CANADIAN NUCLEAR SOCIETY

President's Message

Dear fellow CNS members,

Welcome to the second issue of the 2022 CNS Newsletter. As the 2021-2022 CNS Council is approaching the end of its Term, I would like to express my sincere thanks and appreciation to all its members and extended members for their dedicated and continued volunteer support to promote the cause of the Canadian Nuclear Society. CNS relies very heavily on such dedicated support. I realize it is not easy to find volunteer time from the daily busy work and family lives we lead these days, but majority of you have been doing it for many years. Hats off to all of you for doing this selflessly!

As you may have noticed we were able to achieve a few more major initiatives since our last Newsletter, namely:

1. The successful completion of fulfilling the CNS mandate as approved by the Council by hiring a well qualified and a well-known nuclear industry leader, Dr. Neil Alexander, to the position of the CNS Communication Director after a very thorough selection process led by the Strategic Planning Committee comprising of Paul Spekkens, Daniel Gammage and Ujjal Mondal. The comprehensive contract, prepared by Mohamed Younis, was signed by both sides on April 30, 2022 and Neil started his new role on May 1st.

2. As reported in the Council meetings, we have started taking steps to perform an analysis of the Office Manager's position. These steps will continue for the next few months and will be completed during the 3rd Quarter of this year.

3. Based on past assessments, we are taking more professional steps by hiring Redstone to dig deeper into how we can improve our CNS membership going forward. This process is expected to be completed in the next 3-4 months.

4. The scanning of the last segment of CNS Bulletins is currently underway and is planned to be completed by the end of this month. At that time, we would have successfully scanned and downloaded 127 paper copies of these bulletins on our website for its member's quick access. Thanks to Arthur and Colin for leading and supporting this initiative.

5. Two license hearing processes are going to be underway by the CNSC this month, one for the Point Lepreau Nuclear Generating Station and the other for the Canadian Nuclear Laboratories (CNL) Near Surface Disposal Facility near Chalk River. Both hearings are extremely important for the Canadian Nuclear Industry. CNS has submitted its intervention reports for both hearings prepared by Colin Hunt and Peter Easton.

6. Our Marketing Committee Chair, Cheryl Tasker-Shaw, has significantly improved the appearance of the CNS's booth that we set up at various conferences and other events by getting large size banners printed professionally. More will be done in this respect by having a promotional video completed in the months to come. This will help CNS enhance its image more professionally.

7. Although our website has been modernized and significantly improved/enhanced as led by Arthur, we will continue finding areas of further improvement as well as making sure it covers all the information accessible to all its users in a more user-friendly manner. Please continue providing your feedback in this regard to the Website Committee at website_updates@cns-snc.ca

I would like to take this opportunity again to thank all of you for supporting CNS as it fulfills its mandate.

Kamal Verma

Upcoming Events

DIET 2022
Virtual

Nov 1 - Nov 3 2022

Artificial Intelligence, Machine Learning, Big Data and DIET are increasingly being utilized to obtain new insight, perform analysis more efficiently and more accurately, be more sustainable and improve safety

Visit the website >

11th International Conference on Isotopes

Postponed to 2023

11ICI hosted by Sylvia Fedoruk Canadian Centre for Nuclear Innovation (the Fedoruk Centre) in partnership with University of Saskatchewan and Tourism Sask atoon, will build on past conferences by continuing a multifaceted interdisciplinary ...

Visit the website >

2022 Fuel Conference

August 21 - August 24 2022

Following the success of the 14th conference held in Mississauga, Ontario in 2019, the **15th International Conference on CANDU Fuel** to be held in **Ajax, Ontario on August 21-24, 2022,** will once again bring together international nuclear fuel industry experts involved in research, design, fabrication, operations, fuel modelling...

Visit the website >

G4SR-4 in 2022

October 3 - October 6 2022

The Canadian Nuclear Society (CNS) is hosting the 4th International Conference on Generation IV and Small Reactors (G4SR-4) in cooperation with international partners in industry and government. G4SR-4 will be a 4-day international conference to maintain and advance the momentum from the past three successful G4SR conferences...

Visit the website >

Announcements

CNS Booth is on the move .... Finally some in person events!

CNA Show, April 12-14, Ottawa, Ontario

Canada's National Indigenous Peoples Day gives us a chance to recognize the many achievements of the country's Indigenous peoples. The day also celebrates the distinct cultures and unique traditions of these native communities. Three Indigenous peoples groups exist in Canada: the Inuit, First Nations, and Metis. Recent statistics put their population at just under 1.7 million. Festivities celebrating National Indigenous Peoples Day are held all throughout Canada every year on June 21.

WHY CANADA'S NATIONAL INDIGENOUS PEOPLES DAY IS IMPORTANT

A. **It bring awareness to the three Indigenous peoples groups in Canada**

It's important to remember that they are many unique cultures and traditions held throughout the country. National Indigenous Peoples Day is an excellent opportunity to brush up on the three distinct heritage groups that make up the country's native population.

B. **It means summer is near**

Traditionally, the Indigenous people have held celebrations on the summer solstice, and that's why June 21 was chosen to celebrate National Indigenous Peoples Day. From now on, whenever you hear of National Indigenous Peoples Day, the official beginning of summer in the northern hemisphere is a reason to get even more excited.

C. **National Indigenous Peoples Day is a great reason to try traditional food and games**

Unless you're from Canada's Northwest Territory, there is a good chance that you aren't too familiar with the traditional food and games that are enjoyed by the Indigenous people. National Indigenous Peoples Day is a great occasion to get out of your comfort zone a little and try something new.

