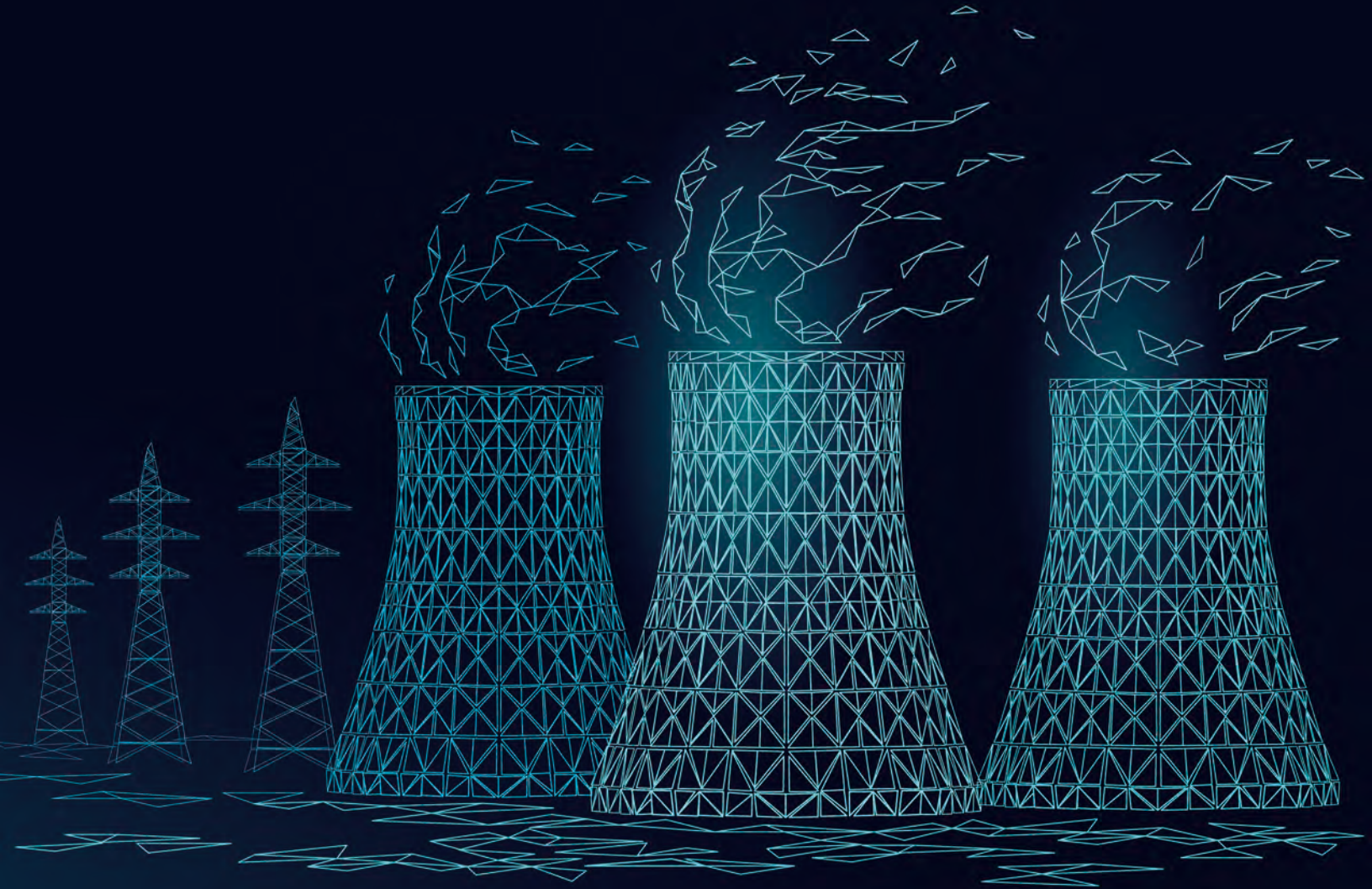


THE 2020 CANADA-UNITED KINGDOM COLLOQUIUM



THE NUCLEAR AGENDA:

CHALLENGES & OPPORTUNITIES

NOV 21-22
TORONTO

Table of Contents

Letter from Prime Minister Johnson.....	1
Overview of the 2020 Canada–UK Colloquium.....	2
Rapporteur’s Report.....	3
2020 CUKC Agenda.....	18
List of Canadian Participants.....	23
List of UK Participants.....	25
Biographies of Canadian Participants.....	26
Biographies of UK Participants.....	39
Co-Sponsors(Canada).....	48
Co-Sponsors (UK).....	49



THE PRIME MINISTER



10 DOWNING STREET
LONDON SW1A 2AA

For almost half a century the Canada-UK Colloquium has brought us together to share ideas, cement relationships and help build a successful and sustainable future for both our nations.

This year, that mission has taken on a renewed importance. The global challenge of Coronavirus has, quite rightly, consumed the attention of politicians and policymakers around the world. However, we cannot allow this pandemic to blow off course the UK and Canada's common pursuit of a cleaner, greener world.

If we are going to not merely bounce back from the economic devastation of Coronavirus, but also reach the game-changing goal of achieving net-zero carbon emissions by 2050, then we are going to have to be bold and innovative. We are going to have to move fast and keep nuclear power in the mix to keep our homes heated, our lights lit and our factories humming.

Agreements have already been reached between the British and Canadian governments, our nuclear industry associations and our national nuclear laboratories. We all know what we want to achieve. The debate now is about how to make it happen – and I have no doubt that this 49th gathering of the Canada-UK Colloquium will have every success in helping us answer that question.

November 2020



The 2020 Canada-United Kingdom Colloquium (CUKC)

The Nuclear Agenda: Challenges & Opportunities

NOV 21-22, 2020

Nuclear energy currently provides some 10% of the world's electricity from about 440 power reactors. It is the world's second largest source of low-carbon power (29% of the total in 2017), used by over 50 countries. As an important carbon-free source of power, and the only one offering large scale continuous generation, it has a key role to play in combating global climate change.

The 2020 Canada-United Kingdom Colloquium will examine challenges and opportunities involving nuclear energy and public policy, at the intersection of global security, economics and technology.

Both Canada and the UK are committed to a transition to a low-carbon and low-pollution economy, which cannot be accomplished without proper consideration of the nuclear option. Both countries are Tier-1 nuclear nations, with a full spectrum of nuclear capabilities such as research reactors, power reactors, fuel manufacturing capabilities, R&D, etc. The nuclear facilities in Canada and the UK have been consistently ranked as among the best in the world for safe and reliable performance. Both countries adhere to internationally respected, independent regulation, operating in a coherent legislative and legal framework that meets and exceeds international expectations.

Yet public concern, including fears of contamination, has hampered the uptake of nuclear power. Countries such as Austria, Australia, Italy and New Zealand have chosen nuclear free energy strategies. Others, including Germany, Spain and Switzerland are choosing not to build more nuclear reactors. Even where nuclear power forms part of the energy mix, such as in Canada and the UK, it is still challenged by many as a good source of energy for the future. There are concerns regarding relatively high costs of investment, perceived adverse safety, environmental and health effects, and potential security risks stemming from misuse of nuclear materials, weaponization and proliferation, as well as management of nuclear waste and costs of decommissioning.

The 2020 CUKC will convene experts, political leaders, civil servants, and industry representatives to discuss the nuclear agenda, with the goal of sharing best practice, promoting constructive policy dialogue between Canada and the UK, and making policy recommendations. In doing so, it seeks to advance mutual understanding on clean energy sources and suggest tangible future steps for innovation and collaboration on nuclear power and the global nuclear landscape.

2020 Canada–United Kingdom Colloquium on the Nuclear Agenda: Challenges and Opportunities

Rapporteur's Report by Ivan Semeniuk

INTRODUCTION

This report is a distillation of expert presentations, group discussions and breakout sessions centred around the broad theme of nuclear energy and its role in a climate-challenged world. Recent progress and challenges faced by the nuclear sectors were reviewed during two days of intensive online dialogue with additional viewpoints provided through concurrent chat streams. During the meeting, Canadian and UK experiences in the nuclear sector were compared and contrasted and, where possible, policy recommendations, solutions and opportunities for collaboration were identified and highlighted.

While the colloquium schedule divided the conversation into distinct sessions, a number of recurring themes spanned multiple sessions. Here, an effort has been made to reflect those themes along with specific recommendations that emerged from a wide-ranging and lively series of discussions.

One message informed every session and adjacent discussion during this colloquium. It is that the climate emergency has fundamentally changed the terms of the debate over nuclear energy. Now is the time for policymakers to engage consumers and stakeholders in a meaningful public dialogue on the contribution that nuclear power can make in helping to mitigate a looming global environmental crisis. This report considers how that dialogue can unfold in a way that is most beneficial to citizens in both countries and the world at large.

1. THE NUCLEAR INDUSTRY IN TRANSITION: A CANADA-UK OVERVIEW

Canada and the UK share a common status as Tier 1 nuclear nations with a full spectrum of capabilities and assets that includes fuel production, power plants at commercial scale, established supply chains, waste management operations, an experienced workforce and advanced scientific research and development. In Canada, 19 reactors at four sites deliver approximately 13.5 GWe or 15% of the country's total electricity needs. Canada is also the world's second largest producer and fourth largest exporter of uranium. The UK, home to the world's first nuclear power station, currently has 15 reactors operating at seven locations accounting for approximately 19% of electricity generation, or 10GWe.

Following its initial growth during the 1950 and 1960s onward, the industry in both countries found itself in a holding pattern beginning the late 1990s, a period characterized by ageing infrastructure, reactor shutdowns and growing public ambivalence about the future of nuclear energy.

More recently there have been signs of renewed momentum. In 2016, Ontario commenced an extensive refurbishment of 10 reactors, one of the largest infrastructure projects in Canadian history. By late 2018, construction had begun on the Hinkley Point C power station in Somerset, the UK's first new nuclear build in a quarter century with first generation of electricity expected by 2025. Plans are also proceeding toward a second new power station at the Sizewell site in Suffolk.

Concurrent with these developments, the need to shift away from fossil fuels in order to meet ambitious targets on greenhouse gas emissions has prompted a reconsideration by policymakers of the role of nuclear energy. Both Canada and the UK have committed to net-zero emissions by 2050. Colloquium participants noted the degree to which this goal is likely to be more costly and more difficult to achieve without an expanded role for nuclear energy.

In this context, the advent of small modular reactors (SMRs) along with other emerging technologies opens the door to new applications, new jurisdictions and a more diverse future for the nuclear industry beyond traditional gigawatt-scale reactors. For example, some 20% of Canada's power grid is directly tied to fossil fuels — the next most important source after hydroelectricity — which suggest there is an opportunity for SMRS to be deployed in parts of the country that are currently reliant on coal and gas for generation. As a step toward showcasing this potential, Ontario Power Generation recently announced resumption of its plans to host a small modular reactor at its Darlington site, east of Toronto. More broadly, the deployment of SMRs could play a transformative role in off-grid settings, by helping decarbonize resource extraction or by bringing emissions-free power to remote northern communities. In contrast, the UK's electricity grid is approximately 50% carbon dependent. Here, SMRs may offer an attractive and cost-effective avenue for scaling up nuclear infrastructure with a smaller footprint than conventional power plants. Beyond power generation, SMRs offer an alternative pathway for clean energy when electricity needs are low by harnessing heat to produce low-carbon intensity hydrogen. And the prospect of green jobs connected to a revitalized and diversified nuclear industry is a selling point for broader public support. However, a number of challenges — some technical, some financial and some political — must be surmounted if the industry is to realize a “nuclear renaissance.”

Public attitudes toward nuclear energy due to concerns over safety, security, the disposal of nuclear waste, nuclear proliferation and the industry's reputation for cost overruns remain a significant barrier. Over the years, these factors have muted government support for nuclear energy and produced a moribund environment for policy making. In turn, policy stagnation has left the industry in both countries in a weakened position relative to international competitors and less secure in terms of the future of its supply chains and labour force. The net effect is that while the industry is striving to position itself as a central player in the collective effort to address climate change, it must also make up lost ground in a challenging global marketplace.

A key determinant of the industry’s future is the degree to which it is included in the broader public conversation on clean energy. Promising signs can be seen in the integration of nuclear energy into discussions at the leading global forum for advancing clean energy technologies (the Clean Energy Ministerials). The 2019 ministerial, hosted by Canada, became the venue for a report on nuclear power in the context of clean energy from the International Energy Agency, the agency’s first such analysis of the industry in years. In September 2020, another ministerial initiative, co-led by the United States, Canada, Japan and the UK, produced a separate report on the role of flexible nuclear energy for clean energy systems.

The Canada–UK Cooperation Nuclear Action Plan, signed in March 2020, provides a framework for enabling collaboration in areas of common interest and, explicitly, for “advancing the role of nuclear energy in combating climate change”. It includes a strategic focus on the development and deployment of SMRs with specific objectives related to waste minimization, fuel supply chain, regulatory collaboration, advanced manufacturing and financing. In conjunction with the Action Plan, a bilateral agreement between national laboratories lays the groundwork for joint research projects in advanced reactor fuel security, medical isotope production and environmental remediation. Regulators and nuclear industry associations in Canada and the UK have similarly begun cooperative efforts with their counterparts. Collectively, these joint activities can help raise the profile of the nuclear sector and contribute to a broader public understanding of the industry and its relevance to clean energy.

What follows are some of the ideas and directions that colloquium participants perceived to be the most fruitful next steps for advancing the nuclear agenda.

