

**Submission to Legislative Committee regarding Bill 100 2004  
An act to amend the Electricity Act 1998 and the Ontario Energy Board Act 1998**

**A case for using more nuclear energy**

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**Introduction**

A change in our current course is appropriate in light of the projected shortage of generating capacity in Ontario and the August 14 blackout, which revealed to everyone that "nothing works without electricity". The signs of an approaching energy crisis are clear as oil supply and demand move out of balance, putting increasing pressure on the limited supplies of natural gas in North America.

A solution to this problem in Ontario is the increased use of nuclear energy, and a very recent Ipsos-Reid/CNA survey indicates most Ontarians support this idea. However, there seems to be some reluctance for Government initiatives toward this course of action. I urge the committee to identify all the reasons for this reluctance and assess what can be done to address them, in order to remove the apparent barriers.

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I perceive the reasons are due to widespread misinformation about nuclear energy. In this submission I will provide factual information in several key areas. Certainly, the ideals of a clean environment, sustainability and social acceptance are very important to all Ontarians, so we should focus on them.

### Clean Environment

Let's examine whether nuclear energy provides a clean environment. The mining and processing of uranium into nuclear fuel are carried out in accordance with the Canadian regulations. And the operation of our nuclear power plants is also carried out under strict regulations to provide more than 40% of the electricity we currently use. The environment around these plants is not polluted. Emissions of radioactivity are typically a hundred times below the regulatory limits. Those who advocate nuclear phase-out have created an issue about the management of the small amount of used fuel we have been accumulating over the past 30 years and the potential release of radioactivity from this material far off in the future. The used fuel is stored at our nuclear sites in robust containers, made from steel and reinforced concrete, which will remain leak tight for thousands of years. Long before then, future generations of Canadians will recycle the used fuel in advanced nuclear reactors to release the vast amount of energy that still remains in this fuel. In these reactors, the long-lived radioactivity will be changed into much shorter-lived radioactivity that will also be stored. The amount of this material will be negligible compared with the amount of natural radioactivity in the soil we cultivate, the water we drink and the air we breathe.

### Sustainability

I urge the Government to inform Ontarians that just one CANDU fuel bundle, 10 centimetres in diameter and 50 centimetres long, provides the same amount of electricity that an average household will consume over a period of about 100 years. Current reactors release only one percent of the nuclear energy available in our fuel bundles, so an enormous amount of energy remains in the stored bundles. A time will come when it will be economical for future generations of Canadians to build advanced reactors and recycle our used fuel.

How long can this fuel sustain us? Dr. Bernard Cohen has pointed out that the usual assessment of the world's uranium resources, lasting a few thousand years, is based on the quantities available at the current market price.<sup>1</sup> The use of advanced reactors will make it economical to extract uranium from the oceans and still keep the fuel cost below one percent of the cost of electricity. This fuel supply is sustainable because new uranium is being carried into the seas by rivers, allowing at least 6500 tonnes of uranium to be withdrawn each year. This amount is adequate to generate approximately ten times the world's present electricity usage, for many billions of years. Fission of uranium is consistent with the definition of a "renewable" energy source in the sense in which that term is generally used.

Nuclear power is generally regarded to be an economical source of "base load" generation with coal-fired generation reserved for "peaking". I would like to point out that nuclear power plants can be designed with a high degree of load-following capability and they could replace coal-fired plants to ensure that Ontario's electrical output will always be able to match the changing consumer needs around the clock and during the day-to-day variations throughout the seasons of the year. The reactors in nuclear-powered ships perform in this manner.

### Social Acceptance

Ontarians have accepted nuclear power for supply of a significant fraction of their electricity for more than 30 years. In the early 1990s, it supplied approximately two-thirds of the electricity consumed.

Since then, there have been prominent efforts to discredit this power source, and the NDP government severely damaged the capability of Ontario Hydro to manage its nuclear plants. To be fair, some of the criticism is deserved. The Darlington project should have been managed better. There were management problems in Ontario Hydro, but serious management problems occur in all industries. Management problems have to be corrected, and they are being corrected. On the other hand, many nuclear projects were very well managed, and the stations worldwide are generally very well managed. Technical problems were identified over the past 30 years, in this relatively new technology, and solutions have been developed for the technical problems. The operating lives of many reactors are being extended.

An issue has been made about the high capital cost of nuclear power plants. Current plants cost approximately \$2000 per kilowatt of capacity and last more than 25 years before refurbishment is needed. Since the average Ontario home uses approximately one kilowatt of power, a homeowner's share of the capital cost of our nuclear plants is about \$2000. This is roughly the same cost as a home gas furnace. The homeowner's share of the capital cost of a nuclear plant is reasonable when put in this perspective. We ought to find a way to pay for nuclear plants in the same period of time that homeowners pay for their gas furnaces. If a stable 'floor' were put on electricity prices, financial institutions would invest in nuclear plant construction. And with the advances in technology over the past 30 years, the capital costs of future plants will be greatly reduced. The operating costs of nuclear plants are competitive with the operating costs of fossil plants due to the low cost of nuclear fuel. Reductions in nuclear operating costs can be achieved by improving current methods of operation.

A scare has been created about the safety of our nuclear plants. Analysis of plant design and operation over more than 30 years has demonstrated that nuclear power is a very safe method of generating electricity compared with other methods. Concerns have been raised about potential exposures to ionizing radiation from the reactors, but experience has shown that exposures to the nearby residents are a very small fraction of the radiation they receive from natural sources. Considerable research has been carried out on the effects of radiation on health for more than a century, and radiation is being used extensively in medicine. The radiation level below which no adverse health effects have been observed is well known,<sup>2, 3</sup> and employee exposures are maintained below this level. This research has also produced extensive evidence of beneficial health effects (radiation hormesis), in all living organisms, following exposures to low doses and low dose rates of radiation.<sup>4</sup> Low doses reduce risk. The explanation of this phenomenon is that small amounts of radiation increase the activity of our damage-control biosystems and this lowers the incidence of cancer and congenital malformations below the normal incidence. Large amounts of radiation decrease their activity resulting in a greater incidence of these occurrences.

For greater social acceptance of our very important nuclear option, I urge the Government to share this factual information with the people of Ontario. Anti-nuclear myths mislead people, creating on-going confusion and resistance to the increased use of nuclear energy and difficulty in supplying the growing needs for electricity in this province.

#### References

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