Point Lepreau Generating Station Hearings

On 12 May a four-person team traveled to St John New Brunswick to intervene at the CNSC hearing about the extension of New Brunswick Power's (NBP) operating licence for the Point Lepreau Generating Station (PLGS). It was led by the CNS president Kamal Verma who was supported by Colin Hunt (co-chair of the Government and Regulatory Affairs Committee), Ruth Burany (Council Secretary) and me, the newly appointed Communications Director. We were supported virtually by Peter Easton, Colin's co-chair for the Government and Regulatory Affairs Committee.

NBP were requesting a groundbreaking, for Canada, 25-year licence extension. Longer licences create greater certainty and that makes planning more effective. Furthermore, preparatory work to prepare for periodic license renewals requires an enormous effort by the station staff for several months. The relatively recent refurbishment of the station, backed by the decades of safe and reliable operating experience, made a long licence feasible.

During the morning a number of intervenors suggested that shorter licences were needed in order to force more frequent engagement. They typically recommended a 5-year licence.

Following Kamal's oral summary of our written submission the Commission members took the opportunity to ask about the international standard for station licence extensions and our views on the impact of less frequent licence hearings on engagement.

Kamal confirmed that many nations granted lifetime licenses while Colin drew very clear attention to the extensive engagement campaigns run by NBP that had nothing to do with the licensing process and which had been outlined by NBP in their answers to other questions. This evidence from a learned society, CNS, helped the commission understand that longer licences worked internationally and that they were unlikely to lead to any reduction in engagement and will no doubt have helped the commission understand the issues. NB Power management and staff present at the hearings, expressed their appreciation, after the hearings, for our intervention in support of their license renewal application.

CNS will also be intervening at the hearing for Canadian Nuclear Laboratories' Near Surface Disposal Facility (NSDF) license application later this month.

The Search for a Communications Director

As was widely announced, the CNS has a new Communications Director, Neil Alexander. The process that culminated in Neil's appointment was long and detailed. The Search Team consisted of the Strategic Planning Committee (Daniel Gammage, Ujjal Mondal and Paul Spekkens), along with CNS President Kamal Verma and 1st Vice-president Guy Hotte. The process started by listing the key duties of the Communications Director, as well as the most important skills and attributes that the successful candidate should display. We iterated until we were confident that we had created a Job Document that would serve for posting the role as well as for the selection process. The Job Document was distributed to all CNS members to seek potential internal candidates. It was also posted on the INDEED Canada website and on Linked-in .

The attributes in the Job Document were converted into criteria to be used to rank the candidates. Two criteria were deemed to be mandatory, *Yes/No* attributes that needed to be answered in the affirmative for the ranking process to proceed. Another eight criteria were assigned weighting factors and scored on a scale of 1-10. Standard questions on all ten criteria were prepared and used in all the interviews to provide for "apples to apples" comparisons of the candidates to each other.

After posting the position for about 10 days, we had over thirty-four applicants. Each of the Search Team members ranked the candidates based on an initial screening of the candidate`s application letter and resumé against the ten criteria. The rankings by the individual Team members were combined and a composite score was determined for each applicant. There was a healthy degree of consistency between the rankings of the various Team members. We selected the top five applicants for interviews. While the interviews were being conducted, one of the candidates withdrew, leaving four interviewees. Three of the four impressed the Search team sufficiently to be deemed to be suitable to hire into the role. We placed the candidates in ranked order and asked follow-up questions to solidify the order. After a very careful final assessment by the team, Neil Alexander became the obvious top candidate. In parallel with the candidate's assessment process, Mohamed Younis was busy drafting the contract so that we could sign it as soon as the selection process was completed. We were delighted that the contract discussions with Neil Alexander were very efficient and successful. From a start in late January, the process took three full months of effort. Neil started in his new role on May1, 2022.

Paul Spekkens
Chair, Strategic Planning Committee

Welcome Neil Alexander, Communications Director CNS

The Charter of the Canadian Nuclear Society includes a mandate to inform people about nuclear issues and its volunteers have been doing that for decades. These experts have had a powerful and trusted voice because they are known to understand their subject and to have no axe to grind. John Luxat's excellent work on informing the public during the Fukushima incident is a shining example of the contribution that CNS has made and one which sets a standard guide for future communication activities.

It is an exciting time in the nuclear industry. The potential for nuclear power to mitigate the effects of climate change while giving national energy security is increasingly being recognized, new technologies that will open new markets are being developed and legacy issues are being addressed. Additionally, the public and our politicians are becoming aware of how many lives are being saved by the products that come from the nuclear industry, notably medical isotopes, and of Canada's leadership role in making that possible.

And this has created a demand for informed communication that exceeds the capacity of the volunteers, and a dedicated effort is needed to act as a focus for the communication activities. I consider it a great honor to have been entrusted by the people of the industry with that task.

Many of you will know that I am passionate about nuclear communications, and I am looking forward to harnessing that passion to work with the CNS membership to ensure its mandate to inform is undertaken effectively.

The emphasis here is on the word "focus" as it is important for the reputation of the organization that this role enables the effective expert communications and does not replace them. As such I am looking forward to working with our stakeholders to understand their issues and with the membership of CNS to establish where the expertise lies and then to act as a conduit between the two ensuring CNS is on hand to inform effectively whenever it is appropriate to do so.

Push yourself because no one else is going to do it for you!

There is nothing like GOLD! Claire Thomson, daughter of Ian Thompson, Vice President – Major Components & Materials, Kinectrics.

"Our entire family is so proud of Team Canada and Claire for what they have accomplished to prepare through the pandemic and bring home Gold! It has been an incredible journey for them!"