RECOMMENDATIONS:

- 1.1) Governments should work closely with their respective industries to simultaneously position nuclear energy for addressing climate targets while improving economic competitiveness as a parallel objective.
- 1.2) Policy makers should consider ways in which a carbon tax can be used as a reinvestment tool for supporting the development of nuclear technologies and projects in order to provide a more consistent funding stream and to more closely identify nuclear energy with its role in achieving zero emissions.
- 1.3) Industry should pursue cogeneration models that can be developed alongside intermittent renewables such as wind and solar so that heat from next generation reactors can be utilized for other purposes (for example, hydrogen production) when renewables are most active.
- 1.4) Led by governments, all stakeholders should be engaged in developing national energy resource plans that integrate nuclear with non-nuclear renewables.
- 1.5) All stakeholders should be proactive in advancing equity and diversity in the nuclear workforce and encouraging the recruitment and retention of women as part of a changing role for nuclear energy in addressing national and international climate.

2. REIMAGINING THE NUCLEAR PROPOSITION: SMALL MODULAR REACTORS AND BEYOND

Practical realities suggest that conventional fission reactors will be essential in facilitating a global transition to a low-carbon energy system — an assessment that can be made absent any significant advancements in nuclear technology. Yet the past 20 years have brought important innovations and an abundance of new reactor concepts. Collectively, these point to a more substantial future role for nuclear energy catalyzed by the deployment of SMRs and other advanced reactor technologies.

Compared to conventional reactors which are constructed on-site from the ground up, the compact design of SMRs allows them to be factory-built and transported to where they are needed. A wide range of designs are now being explored, featuring units that generate power in the range of tens to hundreds of megawatts. They include models with passive safety features that improve containment and reduce risk. Another marked difference from conventional reactors is that the radius of the emergency planning zone required for an SMR is small enough to be contained within the site boundary of a power plant. Some SMR designs include the capacity to recycle spent fuel from conventional fission reactors, and potentially yielding a waste product with lower radioactivity and reduced half-life.

As colloquium discussions made clear, large gigawatt-scale reactors will remain important, at least in the near term, for delivery of base load power independent of fossil fuels. However, SMRs can leverage economies of scale to provide a lower cost and more flexible energy stream that can supplement on-grid nuclear as well as provide new options for off grid applications.

The UK's Low-Cost Nuclear Challenge, a government-initiated programme to develop a homegrown SMR, is currently underway in collaboration with an industrial consortium led by Rolls Royce as programme integrator and principal co-investor. It is accompanied by parallel efforts to develop a commercial market and supporting policy regime. Part of the case for public investment is the opportunity for a dispersed supply chain and job creation that the SMR model makes possible.

In Canada, there has been progress on SMRs at both the federal and provincial levels, including the launch of a Canadian action plan during the time this report was in preparation. New Brunswick, Ontario and Saskatchewan have signed an MOU to collaborate on SMRs with Alberta also indicating its intention to join. It is noteworthy that the latter two provinces do not host conventional nuclear power plants. Other developments include the launch of a nuclear research cluster in New Brunswick to spur SMR innovation, including MOUs between New Brunswick Power and two SMR vendors. In addition to its plans to host an SMR at Darlington, Ontario Power Generation (OPG) has struck an agreement with the Canadian Nuclear Laboratories to build an off-grid SMR as a commercial demonstration project. Potential customers for off-grid power generation in Canada include the mining sector as an alternative to diesel. Other opportunities include the use of SMRs for direct heating, hydrogen production, desalination and synthetic fuels among other processes. OPG is also pursuing an on grid project, though a design has not yet been selected. Crucial to the success of these projects will be proof not just of technical capability but commercial viability, including predictable timelines and budgets, ease of operation and a straightforward path to licensing.

The needs of SMRs include new fuels and supply chains. These are areas of potential collaboration identified in the Canada–UK Nuclear Cooperation Action Plan and re-emphasized by colloquium participants. In addition, in October 2020, the nuclear regulators of Canada (the Canadian Nuclear safety Commission) and the UK (Office of Nuclear Regulation), signed a Memorandum of Cooperation which provides a framework for sharing information, expertise and best practices to support more efficient technical reviews of small modular reactors and advanced nuclear technologies.

Vital, too, is the need for collaborative efforts in research and education in order to create and motivate a diverse and flexible workforce that can move SMRs from the drawing board into operational and commercial reality. The development of associated technologies, including transportable off-grid microreactors that generate electricity in the range of 1–20 megawatts, or facilities for hydrogen production, would similarly be accelerated in a well-supported R&D environment that fosters ties between academic programmes in both countries and strengthens communication between universities and industry.

With respect to R&D, it would be beneficial if the UK and Canada could develop a “technology platform” approach, allowing common research and development irrespective of the particular reactor type concerned. For example, in the case of high temperature gas reactors (HTGRs) — reactors which deploy helium as their coolant and are especially well-adapted to the supply of heat — a joint R&D programme could address such issues as Triso fuel irradiation and performance assessment, as well as the coupling of these reactors to hydrogen generation plants. Among the benefits of such an approach would be a better understanding of the regulatory issues raised by the differences between advanced reactors of this kind and conventional systems. Generic research programmes that are independent of particular nuclear technologies would also foster a pool of expertise and capability that the UK and Canada can develop in a collaborative way, sharing experimental trials and research results. Working together would enable a more efficient deployment of resources and help both countries derive more benefits from research investments. Already SMRs and other advanced systems have made it possible to envision a nuclear industry that is more sustainable, more efficient, more cost-effective and better suited to addressing the zero emissions challenge. Colloquium participants underlined the need for clear direction from governments that will signal, to industry partners and to investors alike, their willingness not only to reimagine nuclear power but to re-engineer and re-monetize it for a new era.

RECOMMENDATIONS:

- 2.1) Governments should prioritize the development of SMRs as a key part of their energy portfolios, provide regulatory support and work with industry partners to identify and accelerate technologies that are ready for market by the end of this decade.
- 2.2) Industry and governments should begin to promote a coalescence of efforts around SMRs and other technologies that are most likely to succeed at commercial scale, guided by mutually agreed criteria such as cost, simplicity, waste management and social acceptance.
- 2.3) Canada and the UK should establish equipment qualification facilities with common standards to compete more effectively with outside suppliers.
- 2.4) Canada and the UK should consider a joint “technology platform” R&D programme of generic nuclear research independent of the particular reactor type concerned.
- 2.5) Canada and the UK should partner in at least one high profile advanced reactor project — for example in the area of high temperature gas reactors, cogeneration and/or hydrogen production — culminating in a demonstration plant to validate performance measures and to attract and inspire technical talent with a climate-focused mission.
- 2.6) Canada and the UK should collaborate on SMR fuel design and an integrated plan for recycling waste streams through SMRs.
- 2.7) Industry should be developing and promoting designs that carry the philosophy of modularization embedded in SMRs throughout the entire facility to reduce front end costs and shorten time-to-generation.
- 2.8) Industries involved in new nuclear technologies should identify common objectives and challenges where collaborative efforts can lead to solutions that reduce risk and drive down costs for all.
- 2.9) Advanced reactor demonstration plants should have an open architecture so that vendors for heat source applications can showcase parallel technologies that leverage the potential of SMRs.
- 2.10) Research and educational institutions in both countries should work together and collaborate with industry to develop programmes and common competencies that are relevant to SMRs.

3. SUPPORT SYSTEMS: FINANCING AND REGULATION

Relative to other forms of low carbon energy generation, nuclear projects are more likely to face unfavourable financing terms due to perceived risk. A higher interest rate on raised capital ultimately translates into an increase in the price of energy which harms consumers and drains economic competitiveness. The barrier this presents is evident in the UK, which has led the shift to a deregulated energy sector. As part of a study of the Hinkley Point C project, the UK's National Audit Office detailed the extreme sensitivity of energy price to financing. In the context of broader energy policy, creative financing solutions are therefore essential for optimizing the nuclear contribution to the goal of net zero.

The challenge posed by financing models was driven home by the withdrawal in September 2020 of Japan's Hitachi Ltd. from a nuclear power plant project at Wylfa Newydd in Wales. Despite a substantial investment by the company and the government's efforts to support the project, the financing challenge ultimately proved insurmountable.

The UK situation demonstrates the limitations of a model where investment and risk is primarily in the hands of utility developers. In the present environment, few companies can sustain such an investment. Alternatively, a public utility model poses political challenges, particularly in light of the COVID-19 pandemic which has already placed huge burdens on public spending. A third way, which is gaining some traction in the UK, is a financing model that looks to institutional investors for capital but with shared risk.

Prior to Hitachi's withdrawal from the Wylfa project, the UK government undertook a public consultation on the regulated asset based (RAB) model, an alternative approach to financing nuclear projects. In its release of the results in December 2020, the government indicated that it would continue to explore financing options with developers, including the RAB model, as well as a role for government finance during construction. Though taxpayers do not enjoy being saddled with hefty bills for projects that run over budget, the colloquium also considered the public cost of projects that are hindered by inadequate financing models and the threat this poses to time-sensitive climate targets.

Likewise, attracting capital without revisiting the allocation of risk remains a challenge. While investment firms have shown increased interest in green energy projects overall, this has typically not been the case for nuclear power plants as an asset class. That could change under an RAB model or similar approaches aimed at improving the risk profile of nuclear projects. Experience with large projects in other sectors suggests that the ideal model is one that allows risk to be shared between developer, contractor, the state, investors and the consumer in a way that is considered fair and produces value. This will be critical in the UK where the scale of new energy infrastructure required to achieve net zero depends on private sector financing as well as public support. In both countries, appropriate financing models could create opportunities that are particularly suitable for long term investors such as insurance firms and pension fund managers.

A growing consideration for investors is the requirement for projects to meet environmental, social and governance (ESG) criteria. It is critical that markets should have a positive view of nuclear energy as an asset class from a reputational and ESG perspective. Government can play a role in assisting financial institutions form a consistent ESG analysis by providing clarity on the importance of nuclear energy to climate change policy. A robust ESG case for nuclear should also address social need, environmental impact, safety, cost, and waste management.

During the current period of historically low interest rates, it might be possible to mobilize significant long-term fixed-rate finance for nuclear new build through the public issue or private placement of ‘nuclear green bonds’. These possibilities would be greatly enhanced by an improved ESG profile for nuclear along with unambiguous government support. The fact that nuclear energy was ranked third in the British Prime Minister’s Ten Point Green Energy Plan announced in November 2020 was a positive step in that direction.

Looking forward, the promise of SMRs is that modularization and automation will lower capital and operational costs. However, these advantages — indeed, the entire business case for SMRS — are unlikely to be realized without a suitable regulatory framework, ideally combined with international cooperation and harmonization to support a fleet-based production model. This is an area where more work is needed and where colloquium participants emphasized the benefits of meaningful Canada–UK collaboration.

The cost of licensing presents another significant barrier to SMR implementation, from design review through to site preparation, construction and operation. While there is undoubtedly a potential market for SMR generated power, that market is unlikely to shift readily from conventional sources if it includes shouldering the overhead that comes with bringing a new technology on stream. A thoughtful approach to licensing and regulation for the new technologies should also extend to fuel fabrication, potentially the most expensive element in an SMR system.

Another avenue to explore is a product-base licensing scheme that is shared by like-minded regulators. Industry and governments, including their nuclear regulators, should enhance international collaboration and enable smart regulation, including early engagement, of innovative technologies. The challenges here included national sovereignty over regulatory matters and differing perspectives between countries. However, discussions are underway and there is, at least, the potential for greater convergence on regulatory matters.

RECOMMENDATIONS:

3.1) Governments must provide a policy framework that supports investor confidence in nuclear projects as well as provide direct public investment in first-of-a-kind projects (and possibly second-of-a-kind) and serve as the insurer of last resort for risks that industry cannot take on alone.

3.2) Industry must develop best practices to reduce the cost of projects and ensure that designs are set early to mitigate risks and minimize schedule and budget overruns.

3.3) Governments should work with financial institutions to support and facilitate the development of consistent environmental, social and governance criteria for investment in nuclear projects.

3.4) Governments should ensure funding mechanisms are well-matched to the development of SMRs and microreactors and provide policy support for private investment.

3.5) Governments should investigate mechanisms for defraying the licensing costs associated with new technology projects including SMR

4. LIFE CYCLE MANAGEMENT — SECURITY, SAFETY, WASTE AND DECOMMISSIONING

The combination of emerging technologies, new financing models and the pressing need for progress on greenhouse gas emissions has cast the future of nuclear energy in a new light. However, to fully realize this future, the nuclear industry must demonstrate its ability to meet a suite of familiar challenges.

Among them, the long-term management of nuclear waste, especially in the form of spent fuel from conventional fission reactors, consistently ranks high as a public concern because of the perceived risk of release into the environment and the uncertainties associated with storage on millennial timescales.

Guided by science and a commitment to public engagement, efforts in Canada have been advancing steadily toward a national solution to the problem. By 2023, Canada's Nuclear Waste Management Organization (NWMO) expects to complete site selection for long term nuclear waste disposal in a deep geological repository — the recommended end point for radioactive materials. Once chosen, operations at the site would begin in the 2040s. A key feature of the process has been the organization's partnership with local communities at candidate sites. In particular, the NWMO views the support of Indigenous people as critical to the success of its mission.

Recently, the organization was tasked by the federal government to lead a dialogue with stakeholders and Canadians for the development of a national integrated strategy for all of Canada's radioactive waste. The effort will focus on identifying gaps in current plans for long term waste management and provide technical options for addressing them. But while this development bodes well for ensuring that the waste challenge can be effectively met in a way that does not impede future development of the industry, it will require both industry and government to follow through with evidence-based solutions and ensure that there is public buy-in at every step in the process to allow solutions to move forward in a timely way.

Because secure waste management is crucial for the industry's future it is also an area where knowledge sharing between nations is of clear benefit to all parties. Canada has collaborated extensively on waste management solutions with the UK, which is currently working through its own site identification process. Colloquium participants stressed the need for collaboration among implementors and regulators with harmonization of standards as a common goal.

