

Mr. Colin Hunt (Secretary, Canadian Nuclear Society):

Good morning, Mr. Chair and ladies and gentlemen of the committee.

My name is Colin Hunt. I'm the secretary of the Canadian Nuclear Society.

The Canadian Nuclear Society is a national, not-for-profit, learned society across Canada whose members are interested in nuclear science and applied technology in Canada. The CNS has branches of local operations across the country.

The committee posed a number of questions to the Canadian Nuclear Society. My opening remarks this morning will provide short answers to each of those questions.

With respect to the future opportunities for Canadian nuclear science and technology, we believe it lies in the following areas.

The first, immediately, is the various refurbishment projects of 10 Ontario nuclear power reactors, four at Darlington, six at Bruce, in a \$25-billion program stretching out over the next 10 to 12 years. It should be noted that much of this investment is private sector capital, specifically at the Bruce plant. This means that the private sector is willing to invest its capital in domestic nuclear power projects where there exists stable government policy. This ensures that nuclear power will remain the dominant source of electricity for Canada's principal industrial province well past the mid-point of this century.

The CNS also notes that the implementation of nuclear generation lies within the jurisdiction of the provinces, as noted by our friends at NRCAN just a moment ago, and it is thus up to the provinces to determine their means of electricity production. It should also be observed that because of the previous restart of six nuclear reactors in Ontario—four at Bruce, two at Pickering—that province is now nearly free of gaseous emissions from its electricity sector.

The second area is the immediate prospects before us of new CANDU reactors in Romania, Argentina, and China.

The third area, over the longer term, is expansion into more regions of Canada of nuclear power generation via small reactor technology for both grid applications and remote locations across northern Canada. SMR technology is also applicable to site-specific industrial applications.

The fourth area is the strong prospects of export of fuel and services to large new markets, and I'm specifically referring here to India.

The committee also asked us about the state of Canada's technology domestically and internationally. The view of the Canadian Nuclear Society is that the state of Canada's CANDU technology domestically and internationally is strong. Domestically, Canada's nuclear reactor fleet is among the best performing in the world in terms of both safety and efficiency. This performance is attributable in part to the expertise of Canada's nuclear plant operators and in part to the thoroughness and effectiveness of its regulator, the Canadian Nuclear Safety Commission.

Internationally, aside from the new construction prospects noted above, one of the most promising developments is the agreement between SNC-Lavalin and two large companies in China to build a new CANDU project in China to demonstrate advanced fuel cycles, and again, our friends at NRCan have made reference to this impending project. Unlike most of the other nuclear power reactors around the world, CANDU reactors can use a variety of different fuels without significant modification of the reactor.

With respect to the question the committee asked about benefiting other economic sectors within Canada, one of the principal ways it can benefit Canada's other resource sectors is by providing a cost-effective energy supply free of gaseous emissions to support primary industry.

The use of small modular reactors, for example, can reduce significantly the need of Canada's oil industry to use large amounts of natural gas for oil sands or for shale oil projects. Small reactors can avoid the need to rely on diesel fuel for energy supply in Canada's Arctic regions. This would lower costs and greatly reduce the risk of shortages. Providing reliable energy supplies would in turn encourage greater economic development of these regions in the interests of local populations.

A third point here would be that expanding reliable supplies of electricity to remote communities will greatly assist in improving health and water treatment in the local communities. At this time, existing energy supplies to these communities, primarily diesel fuel, can be highly unreliable.

With respect to research and development, Canada has a strong nuclear R and D structure, and this should not be surprising given that Canada is an innovator nuclear nation. It is active in all areas of nuclear science and technology, and it was, in fact, the second nation in the world to demonstrate controlled nuclear fission.

Canada's R and D structure is not confined strictly to Canadian Nuclear Laboratories, though I'm in no way understating the importance of that facility. Canada's nuclear R and D structure is distributed through a host of other institutions, universities, and corporations. Canada has a large number of research reactors and particle accelerators across the country, many of which are engaged in various research activities.

But all nuclear innovator nations—and this specifically includes Canada—need high-flux neutrons for large parts of nuclear research. Thus far, the only large source for this has been the NRU at Chalk River. Its impending shutdown does not mean that all such research in Canada will cease. What it means is that such research in Canada will have to go outside Canada for irradiation of targets. Unless the supply of high-flux neutrons is addressed by the Government of Canada, over the long term there is a risk that nuclear expertise in Canada must diminish.

With respect to R and D and nuclear medicine, this is a question I would more happily defer to other associations and societies more expert in the science and application of nuclear isotopes for medical purposes. The CRPA comes to mind in that regard.

