and praised its fantastic reliability. The Sussex University research unit in Britain, after a worldwide analysis of nuclear plant performance, has rated the Candu heavy water system the best in the world and recommended its adoption in Britain. And in the wake of Three Mile Island in the United States, the Tennessee Institute for Energy Analysis suggested that the U.S. use the current lull in the construction of new nuclear plants there to examine alternative models, including Canada's Candu reactor.

As a development-hungry Third World looks toward nuclear technology to replace oil-related energy and as Europe is planning for massive nuclear development, Canada finds itself with an unique opportunity to prove its nuclear technological leadership.

I believe it is clear from what I have said that the nuclear industry in Canada and particularly the development of AECL has not been something that happened overnight or without the consultation of Parliament. For almost 40 years the Canadian government and the nuclear industry have been working to develop and build a viable product that is not only safe but dependable and efficient. It is helping to meet Canada's current energy demands and, according to projections, it will provide a greater proportion of our energy demands in the future. Parliament has been involved with the development of the industry since its inception and will continue to help to ensure that the nuclear option provides safe and dependable energy for all Canadians.

But what of the future of the Candu reactor? Although the Candu reactor has achieved practical maturity and proven its commercial viability, the development potential of the system is nowhere near exhaustion. The current Candu designs are capable of evolutionary development to minimize energy costs and conserve resources. It is most important to recognize that the Candu system can and will adjust to future requirements by a process of evolution, based on a proven, highly successful design.

Most other advanced nations expect that future nuclear energy requirements will be met by a change from current thermal reactor systems to fast breeder reactors. However, the fast breeder type of reactor is far from being commercially feasible at this stage and will require massive outlays in capital before it is fully developed. The evolutionary route of the Candu system is obviously less costly and more predictable than employing our scarce resources to develop the fast breeder reactor.

Three major areas for the evolutionary development of the Candu system that are currently under way are reactor size, in terms of unit output; the fuel cycle, and heat-transfer fluid or coolant, used to extract the heat energy from the reactor core.

On the first point, it has been found that it is possible conceptually to design units of 2000 megawatts without technical limitations. For the Bruce Generating Station, each of the four units is rated at a nominal 750 megawatts, with the additional thermal energy being supplied as industrial process heat to a heavy water plant. This demonstrates the other possibilities open for power reactors other than generating electricity.

Part of the power reactors output may be extracted directly as heat for space heating for industrial and residential uses. One possibility that has been suggested is the full output of a reactor being applied to the extraction of oil from tar sands. The large quantities of heat and electricity that are required for this process could be matched to the capacity of the reactor. Heat from the reactor can be used in greenhouses and providing warm water for fish farming, as the hon. member for Bruce-Grey (Mr. Gurbin) has pointed out in this House.

The second area of development of the Candu system is in the fuel cycle. All present Candu reactors operate on the once-through natural uranium cycle, with retrievable storage of the spent fuel. Although this cycle is very efficient in its utilization of our uranium resources compared to other commercially available reactor systems, it does consume fissile uranium, the supply of which is limited.

The Candu reactor is, however, capable, with minor alterations, of being adapted to exploit the considerable reserve of energy in spent fuel by recycling plutonium, and may be further adapted to the transformation of thorium into a fuel material, thus giving access to vast new reserves of energy. This inherent advantage of the Candu system is unparalleled in the world today. It will prolong the life of our present nuclear facilities and ensure that we shall remain competitive internationally in the future.

The third area of possible development is the choice of heat-transfer fluid or the coolant, as it is known. The coolant presently used in the Candu design is heavy water. Heavy water is an efficient but expensive heat-transfer fluid.

Two other coolants are being examined for possible savings in energy costs, boiling light water and organic-cooled reactor type. Both of these approaches have been examined in conjunction with the advanced fuel cycles. By combining alternative coolants with advanced fuel cycles it seems certain that additional reduction in capital costs will be possible. Estimates of over-all cost reductions of 15 per cent to 20 per cent may be realized, principally in the capital cost component when the advanced fuel cycles are available.

The Candu reactor is not simply for our present use. It is flexible enough to be adapted for the advanced fuel cycles of the future. As I have indicated, AECL and the nuclear industry are studying ways by which we can continue to use the Candu reactor well into the next century. The future of the Candu reactor is bright; with its flexibility and proven capability it is indeed a "technical wonder."

• (1730)

The nuclear power programs of many industrialized nations, including Canada, have been challenged by perceptions which focus essentially on three principal issues: reactor safety, the safe management of high level nuclear wastes and nuclear weapons proliferation. These are, of course, important issues which will continue to require consistent attention. While these issues are the subject of concerted national and international