In parallel with the waste issue, the gradual turnover of the first generation of commercial nuclear reactors has necessitated the development of expertise in decommissioning power plants. This highlights the need for a whole life cycle approach to nuclear technologies. For example, the contract for the construction of the Hinkley C nuclear plant in the UK includes arrangements for holding aside funds independent of both developer and government to ensure that the cost of waste management and decommissioning is built into the budget, with mechanisms for reassessing projected costs over time. In Canada the federal government, including the nuclear regulator, ensures producers and owners of radioactive waste comply with legal requirements and meet the funding and operational responsibilities which account for and build the cost of waste and decommissioning into the price of the electricity it generates. This uniquely positions the nuclear industry in relation to other energy providers because it is the only large-scale energy-producing technology that takes full responsibility for all its waste and fully costs this into the product.

Looking further into the future, SMRs offer the opportunity for a paradigm shift in waste and decommissioning through the development of reactor designs that recycle spent fuel. The principle of modularity also introduces the possibility of multigenerational operation, with separate parts designed for replacement in order to extend facility lifetimes and create a more compartmentalized approach to decommissioning. But all of this requires a holistic approach to reactor technologies that begins with fuel fabrication and considers the economics, the environmental impact, safety, security and the supply chain at each stage. This route opens multiple avenues for international collaboration. It also uniquely positions the nuclear industry in relation to other energy providers because it accounts for and builds the cost of waste and decommissioning into the price of the electricity it generates. The potential benefits to be derived from this approach include increased public acceptance and rising confidence from private investors.

In a separate series of discussions, colloquium participants also considered issues of safety and security in a time of technological and political change.

For example, recent advances in artificial intelligence have made a marked impact in many industries and the nuclear sector energy is unlikely to be an exception. The next generation of power plants may employ machine learning algorithms that can preemptively spot conditions and patterns that might otherwise lead to a safety threshold being crossed. Algorithms that feature natural language processing could be applied to accelerating documentation searches in support of safety analyses. The ongoing requirements for human judgement, accountability and cybersecurity suggest that artificial intelligence is more likely to be called on for assurance and assistance than for direct operational control. The key point is that new technologies are emerging that have the potential to enhance safety while reducing costs.

Non-proliferation is an important area in which it might be possible to deepen cooperation between Canada and the UK. For well over 20 years Canada has been a global leader pushing for negotiation of a Fissile Material Cut-off Treaty (FMCT), putting forward the current agreed mandate for such negotiations in the 1990s as well as leading two UN Groups of Government Experts in more recent years. Over a similar timescale the UK has had the leading role in the area of verification of future nuclear arms control and disarmament agreements. Efforts should be made to combine these workstreams.

Neither Canada nor the UK are signatories to the Treaty on the Prohibition on Nuclear Weapons that became effective in January 2021, but there could be longer term implications for the civil nuclear industries in both countries, for example as a side effect of pressure on financial institutions to divest from companies that have connections with the defense side of the nuclear industry. An important consideration for the industry and policymakers is how to reap the advantages of SMRs without increasing security vulnerabilities that could arise when reactors are in many locations, including remote sites with minimal staffing. Colloquium participants underscored the need for stakeholders to be out front and transparent on security as well as other issues as part of the planning process for next generation nuclear technologies.

Finally, many participants echoed the need for a talented and representative workforce that can meet the complex set of challenges that the industry faces. Currently, less than a quarter of those employed in the nuclear sector are women. The industry must do better if it wishes to attract and retain top talent and better reflect the communities that it serves.

RECOMMENDATIONS:

- 4.1) Best practices for implementing new nuclear technologies should seek to minimize waste and, where possible recycle components.
- 4.2) A focus on environmental footprint should be prominently featured in any proposal for a nuclear facility or technology demonstration.
- 4.3) Industry and governments should adopt and publicly promote a holistic model for nuclear energy that encompasses all aspects of design, construction, operation, fuel fabrication, waste and decommissioning with a view to reducing public uncertainty about costs and safety.
- 4.4) One element of this holistic approach (see Recommendation 4.3) should be an effort to harness AI in the development of systems to improve safety, and to further enable the timely adoption of steps to mitigate risk.
- 4.5) To develop a more welcoming culture and a more representative public profile, the nuclear industry should proactively seek to diversify its workforce and increase opportunities to advance women into senior and public facing roles.
- 4.6) The UK and Canada should seek closer integration of their separate non-proliferation efforts, for example by working collaboratively and with other nations to address verification challenges related to the Fissile Material Cut-off Treaty.

5. CLIMATE CHANGE AND PUBLIC ACCEPTANCE

In Canada and the UK, climate change has reset the nuclear agenda. Spurred by the global imperative to reach net zero carbon emissions, a new conversation about nuclear energy is well underway among policymakers and stakeholders. Whether or not the conversation can gain traction with the broader public depends on the narrative that proponents of the sector can offer.

For at least the past two decades, the central debate around energy and climate change has typically been cast as a choice between fossil fuels and renewables. Nuclear energy has been conspicuous in its absence from the discussion. When it does appear, its mention is often accompanied by the suggestion that it is too costly, too slow and possibly too burdened by past controversies to play much of a role in the future energy mix. And while research suggests there is a credible path for nuclear energy alongside renewables, this idea has yet to be communicated effectively outside the sector.

Historically, the nuclear industry has not helped its own case in this regard. Colloquium participants noted that, in the nuclear industry, the role of managing public relations and communications has too frequently been relegated to technical personnel while the strategically important task of building brand equity has been chronically under-resourced or overlooked altogether. Surveys reveal that many people do not know much about the industry and what information they do have was not acquired recently. Not surprisingly, the industry's public image has been dominated by media coverage of major failures, most recently the Fukushima disaster of 2011. Such coverage is often lacking in context and reinforces a perception that nuclear energy poses a constant threat to public health and the environment. Outreach campaigns designed to assuage public concerns may have served rather to stoke them. In both Canada and the UK, some people have formed a negative attitude toward the industry, although polling in the UK suggests the nuclear industry may have overestimated these concerns. In Canada, opinion polls offer a mixed picture which includes ongoing concern over safety, cost and the risk of environmental contamination. However, a 2019 survey by the Canadian Nuclear Association indicated that a large majority of Canadians are open or supportive of small modular reactors.

What is missing in this depiction is an approach that centres on the social value of the nuclear proposition. The question proponents face is how best to position nuclear energy as part of a future that communities wish to create for themselves. Experiences in the UK suggests that by prioritizing a sustained and thoughtful public dialogue with an emphasis on social license, the industry can create a more receptive environment for nuclear development. This remains to be tested in Canada with respect to new build, though the Nuclear Water Management Organization offers a useful model for productive public engagement. The challenge for both countries is to replicate local successes at a national scale.

A development that has big implications for the nuclear sector is the growing trend in corporate boardrooms to ensure that business practices align with environmental, social and governance goals. Climate change and sustainability feature prominently in this shift, to the point where decarbonizing is becoming a basic condition for doing business in both the public and private sectors. International trade agreements appear to be moving in a similar direction. This creates a path for programmes and investments aimed at revitalizing and advancing nuclear energy as part of an effort to meet national and international climate goals.

Yet it is equally possible to see how such a trajectory can be diverted by political realities. The view that nuclear energy is essential for meeting climate targets, though widespread in the industry, is not yet mirrored in public opinion. This disparity could prove fatal to the prospects of a nuclear renaissance. For example, in Canada the current political dynamic creates an incentive for opposition parties seeking to leverage the “environmental vote” to criticize government support for nuclear initiatives while portraying those initiatives as incompatible with a green environmental policy. Doubts about SMRs could be turned into a wedge issue by labelling the technology as a false promise that does little to advance climate goals, or does so with unacceptable risk. In the UK, the political discussion has been aided by improving attitudes toward the industry from trade unions and some media.

By stressing the cost advantage of renewables, opponents could also raise questions about the allocation of public funds toward the further development of nuclear technologies and projects. For this reason, colloquium participants noted that the future prospects of the industry would be significantly boosted if the serial manufacture of SMRs serves to reduce the cost of electricity generation to a level comparable with renewables

If nuclear energy is to be considered on its merits, it will require a dialogue that is perceived as genuine, transparent, evidence-based and people-centred. In the past, a focus on dry factual information over more human aspects of communication has been detrimental to the nuclear cause and new approaches are needed. Participants agreed that the key to building public trust and political support is for the industry to offer a strong value proposition, with benefits for people, for the economy and for the global climate, while providing a cost competitive solution across a range of applications. The dialogue should be forthright on the subject of risk with context that includes the risk of failing to decarbonize. It should also be diverse and inclusive of all aspects of the sector, including nuclear regulators, civil society organizations and, where appropriate, Indigenous communities.

The picture that has yet to be fully developed in the public arena is the integrated case in which nuclear energy is harnessed in conjunction with renewables, both for base load in power generation and for new applications in cogeneration for hydrogen and synthetic fuels. The prospect of leveraging existing infrastructure, such as by converting coal plants into synthetic fuel plants has the further attraction of maintaining socioeconomic benefits without the environmental footprint that comes with scaling up renewable sources.

In a separate session, colloquium participants explored the role of the industry in supplying isotopes for medical treatment as an overlooked argument for continued development of nuclear technologies. However, this is complicated by various factors including details related to the business case for isotope production. Also, because of cost, isotope production has not figured into the push to develop SMRs. In general, colloquium participants agreed that medical isotopes should be part of a more coherent and informative public dialogue around the benefits of nuclear energy. In addition, there was agreement that the public also needs to be reassured about the safety and security of using radio-active materials in medical facilities. Constant vigilance is needed, for example, to avoid theft of such materials by terrorists for use in a “dirty bomb”. Hospitals and other facilities are a key part of the nuclear community’s critical infrastructure.

Finally, one question repeatedly preoccupied participants during the two days of discussion: Who leads the nuclear agenda? Should it be the industry itself? Power utilities? Public servants? Academics? Is the leadership that is needed derived from a bottom-up model in which support for nuclear energy emerges from a public demand for a solution to climate change or from a top-down model featuring one or more vocal champions? If those champions are political leaders, there is the question of how to shape public opinion on a subject that is frequently emotionally driven and where too strong a positive expression could be perceived as biased advocacy.

It may be that the answer lies with improving public energy literacy as a first step toward a more substantive discussion on the nuclear agenda. Ultimately, what is needed is a strategy for moving the discussion from the domain of public opinion to public judgement based on evidence. If this can be achieved, then elected officials will be empowered to make sound decisions in the public interest.

RECOMMENDATIONS:

5.1) Stakeholders should organize a multi-party working group to identify solutions and strategies for more effective public communication with the mandate to develop recommendations for all key enablers. The goal should not be an industry-led marketing campaign but a sustained effort to improve the quality of the information landscape.

5.2) Stakeholders should seek to raise the profile of nuclear technologies within the context of a national energy portfolio aimed at decarbonization. This could include greater presence at conferences and events that focus on sustainability as well as increased interaction with environmental NGOs and other activities that reinforce the role of nuclear in climate change mitigation.

5.3) The community outreach that has marked the ongoing process of identifying a site for long term storage of nuclear waste in Canada merits a case study that could lead to developing best practices for communication across the nuclear sector.

5.4) Further efforts are required, in both the UK and Canada, to convey the community benefits and the socio-economic opportunity offered by nuclear power (including SMR and decommissioning projects) to stimulate regional economic growth through their impact for example on the supply chain, local R&D and academia.

5.5) Stakeholders should pursue nuclear cooperation as an element of ongoing Canada-UK bilateral trade negotiations.



2020 Canada-United Kingdom Colloquium

The Nuclear Agenda: Challenges & Opportunities

Presiding Chair: [Dr David Cameron](#), Chair, Advisory Council, Nuclear Waste Management Organization
Official Rapporteur: [Ivan Semeniuk](#), Science Reporter, *The Globe and Mail*

Programme for Saturday, Nov 21, 2020 <Day 1>

Welcome Remarks (8:00- 8:15 EST / 13:00 - 13:15 GMT)

- Dr Mel Cappe, Canada-UK Colloquium Co-Chair
- Anthony Cary CMG, Canada-UK Colloquium Co-Chair
- H.E. Susan le Jeune d'Allegre CMG (British High Commissioner to Canada)
- H.E. Janice Charette (Canadian High Commissioner to the United Kingdom)

Session 1: Briefing on the Nuclear Energy Industry (8:15-9:15 EST/ 13:15-14:15 GMT)

Panel featuring:

- Diane Cameron, Director, Nuclear Energy Division, Natural Resources Canada
- John Gorman, President & CEO, Canadian Nuclear Association
- Dr Tim Stone CBE, Chair, Nuclear Industry Association
- Duncan Hawthorne, CEO, Horizon Nuclear Power
- James Scongack, Executive-Vice President, Corporate Affairs & Operational Services, BP
- Chris Bowbrick, Deputy Director for Nuclear Generation Policy, Department for Business, Energy and Industrial Strategy

>> Canadian and British updates on the current state of the nuclear energy industry, providing a comprehensive overview of political, regulatory, economic and technological developments

Session 2: The Economics of Nuclear Power: Political, Regulatory, Technological and Financial Constraints & Benefits (9:15-10:15 EST/14:15-15:15 GMT)

Panel featuring:

- Milt Caplan, President, MZConsulting Inc.
- Dr John Barrett, President, Portolan Global Inc.
- Darryl Murphy, Head of infrastructure, Aviva Investors
- Fiona Reilly, MD, FiRe Energy Ltd; former Chair, SMR Expert Finance Group

>> Canadian and British plans for nuclear power as a component in their energy mix, given the need for reliable base-load supply, carbon reduction targets and current limitations of battery storage.

>> Financing & regulatory challenges, including prospects for public-private partnerships and the UK experience with the Regulated Asset Base (RAB) financing model & Opportunities for 'passporting' between UK and Canadian regulators.