Claire Thompson made her Olympic debut at Beijing 2022 where she was a key contributor to Canada winning the gold medal. She set a new Olympic Record for defence in scoring with 13 points on two goals and 11 assists. She was also a +23 to lead all players in the plus-minus standings. Her efforts led to her being named to the Media All Star Team on defence.

Claire started skating at the age of 3, began playing hockey the next year and never looked back. She has wanted to represent Canada since watching the women's team win gold at the Vancouver 2010 Olympics. She had a vision and she made it happen.

It has been an incredible journey for her and not without setbacks. She was cut from the Under 18 Team and Hockey Canada did not invite her back until her last year of eligibility for the Under 22 Team. She never gave up, but at the same time, just kept focusing on being the best player she could be to help her College Team win a championship. Claire made the U22 Team and her strong play earned an invite to the National Team Camp in 2019. 2 ½ years later she and her Teammates have World Championship Gold in 2021 and Olympic Gold in 2022!!

Never give up on your dreams!
Congratulations Claire!

Branches' Corner

CNS - Sheridan Park Branch

CNS Sheridan Park Branch invites you to participate in the following virtual presentation:

Title: Is it appropriate to pre-distribute potassium-iodide (KI) pills around nuclear power plants?

Date/time: Wednesday May 25, 2022, 3:30 PM to 4:30 PM

Speaker: Dr. Jerry Cuttler, D.Sc., P. Eng., Former Engineering Manager at Atomic Energy of Canada Limited

Summary: The presentation demonstrates that a credible accident would not cause any radiation-induced thyroid cancers in the surrounding population. The purpose of pre-distributing these pills is compliance with the precautionary principle policy that was adopted in 1960 by the U.S. NCRP and accepted world wide. The reason given for adopting the false radiation scare was a lack of scientific information about the health effects of radiation. However, more than 120 years of scientific evidence in medicine and research is available that supports the known safety of the expected exposures to ionizing radiation. Distributing KI pills would only add to widespread public fear. The false scare not only blocks the provision of affordable nuclear energy, it also blocks potential applications of low doses of radiation in medical therapies for diseases, such as cancer metastasis, inflammations, infections, autoimmune conditions, and neurodegenerative Alzheimer's and Parkinson's.

Click here to view the presentation.

Member's Corner

Doddy Kastanya
Senior Analyst at Kinectrics Inc.

New Kids on the Block

"We keep moving forward, opening new doors, and doing new things, because we are curious ... and curiosity keeps leading us down new paths."
Walt Disney

For those who thought that the article will be about the glory days of a boy band from the mid-eighties, I am sorry to tell you that it will not be about them. However, since you already got this far, I hope you decide to continue reading. After all, it will not take more than five minutes of your time.

The heart of this article is about new nuclear power generation technologies that will soon enter the realm of Canadian nuclear industry. The arrival of the first "new kid on the block" was marked by a historical moment happening on the second of December 2021 when Ontario Power Generation (OPG) announced that in collaboration with GE Hitachi, it will deploy the BWRX-300 small modular reactor (SMR) at the Darlington site [1]. This is a very encouraging development and should be the first of many more SMR deployments throughout Canada. In fact, New Brunswick Power has been considering two other SMR technologies to be deployed in their province, namely the ones independently developed by ARC Canada and Moltex Energy. It is hopeful that other provinces will follow suit in the not-so-distant future.

While it is exciting to welcome the new SMRs to our country, as a nuclear community in Canada we need to assess our readiness for embracing these new technologies. In my opinion, there are a few fundamental aspects that we need to consider, such as:

1. **Regulatory Aspect**
   The Canadian Nuclear Safety Commission (CNSC) already has a comprehensive evaluation system for the SMR technologies prior to allowing them to be deployed in Canada. Regardless of their pedigree or maturity of designs, all of these SMRs must satisfy strict regulatory requirements set out by the CNSC. So, for this particular aspect, our regulators are already well equipped to welcome these new technologies. A statement from the president of the CNSC, Ms. Rumina Velshi, at the 2022 Canadian Nuclear Association conference reflects this readiness [2].

2. **Understanding of the Technologies**
   As members of Canadian nuclear community, we are proud of our home-grown CANDU reactor technology. We have been operating CANDU reactors for many years, through many challenges and successes. In short, we can say that CANDU reactors are our old friends, and we understand their temperament. On the other hand, the SMRs will bring about new challenges for us since the basis of these reactors are very different from those of CANDU reactors. From the perspective of fuels used in these SMRs alone, we can observe many different flavors starting from the concept of fuel assemblies (BWRX-300 and NuScale), molten salt fuel (SSR-W and IMSR), and TRISO fuel (Xe-100 and U-Battery). They also come in different sizes with respect to the electricity output, which could be advantageous when selecting the appropriate reactor technology that meets the energy demand of certain communities. The key is for us to fully understand these new-to-us technologies before we can effectively take advantage of them. This leads to the next aspect that we need to consider.

3. **Education, Research, and Development**
   The work force that will support the operation of these SMRs in the future would need to be equipped with the knowledge of how these reactors work. There are currently several universities in Canada already offering nuclear engineering degrees or other programs focusing on nuclear applications. However, with respect to the reactor operation and analyses, more focus has been given on CANDU reactors. The curriculums would need to be expanded to include courses which cover the fundamental science and engineering behind the new technologies. More research and development activities are also needed to ensure that all aspects of these reactors are fully understood. Needless to say, we also need the support of our government on other research initiatives for emerging technologies related to nuclear energy.

