supplies

3.5 percent of the nation's electricity and reactors have been exported to countries such as South Korea, Argentina and Rumania.

The unique "on-load" refuelling feature of the system and its ability to use uranium that does not require enrichment prior to use, make the CANDU system particularly suited to minimising operating costs in a world of constantly increasing energy prices.

According to recent figures prepared by the province of Ontario's Hydro Authority, its large CANDU reactors, which averaged a performance rating of 88.5 per cent, were found to be more reliable than any of the 110 other large power reactors in the world.

Thermal and Fossil Fuel Power

In the future, domestic coal resources will play an increasingly important role within the energy economy. In the short-term coal will be used in the conventional forms, within the steel industry for non-energy utilization, and in the generation of electrical power. In the long-term, however, it will be used to produce synthetic gaseous and liquid fuels. For example, the direct hydrogeneration of coal can produce synthetic petroleum products such as fuel oils, transportation fuels and chemical feedstocks. Coal gasification can produce substitute natural gas and synthetic gas which can be used for the manufacture of ammonia, methanol and replacement petroleum products. Extensive research in these various areas is underway.

The oil-rich province of Alberta has large resources of mineable sub-bituminous coal. Consequently, the province has opted to develop this low-cost resource as a fuel for thermal power stations, and most new thermal capacity in the province to the end of the century will likely be based on coal.

Small Gas Turbine Generators

Not all Canadian projects are of mammoth size. To meet the need for smaller units that can produce power quickly during load-peaking periods, the Canadian industry has developed a variety of small gas turbine generators.

These units, which can often be supplied on relatively short delivery schedules, are finding a ready market in many countries because they can provide an ideal source of low-cost power for communities in remote areas. These systems are now in service in China, Mexico, the Middle East, South America, Africa and Asia.