Health Break (15 minutes)

Session 3: Small Modular Reactors (SMRs) and other Advanced Reactor Technologies: Opportunities, Challenges and Prospects for partnerships & collaborations (10:30 - 12:00 EST/ 15:30-17:00 GMT)

Panel featuring:

- **Shawn Tupper, Associate Deputy Minister, Natural Resources Canada**
- **Brett Plummer, Vice President Nuclear and Chief Nuclear Officer, NB Power**
- **Robin Manley, VP New Nuclear Development, Ontario Power Generation**
- **Dr Kirk D. Atkinson, Director, Centre for Small Modular Reactors**
- **Rich Deakin, Director, Low Cost Nuclear Challenge, UKRI InnovateUK**
- **Dr Dame Sue Ion DBE, Hon President, UK National Skills Academy for Nuclear**

Comments by:

- **Alan Woods, Director, SMR Strategy/Business Development, Rolls-Royce**
- **Simon Newton, Corporate Development Director, Moltex**

>> SMRs represent considerable opportunities to capture environmental, economic, and geopolitical benefits; comparison of Canadian and British experiences and plans for Small Modular Reactors, as well as cooperation on innovative technologies.

>> Discussions on public-private partnerships for the way ahead & Inter-provincial collaboration

Keynote Addresses by ADM Shawn Tupper, Natural Resources Canada &

Nadhim Zahawi MP, Minister of UK Department for Business, Energy and Industrial Strategy,

(12:00 -12:30 EST/ 17:00-17:30 GMT)



Programme for Sunday, Nov 22, 2020 <Day 2>

Session 4: Nuclear Energy & Climate Change: Opportunities for shaping public opinion & fostering international cooperation? (8:00–9:00 EST/ 13:00–14:00 GMT)

Panel featuring:

- **The Hon. Jean Charest, Partner, McCarthy Tétrault LLP & Former Premier of Quebec**
- **Dr Tom Axworthy, Secretary-General, InterAction Council**
- **Kirsty Gogan, Managing Partner, Lucid Catalyst**
- **Malcolm Grimston, Centre for Energy Policy and Technology, Imperial College**
- **Ivan Baldwin, Chair, Britain's Energy Coast Business Cluster (BECBC)**

>> Can nuclear power help to address the climate emergency? Will emerging nuclear technologies help in the transition to a low-carbon economy?

>> Nuclear energy as a contributor to green technologies such as hydrogen production and desalination

>> 2016 Paris Agreement - energy planning & analysis and success stories

>> Managing public confidence & galvanizing civil society actors

>> International cooperation, i.e. at ITER, and prospects for harnessing nuclear fusion.

Break-out Group Discussions (9:00–10:00 EST/14:00–15:00 GMT)

[BoG #1] Perceptions & public opinion on nuclear energy

UK Co-Chair : Chris Anastasi, Energy consultant and author

Canada Co-Chair: Greg Lyle, Innovative Research Group

Rapporteur: Rob Ward – Chair, NI Young Generation Network

Political and public attitudes to current and planned nuclear components in overall electricity generation in Canada and the UK. How best to pursue the public debate and to consult on future plans? Whose responsibility is it to lead?

[BoG#2] Can Artificial Intelligence technology improve nuclear safety?

UK Co-Chair : Julianne Antrobus, Partner and Global Head of Nuclear, PA Consulting

Canada Co-Chair: Dr Mark Daymond, Professor, Queen's University

Rapporteur: Dr Jennifer Orange, Principal, Jennifer Orange Dispute Resolution

The role of technology in improving safety, and its likely impact on public attitudes. Part of the problem or part of the solution? Discussions on digital design and "digital twinning". How can technological advancements and automation be used to harness the full potential of the nuclear industry?



[BoG#3] Nuclear Energy & Health -- Risks and Opportunities

UK Co-Chair : Professor Eric Aboagye, Dept of Surgery & Cancer, Imperial College London

Canada Co-Chair: Dr Julie Leblanc, Canadian Nuclear Safety Commission

Rapporteur: Camilo Galindo, Junior Fellow, Massey College

Current and future medical applications of nuclear and availability of isotopes & prospects for new treatments, as well as safety considerations related to nuclear energy and radiation

[BoG#4] Nuclear non-proliferation & International Security Regime

UK Co-Chair: Tom Plant, Director of Nuclear, Royal United Services Institute

Canada Co-Chair: Gen. Tom Lawson, former Chief of Defense Staff, Canada

Rapporteur: Isaac Gazendam, Junior Fellow, Massey College

How can the international community better monitor the activities of violators of the nuclear non-proliferation treaty (NPT) such as North Korea and preserve the relevance and strength of the international legal regime concerning nuclear weapons?

- *Health Break (15 minutes)* -

Session 5: The long-term implications of nuclear energy and new build: operational safety, decommissioning, and waste management (10:15-11:15 EST/ 15:15 - 16:15 GMT)

Panel featuring:

- Laurie Swami, President & CEO, Nuclear Waste Management Organization
- Rumina Velshi, President & CEO, Canadian Nuclear Safety Commission
- Julia Pyke, Director of Financing and Economic Regulation, Sizewell C (EDF)

Comments by

- Dan Mathers, Nuclear Innovation and Research Office (NIRO)
- David Peattie, CEO, Nuclear Decommissioning Authority (NDA)
- Dr Paul Howarth, Managing Director, National Nuclear Laboratory (NNL)

>> Waste management, storage, disposal, deep geological repositories, decommissioning, spent fuel management such as waste recycling, reprocessing, minimization, and the liability regime.

>> Regulatory effectiveness in nuclear, radiation, transport and waste safety, and in emergency preparedness and response

>> International standards, monitoring mechanisms and the role and effectiveness of the IAEA, including budget and staffing considerations

>> Radiation protection of the environment and remediation

>> Strengthening civil liability for nuclear damage



Session 6: Reports from Break out Sessions (11:15-12:00 EST/ 16:15 - 17:00 GMT)

- BoG 1 - Perceptions & Public Opinion on Nuclear Energy
- BoG 2- Artificial Intelligence & Nuclear Power
- BoG 3- Nuclear Energy & Health
- BoG 4- Nuclear Non-Proliferation & International Security

A Brief Summary by the Official Rapporteur (12:00-12:15 EST/17:00-17:15 GMT)

Final Remarks by the Presiding Chair, Dr David Cameron

Concluding Remarks by Co-chairs & Acknowledgement of Co-Sponsors

- Anthony Cary CMG, Canada-UK Colloquium Co-Chair
- Professor Peter Loewen, Canada-UK Colloquium Co-Chair

- *Adjournment* -

**** Please check out the CUKC2020 channel on Youtube for the launch of our report on Feb 18th ****



The 2020 Canada-United Kingdom Colloquium

List of Canadian Participants

- **Prof. Kirk Atkinson**, Director of the Centre for Small Modular Reactors, Associate Professor and NSERC/UNENE Industrial Research Chair, Ontario Tech University
- **Dr. Tom Axworthy** OC, Secretary-General, InterAction Council
- **Dr. John Barrett**, President, Portolan Global Inc.
- **The Hon. Carolyn Bennett**, MP for St.Paul's & Minister of Crown-Indigeneous Relations
- **Dr. Dana Brown**, Dean, Sprott School of Business, Carleton University
- **Dr. David Cameron** CM,FRSC, Nuclear Waste Management Organization & Professor of Political Science, University of Toronto (Presiding Chair for the 2020 CUKC)
- **Diane Cameron**, Director, Nuclear Energy, Natural Resources Canada
- **Milt Caplan**, President, MZConsulting Inc.
- **Dr. Mel Cappe** OC, former Clerk of the Privy Council & CUKC Co-Chair
- **The Hon. Jean Charest** PC, Partner, McCarthy Tétrault & Former Premier of Quebec
- **H.E. Janice Charette**, Canadian High Commissioner in London, UK.
- **The Hon. David Collenette** PC, LLD., Chair, NATO Association of Canada
- **Dr. Mark Daymond**, Professor, Engineering & Applied Physics, Queen's University
- **John Gorman**, President & CEO, Canadian Nuclear Association
- **Justin Hannah**, Business Development Director, Cavendish Nuclear Canada
- **Claire Harris**, Senior Advisor Advanced Nuclear Program, New Brunswick (NB) Power
- **General Tom Lawson** CMM, CD, Former Chief of the Defence Staff, Canadian Armed Forces
- **Dr. Julie Leblanc**, Radiation & Health Sciences Officer, Canadian Nuclear Safety Commission
- **Dr. Peter Loewen**, Professor in the Department of Political Science and the Munk School of Global Affairs and Public Policy & CUKC Co-Chair
- **Greg Lyle**, President, Innovative Research Group Inc.
- **Robin Manley**, VP New Nuclear Development, Ontario Power Generation
- **Dr. Ron Oberth**, President, Organization of Canadian Nuclear Industries
- **Dr. Jennifer Orange**, Principal, Jennifer Orange Dispute Resolution
- **Dr. Tina J. Park**, CUKC Project Manager & C.E.O., The Park Group Inc.
- **Brett Plummer**, Vice President Nuclear and Chief Nuclear Officer, NB Power
- **Dr. John Polanyi** PC, CC, FRSC, OOnt, FRS, Professor of Chemistry (1986 Nobel), Univ. of Toronto
- **Nathalie Des Rosiers** CM, FRSC, OOnt, Principal, Massey College
- **The Hon. Hugh D Segal** OC,OOnt,CD, Matthews Fellow in Global Public Policy, Queen's University
- **Laurie Swami**, President & C.E.O., Nuclear Waste Management Organization
- **Ivan Semeniuk**, Science Reporter, *Globe & Mail* (Official Rapporteur for the 2020 CUKC)
- **James Scongack**, Executive Vice President, Corporate Affairs & Operational Services, BP
- **Shawn Tupper**, Associate Deputy Minister, Natural Resources Canada
- **Rumina Velshi**, President & C.E.O., Canadian Nuclear Safety Commission



Observers

- Amine Belhacel, Office of the Hon. Jean Charest
- Jason Cameron, Canadian Nuclear Safety Commission
- Véronique Dault, Nuclear Waste Management Organization
- Zainab Feroz, Natural Resources Canada
- Lisa Frizzell, Nuclear Waste Management Organization
- Camilo Galindo, Junior Fellow, Massey College
- Isaac Gazendam, Junior Fellow, Massey College
- Ramzi Jammal MBA, Canadian Nuclear Safety Commission
- Anita Kuipers, Natural Resources Canada
- Rory O'Sullivan, Moltex Energy
- Paul Thompson, NB Power
- Caitlin Vito, High Commission of Canada in London, UK.
- Janice Vogtle, High Commission of Canada in London, UK.
- Fawn Zeuchner, ARC Nuclear
- Marcin Zydowicz, High Commission of Canada in London, UK.



The 2020 Canada-United Kingdom Colloquium List of UK Participants

- **Professor Eric Aboagye**, Professor of Cancer Pharmacology & Molecular Imaging at Imperial College London
- **Chris Anastasi**, Author and consultant on energy and climate change
- **Julianne Antrobus**, Partner and Global Head of Nuclear at PA Consulting
- **Ivan Baldwin**, Bechtel lead for Nuclear in the UK & Nuclear Industry Council
- **Simon Barber**, UK Managing Director, Assystem
- **Chris Bowbrick**, Deputy Director, Dept for Business, Energy & Industrial Strategy (BEIS)
- **Rt Hon Alistair Burt**, Pro-Chancellor, Lancaster University
- **Anthony Cary** CMG, former High Commissioner to Canada & CUKC co-Chair
- **Dr David Chambers**, Senior Principal Research analyst on nuclear matters at the Foreign, Commonwealth & Development Office (FCDO)
- **Rich Deakin**, Challenge Director for Low-Cost Nuclear at UKRI Industrial Strategy Challenge Fund
- **Jonathan Ford**, City editor, *Financial Times*
- **Professor Antony Gee**, Professor of PET & Radiochemistry at King's College London
- **Kirsty Gogan**, Managing partner, LucidCatalyst
- **Professor Robin Grimes**, Professor of Materials Physics at Imperial & Chief Scientific Adviser on nuclear science and technology at the Ministry of Defence.
- **Malcolm Grimston**, Author and Visiting Senior Research Fellow at Imperial College
- **Peter Haslam**, former Head of Policy at the Nuclear Industry Association (NIA) & Adviser on Nuclear to CUKC
- **Duncan Hawthorne**, CEO, Horizon Nuclear and former CEO of Bruce Power
- **Dr Paul Howarth**, CEO, UK National Nuclear Laboratory (NNL)
- **Dr Dame Sue Ion** DBE, Hon President of the National Skills Academy for Nuclear
- **Sam Jeremy**, Science and Innovation Team, British High Commission, Ottawa
- **H.E. Susan le Jeune d'Allegeershecque** CMG, British High Commissioner to Canada
- **Nicolas Maclean** CMG, Nuclear consultant and CUKC Council
- **Dan Mathers**, Executive Director, Nuclear Innovation and Research Office (NIRO),
- **Dr Darryl Murphy**, Head of Infrastructure, Real Assets at Aviva Investors
- **Simon Newton**, Corporate Development Director, Moltex.
- **David Peattie**, CEO, Nuclear Decommissioning Authority (NDA)
- **Dr Gareth Peel**, Strategy Director, Advanced Nuclear Technology, Cavendish Nuclear UK
- **Tom Plant**, Nuclear programme director, Royal United Services Institute (RUSI).
- **Julia Pyke**, Director of Financing and Economic Regulation, Sizewell C nuclear power station.
- **Fiona Reilly**, MD, FiRe Energy & a non-exec Director, Nuclear Industry Association
- **Dr Tim Stone** CBE, Chairman, Nuclear Industry Assoc. & Chairman, Nuclear Risk Insurers.
- **Derreck Van Gelderen**, Consultant in advanced analytics at PA Consulting.
- **Martin Vander Weyer**, Business editor, *The Spectator*.
- **Rob Ward**, Nuclear lead, Copeland, Cumbria & Chair of NI Young Generation Network.
- **Alan Woods**, Director of SMR Strategy and Business Development, Rolls-Royce.
- **Jennifer Young**, British Consul General in Toronto.
- **Nadhim Zahawi** MP, Minister for Business and Industry at the Department for Business, Energy and Industrial Strategy (BEIS)



