ENERGY RESEARCH AND PUBLIC POLICY ADVICE: A BRIDGE TO CANADA'S FUTURE

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Abstract

Canada needs a National Energy Laboratory comparable to those research laboratories found in the United States but with a multifaceted mandate to do basic research in the generation, transmission and storage of energy as well as to provide, when requested, sound engineering and scientific advice to governments at all levels on energy matters.

1. Introduction

In the current times of economic distress and turmoil it is prudent to think strategically and long term. We now find ourselves in such an unsettled situation but with no apparent plan other than to revive with slight alterations the current economy. It would appear that billions are about to be spent on bailouts and infrastructure but all such suggestions made to date appear to be narrow in outlook. No doubt we need roads and bridges but we also need intellectual bridges to the future.

When we, as a country, emerge from this current financial and human chaos, hopefully sometime soon, we should have in place the plans and institutions to take full advantage of that new situation. The market place of ideas is already one of the powerful emergents of the first decade of the 21st century. Those countries which have a firm vision of education, research and development will dominate the economic landscape. Development without adequate backing of fundamental research will lead into blind alleys which in the long run will waste financial and human resources. No one can foresee where research and development will lead us but being passive is not a good reason to give up being inquisitive. When Canadians do get inquisitive and develop something of value we have a bad habit of leaving it to others to enjoy the full fruits of that idea. In blunt terms we tend to not eat but abandon our young.

2. Energy's future

It is clear that energy in all its forms is going to be the major driving force in the economic recovery not only for the direct jobs it creates but for the world economy in general. Energy abundance and availability to all the people of the planet will to a large extent determine their level of development and prosperity into their foreseeable future. In our wired world most people are aware of what is going on in other places on the planet and build their hopes and dreams on what they believe is best for them. Lack of access to adequate energy supplies could contribute, as it has in the past, to instability and destruction.

3. Counter currents

There are pressures building to reduce emissions of all sorts and this leads to some obvious contradictions in the paths we are traveling now. In the oil sands megaprojects we are generating tremendous amounts of CO_2 by burning natural gas to generate more hydrocarbons which will generate even more CO_2. Little did we recognize over the years how the internal combustion engine would "drive" our lives. This cannot be turned around in a few years since it will take time, patience and a will to do so as new technical advances emerge.

While the world-wide elves are busy proposing all sorts of electricity alternatives and generation schemes such as conservation, ocean waves, geothermal, wind and solar for the electrical grid in order to cut emissions, the fundamentals of base-load generation are not well understood. There are some powerful and well-financed groups who, through spreading of fear and false statements, wish to cripple the nuclear industry, the very industry which can produce electrical power and heat with low emissions.

For far too long we have allowed a pause to occur in rational thought and as a result the uninformed have moved in to dominate the landscape. We must return to active consideration of engineering and scientific advice and not be so accepting of the knee-jerk reactions of some special interest groups.

4. Canadian research laboratories

Throughout Canada there are many laboratories, quite a number on university campuses and in governmental departments, doing good research work. For instance, we currently have laboratories in nanotechnology at the University of Alberta in Edmonton, a high security biological laboratory in Winnipeg, and nuclear research laboratories at Chalk River to name but three. These laboratories are currently well regarded internationally but are relatively restricted in mandate. In looking at the larger picture in Canada one gets the impression that there is a heavy emphasis on getting results from the lab bench to the store front as soon as possible. There is nothing wrong with this so long as this is not the sole objective of the enterprise.

5. A Canadian national energy laboratory

Canada needs a **National Energy Laboratory**, similar to those in the United States, but with a multifaceted mandate to:

Do basic fundamental research in the generation, transmission and storage of energy as well as, when requested, to provide governments at all levels with sound engineering and scientific advice on energy matters.

This four-pronged mandate is attainable under suitable financial, engineering and scientific arrangements, political good-will and action. Such an undertaking is not going to be easy or inexpensive and will take at least five to ten years to accomplish. It will take political courage to

create such an institution. We must avoid setting up another lab in some university or government department and proclaiming it as our national laboratory. This must be a laboratory of international stature, suitably equipped and financed which eventually will be a source of pride to all Canadians. It will be the primary source for energy research in the country. Canada could have a lot to say to the world about energy as this nation sits upon a vast array to energy and other resources.