The committee asked us about isotope supply, and, again, we would prefer to defer that to other organizations. We can provide the committee with a list of those who we believe are appropriate organizations to deal with that matter specifically.

The committee asked us a series of questions regarding waste management decommissioning. I would prefer to make a general statement here. All radioactive wastes in Canada are comprehensively managed by the owners of the waste. It should further be noted that, over the past decade, the Government of Canada has taken steps to manage comprehensively the legacy waste from the early years of nuclear science and research in Canada.

With respect to existing waste management, it's the view of the CNS that Canada's record is as effective as that of any other nation in terms of public safety. For the longer term, Canada has a long-term plan for management of all of Canada's nuclear waste in a program administered by the Nuclear Waste Management Organization. The CNS is in fundamental agreement with the approach taken by the NWMO.

Those constitute the bulk of my introductory remarks.

Peter, do you have anything you would like to add?

Mr. Peter Easton (Director of Communications, Canadian Nuclear Society):

No, not specifically, although I would make a couple of points with regard to the nuclear waste.

There are, of course, two types: the high-level waste that comes out of power reactors, and the low- and medium-level waste, some of which is from medical purposes in labs, hospitals, and so forth. There are two different processes for storing these, which my former colleagues at NRCAN referred to.

The one point to be made about these is that the waste from nuclear reactors in particular is very small in relation. It's a controlled volume, and it's completely under the control of the plant operator. They are in swimming pools at plants, so it is not as if the waste is untracked along large areas of the country, and similarly for the low and medium waste. As I said, a lot of this comes from hospitals, medical facilities, and so forth. They are easy to identify and easy to control, and, of course, the Canadian Nuclear Safety Commission places restrictions on facilities that produce these wastes. There are regulations on how they are to treat waste of that nature.

Mr. Denis Lemieux (Chicoutimi—Le Fjord, Lib.):

Thank you, Mr. Chair.

I would like to thank the two groups of witnesses for their presentations.

As has already been said, nuclear energy accounts for over 50% of electricity production in Ontario. I would like to hear the opinion of the two groups of witnesses. Why do you think using nuclear energy isn't as popular elsewhere in the country? What could the Government of Canada do to change this trend?

Mr. Colin Hunt:

Monsieur Lemieux, that's a very interesting couple of questions that you've asked. I want to deal with them separately, but head-on.

The origin of nuclear power specifically in Ontario was driven by a series of both historical and geographic factors that emerged at the end of the Second World War, and those factors have not changed one iota in the previous half-century. That's a very long discussion, and I'd be happy to address it at some future date with you or the members of this committee.

With respect to the appearance of the lack of support for nuclear power, this is something of a myth. I spent nearly two decades at the Canadian Nuclear Association prior to my role here at the Canadian Nuclear Society, and we made it our business every year to sample what Canadians thought about nuclear power, both in general and in specific provinces across Canada.

Nuclear is not unpopular. That is something of a myth generated in the media. What we found year after year—and this goes back to the early 1990s—is that, in general, citizens in Ontario are divided into three groups. There is a very small and vocal group opposed to nuclear power. There's a somewhat larger group—but again, very much a minority—of those vigorously in support of nuclear power. Then there's the vast majority of citizens in the middle who are mildly supportive, who don't know much about it, and who aren't much interested unless something hits the headlines and causes a big sensation.

As we look at the development of nuclear power in Ontario, I'm going to refer specifically to the nuclear refurbishment projects that are going on right now. These have been fairly extensively surveyed in terms of “does the public support them, or don't they?” The public is rather lukewarm about the whole business of building new reactors. This arose about 10 years ago, when Ontario was considering this. Mostly, it was not because of fear of nuclear power or its consequences. Mostly it was concerns about how much it would cost. However, with refurbishment, it's a very different thing. Year after year, survey results have consistently shown that support for refurbishment of Ontario's existing nuclear power plants runs well above 80%.

Mr. John Barlow (Foothills, CPC):

Thank you very much, Mr. Chair.

Thank you very much to our witnesses for being here.

This is going to be an interesting process. Certainly, as a member from Alberta, I'll say that this is something fairly new to us, as we don't have nuclear power in Alberta. It's been a topic of discussion for many years, but for the reasons you've just touched on, it has not come to Alberta.

You've talked about that opposition to nuclear power. In Alberta, we feel much the same in terms of the oil-and-gas side. We have that misperception of the dangers of oil and gas when we know that the safety record is much different in reality, so I certainly feel your pain in trying to promote the nuclear industry.