The 2020 Canada-UK Colloquium

Biographies of the Canadian Participants

Dr. Kirk Atkinson

Dr. Kirk Atkinson is [Director of the Centre for Small Modular Reactors, Associate Professor and NSERC/UNENE Industrial Research Chair](#) at Ontario Tech University. Dr. Atkinson graduated from the University of London with a BSc in Theoretical Physics in 1999, an MSc in Astrophysics in 2001, and an MRes in Image and X-ray Physics in 2002. He joined the Gray Laboratory in 2002 as a Research Associate and PhD student on a US DOE-funded project on low-dose radiation. After postdoctoral work at the Diamond Light Source, in 2008 he joined the Ministry of Defence as Senior Lecturer in Nuclear Science in the Nuclear Department, the UK's only dedicated Nuclear Engineering School. He became Technical Lead for Reactor Physics and High Performance Computing in 2012, and for Radiation Physics and Criticality in 2018. Since 2014, in collaboration with Rolls-Royce, he led a multi-million dollar technical effort to develop a high-throughput Gamma Emission Tomography system (EGRET) for imaging and characterisation of spent nuclear fuel. Since 2016 he has been collaborating with Idaho National Laboratory on modelling and simulation of reactors using the MOOSE framework. An expert on Small Modular Reactors in the marine context, he served on the Physics Working Group and Science Support Network for the UK Naval Nuclear Propulsion Program (NNPP), was part of the team assessing nuclear power options for future Royal Navy submarines, and co-authored a report on marine power options for the UK's chief scientific advisor. A visiting lecturer at the University of Manchester, where he taught on the UK's NTEC MSc Program, he joined the Faculty of Energy Systems and Nuclear Science at Ontario Tech University as an Associate Professor in January 2019.

Dr. Tom Axworthy, oc.

Dr. Thomas S. Axworthy serves as the Secretary-General of the [InterAction Council](#) and as the Public Policy Chair at Massey College. He is a distinguished senior fellow at the Munk School of Global Affairs and Public Policy, University of Toronto. Previously, he served as Senior Policy Advisor and Principal Secretary to Prime Minister Pierre Trudeau. Dr. Axworthy was invested as an Officer of the Order of Canada (2002). In 2003, he became Chair of the Centre for the Study of Democracy, School of Policy Studies, Queen's University, pursuing the themes of expanded human rights and responsibilities, democratic reform, Canadian-American relations, and modern liberalism that characterized his research, teaching and advocacy career. In 2009, he became President and CEO of the Walter & Duncan Gordon Foundation. Dr. Axworthy has edited several publications, including *Towards a Just Society: The Trudeau Years*, with the most recent being *Bridging the Divide – papers for the Interaction Council*, (June 2008). He was awarded an honorary LLD from Wilfrid Laurier University (2003) and the Public Affairs Association Award of Distinction in 2008. His most recent co-edited volume is called [Lessons from the Arctic: The Role of Regional Government in International Affairs](#), a collection of articles written by twenty-six leading and emerging scholars from across the circumpolar region.



Dr. John Barrett, ICD.D., Ambassador (ret.)

Dr. John Barrett’s professional career spans the federal public service, international organizations, policy think-tanks and universities, the nuclear industry – with a focus on international security and the peaceful uses of nuclear technology. He is the President of [Portolan Global Inc.](#), an Ottawa-based consulting firm offering navigational advice and expertise in the nuclear and clean energy sector. Portolan Global specializes in government & stakeholder relations; international governance and geopolitical risk; and policy advice that integrates climate change, national security, non-proliferation, and advanced small reactors (SMRs). Among his major clients is Westinghouse Electric Canada. Between 2013–2019 Dr. Barrett was President & CEO of the Canadian Nuclear Association, where he revitalized Canada’s nuclear industry as “New Nuclear”, a source of clean energy solutions to climate change and energy security. From 2009–2013, he served as Canada’s Ambassador to the International Organizations in Vienna (United Nations, International Atomic Energy Agency, Comprehensive Nuclear Test Ban Treaty Organization). He chaired the IAEA Board of Governors (2012–2013) and the UN Commission on Crime Prevention and Criminal Justice (2011) and had the honour of being appointed Canada’s Ambassador to Austria and Slovakia. Dr. Barrett is a Director of the World Institute for Nuclear Security (WINS) in Vienna and a Fellow of the Canadian Global Affairs Institute (Ottawa). He holds the ICD.D certification of the Canada-based Institute of Corporate Directors (Toronto).

The Hon. Carolyn Bennett, MD.

The Honourable Carolyn Bennett was first elected to the House of Commons in 1997 and currently serves as a Member of Parliament for Toronto–St. Paul’s and as the [Minister of Crown-Indigenous Relations](#). She has served in the past as the Minister of State for Public Health. She has also served as the critic for Public Health, Seniors, Persons with Disabilities, the Social Economy, and Aboriginal Affairs. Prior to entering politics, Minister Bennett was a family physician and a founding partner of Bedford Medical Associates in downtown Toronto. She also served as an Assistant Professor in the Department of Family and Community Medicine at the University of Toronto. In 1986, she received the Royal Life Saving Society’s Service Cross – a Commonwealth Honour Award recognizing her more than 20 years of distinguished service. In 2002, she was the recipient of the coveted EVE Award for contributing to the advancement of women in politics, and in 2003, she received the first-ever Champion of Mental Health Award from the Canadian Alliance on Mental Illness and Mental Health. She was also the first recipient of the National Award of Excellence for Outstanding Leadership and Dedication to Injury Prevention and Safety Promotion in Canada, and was the co-author of *Kill or Cure? How Canadians Can Remake Their Health Care System*.



Dr. Dana Brown

Dr. Dana Brown serves as the [Dean of the Sprott School of Business at Carleton University](#). Dana holds a BA in Political Science from Rutgers University, an M.Phil. in Russian and East European Studies from Oxford University, and a PhD in Political Science from Massachusetts Institute of Technology (MIT). She won a Rhodes Scholarship to attend Oxford in 1994. Dana has trained as an Executive Coach with Meyler Campbell in London and has incorporated coaching into her role as a manager and into MBA and executive education curricula.

Dr. David Cameron, CM,FRSC.

Dr. Cameron is a Professor of Political Science at the University of Toronto and serves as the Chair of the [Advisory Council of the Nuclear Waste Management Organization](#). A long-time student of Canadian federalism, Quebec nationalism and constitutional reform, in recent decades he has turned his attention to political change and constitution-making in conflict and post-conflict situations in Sri Lanka, Iraq, Somalia, the Western Sahara, and Jerusalem. From 2013-19 he served as Dean of the Faculty of Arts and Science at the University of Toronto. He has served in many other roles at the University of Toronto, including: Vice-President, Institutional Relations and Chair of the Department of Political Science. In addition to extensive advisory and administrative work for the Government of Canada, Professor Cameron has served in a series of senior positions for the Government of Ontario, including: Deputy Minister, Intergovernmental Affairs; Deputy Minister and Special Advisor to the Premier on Constitutional Reform; and Special Constitutional Advisor to the Premier of Ontario. He is a member of the Order of Canada, a Fellow of the Royal Society of Canada, and a recipient of the Governor General's International Award for Canadian Studies, the University of Toronto's Ludwik and Estelle Jus Human Rights Prize, the Carolyn Tuohy Impact on Public Policy Award, and the Adrienne Clarkson Public Service Laureateship.

Diane Cameron

Diane Cameron is the Director of [Nuclear Energy at Natural Resources Canada](#) (NRCan). She specializes in many areas including energy policy, environmental standards and negotiations. As the Director of Nuclear Energy, Diane is fully committed to the Clean Energy mandate at NRCan. Prior to her current role at NRCan, Diane held the Deputy Director position for several divisions at Foreign Affairs and International Trade Canada. She was the Deputy Director of the Trade Controls Policy Division, Strategic Policy Section and the Trade and Environment Section. She also held a Senior Consultant position at Princeton Consultants where she specialized in transportation and logistics practice. Diane completed her Systems Design Engineering degree at the University of Waterloo, before obtaining her Master's of Technology and Policy Program at the Massachusetts Institute of Technology.



Milt Caplan

Milt Caplan is the President of [MZConsulting Inc.](#), which specializes in advising governments and utilities on how to increase confidence and reduce risk for large energy projects with a focus on managing projects for success. He is currently providing independent oversight of the Darlington Refurbishment Program for the Ontario government, serves as the chair of the World Nuclear Association Economics Working Group and teaches nuclear economics and nuclear plant structuring and financing for the World Nuclear University.

Dr. Mel Cappe, oc.

Mel Cappe is a Professor at the [Munk School of Global Affairs and Public Policy](#). From 2006–2011, he was President of the Institute for Research on Public Policy. Prior to that, he served four years as the High Commissioner for Canada to the United Kingdom, and worked as the Clerk of the Privy Council, Secretary to the Cabinet and Head of the Public Service in Ottawa. Earlier in his career, he held senior economic and policy positions in the Departments of Finance and Industry. He was Deputy Secretary to the Treasury Board, Deputy Minister of the Environment, Deputy Minister of Human Resources Development, Deputy Minister of Labour and Chairman of the Employment Insurance Commission. He did graduate studies in Economics at the Universities of Western Ontario and Toronto and has honorary doctorates from both. He is an Officer of the Order of Canada.

The Hon. Jean Charest, pc.

As Deputy Prime Minister of Canada and Premier of Québec, Jean Charest is one of Canada's best known political figures. His government initiated an unprecedented labour mobility agreement between France and Québec and was best known for a major initiative for the sustainable development of Northern Québec called "Plan Nord". He is notably the initiator of the negotiation for the Canada-European Union Comprehensive Economic Trade Agreement (CETA). Today, he is a [Partner at Canadian law firm McCarthy Tétrault](#).

H.E. Mrs. Janice Charette

Janice Charette has served as the [High Commissioner of Canada to the UK](#) since September 2016. She also served as the Clerk of the Privy Council and Secretary to the Cabinet from October 2014 to January 2016. Previously, she was the Deputy Clerk of the Privy Council and Associate Secretary to the Cabinet as well as Deputy Minister of Intergovernmental Affairs. Held leadership positions in eight ministries, that covered issues including skills development, labour markets, immigration, citizenship, social security programs, health and justice.



The Hon. David Collenette, PC, LL.D.

The Hon. David Collenette represented a Toronto constituency for 21 years and served in the cabinets of three prime Ministers, Pierre Trudeau, John Turner and Jean Chretien. He served as Minister of Defence during the Canadian deployment to Croatia and Bosnia and as Minister of Transport on 9/11, 2001. Mr. Collenette has recently been elected as the [Chair of the NATO Association of Canada](#).

Dr. Mark Daymond

Dr. Mark Daymond is a [Professor in the Departments of Mechanical and Materials Engineering, and Physics](#) at Queen's University. He holds an NSERC/UNENE Industrial Research Chair in Nuclear Materials, and a Tier 1 Canada Research Chair. He is the Director of the Reactor Materials Testing Laboratory (www.rmtl.ca) an accelerator facility focused on irradiation and characterization of materials for nuclear power applications.

John Gorman

John Gorman is President & CEO of the [Canadian Nuclear Association \(CNA\)](#). Prior to joining the CNA, John served as President & CEO of the Canadian Solar Industries Association (CanSIA), the national trade association for Canada's solar energy industries. He oversaw all of CanSIA's activities including government affairs, research, communications and industry leadership. Before joining CanSIA, he served as the Senior Vice President at Empower Energies, an innovative, global integrator of energy systems. John serves as Canada's Designate to the International Energy Agency (Executive Committee – PVPS) and sits on the Executive Council of the Canadian Council on Renewable Energy. John has been recognized as one of Canada's CLEAN50 and is the recipient of the "40 Under 40" business award for excellence in business practices. He was awarded the designation of Climate Project Ambassador by Nobel Laureate Al Gore in 2008.

Justin Hannah

Justin Hannah is the Business Development Director for [Cavendish Nuclear Canada](#). He has over 15 years of nuclear industry experience leading dynamic teams and programs focused on strategy, business development and engagement with clients' governments/departments on a wide range of issues. His areas of expertise include government policy, business development, international affairs.

Claire Harris

Claire Harris is a Senior Advisor for the Advanced Modular Reactor Team at the [Point Lepreau Generating Station, NB Power](#). She is currently supporting the advancement of Small Modular Reactors in New Brunswick.



General Thomas James Lawson, CMM, CD.

[General Tom Lawson](#) is a retired Royal Canadian Air Force general. He has Bachelor and Master's degrees in Electrical Engineering from the Royal Military College of Canada. He previously served as Deputy Commander of the North American Aerospace Defence Command. He commanded Canada's largest base, 8 Wing Trenton, and was Commandant of the Royal Military College before serving as Canada's Chief of the Defence Staff 2012-2015. Gen.(Ret'd) Lawson now provides strategic advice to companies including Air Canada, Lockheed-Martin and CAE, and enjoys speaking engagements and symposia that leverage his experiences in the Canadian Armed Forces command positions.

Dr. Julie Leblanc

Dr. Leblanc is a [Radiation and Health Sciences Officer, Canadian Nuclear Safety Commission](#). She provides technical support to the Commission on matters relating to the health of members of the public and workers and more broadly on radiobiology. She also conducts outreach, research and leads the coordination of the Canadian Organization on Health Effects from Radiation Exposure (COHERE).

