Canadian reactor experiments was brought to Canada by French scientists.

Although close scientific ties have been maintained between the two organizations since that time, the extent of technical co-operation was limited primarily because the French had concentrated on the development of the gas-cooled type of nuclear power system, a system that is not in the Canadian program. However, with a growing interest on the part of C.E.A. in the water cooled, heavy water moderated reactor systems, coupled with an extensive C.E.A. development program, particularly in materials research, it became clear that expanded technical co-operation between A.E.C.L. and C.E.A. would be of mutual benefit. Both parties are looking forward to an active program and closer ties involving exchanges of technical personnel as well as information and technical data.

The Canadian nuclear power system—we call it CANDU, short for Canada Deuterium Uranium—has a number of important features, foremost of which is its efficient use of uranium as fuel. For a natural uranium, heavy water reactor of the CANDU type, the fuel cost is far below—by as much as 50 per cent or more—that of reactors of comparable size burning enriched uranium.

Should the price of uranium increase, the fuel cost differential becomes even greater, for the CANDU reactor requires only about one-third as much uranium for its initial charge as does an enriched reactor and from one-half to two-thirds as much fuel in the course of its lifetime.

Another important feature of the natural uranium system is that it does not tie the user to a specific source of fuel, as is the case with enriched uranium reactors where the U.S.A. is the only practical source today for most of the world. Many countries have indigenous supplies of uranium on which they can draw; for others uranium is widely available, at competitive prices, on the world market.

So efficient is the CANDU system that the spent fuel can be simply and safely consigned to storage and treated as waste. However, it does contain a by-product—plutonium—which very definitely is an asset and, when conditions warrant, can be reprocessed and burned as fuel in CANDU reactors, or can be sold if it is more profitable to do so. The fact that the CANDU type of reactor produces a substantial amount of plutonium and can make efficient use of plutonium on a recycle basis is another attractive feature of the system. In addition, because of the characteristics of heavy water, thorium—another potential nuclear fuel—can be economically introduced as uranium resources diminish or become more expensive, thus ensuring adequate energy reserves far into the future.

[Mr. Greene.]

Competitive electric power costs from the CANDU system, coupled with the very low fuel costs of the natural uranium reactor, the independence of fuel supply through the life of the plant and the flexibility of the fuel cycle which allows efficient burning of not only the initial uranium but later the plutonium produced and eventually the abundant reserves of thorium, have made this system appear attractive to many areas of the world. A.E.C.L. has a vigorous international power reactor marketing program under way and prospects of sales in several areas of the world are very promising.

Canada has long been acknowledged as a world leader in the development of heavy water moderated reactors. Other countries, however—notably Britain, the Federal Republic of Germany, Sweden, Japan and Italy—have embarked on significant heavy water reactor programs. The British have developed for domestic and export use a reactor concept which uses boiling light water as the coolant and slightly enriched uranium as the fuel and has, I understand, a natural uranium fuel version now in the final design stage.

Japan is developing its own heavy water moderated reactor which may, in its final form, be similar to Gentilly, the CANDU/B.L.W. station under construction in the province of Quebec.

The Federal Republic of Germany has successfully offered a heavy water moderated, natural uranium fuelled reactor for sale in Argentina and is vigorously trying to market similar units in other countries.

In Italy a concept similar to the Gentilly station is under development, and co-operative programs between Canada and Italy in this specific field are being considered. A.E.C.L. will be bidding next year on a large nuclear station for installation in Italy, using a reactor similar to the Pickering units.

In the light of these developments abroad, I am sure the house will recognize the significance of French interest in the Canadian nuclear power system, and of the agreement to extend appreciably the co-operation between Canada and France in the field of nuclear power. I am therefore taking this first opportunity of making this announcement in the house, this announcement being made at the same moment in France.