4. **Supply Chain**
   The nuclear industry's supply chains are paramount in ensuring safe, dependable, and effective operations of nuclear power plants throughout their lifetime. Therefore, in order to have a successful deployment of the SMRs in Canada, it is important to ensure that various high-quality components required by these new technologies could be manufactured by companies in Canada (e.g., members of the Organization of Canadian Nuclear Industries or OCNI).

5. **Waste Management**
   While the first three items above cover the "getting-ready part" and the fourth item covers the "operating part" of the deployment, we also need to consider the "after-life part" of the SMR deployment. The fuels discharged from these SMRs as well as other by-product of their nuclear fuel cycle would need to be stored safely. To accomplish this effectively, we need to understand the short-term and long-term behaviors of these fuels. In my observation, the Nuclear Waste Management Organization (NWMO) is diligently taking the lead in addressing this aspect [3].

There are certainly many other, less conspicuous aspects that would need to be considered as well. Being aware of some, if not all, of various facets of these SMRs is a prerequisite for us to have a successful path forward for the deployment of these reactors in Canada.

References:
[1] https://www.opg.com/media_releases/opg-advances-clean-energy-generation-project/. Visited on April 15, 2022.
[2] https://www.linkedin.com/feed/update/urn:li:activity:6920394377685053440?updateEntityUrn=urn%3Ali%3Afs_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6920394377685053440%29. Visited on April 18, 2022.
[3] https://www.nwmo.ca/~/media/Site/Files/PDFs/2018/03/28/09/24/EN_Backgrounder_SMRs2018_Feb28.ashx?la=en. Visited on April 19, 2022.

If you have a column to share in our Member's corner, send us an email at **cns_office@cns-snc.ca**.

Latest News

From the CNA reactor:

Canada/US cooperation for a clean energy future

Last edition of the reactor we shared the exciting news of a pioneering partnership between Ontario Power Generation (OPG) and the Tennessee Valley Authority (TVA) to develop advanced nuclear technology and create a North American energy hub. This announcement was made at the 2nd Nuclear Forum held between CNA and the Nuclear Energy Institute (NII) in Washington, DC. The forum brought together nuclear industry leaders from across Canada and the US to identify opportunities for cooperation and discuss strategies for jointly overcoming challenges.

Cooperation between the US and Canada is a win for both countries. Many companies working in the nuclear industry are active on both sides of our shared border, and both countries recognize the benefits that will come from sharing their technical expertise and manufacturing bases as they enter foreign markets.

There are a range of issues where our two countries can cooperate, coordinate, and harmonize efforts on nuclear expansion and innovation, including quality assurance, export rules, liability regimes, and enriched uranium.
However, one significant barrier to efficient cooperation is that while our two countries have similar goals for nuclear safety regulation, our two regulatory systems are different. In other high-tech sectors, like aviation, the United States and Canada have reciprocal acceptance agreements.

For years the lack of regulatory reciprocity didn't matter much, because the United States operated only light water reactors, and here in Canada we operated only heavy water. Now companies are seeking to deploy the same technologies in both countries, which would mean having to go through two separate licensing processes.

This year has seen a dramatic shift toward countries seeking greater energy independence, more than ever before. But that shouldn't stop close allies from working hand in hand, particularly when the acceleration of the deployment of innovative nuclear power could make such a dramatic difference in efforts toward net zero emissions.

There's much more to net-zero than clean electricity

Speaking of net zero emissions, it sometimes feels like the public discussion is focused almost entirely on clean electricity. This isn't surprising – electricity is something we all understand and deal with every day, and we have all the technology we need to move to a net-zero electricity grid, if we invest properly.

But by focusing discussion on decarbonization of the electricity grid, the government is dealing with low-hanging fruit and ignoring the greater challenge. Hardly anyone is talking about the much more difficult challenge of decarbonizing heavy industry, and specifically industrial heat production.

Industry in Canada (when we include mining and fossil fuel extraction) accounts for over one-third of the country's GHG emissions, and almost 20% of the country's GDP. A new report out by Pollution Probe estimates that up to 40% of industrial emissions come from burning fossil fuels to produce high-temperature heat, used in a range of processes including cement and steel production, mining, and in-situ oil production

There is a short menu of options for producing this heat and so far nothing has been able to compete with fossil fuels in terms of temperature and reliability... until small modular reactors. SMRs are not only emissions free, but they can be installed on site and generate heat and electricity at the same time.

It is our industry's challenge to get SMRs to market and make sure they're economically competitive. We should be under no illusions - early SMR designs are likely to have higher costs than later versions, but economies of scale have the potential to dramatically reduce these costs over time.

Modeling by Navius research suggests that by 2050, SMRs could account for most of the heat production for steel and biofuels production, plus a significant proportion for manufacturing and mining. It's time we shine a light on one of the greatest challenges in emissions reductions and show Canadians that nuclear can produce far more than just clean electrons.

For more on the promise of SMRs and the role of nuclear in decarbonizing heavy industry, make sure to check out CNA President and CEO John Gorman on the most recent edition of ARC Energy Ideas Podcast, "Leading in a Big Way: The Future of Small Modular Reactors (SMRs) in Canada".

A new nuclear plant every year?

The explicit inclusion of nuclear power in the federal budget (and then last week week in the Ontario budget) reassured many of us in the Canadian nuclear industry that we have the support of government. It feels like we've come a long way from a few years ago when it was hard to get a federal leader in Canada to even acknowledge nuclear, let alone make financial and policy commitments.

But we've still got a very long way to go. If you follow the industry, you can't have missed the comments by UK Prime Minister Boris Johnson last week that he wants to "build a nuclear reactor every year rather than once every decade". It sounds dramatic, but given the size of the challenge, this is the kind of ambition that we'll need to see in Canada and other countries around the world.