Dr. Peter Loewen

Peter Loewen is a [Professor in the Department of Political Science and the Munk School of Global Affairs & Public Policy](#). He is also the Associate Director, Global Engagement at the Munk School, Director of PEARL, a Research Lead at the Schwartz Reisman Institute, a Senior Fellow at [Massey College](#), and a Fellow with the [Public Policy Forum](#). For 2020-2021, he is serving as a Distinguished Visitor at the Institute for Advanced Study at Tel Aviv University. He received his BA from Mount Allison University (2002) and his PhD from l'Université de Montréal (2008). He held postdocs at the University of British Columbia and the University of California at San Diego. Since coming to Toronto in 2010, he has held visiting positions at the Melbourne School of Government at the University of Melbourne, the Center for the Study of Democratic Politics at Princeton University, and the Center for Advanced Study in the Behavioral Sciences at Stanford University. From 2016 to 2018, he was the Director of the School of Public Policy & Governance, which he led into a merger with the Munk School of Global Affairs to create the Munk School of Global Affairs & Public Policy.

Greg Lyle

Greg Lyle is the [founder and President of Innovative Research Group Inc](#). As a former Principal Secretary, Greg has built a career at the intersection of public policy, communications and public opinion. With over 25 years of communications and opinion research experience, Greg uses a full range of research tools to provide strategic counsel to a variety of government and corporate clients across industries such as financial services, infrastructure development and the energy sector. Greg has worked extensively in Canada's energy sector over the past decade. He has provided strategic advice and research to some of the country's largest energy producers, transmission companies and distributors as well as associations, governments and various regulatory bodies.



Robin Manley

Robin Manley is the Vice-President of New Nuclear Development at [Ontario Power Generation](#) (OPG). OPG is the largest and most diverse nuclear operator in Canada, operating 10 CANDU nuclear reactors (as well as owning 8 additional reactors) along with a diverse fleet of hydro-electric and gas generation units. OPG is currently pursuing implementation of Small Modular Reactors at two scales: on-grid either a Gen 3+ or Gen 4 design, as well as a very small modular reactor of a high-temperature gas TRISO fuel design. Robin's education includes a B.Sc. (Hons) at Queen's in Physics and a Master's degree in Astrophysics. Robin started his career in nuclear in 1988 in England, working for a consulting engineering company involved in public Hearings on Hinkley Pt C and other nuclear facilities in the UK. He joined Ontario Power Generation in 1990 as a Health Physicist at Darlington. Robin has worked through progressively more senior roles including Senior Health Physicist, Radiation Protection Manager, and Director and then VP of Nuclear Licensing. Robin assumed the role of VP of New Nuclear Development April 1, 2019, becoming accountable for the implementation of Small Modular Reactors and the Darlington New Nuclear Project on April 1, 2019.

Dr. Ron Oberth

Dr. Ron Oberth is President and CEO of the [Organization of Canadian Nuclear Industries \(OCNI\)](#), an industry association that represents 240 private sector companies that supply equipment and services to Canadian and offshore nuclear power plants. Ron is a graduate of the University of Manitoba the Rotman School of Business, and received his PhD in aerospace propulsion from Princeton University.

Dr. Jennifer Orange

Dr. Jennifer Orange is a [lawyer, mediator, arbitrator and educator](#). Called to the Bar of Ontario in 2000, she is an expert in human rights, dispute resolution and international law. For the past 20 years, Jennifer has been a leader in non-profit organizations dedicated to mental health, patient advocacy and rare diseases.

Dr. Tina J. Park

Dr. Tina J. Park is the C.E.O. of [The Park Group](#), a boutique consulting agency based in Toronto. An award-winning scholar, she earned her Ph.D. at the University of Toronto specializing in Canadian-Korean relations. Dr. Park serves as the Vice-President of the NATO Association of Canada and recently returned from her fellowship at the NATO Defense College in Rome. She is also one of Canada's top experts on Asia, especially the DPRK's nuclear weapons programme, and comments frequently in the media. She is an alumna of Trinity College and Massey College.



Brett Plummer

Brett Plummer was appointed [Vice President Nuclear and Chief Nuclear Officer at NB Power](#)'s Point Lepreau Nuclear Generating Station (PLNGS) in November 2015. As a member of the Executive, he is accountable for leading the strategic direction of PLNGS, has taken the lead in pursuing Small Modular Reactors for New Brunswick and has played an active role in developing the SMR Roadmap for Canada. Brett has over 45 years experience in nuclear power Operations, Senior Leadership and Project Management roles. Brett holds a Bachelor of Science degree in Technical Business and an Associate Science degree in Nuclear Engineering Technology. While in the United States Navy, he attended the Naval Nuclear Power School and the Naval Electronics Technician School.

Dr. John Polanyi, PC, CC, FRSC, OOnt, FRS.

Dr. John Polanyi is [Professor of Chemistry at the University of Toronto](#). He received the Nobel Prize for Chemistry in 1986 for his contribution to the field of chemical-reaction dynamics. He is a founding member of both the Committee on Scholarly Freedom of the Royal Society and the Canadian Committee for Scientists and Scholars, a human rights organization of which he is President. Dr. Polanyi has been active for 40 years in International Pugwash, a global movement of scientists and others with a professional concern about the social impact of science and seeking ways to prevent its misuse. He helped to establish the Canadian Pugwash Group in 1960, serving as its first Chairman. Dr. Polanyi has written extensively on science policy, the control of armaments, and peacekeeping. He co-edited *The Dangers of Nuclear War*, and participated in the Canada 21 study of a 21st-century defence posture for Canada. His awards include the Royal Medal of the Royal Society of London and some 30 honorary degrees from six countries. Dr. Polanyi is a Fellow of the Royal Societies of Canada, London and Edinburgh, and of the American Academy of Arts and Sciences, the U.S. National Academy of Sciences, the Pontifical Academy of Rome and the Russian Academy of Sciences. Dr. Polanyi is also a member of the Queen's Privy Council for Canada, and a Companion of the Order of Canada.

Nathalie Des Rosiers, CM, OOnt, FRSC.

Nathalie currently serves as the Principal of [Massey College](#). She is also a Professor of Law, past General Counsel of the Canadian Civil Liberties Association, and past Dean of Law at University of Ottawa. She has received many honours, including the Order of Canada in 2013, the Order of Ontario in 2012, an Honorary Doctorate from the UCL (Université catholique de Louvain) in Belgium in 2012, an Honorary Doctorate from the Law Society of Upper Canada, the Medal from the Law Society of Upper Canada, the NUPGE Award, the APEX Partnership Award and was named one of Canada's 25 most influential lawyers in both 2011 and 2012. She holds a law degree from the Université de Montréal, a master's degree from Harvard Law School and she is a member of the Quebec and Upper Canada Bars. She is also a Fellow of the Royal Society of Canada.



The Hon. Hugh D. Segal, OC, O. Ont, CD.

The Hon. Hugh D. Segal currently serves as a Matthews Fellow in Global Public Policy. He is also a Senior Strategic Advisor at the [Aird & Berlis LLP law firm](#), and a Distinguished Fellow at both the Munk School of Global Affairs and Public Policy, and the School of Policy Studies at Queen's University. Dr. Segal has also served as Chief of Staff to Prime Minister Mulroney, Associate Cabinet Secretary for federal provincial relations in Ontario under Premier William Davis, President of the Institute for Research on Public Policy in Montreal, and Principal at Massey College. During his service at the Senate, he was the Chair of the Senate Foreign Affairs Committee, and the Special Senate Committee on anti-terrorism. His other notable foreign policy engagements include serving as the Chair of the NATO Association of Canada, and Co-Chair of the Democracy 10 International Strategy Forum, and as a member of the Eminent Persons Group dealing with human rights and rule of law in Commonwealth countries. Dr. Segal is globally recognized for his work on guaranteed annual basic income. He has written seven books on public policy, and holds honorary doctorates from the University of Ottawa and the Royal Military College. He is an Honorary Captain of the Royal Canadian Navy.

Laurie Swami

Laurie Swami is the President and CEO of the [Nuclear Waste Management Organization](#). She was appointed to the role in 2016 and is responsible for implementing Canada's plan for the long-term management of used nuclear fuel. Ms. Swami previously served as Senior Vice-President of Decommissioning and Nuclear Waste Management at Ontario Power Generation (OPG). Her responsibilities included overseeing operation of OPG's nuclear waste management facilities, as well as implementing OPG's low- and intermediate-level nuclear waste deep geologic repository. She began her career at OPG in 1986 and held various roles with increasing responsibility in the Nuclear Division. She holds a Bachelor of Science in Engineering Chemistry from Queen's University and a Master of Business Administration from the Schulich School of Business.

Ivan Semeniuk

Ivan Semeniuk covers [science for The Globe and Mail](#), a beat that ranges from the furthest reaches of the cosmos to the most pressing issues and discoveries related to the environment, technology and human health. A career science journalist, editor and broadcaster, he has previously worked for the journal Nature, New Scientist magazine and Discovery Channel. His work in various media has garnered several awards and nominations. Ivan is the official rapporteur of the 2020 CUKC.



James Scongack

James Scongack is the Executive-Vice President Corporate Affairs & Operational Services at [Bruce Power](#). He leads a team of approximately 900 talented individuals that provide operational services and support for both operations and construction activities of the Bruce Power Site. He also has responsibility for external relations, regulatory affairs and the company's medical Isotope business. James also serves as Chair of the Canadian Nuclear Isotope Council, an entity of over fifty respected organizations from across the Country that is committed to advancing Canada's leading role in the fight against cancer and disease domestically and internationally. In the Canadian energy sector, he serves as a Generator Representative and Vice Chair on the Independent Electricity System Operator Advisory Committee and is also a Member of the Advisory Board for the Ivey Energy Policy and Management Centre. James sits on the Board of the Brain Tumor Foundation of Canada and the Development Cabinet for the Pediatric Oncology Group of Ontario (POGO). He has been a long-time supporter of Easter Seals previously serving as a member of the Board and Chair of the Fundraising Committee and received a diamond award of distinction. James sits on the Board of Life Labs and serves as a Member of the Human Resources and Compensation Committee. He has an Executive MBA from London's Ivey Business School and a Chartered Director through the DeGroot Business School Directors College. James also holds a Master's Degree from the University of Guelph College of Management and Economics in Leadership and a BA (Hons) and has completed Master's-level Project Management certification through York University's Schulich Business School. He is also a graduate of the Bruce Power Nuclear Operations Executive Fundamentals Program.

Shawn Tupper

Shawn Tupper was appointed [Associate Deputy Minister of Natural Resources Canada](#) effective November 5, 2018. He was previously the Assistant Secretary to the Cabinet at the Privy Council Office, where he was responsible for Economic and Regional Development Policy. Prior to this position, Shawn was the Assistant Deputy Minister, Policy, at Transport Canada, where he was responsible for the breadth of policy development and advice regarding the Transportation System.

Rumina Velshi

Rumina Velshi was appointed [President and Chief Executive Officer of the Canadian Nuclear Safety Commission](#) in August 2018, and has extensive technical, regulatory and adjudication expertise in the energy industry. Key priorities for Ms. Velshi includes ensuring that the CNSC and other nuclear regulators are ready to respond to innovation and accelerating technological change, are collaborating with a view to eventually harmonize regulatory reviews, and are continuing to find ways to gain and enhance public trust. In February 2020, Ms. Velshi was appointed Chairperson of the Commission on Safety Standards (CSS), established by the International Atomic Energy Agency (IAEA), for a four-year term. Ms. Velshi very actively promotes careers in science, technology, engineering and mathematics (STEM), especially for young women. Ms. Velshi holds a Bachelor of Applied Science degree in civil engineering, a Master of Engineering degree in chemical Engineering and a Master of Business Administration, all from the University of Toronto.



OBSERVERS

Amine Belhacel is a student in the Master Program in International Law and Politics at the University of Sherbrooke. Amine holds a Bachelor degree in International Politics from UQAM. Amine is currently doing his internship at the Office of the Hon. Jean Charest.

Jason Cameron serves as the Vice-President and Chief Communications Officer, Canadian Nuclear Safety Commission (CNSC). Jason Cameron has dedicated the past two decades of his career to nuclear issues, regulatory policy and international relations. He joined the Atomic Energy Control Board of Canada (CNSC's predecessor) in 1998 as a Safeguards Officer. Over the next 15 years, he assumed progressively senior roles including Chief of Staff, Head of Evaluation, and Director General of Strategic Planning. Before joining the GoC, he was a Visiting Information Officer with the World Nuclear Association, based in London, England. There, he was responsible for analyzing the impact of strengthened import/export controls on the international nuclear industry. He completed his post-graduate Master's degree in international relations and his Bachelor's degree in political science at the University of Calgary.

Véronique Dault is a bilingual (English/French) government relations professional with over a decade of proven experience in policy development and government relations both as a public servant (MOHLTC) and as a senior political staffer to the Honourable Marie-France Lalonde. Currently she serves as the Director of Government and External Relations for the Nuclear Waste Management Organization.

Zainab Feroz is a Senior Policy Advisor with the Nuclear Energy Division at Natural Resources Canada. In this capacity, Zainab supports Canada's bilateral and multilateral nuclear energy cooperation. Prior to this, Zainab was a Policy Advisor at the Treasury Board of Canada Secretariat, where she delivered Canada's Open Government Partnership Global Summit in 2019. Zainab completed an Arts and Contemporary Studies degree at Ryerson University, before obtaining graduate degrees in Global Political Economy at the University of Sussex and in Public and International Affairs at the University of Ottawa.

Lisa Frizzell is the Vice-President of Stakeholder Relations at the NWMO. Ms. Frizzell holds a Bachelor of Public Relations from Mount Saint Vincent University and an Executive Master of Business Administration from the University of Calgary's Haskayne School of Business.