6. Governance of the laboratory

It is proposed to create a seven member **Board of Trustees** not entirely at arms length from the rough and tumble of politics and made up of the following:

Two federal government appointees with energy expertise appointed by Cabinet
One appointee from the private sector with energy expertise appointed by the energy industry
Three engineers and scientists from the academic community with energy expertise and appointed by the Association of Colleges and Universities
Chairperson, with energy expertise, appointed by the National Research Council and who could serve at most two consecutive terms.

The startup terms would be staggered in length to get the ball rolling but after that the term of appointment to the Board would be six years with no possibility of reappointment except for the Chair. The once through appointment process is to avoid fossilization and to encourage a vigorous Board of action.
The single appointment from the private sector and three engineers and scientists from the academic community is to emphasize the research role and not necessarily the developmental role of the Canadian National Energy Laboratory.
Any body requesting help from the Canadian National Energy Laboratory would have to submit their request through protocols established by the Board of Trustees and directed firstly to that Board.

7. Financing the lab

The Federal Government would be encouraged to pass legislation establishing an **Energy Trust Fund** which would be created by contributions over a period of five to ten years so that eventually five billion dollars would be in place. After inflation/deflation proofing the Energy Trust Fund, only the investment income would be allowable for research expenditure which would be managed by the Board of Trustees. A target of some 250-300 million dollars in annual operating funds should be achievable in the first phases. At appropriate times the five billion trust limit could be examined by the Cabinet for possible expansion.
Capital expenditures for building and equipment would be heavy in the first few years as the Canadian National Energy Laboratory established itself and this phase would be a federal responsibility. Once in place the responsibility would fall to the Board to operate the lab.
There is a good reason to have an independently financed operation since those labs which are directly reportable to governments usually suffer cutbacks in hard financial times. Most hard

research projects require uninterrupted long term financing. After work starts on a project it should not be the priority of the prime researcher to be a money hustler.
The Provinces would be invited to contribute financially to the Canadian National Energy Laboratory Trust Fund, perhaps on a per capita basis, so that all parties would feel they have a stake in the operation. Private sector firms would also be invited to contribute without strings attached. It is important for all Canadians to feel that they have a stake in the success of this National Laboratory.

8. Appointments to the lab staff

There must be sufficient long-term funds made available to create that critical mass of researchers and assistants so that it becomes a self-sustaining institution of international reputation.

There would have to be the usual mix of permanent and visiting staff with priority emphasis on recruiting only the best and brightest men and women from around the world. Canadian Universities and Colleges and research institutions would certainly be encouraged to supply candidates but would not be the sole source for appointments.

9. Evaluation of research development proposals

All proposals for major projects would be peer reviewed by appropriate independent panels of engineers and scientists appointed by the Board and if a proposal was recommended by a panel, then it would be submitted to the Board of Trustees for review and perhaps approval. A small amount of funds may be set aside by the Board to assist in the development of research proposals.

Since governments are to provide the majority of the financial support there would have to be clear protocols in place as to how the Canadian National Energy Laboratory would reflect government policies.

10. Siting the lab

Since the men and women participating in the Canadian National Energy Laboratory would not be spending twenty-four hours per day working, it would be necessary to site the lab in a region where good work was possible with easy access to working professionals but also good recreational facilities and areas close by. The researchers would probably tend to be young and vigorous people who work and live in an energetic manner.
At present traditional energy development work is concentrated in British Columbia, Alberta, Saskatchewan and Newfoundland and a certain amount of research is currently being carried out in these provinces. The siting of the Canadian National Energy Laboratory in the West would give easy acess by lab researchers to a broad range of applied professionals working in the energy industry and resident there.

A site in or near the Rocky Mountains in Alberta or British Columbia with all its possibilities has some considerable merit. Within this area are several major universities with strong engineering and science programs.