Estimates of Canada's electricity generation capacity needs in 2050 under a net zero scenario range from double to triple today's levels – or the equivalent of 20 additional Bruce Power Generating Stations. Of course, this will be met by a mixture of hydro, variable renewables, and nuclear.

But in the context of this much demand growth... does one new reactor every year really sound so dramatic?

A new chapter for the Canadian nuclear industry

It's a bit of an industry joke that there's a renaissance of the nuclear industry announced every few years. But judging by the reaction of the speakers, panelists and participants at CNA2022 last week, to the recently announced Federal budget, this time feels different.

The 2022 Federal Budget, tabled a few weeks ago, represents a significant shift for the government's position on the nuclear industry. It is remarkable not only for the inclusion of support and enablement of small modular reactor (SMR) development and deployment, but also support for uranium exploration and nuclear supply chain opportunities in Canada.
The Budget shows that that the Government is committing to nuclear being a key part of the shift towards a net zero economy. In fact, this is the first documented government policy that provides explicit financial support for SMRs as a key solution for climate change.

The Budget includes financial, program and policy support across the breadth of the full nuclear eco-system. This includes pre-development activities, regulatory capacity and harmonization activities, an explicit Canada Infrastructure Bank investment mandate, and support for uranium supply chains and exploration.

As CNA's John Gorman said in his opening remarks last week at CNA2022, "*this budget is pivotal for our industry. It is not just a step forward; it is a step change.*"

Perhaps it's time to stop talking about a "renaissance" of the nuclear industry – we've been here for over 60 years in Canada, steadily and quietly providing clean, sustainable power and life-saving nuclear medicine. Maybe instead it's time to start talking about the "next chapter" for the Canadian nuclear industry, and look forward to even more exciting chapters ahead.

You can read more about the role of nuclear in the budget in our article on LinkedIn, or check out this interview with John Gorman in the National Post.

Looking back at CNA2022

The release of the budget just the week before our annual conference added to the momentum that the entire industry has been feeling over the past few months. We were finally able to come back together, in person, and celebrate the industry's accomplishments, discuss our challenges, and make plans for a brighter future.

Through seminars, panels, keynote speeches, receptions and countless invaluable meetings and informal discussions, there was a real sense of energy and optimism over the course of the three-day conference and trade show.

Some exciting announcements were also made last week, including a strategic partnership agreement between SNC-Lavalin and Moltex, the opening of a Canadian office for European nuclear firm Tractebel, and the acquisition of BHI Energy by Westinghouse. In all cases, government officials were on site for these announcements, providing words of encouragement and support and further adding to the sense that the industry's best days are ahead.

If you were unable to attend CNA2022, we will be posting videos of the main sessions in the coming days.

Cross-border collaboration on the future of SMRs in North America

The momentum kept on rolling into this week, with the announcement Monday of a pioneering partnership between Ontario Power Generation (OPG) and the Tennessee Valley Authority (TVA) to develop advanced nuclear technology and create a North American energy hub. OPG and the TVA will jointly work to help develop SMRs as an effective long-term source of 24/7 carbon-free energy in both Canada and the United States.

OPG is moving forward with plans to deploy an SMR at its Darlington nuclear facility, the only location in Canada licensed for new nuclear with a completed and accepted Environmental Assessment. TVA currently holds the only Nuclear Regulatory Commission Early Site Permit in the United States for SMR deployment at its Clinch River site near Oak Ridge, Tennessee.

Last week at CNA2022, many of our speakers and panelists talked about cooperation and collaboration, and how when we come together as an industry, we can accomplish great things. This partnership announcement is a prime example of that kind of cooperation. As CNA's John Gorman said last week, "*big problems require big players*", and these are two of the biggest players in the game coming together to make things happen.

With strong partnerships like this one between OPG and the TVA, and the support of Canadians and federal and provincial governments, the future of the nuclear industry in Canada is looking brighter than ever.

Canada announces its Emissions Reduction Plan

The release last week of Canada's 2030 Emissions Reduction Plan gave us all an opportunity see how committed the government is to embracing nuclear as a key pillar of its net zero ambitions

There was much in the plan for supporters of nuclear energy to be excited about, but it ultimately falls short of fully eliminating the uncertainty associated with the Government's position and inclusion of the technology.

Though nuclear and SMRs are mentioned throughout the plan, there are no explicit financial commitments for the development of new nuclear capacity other than the prospect, yet to be clarified, of nuclear and SMRs being eligible in a new $250 million clean energy fund (we hope to get some clarity on funding for clean energy technology in the federal budget, set to be released on Thursday).

That aside, nuclear was finally – and hopefully consistently from now on – included alongside solar, wind, and hydro as a clean energy technology. The government has come to recognize that with the expected doubling, or even tripling, of generation capacity needed to reach net zero by 2050, all non-emitting technologies will need to be included (if you haven't, make sure to check out Minister Guilbeault's answer when asked last week whether nuclear is "green").

Renewables will play a significant role in meeting this dramatic increase in demand, but nuclear will still provide the sustainable, secure, and reliable power that will be necessary in this electrified economy.

SMRs are set to play a growing role, and while the plan was non-committal on funding and support, it was clear that the momentum behind SMRs remains strong. The plan indicates that the government will continue to advance SMRs through Canada's SMR Action Plan and also commits to "*establishing a SMR Leadership Table to advance Canada's SMR future and ensure participants benefit from expert advice and guidance, and explore opportunities to expand the development and deployment of SMRs at home and abroad.*"

This is all welcome news and reinforces the momentum that we've seen over the last few months with announcements from OPG, Westinghouse, and the provinces of Saskatchewan, Alberta, Ontario, and New Brunswick.