Cam Galindo is a first year Master of Public Policy student at the Munk School of Global Affairs and Public Policy and a Junior Fellow at Massey College. As an elected trustee on Hamilton-Wentworth District School Board (HWDSB), Cam represents wards 9 and 10, is the current Chair of Policy Committee and helps balance a \$726.7 million annual budget, while serving 49,748 students, and supporting 7,096 staff members.



Isaac Gazendam is a third-year law student at the University of Toronto and a Junior Fellow at Massey College, focussing on environmental and human rights law. He is passionate about climate change policy and creating socially, economically, and environmentally sustainable communities. Isaac's research interests include urban geography, behavioural and heterodox economics, and welfare state policies.

Ramzi Jammal MBA is the Executive Vice-President and Chief Regulatory Operations Officer, Canadian Nuclear Safety Commission (CNSC). Mr. Jammal has accumulated over 20 years of experience in the nuclear industry, combining management skills with scientific expertise, and representing the CNSC in various international activities. These include the development and establishment of the IAEA Code of Conduct for the Safety and Security of Radioactive Sources, and the international categorization of radioactive sources. Prior to joining the CNSC, Mr. Jammal was the Technical Manager of the Department of Radiological Sciences Nuclear Medicine Division at the Ottawa Hospital's Civic Campus. Under his leadership, the department became the first filmless nuclear medicine department in Canada.

Anita Kuipers is the Deputy Director of Strategic Partnerships and International Relations within the Nuclear Energy Division at Natural Resources Canada. She has worked in the field of international cooperation for the past fifteen years with a concentration in energy in the past four years. Anita has worked across several facets of engagement, through bilateral and multilateral fora, to establish Canada's first Track II Energy Dialogue and represent Canada at the G20 energy negotiations.

Rory O'Sullivan is the Chief Executive Officer, North America at Moltex. He joined the company as Chief Operating Officer in the UK, before moving to Canada to set up the North American business. Rory began his career as an award-winning project manager at the Bouygues group, running £50m+ projects. With a passion for delivering clean, low-cost energy to the world, he co-founded Energy Process Developments Ltd to pursue advanced nuclear and led a government-funded feasibility study on the development of a prototype molten salt reactor. Rory sat on the IAEA- MSR advisory committee and was a Forbes 30 Under 30 Standout. He obtained a 1st class honours in Mechanical and Manufacturing Engineering from Trinity College, Dublin and a degree in Mechanical Design Engineering from INSA Lyon in France.

Paul D. Thompson is a Senior Strategic Advisor at the Point Lepreau Generating Station on the Advanced Small Modular Reactor team at NB Power. He was a member of the Steering Committee that developed the Pan-Canadian SMR Roadmap and is a member of the Candu Owners Group (COG) CEO SMR Forum Working group and the COG SMR Technology forum.



Caitlin Vito is a Political Officer at the High Commission of Canada in London, UK.

Janice Vogtle has served as Investment Counsellor and Trade Commissioner at the High Commission of Canada in the United Kingdom since 2016. In this role she leads a multi-sector team assisting Canadian businesses with their international commercial objectives and supporting UK investors to expand into Canada.

Fawn Zeuchner is a recent graduate from St. Francis Xavier University and is currently the Program Manager for ARC Nuclear Canada Inc. As a clean energy enthusiast, Fawn is proud to start her career working for a company that is promoting environmentally friendly energy solutions to mitigate climate change while promoting economic growth. Fawn hopes to see New Brunswick grow into a manufacturing hub for SMR deployment, exporting clean and reliable power around the globe. Fawn's interest in making an active difference in the fight against climate change is what led her to work in the green energy sector. In the future, Fawn hopes to continue to help clean, sustainable, and affordable energy become widely available around the globe.

Marcin Zydowicz is a Trade Commissioner for Energy and Mining, High Commission of Canada in London, UK.



The 2020 Canada-UK Colloquium

Biographies of UK Participants

Professor Eric Aboagye

Eric is Professor of Cancer Pharmacology & Molecular Imaging at Imperial College London. He obtained a PhD from the University of Glasgow CRUK Beatson Laboratories, and a postdoctoral fellowship from Johns Hopkins University USA. In 1998, he set up an independent research group at Imperial College London, where he has been Professor in the Department of Surgery & Cancer since 2006, and Director of the Cancer Imaging Centre. His lab works at the interface of chemistry, mathematics and biology to develop better ways of visualising metabolic and receptor-signalling properties of cancers in pre-clinical models and patients, using positron emission tomography (PET) and other imaging techniques, together with associated radiotherapeutic applications. He was elected a Fellow of the UK Academy of Medical Sciences in 2010.

Chris Anastasi

Chris is an expert on energy and the related issue of climate change, and a published author. He has led teams in major international energy companies, and in academia, working across the energy spectrum, including civil nuclear power, in the UK and in countries in different parts of the world. His most recent book, [*Who Needs Nuclear Power*](#), has just been published.

Julianne Antrobus

Julianne is Partner and Global Head of Nuclear at PA Consulting. She has worked in the nuclear sector for over 20 years in commercial operations & strategic roles, providing oversight and insight across strategic and complex nuclear programmes. During her career, Julianne has been involved in leading transformational growth for major engineering and consulting organisations in the UK. She has managed a complex portfolio of long term relationships with senior clients & government stakeholders, establishing strategic Joint Ventures between UK, European & Asia Pacific partnering organisations and winning major framework/project contracts in support of the global nuclear fuel cycle from new build to decommissioning.

Ivan Baldwin

Ivan is Bechtel's International Marketing & Business Development lead for Nuclear in the U.K. Ivan is a member of the UK's Nuclear Industry Council, representing the UK nuclear regions and Place Agenda. He is also Chairman of Britain's Energy Business Cluster (BECBC), a private sector led membership organisation of over 300 companies based in Cumbria. Ivan is passionate about the communities which are home to clusters of nuclear capability and has worked for a number of years with partners across the U.K. to bring their voices to the top table. Recently this has included supporting the establishment of the North West Nuclear Arc and the U.K. Energy Region collaborations.



Simon Barber

Simon is the UK Managing Director for Assystem, one of the world's largest nuclear engineering consultancies. A physicist with a career background in nuclear safety and design authority roles, Simon brings 25 years' experience in the UK civil nuclear and defence sectors. Recently, he led the combined industry and academia team that developed the digital technologies roadmap for the UK Atomic Energy Authority's proposed STEP fusion device programme that included a strong focus on Artificial Intelligence technologies and how they might improve design delivery and assurance and be applied within the design to support safe operations and maintenance.

Chris Bowbrick

Chris is Deputy Director for nuclear generation policy, the nuclear sector deal and international issues, within the UK's Department for Business, Energy and Industrial Strategy (BEIS). He has over 17 years experience in the Civil Service, predominantly in project, programme and portfolio management. The majority of these roles have been in the Ministry of Defence and include leading major equipment and change programmes, counter-proliferation work, and establishing portfolio management capabilities. Chris spent twelve years in the Army reserves which included a tour of Iraq in 2002/2003. He is also a trustee of the Kids Cookery School.

Rt Hon Alistair Burt

Pro-Chancellor, Lancaster University. An MP for 32 years, six of which were in Ministerial roles. UK Minister for the Middle East and North Africa between 2010-13, 2017-19. A Distinguished Fellow at the Royal United Services Institute (RUSI), member of the European Council on Foreign Relations and senior member of the European Leadership Network. Currently focusing on the New Strategic Arms Reduction Treaty (New START).

Anthony Cary CMG

Anthony is Chairman of the Canada-UK Council. His career was in the FCO, where he was British Ambassador to Sweden (2003-6) and High Commissioner to Canada (2007-10). Other postings included Berlin, Kuala Lumpur and Washington DC. He served twice on secondment to the European Commission, latterly as Chris Patten's *chef de cabinet*.

Dr David Chambers

David is Senior Principal Research Analyst on nuclear matters at the UK's Foreign, Commonwealth & Development office (FCDO) covering non-proliferation, arms control and disarmament in particular, including during the negotiations of the Joint Comprehensive Plan of Action (JCPOA) with Iran. Before moving to FCDO in 2014, David was the Senior Sponsor for the UK Atomic Weapons Establishment (AWE) programme on Nuclear Treaty Verification where his work included the joint programmes on nuclear disarmament verification with Norway (UKNI) and the US. In this role he also had overall responsibility for the UK's technical support programme to the Comprehensive Test Ban Treaty (CTBT). David has represented the UK and AWE on numerous occasions, including at NPT Review Conferences and Preparatory Commissions, P5 meetings and international workshops and academic conferences. He holds a DPhil from Oxford University and an MSci from St. Andrews, both in Physics.



Richard Deakin

Rich was recently appointed Challenge Director for Low-Cost Nuclear at UK Research and Innovation's Industrial Strategy Challenge Fund (ISCF). His mission there is to enable the development of a UK SMR programme and technology that will attract private finance to support the delivery of a fleet of UK SMRs. Rich has long experience in the nuclear sector, having worked in manufacturing and engineering environments in both the UK and the US for companies including British Nuclear Fuels, Rolls Royce and NuScale. He was also General Manager and 'agent of the licensee' for a UK nuclear-licensed site. Immediately before taking on his present role, he had been a policy adviser in the Nuclear Directorate at the UK Department for Business, Energy and Industrial Strategy (BEIS).

Jonathan Ford

City editor of the *Financial Times*. Jonathan was previously the FT's Chief Leader Writer, and before that Comment Editor at Reuters. He was one of the founders of Breakingviews, an online financial commentary website. Before that he worked on the Lex column of the FT. An Oxford graduate, he started his career in investment banking, working for Morgan Grenfell, now a subsidiary of Deutsche Bank.

Professor Antony Gee

Tony Gee is Professor of PET and Radiochemistry at King's College London and a visiting Professor at Imperial College London. He obtained his BSc at the University of Sussex (1985), and his PhD in Radiopharmaceutical Organic Chemistry at Uppsala University, Sweden (1991). Previous posts have included Director of PET Chemistry at the Guy's and St Thomas' Hospitals Clinical PET centre, UMDS, London, the Aarhus University Hospital PET Centre in Aarhus Denmark, and GlaxoSmithKline where he spearheaded the use of PET imaging in drug discovery and development. He is a member of scientific boards at the International Society of Radiopharmaceutical Sciences, Chairman of the EANM Drug Development Group, RSC Radiopharmacy Group and Medical Imaging Probes & Biosensors for BioimagingUK.

Kirsty Gogan

Kirsty is managing partner of LucidCatalyst, a highly specialized international consultancy offering thought leadership, strategy development and techno-economic expertise. She is also co-founder of a new NGO, TerraPraxis. Both LucidCatalyst and TerraPraxis are focused on multiplying and accelerating zero carbon technology options available for large-scale, affordable, market-based decarbonization of the global economy over a wide range of future scenarios. LucidCatalyst was recently commissioned to produce the widely cited Energy Technologies Institute Nuclear Cost Drivers Study, and by ARPA-E to conduct a study on Cost and Performance Requirements for Flexible Advanced Nuclear Plants in Future U.S. Power Markets. Kirsty co-authored the landmark report: [Missing Link to a Liveable Climate: Hydrogen Enabled Synthetic Fuels](#) (Sept 2020), which describes how the world can still meet the Paris temperature goals if sufficient, low-cost, clean hydrogen and synfuels are produced to replace oil and gas in shipping, aviation and industry.



Professor Robin Grimes FRS FREng

Robin was appointed as the Ministry of Defence Chief Scientific Adviser on nuclear science and technology matters in 2017, having previously served as Chief Scientific Adviser at the Foreign and Commonwealth Office. He is a Professor of Materials Physics at Imperial College, where his research focuses on the use of computer simulation techniques to understand the behaviour of materials for energy applications. He was previously Assistant Director of the Davy Faraday Research Laboratory at the Royal Institution. He spent the year 2000 at Los Alamos National Laboratory as a Bernd T. Matthias Scholar. Since 1984 Robin has authored over 300 peer-reviewed publications. He is currently a member of the editorial board of the Journal of Materials Science. From 2008-2013 he was Director of the Imperial Centre for Nuclear Engineering and from 2010-2013 Director of the Imperial College Rolls Royce University Technology Centre in Nuclear Engineering. In 2013, he was made a Fellow of the Royal Academy of Engineering, and in 2018 a Fellow of the Royal Society.

Malcolm Grimston

Malcolm read Natural Sciences at Cambridge, specialising in psychology. He worked as a chemistry teacher before joining the UK Atomic Energy Authority in 1987. In 1995 he joined Imperial College as a Senior Research Fellow, where he retains visiting status. He was also a Senior Research Fellow at Chatham House between 1999 and 2003. He is a regular media contributor on energy and nuclear matters, notably during the 2011 Fukushima crisis. Among his publications are *The Paralysis in Energy Decision-making*, and two books co-written with the late Peter Beck: *Double or Quits – the global future of civil nuclear energy* and *Civil Nuclear Energy – fuel of the future or relic of the past?* He is currently working on a project based at MIT on the International Nuclear Event Scale (INES). Since 1994 he has been an elected Councillor in Wandsworth, London.

Peter Haslam

Peter was Head of Policy at the Nuclear Industry Association (NIA) from 2010-2019 and has over 40 years' experience in the energy sector. Before joining the NIA Peter was British Energy's Director of Government Affairs, where he ran the company's public affairs strategy at the Scottish, Westminster, and European levels. Previous roles included Public Affairs Manager at Nuclear Electric plc and Head of the Parliamentary Section at the Central Electricity Generating Board. Before joining the electricity industry in 1986 Peter was a career civil servant in the Department of Energy, including spells as private secretary to two Ministers. He served as an advisor for this year's CUKC on Nuclear Energy.

