

having a level of awareness sufficient to enable us to realize the potential of a particular field, and by keeping track of what other people are doing to know whether it is now or in the short-term future appropriate for us to go from just the awareness to either development or new production. If one looks at the various fields, one finds in relation to hydro electric power that there are relatively few areas for technical research available, except perhaps in the tidal field. Consequently there will not be, other than geological and economic exploration, much done in the field of tidal power.

**The Chairman:** But, Mr. Minister, you are always referring to the future. By this do you imply that we have not up to now done any research in the field of energy?

**Hon. Mr. Drury:** Not at all. Do you want me to deal with what research we have done?

**The Chairman:** No, but the implication of your statement meant that you were always speaking about the future—"We will do this and we will do that." I wanted you to state clearly that we have done some research in the past in this field. At least, I hope we have.

**Hon. Mr. Drury:** Yes. I regret to say I had assumed honourable senators were fully aware of what we had done and what we have not done. I am trying to respond to Senator Lang to indicate how in the energy field the research and development effort was being put together, and what will be done henceforth.

**Senator Lang:** You mentioned potential tidal power. What other sources of energy are being studied?

**Hon. Mr. Drury:** By location?

**Senator Lang:** By type.

**Hon. Mr. Drury:** I was trying to tell you what is happening in hydro. We have nuclear energy, which can be divided, or subdivided again, into fissionable and fusion, fission being the technique which is pretty highly developed now in the CANDU reactor, the CANDU technique. There are still possibilities of further development, but this is not as fundamental a potential as fusion. Fusion, which has the very marked advantage of not having a noxious by-product after the extractable portion of the energy has been removed has great potential.

**Senator Lang:** Surely we would buy that rather than trying to develop it ourselves, would we not? That is a pretty expensive field.

**Hon. Mr. Drury:** There are a number of aspects of it which are very expensive indeed. MOSST commissioned a rather extensive study on fusion research and development. As a consequence of this we have come to the conclusion that in some aspects the techniques for containment of this energy before it can be translated into use require huge and very expensive installations. If we get into this area at all, it must be on a joint basis with other countries. The current possibilities for initiation of the operation of fusion as an energy source are laser beams. In laser development we have already had some quite remarkable successes, so in the field of lasers we are going to proceed beyond merely awareness, which we will do in relation to magnetic containment, up to development; so there is a program for laser development.

**Senator Bélisle:** Is there any solar energy research?

**Hon. Mr. Drury:** I was just coming to that. There is quite an extensive program.

**Senator Lang:** Under what department does the laser program come?

**Hon. Mr. Drury:** The laser field comes under the National Research Council. They will be doing some work on this. As lead department, they will commission some of it to be done in universities, and hopefully they will commission some of it to be done in manufacturing industry. I speak of the spectacular progress we have been able to make in lasers. This was mostly as a consequence of the efforts of the Defence Research Board laboratory in Valcartier. It is really following on this, and I would just indicate to the senator that it is a case of follow-on, not something brand new that we know nothing about.

A significant element in the decision whether we should go into any field in a larger way is the measure of success that we have had in a particular field in the past. You use your performance to date as an indicator of the likelihood or probability of success in the future.

With respect to solar energy, Canada is in a climatic zone where the efficiency of the sun in delivering energy to us directly is less than it is in countries in the equatorial belt. Therefore, there are fewer advantages, fewer attractions, to us, than to countries in the equatorial belt through large-scale use of solar energy. We have concluded generally that there is a possibility for small individual residential uses of solar energy, but that the conversion of solar energy into large quantities of electrical power by utilities would not, in the present state of the art at any rate, be economical or attractive for us. Therefore, what we are doing is pushing development of small solar energy units for heating purposes, for residential accommodation, and I suppose in some cases for commercial or industrial accommodation.

**Senator Lang:** Who is pushing them where, Mr. Minister?

**Hon. Mr. Drury:** I am not too familiar with the details on this. I will ask Dr. LeClair to answer this.

**Dr. M. J. LeClair, Secretary, Ministry of State for Science and Technology:** MOSST commissioned a study on this by the Brace Research Laboratory of McGill. That report is now in. NRC is the lead department in solar energy research.

**Senator Lang:** I suppose the next thing would be oil and gas. We have had a pretty varied experience with our prognosticators over the past five years with reserves of energy in this form. Latterly we have been taken up short by the figures published by the National Energy Board as to the sufficiency of Canadian supplies and their duration. I think the public generally is wondering whether they are getting a snow job from the oil companies. Can you give us any indication of the present government position on our exploitation of oil and gas, and the expectancy of our reserves in terms of years?

**Hon. Mr. Drury:** Mr. Chairman, I would suggest that Mr. Gillespie could better provide the answer to that question. Before I would attempt to answer Senator Lang, I would turn to Mr. Gillespie and be briefed by him. But that would be second-hand. I do not know the details of our position in relation to petroleum resources. In any event, I would have great hesitation in putting a number of years on it, without some pretty heavy qualifications.