Finally, the plan echoes a message that we've been saying a lot recently, that as countries work towards net-zero goals, "*it is critical that Canada lead, rather than risk being left behind*". We will keep working proactively with the government to ensure that leadership on climate action includes showing the world that nuclear is a key pillar of net zero, and should play a more central role in coming iterations of Canada's emissions reduction plan.

Another record year for CO2 emissions

Canada's emissions reductions plan arrived just a few weeks after some sobering news about CO2 emissions. Although G7 countries like Canada, UK and France are bringing their emissions under control, globally the news is much more dire.

According to the International Energy Agency (IEA), global CO2 emissions from energy and industry reached their highest levels ever in 2021, rising a full 6% from 2020. Unsurprisingly, the main culprit was coal, which accounted for 40% of the growth of CO2 emissions last year. Emissions from natural gas also rose, and though emissions from oil have yet to surpass pre-pandemic levels (due to limited recovery in global transport), oil still accounted for over 10 Gt of CO2.

There's not much good news here. But there is small hope in the fact that nuclear power output expanded by 100 TWh in 2021, largely due to new projects in China and Russia. Without this increase in output from nuclear, and a welcome and significant buildout of renewable power capacity, the rise in CO2 emissions last year would have been 220 Mt higher.

This data release points to the massive challenge that the world faces if it has any hope of tackling the climate crisis. But it also highlights the significant opportunity for nuclear, which is the most well-placed to replace coal-fired power generation. Look out for the IEA's special report on the role of nuclear energy on the path to net zero, expected early June 2022.

Provinces are taking the lead in charting Canada's nuclear future

The climate challenge may be massive, but at least the future of Canada's nuclear industry is looking bright.

Last week, the governments of Ontario, Saskatchewan, New Brunswick, and Alberta released a strategic plan defining the way forward for the development of small modular reactors (SMRs) in Canada. The plan builds upon the 2021 SMR Feasibility Study which highlighted that development and deployment of SMRs in Canada would not only support domestic energy needs and mitigate CO2 emissions, but also position the country as a global leader in clean technology.

In the press conference held to introduce the plan, Ontario Minister of Energy Todd Smith said, "*We know the world is watching us when it comes to SMRs and I'm confident that our reputation as a global hub for SMR expertise will only grow stronger from here. With job creators looking for affordable, reliable and clean energy, SMRs will enhance our clean energy advantage and help us secure new investments that will create jobs across our province.*"
Here are the key dates included in the plan:

2026: Demonstration micro-SMR up and running in Ontario
2028: Complete the SMR project at the Darlington nuclear site in Ontario
2029: Complete two SMRs at Point Lepreau in New Brunswick
2034: Bring online Saskatchewan's first SMR

We should be encouraged by the fact that, even without the significant federal government support available to other clean energy technologies, SMRs are well on their way to becoming a reality across Canada. We look forward to working with the federal government to ensure that the provinces have the support they need to get these projects licensed, approved, and built.

The NSDF needs your support

Nuclear waste and spent fuel, and what to do with it long-term, remains one of the most pressing challenges for the nuclear industry. Concerns around the safety of nuclear waste and spent fuel storage facilities, often based on misinformation and poor science, are consistently raised by anti-nuclear activists in their opposition to further development in the sector. These objections distract government and the public from focusing on the significant environmental benefits of this low-carbon, stable source of power and heat, and delay the action necessary to find long-term, safe, and reliable solutions.

You now have a chance to lend your voice to this vitally important discussion.

At the end of May, the Canadian Nuclear Safety Commission (CNSC) will hold the second part of its public hearing into the application by Canadian Nuclear Laboratories (CNL) to build its Near Surface Disposal Facility (NSDF). The proposed NSDF would be an engineered containment facility with a design that will last 550 years, more than enough time for the low-level radioactive waste contained in the facility to decay to normal levels.

The approval and construction of the NSDF will prove that Canada is still a world-leader in management of nuclear waste and spent fuel. This facility represents not only a solution to temporary storage of low-level radioactive waste, but also a major step forward for the country's long-term plans for nuclear waste management.

To provide a written submission, or even better to sign up to give an oral intervention at the hearing, you can either visit CNL's website, or go directly to CSNC.

SMRs moving from concept to reality

Realizing the vast potential of small modular reactors (SMRs) took yet another step forward a few weeks ago with the announcement of over $27 million in funding by Innovation, Science and Economic Development Canada for the development and deployment of Westinghouse's eVinci micro reactor. This follows last year's announcement by GE Hitachi Nuclear Energy and Ontario Power Generation that they will work together to deploy a BWRX-300 at the Darlington site by 2028.

In his opening remarks announcing the funding for the eVinci project, François-Philippe Champagne, Canada's Minister of Innovation, Science and Industry, said that the investment "*will play a critical role in fighting climate change, building on Canada's global leadership in SMRs and securing jobs in Ontario's energy sector.*"

But these encouraging words only scratch the surface of the potential of SMRs, which will transform not only the way that we generate power for our daily lives, but also produce off-grid power for rural communities, generate hydrogen, produce clean drinking water, power container ships, produce low-carbon, high-temperature heat for heavy industry, among countless other applications.

Unfortunately, the uninformed criticisms came quickly, suggesting that any investment in SMRs is a "distraction" from the investment that's needed in renewables, an ironic argument considering the vast financial government support already provided for other clean energy technologies.

Climate change and energy transition advocates need to stop trying to pick winners. There is no credible pathway to net-zero emissions in Canada that doesn't include nuclear power. If there's anything that's distracting Canada from reaching zero emissions, it's the constant debates about which technology will be the one to lead the fight – because this is a false choice.