Duncan Hawthorne

Duncan was appointed Horizon Nuclear's CEO in May 2016, having been a non-executive Director since 2013 and CEO of Bruce Power, one of the world's largest nuclear power plants. He is a former Chairman of the World Association of Nuclear Operators (WANO), and brings a wealth of industry experience having worked in the power generation business for 30 years, holding senior positions in power companies in the UK, US and Canada. Originally from Scotland, Duncan joined the electricity board as an apprentice with British Energy. At 21, he went to Strathclyde University in Scotland on a scholarship. He progressed through all the engineering positions to become a Director and then a Board member of British Energy. He is a Fellow of both the Institution of Electrical Engineers and the Institution of Mechanical Engineers.



Dr Paul Howarth

Paul was appointed CEO of the UK National Nuclear Laboratory (NNL) in 2011. He has long experience in the nuclear industry with a broad range of stakeholders across Government, industry and academia. He completed his PhD in nuclear physics at the European Fusion Programme after a first degree in Physics and Astrophysics at the University of Birmingham. He subsequently worked in Japan and then at British Nuclear Fuels (BNFL), where he helped the UK Government make the case for new nuclear build in 2007. He also co-founded the Dalton Nuclear Institute and worked for the US organisation Battelle alongside US National Laboratories, being part of the team that was awarded the contract to run NNL. Paul is a Non-Executive Director at the National Physical Laboratory and Chair of the Association of Innovation, Research and Technology Organisations (AIRTO). He was elected a Fellow of the Royal Academy of Engineering in 2014 and is also a Fellow of the Institute of Physics and the Nuclear Institute. He is an alumnus of Harvard Business School.

Dr Dame Sue Ion DBE

Sue is currently Hon President of the National Skills Academy for Nuclear and a member of the UK Nuclear Regulator's Independent Advisory Panel. She was Chairman of the UK Government's Nuclear Innovation Research Advisory Board (NIRAB) from January 2014 to March 2016. She was British Nuclear Fuels (BNFL) Chief Technology Officer from 1992-2006 and has served on a number of advisory committees associated with the UK's energy requirements. Sue is a Fellow of both the Royal Academy of Engineering and the Royal Society.

Sam Jeremy

Sam is Head of Bilateral, Science and Innovation Teams at the British High Commission in Ottawa. He has been based in Canada since 2018. His career up to that time had focussed on national security and energy policy, with postings in Moscow, Iraq and Ethiopia. Before joining the Foreign, Commonwealth and Development Office, Sam worked as an engineer in each of the oil and gas, power, and nuclear industries, in the UK and in Azerbaijan.

H.E. Susan le Jeune d'Allegeershecque CMG

Susan has been Britain's High Commissioner to Canada since 2017. Her career has somewhat unusually included two spells dealing with nuclear issues. She was the Foreign and Commonwealth Office (FCO) desk officer for non-proliferation in 1985, a job which covered the Chernobyl nuclear accident and its aftermath. Then in 2012, she took up a posting to Vienna where she was concurrently Ambassador to Austria and permanent representative to the UN organisations there, including IAEA and CTBTO. The highlight of those 4 years was the signature of the JCPOA nuclear deal in 2015, but there were many other memorable moments including the CTBTO detection of North Korean nuclear tests and a visit to Fukushima after the accident.



Nicolas Maclean CMG

Nicolas' career was in banking, investment management and insurance, ending as Group Adviser (Asia) to Prudential Corporation and Executive Director of their Asian subsidiary. While at Samuel Montagu, now part of HSBC Group, he worked with Sir Robert McAlpine on the financing of Magnox reactors, and was elected Chairman of the Project and Export Finance Committee of the UK's investment banks. More recently he has been active in consultancy projects on nuclear power generation for MWM (Strategy). While a Senior Fellow at the International Institute for Strategic Studies, London, he was involved in issues relating to Nuclear Non-Proliferation. He has been a Council Member of CUKC since 2008 and is a member of the Canada-UK Chamber of Commerce.

Dan Mathers

Dan is Executive Director of the Nuclear Innovation and Research Office (NIRO), providing advice to the UK Department of Business, Energy and Industrial Strategy (BEIS). He has 23 years nuclear industry experience after an MSc in Engineering Hydraulics from Newcastle University. Previous roles have included work at the UK's National Nuclear Laboratory delivering R&D in nuclear fuels, modelling and simulation, business development and capability management. Dan is the UK representative on the NEA Nuclear Science Committee, the IAEA Technical Working Group on SMRs. He also leads on advanced reactor technology in US-UK bilateral civil nuclear collaboration.

Dr Darryl Murphy

Darryl is Head of Infrastructure, Real Assets at Aviva Investors, responsible for infrastructure transactions for the infrastructure equity and debt strategies. Darryl is responsible for a portfolio of around £10bn of debt and equity investments across the UK and Europe. He has over 25 years' experience in infrastructure financing and investment, having also worked at Hambros, SG, Newcourt Capital, RBC, HSBC. He was also a partner at KPMG. He previously advised the Department for Energy and Climate Change (DECC) on the financing of Hinkley Point C, advised Horizon on the development and financing of Wylfa and advised KACARE on nuclear development. Darryl holds a PhD in Mathematics from Exeter University. He is a member of the UK Nuclear Industry Council and UK council chair of the International Project Finance Association.

Simon Newton

Simon joined Moltex in 2018 as Corporate Development Director, initially to help with Round C funding and latterly assuming responsibility for sales and marketing. Since 2005, he has run a consultancy focused on complex sales and business development, advising, training and occasionally acting in interim capacities for clients. Before this, he held senior management positions in sales and marketing for IT and telecommunication companies Energis, AT&T and IBM. Simon has a degree in Physics from Bristol University, mostly quantum mechanics and all now long forgotten. He is married with three daughters, two of whom are very young. He is a keen offshore sailor and a reluctant triathlon competitor.



David Peattie

David was appointed as CEO for the Nuclear Decommissioning Authority (NDA) in 2017, following a 33 year career in the oil and gas industry, including a final role as Head of BP Russia and a term as CEO at Fairfield Energy, where he led a successful turnaround of performance of North Sea assets and oversaw the start of the decommissioning project for the Dunlin Alpha Platform. He has also served as Chairman of Pacific Nuclear Transport Ltd since 2017. He was appointed Patron of Women in Nuclear UK in 2020 and supports their work in improving gender balance in the nuclear industry. He also personally established and funded undergraduate bursaries for Engineering students at Dundee University. David is a Chartered Engineer and Member of the Institute of Materials, Minerals & Mining (IOM3).

Dr Gareth Peel

Gareth is Strategy Director, Advanced Nuclear Technology, at Cavendish Nuclear, UK. He has over 12 years experience in the UK civil nuclear industry ranging from project delivery and leadership on nuclear licensed sites to strategy and government advisory roles. Highlights include working alongside government as a member of the Nuclear Innovation and Research Office (NIRO) and practical project delivery as a lead team member of the APM UK Infrastructure Project of the Year 2019, the Silo's Maintenance Facility (SMF). Gareth's NIRO work involved leading, authoring and researching government positioning papers and Nuclear Innovation and Research Advisory Board (NIRAB) reports while his SMF delivery work included supply chain leadership and technical delivery of a successful NDA funded project on the Sellafield site.

Tom Plant

Tom is Director of the Proliferation and Nuclear Policy programme at the Royal United Services Institute (RUSI), and Director of the UK Project on Nuclear Issues (PONI), a cross-generational network of over 900 members which encourages young scholars and professionals to engage with established experts on contemporary nuclear issues. Before joining RUSI he was responsible for technical oversight of arms control verification research programmes at the Atomic Weapons Establishment (AWE). Previous roles included posts, mostly focussed on non- and counter-proliferation, at the Ministry of Defence and Foreign and Commonwealth Office. He is a visiting senior research fellow with the Policy Institute at King's. He holds a Masters in Natural Sciences from Cambridge and also studied systems engineering at Cranfield.

Julia Pyke

Julia is Director of Financing and Economic Regulation for Sizewell C, and is working with Government to identify an innovative way for Sizewell C to be funded at best value to electricity consumers, and with potential investors and lenders to raise the capital required (the design replication and funding model could also pave the way for other nuclear projects such as Moorside). Prior to her move to Sizewell C, Julia was Head of Power and Renewables for UK, US & Europe at Herbert Smith Freehills LLP. At HSF, she led a cross-practice team advising on nuclear, wind, biomass and tidal projects. Julia is a Fellow of the Energy Institute, and member of the CBI Energy & Climate Change Board and of the advisory board for Business in the Community, East of England.



Fiona Reilly

Fiona is Managing Director of consulting firm, FiRe Energy, a non-executive Director of the Nuclear Industry Association (NIA), and the UK representative and Co-Chair of the Economic Modelling Working Group (EMWG) of the Generation IV International Forum (GIF). Over 25+ years, she has provided strategic and policy advice including regulatory, structuring and financing advice to the nuclear industry. Previously, she was Partner & Global Head of Nuclear Services at Norton Rose Fulbright. She then joined PwC as the Global Nuclear Lead, Capital Projects and Infrastructure before becoming Executive Partner and Board Director in Atlantic SuperConnection. In January 2018 she was appointed Chair of the Expert Finance Working Group on Small Reactors by the UK Department for Business, Energy and Industrial Strategy (BEIS), and produced the **Market Framework for Financing Small Nuclear** later that year.

Dr Timothy Stone CBE

Dr Stone is Chairman of the UK Nuclear Industry Association (NIA) and the Chairman of Nuclear Risk Insurers. He is a non-executive member of the Arup Group Board and of Horizon Nuclear Power. He was previously the Expert Chair of the Office for Nuclear Development in the UK government and the Senior Advisor to five Secretaries of State responsible for energy in two different governments over nearly 7 years. During this period he conducted a formal review of the nuclear safety regulator and his recommendations resulted in the creation of the Office of Nuclear Regulation. Among other honours, he is a Commander of the British Empire, a Fellow of the Institution of Civil Engineers and an Honorary Fellow of the Nuclear Institute.

Derreck Van Gelderen

Derreck is a Consultant in advanced analytics at PA Consulting. He specialises in developing creative solutions to complex problems using data science and AI, with recent consultancy experience in the nuclear sector. In previous roles he applied natural language processing to support trade agreement negotiations, and helped to develop a data and policy driven approach to job planning in the healthcare sector. He is a chartered mechanical engineer with a PhD in fracture mechanics, using Monte Carlo simulations to predict failure distributions associated with loss-of-coolant accidents.

Martin Vander Weyer

Martin is business editor of *The Spectator*, the UK's oldest weekly political magazine, for which he runs the annual Economic Innovator Awards for UK entrepreneurs. He contributes regularly to the *Daily Telegraph* and is the author of several books. He is currently an Academic Visitor at St Antony's College, Oxford, where he is researching a book on capitalism. A Yorkshireman of Flemish ancestry, Martin is also widely involved in the performing arts. In his first career, he spent 15 years as an investment banker, including assignments in Brussels, Kuala Lumpur, Tokyo, Hong Kong and Eastern Europe.



Rob Ward

Rob is nuclear sector lead for Copeland – a district in the North of England which hosts the Sellafield complex and the UK Low Level Waste Repository as well as the Moorside site, which is designated for nuclear new build. This is a local government economic strategy role encompassing decommissioning, long term radioactive waste management and potential new large, small and advanced nuclear development. He chairs the Nuclear Institute (NI) Young Generation Network (YGN) of 1500 young professional members of the professional body and learned society for the UK nuclear industry. He is a member of the Nuclear Skills Strategy Group, designed to support the UK Nuclear Sector Deal. He is also a director of Energus, a Nuclear Decommissioning Authority company that manages programmes to support the workforce needs of the UK nuclear sector.

Alan Woods

Alan is Director, Strategy and Business Development for Rolls-Royce's SMR business, with responsibility for the development of commercial partnerships, customer opportunities, financial terms and government relationships. Alan also holds a corporate strategy role in Rolls-Royce, assessing adjacent opportunities within the energy market. After completing a Masters Degree in Electrical and Electronic Engineering at Nottingham University, Alan joined Rolls-Royce on the graduate training programme in 1998. His career in Rolls-Royce has covered multiple sectors including Submarines, Marine, Corporate Strategy, and now Nuclear. Alan also has a Masters degree in Programme Management.

Jennifer Young

Jenny has been Consul General in Toronto and the UK's Deputy Trade Commissioner in North America since July this year. Previous roles have included Deputy Director positions at HM Treasury, covering international policy, G7, G20, sovereign debt, IMF, financial services and spending control for the UK aid budget; acting as UK Alternate Director to the European Investment Bank; Leading the UK Financial Advice Market Review at the Financial Conduct Authority; Senior Adviser in the Prime Minister's Delivery Unit; and a trade policy role at the British Embassy in Tokyo. She has also had jobs in the Cabinet Office and at the UK's Permanent Representation to the EU in Brussels. Jennifer has a degree in French and German from Cambridge University and is an operational Japanese speaker.

Nadhim Zahawi MP

Nadhim has been Minister for Business and Industry at the Department for Business, Energy and Industrial Strategy (BEIS) since July 2019, having previously served as Parliamentary Under Secretary at the Department for Education. Nadhim was born in Baghdad to Kurdish parents, and his family immigrated to the UK when he was 9. He studied chemical engineering at UCL in London. In 2000 he founded YouGov, which has become a leading market research and political polling company. He was named entrepreneur of the year by Ernst & Young in 2008. Nadhim was elected as Conservative MP for Stratford-on-Avon in May 2010. In 2011, with fellow MP Matt Hancock, he co-authored *Masters of Nothing*, an account of the human behaviour behind the banking crash. Several of the policy recommendations in that book were adopted by the coalition government of 2010-15. In 2013 he was appointed to the PM's Policy Board with special responsibility for business and the economy.



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