There are some numbers I found really interesting as I was going through some of the research. We keep talking about opportunities to find more environmentally friendly energy supplies, and nuclear is one that is not very often raised, which I find surprising. We always talk about solar and wind and these kinds of opportunities. In Ontario, you have that great app on your phone, Gridwatch, and I wish we had one for Alberta, but we don't. It's really interesting to look at. Today I clicked on it, and for Ontario, solar is at 0%, wind is at 2.4%, and nuclear is at 60%.

When you look at the cost of those energy supplies, you see that nuclear is at about 5.6¢ per kilowatt hour, whereas solar is at 50¢ per kilowatt hour, and wind is at 13.5¢. That shows you the substantial cost difference in these power supplies. Why are we not talking more about nuclear? I think we all know why, but I would like to ask the witnesses this: how do we change the public perception of nuclear?

You talked about a very vocal minority. We face much the same on the oil-and-gas side. I fear that if we start to talk about opportunities with nuclear, those same people who are opposing pipeline construction are going to be the ones opposing additional nuclear power supplies, even when it makes the most sense. It's economical. I know that the CANDU technology is safer than any other technology in the world when it comes to the safety precautions in there.

How do we change that mindset? Or can we? Is there an opportunity to do this or are we going to be facing the same battles we're having with regard to the oil-and-gas sector? Will we have a government that is going to be more supportive of nuclear than they have been with oil and gas? Do we have an opportunity here? Or is this an uphill battle? Mr. O'Dea is talking about exporting our technology to Romania and China, when we could probably be using it right here at home.

Mr. Peter Easton:

Well, if I may, I could make some points. If you look at what we call in statistics a "normal curve" of opinions about things, you will see that there is going to be a small percentage of people who you will never convince. For whatever reasons, ideological or others, they're opposed to pipelines, they're opposed to nuclear power, and they're opposed to anything except what they particularly propose.

As my colleague pointed out, when they were doing surveys of attitudes towards nuclear in Ontario, there was a percentage that was highly supportive. Most were in the middle. Then, of course, there were the ones who were completely opposed to it. There are a number of reasons for this, I think, aside from the ideologues who you just won't convince, and to my way of thinking, there's no point in even thinking you can do that.

In the case of the strong supporters, in part it is because, without this, the communities in Darlington and Tiverton would never have had access to the employment that a nuclear plant provides. The Bruce Power plant has roughly 3,600 employees, while Darlington has slightly less, at slightly over 3,000. These jobs are extraordinarily well paid, and otherwise, without them, you would have rural communities that would not have access to those 3,000-plus jobs with salaries of \$100,000 or \$80,000 per year, so it's not surprising that the support is so high.

As for the bulk of the population, a very large part of the issue is that as a species we're extraordinarily poor at assessing relative risk. Opponents of nuclear power will get up and say that it's risky. Opponents of pipelines will get up and say they are risky. Of course it's risky, because everything is risky. You can't have zero risk; the laws of physics don't allow it.

The question is, what is risky relative to something else? I'm getting off the point of nuclear, but in terms of pipelines, we know, because we've had an event, that shipping oil by rail will kill people. It killed 47. I have not heard of a pipeline spill, ugly though the spill might be, that has actually ever harmed a human—ducks, perhaps, but humans, no.

Similarly, with nuclear power, if you take the Fukushima incident as the most recent episode, you will find that more people died from the evacuation, from the stress of leaving their homes and not knowing when they would be allowed to go back, than would have been damaged by the radiation in those homes, because in actual fact there was not that much radiation released. It was released into the water supplies, but not so much into the air.

Again, with nuclear power—and it's an educational process—there are isotopes, particularly Iodine-131, that are long-lived enough or concentrated enough in the human body to be of concern, but like all highly radioactive substances, these also have relatively short half-lives. You can prevent this by taking iodine tablets in the event of an accident, because it gets concentrated in the thyroid, which is where iodine would normally concentrate, so it never gets concentrated in your body and just gets flushed out.

Over the longer term, these are isotopes that are relatively heavy and will plate out of the atmosphere in relatively short distances from the site of the accident. The rest of it is low-level radioactivity that in fact the human body can well tolerate. There was a documentary some years ago showing the site of Chernobyl, where people are still not allowed to live, although some have snuck back. It's a wildlife refuge. The numbers of bison, boar, and whatever are far in excess of what would have been around had the plant been operating, simply because nobody is hunting them. There are no people there.

How to educate the population is a difficult thing to do, particularly in this age of Twitter and Facebook and everything else, where a negative review will blast out and find hundreds of thousands of supporters simply because it sounds true. There is an unfortunate aspect of current society that someone has described as "truthism", where something is not true in the scientific sense but feels true. How you combat that, I really don't know, to be perfectly honest. If I had the answer to that, I might well win some kind of journalistic prize.

Anyway, that would be my comment on that.