There is no single answer to decarbonisation, all zero and low-emitting electricity sources are required to achieve Canada's GHG reduction targets – we're all in this together.

Latest on the Green Bond Framework

Quickly following the announcement of the federal government's Green Bond Framework, thousands of Canadians spoke up to protest the fact that nuclear had been explicitly excluded. This decision, which is not in line with the government's own climate and emissions plans, caught many people by surprise and frustrated an industry that remains unsure of the government's full and long-term commitment to nuclear.

Thanks to the reaction, which was both swift and loud, the government has been forced to answer the public directly as to why it made this decision. During their press conference detailing the results of the first green bond issuance, Associate Minister of Finance Randy Boissonnault was asked by media why nuclear had been excluded.

Read below for a transcript of his response (or watch a clip we posted to @CanadaNuclear last week).
"It's a very good question and let me just begin by saying that this is the fist time that Canada was going to go to market with a green bond, and we've seen the success of it, and we wanted to make sure that we harmonized with international best practices. And from what we see in Europe, nuclear is not part of that mix. And so we wanted to make sure that we followed those international best practices on this lead bond issuance.

I can also say this – that our government works very closely with the nuclear sector. And just last week, François-Philippe Champagne, our colleague, Minister of Industry, Science and Economic Development, made an announcement of $57 million [sic] to Westinghouse Electric, in the riding of Burlington, precisely for a micro reactor.

And so, we see – and Minister Wilkinson has been very clear on this, our government has been clear on this – we see nuclear as part of the pathway to net zero. And should international best practices evolve, we will definitely take a look at that in the future."

Public recognition by the government that nuclear power is central to Canada's net zero ambitions is important, and we welcome this kind of statement. But statements of support in speeches and press conferences are very different than tangible support in the form of policy, programs, and financing mechanisms.

As Ministers Guilbeault and Wilkinson wrote recently, when announcing government support for carbon capture and storage, "*When it comes to climate change, there's no magic bullet. So let's use every tool in the toolbox*."

Nuclear excluded from the green bond framework?

On 3 March, the Ministry of Finance quietly released its Green Bond Framework, intended to help the government finance projects that will reduce carbon emissions. However nuclear power – one of the most fundamentally important technologies to achieving Canada's emissions reduction goals – was explicitly excluded.

This has left many in the industry wondering about the federal government's true position on nuclear. Do they support nuclear as a key part of a clean energy mix, as they have stated explicitly in Canada's Climate Plan and reinforced at the launch of the recent IEA Energy Policy Review of Canada? Or do they intend to tip the playing field exclusively in favour of renewables, ignoring the mountains of evidence showing that an energy transition without nuclear is virtually impossible?
Whatever the intentions, the exclusion of nuclear is short-sighted. Public acceptance and support of nuclear power is on the rise. Innovations that will cut costs and deliver low emissions power and heat to industry and remote communities are coming to market. Now is the time for government to publicly embrace and promote nuclear power, and that starts with recognizing it as clean energy on par with renewables and other low-carbon technologies.

Discussions between industry and government about this issue are underway, but you can also get involved directly. A parliamentary petition has been created by Canadians for Nuclear Energy, and every signature matters.

Latest on Ukraine

Like many of you, we've been watching the situation in Ukraine very closely. The attacks by the Russian military on the Chernobyl nuclear facility and the Zaporizhzhia Power Plant were not only reckless and in violation of IAEA principles but were also against international law. There have been no reported deaths or damage to critical nuclear infrastructure, but we remain concerned for the health and wellbeing of workers at both plants who have reportedly been unable to change shifts, and do not have adequate access to food and clean water.

Unsurprisingly, there have been far too many sensationalist headlines over the past few weeks about what could happen in the event of a direct military strike on a nuclear reactor. The most accurate, fact-based information available is from the International Atomic Energy Agency (IAEA), who are publishing regular updates on their website. In our efforts to combat misinformation, we've also put out a short statement on our website with links to reliable sources.

We are in close contact with our international partners, including the IAEA, World Nuclear Association (WNA), and FORATOM. We will continue to share only verified and fact-based reporting, and we urge you all to do the same.

Get ready to hear more about "energy security"

Natural gas prices in Europe are hitting all time highs, rising to prices ten to twenty times higher than what had been normal over the last decade. Meanwhile oil prices have also risen dramatically and could rise further still if further sanctions are imposed on Russian energy exports.

For Europe, which relies on Russia for nearly half of its natural gas demand, this will have significant economic consequences. Europeans can expect to pay more to both heat their homes and keep their lights on. Canadians are also feeling the impact of energy supply volatility, as the price of gasoline has been smashing records across the country. These price shocks are some of the most dramatic since the oil shocks of the 1970s, which led to the creation of a system of global energy governance and cooperation intended to ensure energy security – the uninterrupted availability of energy sources at an affordable price – in the face of geopolitical crises or natural disasters. But cooperation can only do so much when demand dramatically outstrips supply.

So, what do rising fuel prices have to do with nuclear power? First, no industry, including nuclear, will be immune to supply chain issues and rising costs as the economic effects of this crisis ripple across the globe. But more fundamentally, Canada should start to imagine and build a future where the economics of home heating, personal transport, and industrial processes do not rely on geopolitics and unpredictable markets. A future where low-carbon electricity is powering our economies, and technologies like electric vehicles, heat pumps, and electric arc furnaces are no longer considered innovations. This is a future powered by variable renewables, hydro, and nuclear, all working together in a sustainable system.

Canada has all the pieces in play to make this future a reality, starting with an electricity system that is one of the cleanest in the world. But as a country we are still heavily reliant on fossil fuels to heat and power our transport, buildings, and heavy industries. If we want to be energy secure and zero emissions, then nuclear power is our future.

Diversification is key to Canada's long-term energy security - not 100% renewables

The world is facing a global energy crisis. Whether you're filling up your car, heating your home, or buying your groceries, you're somehow feeling the economic effects of a complex series of events that began halfway around the world.

If there's one lesson that governments need to learn from this crisis, it's that nobody can take energy security for granted, and diversification of supply is critically important. Whether it's due to geopolitical instability, market fluctuations, extreme weather events, or a complex combination of all three, a lack of diversification can be a trigger for crisis.

Canada is fortunate to have an electricity grid that is based almost entirely on domestic resources, including uranium, hydro, wind, solar, and at least for now, fossil fuels. This broad diversification of energy sources has meant that as one supply gets cut off, for example when Ontario shut down coal fired power generation, another source is able to pick up the slack. For Ontario that was nuclear power, resulting in one of the greatest CO2 emissions reductions success stories in history.

Given this importance of diversification and energy supply security, why are some groups so eager to push for an electricity grid that is powered by 100% renewables?

The report out last week by the Suzuki Foundation argues that "*Reliable, affordable, 100 per cent emissions-free electricity in Canada by 2035 is entirely possible … without relying on expensive and sometimes unproven and dangerous technologies like nuclear or fossil gas with carbon capture and storage*." Ironically, the report then goes on to promote a series of expensive and unproven solutions for a 100% renewable power grid while admitting that the technology improvements for such a grid aren't yet available and fundamental changes to interprovincial electricity markets would be necessary.

Nuclear power is already part of Canada's diverse, clean, sustainable power grid and regardless of any headlines is set to play a fundamentally important role in the future. In addition to over 60 years of experience and a talented and trained workforce, the nuclear industry has proven and affordable solutions for decommissioning and long-term waste storage – and in fact the industry has much of the expertise that the renewables industry will need as it comes to grip with its own decommissioning, waste, and recycling challenges.

Any realistic scenario for net zero by 2050 in Canada needs to include the full suite of energy technologies. Of course, this includes a massive rollout of variable renewables and storage. But it also includes significantly more nuclear power generation, carbon capture and storage (at least for the medium-term), not to mention realistic and affordable options for decarbonizing heavy industry.

Pretending that a 100% renewables solution is feasible for a country like Canada might make attractive headlines, but it doesn't help in building out a realistic, practical, and affordable energy system for the coming generations.

Is Canada really committed to nuclear?

Unfortunately, part of the reason that Canadians continue to be enamored with the unrealistic prospect of a 100% renewables grid is that the federal government has repeatedly failed to explain to the public the complexity of the energy and climate challenge. As CEO of CNA John Gorman wrote last month in Policy Options, part of that failure has been the inconsistency of its vocal support for the nuclear industry.

From time to time, the federal government acknowledges that nuclear will be a key part of Canada's energy future. The 2022 federal budget, for example, included explicit financial and policy support for not only the development and deployment of SMRs, but also uranium exploration and nuclear supply chain opportunities in Canada. Yet nuclear was excluded from the clean tax credit policy announcements made in the 2020 federal budget as well as the accelerated capital cost allowance (CCA) for clean energy equipment. Then there's the release of Canada's green bond framework in March 2022 that explicitly excludes nuclear power.

These inconsistencies have left many in the nuclear industry wondering about the federal government's true position and the future of the 76,000 Canadians employed by the industry.

If Canada is to have any hope of meeting its climate and energy targets, then the federal government must explain clearly and confidently to Canadians that this is not an easy problem to solve. It won't be solved by building out a few more wind turbines and solar panels, giving some incentives for home energy retrofits, or shifting commuters to electric vehicles.

They need to say loudly, clearly, and consistently that every energy technology, including conventional and next-generation nuclear, will be part of Canada's energy future. This recognition must be stated not only in government documents and speeches, but also in additional policy, programs and financing mechanisms. That's what it means to commit to nuclear.

Saskatchewan's nuclear advantage

If anyone needs an example of what it looks like when a government commits, then they need look no further than the province of Saskatchewan. Over the past few months, Saskatchewan has taken major steps forward to producing clean and reliable power from nuclear energy.

Of course, Saskatchewan is no stranger to the nuclear industry, being home both CAMECO and ORANO Canada, two of the oldest and most established nuclear companies in the world. The fuel mined here has been critically important to Canada's role as a global leader in nuclear technology.

Now it's Saskatchewan's turn to fully profit from its nuclear advantage by embracing innovations in nuclear power generation through the development and deployment of small modular reactors (SMRs). When speaking a few months ago about the options available to the province as it seeks to reduce its emissions from power generation, Saskatchewan Premiere Scott Moe said that *"one of those options most certainly are small modular reactors."*

The decision to pursue SMR technologies in Saskatchewan has been years in the making, starting with the SMR Roadmap published in 2018 and the SMR Action Plan in 2020. More recently, in the last six months we've seen a series of major announcements of investments and strategic agreements to develop SMRs in Saskatchewan, Alberta, New Brunswick, and Ontario.

SMRs are only going to be one part of Canada's future energy system. Renewables will play a key role – Saskatchewan plans to get 50% of its power generation from renewables by the end of the decade – as will carbon capture and storage, hydrogen, and energy efficiency. But none of these technologies can solve the problem alone, and each province will have to chart its own energy future based on its history, resources, and economic characteristics.

The decision to develop a nuclear industry in Saskatchewan is the next step in the province's long tradition of building a strong, secure, diverse, and reliable resource economy.

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