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Oral presentation

Written submission from the Rural Action and Voices for the Environment (RAVEN)

In the Matter of the

New Brunswick Power Corporation, Point Lepreau Nuclear Generating Station

Application for the renewal of NB Power's licence for the Point Lepreau Nuclear Generating Station

Commission Public Hearing
Part 2

May 11 and 12, 2022

Exposé oral

Mémoire de Rural Action and Voices for the Environment (RAVEN)

À l'égard de la

Société d'Énergie du Nouveau-Brunswick, centrale nucléaire de Point Lepreau

Demande de renouvellement du permis d'Énergie NB pour la centrale nucléaire de Point Lepreau

Audience publique de la Commission
Partie 2

11 et 12 mai 2022

Canada

Senior Tribunal Officer, Secretariat
Canadian Nuclear Safety Commission
280 Slater Street, P.O. Box 1046, Station B
Ottawa, Ontario K1P 5S9
By email: interventions@cnsc-ccsn.gc.ca

March 28, 2022

Re: Intervention by the RAVEN project at the University of New Brunswick for the NB Power Licence Renewal Application (Hearing Ref. 2022-H-02).

Dear Madam or Sir,

The RAVEN (Rural Action and Voices for the Environment) project requests that the Canadian Nuclear Safety Commission (CNSC) consider this comment regarding the request by NB Power to renew its licence to operate the power reactor at the Point Lepreau Nuclear Generating Station (PLNGS). As representative of the RAVEN project, I am requesting to intervene orally in the hearing in Saint John, if possible, or virtually.

The RAVEN project, based in the Department of Sociology at the University of New Brunswick in Fredericton, is funded by the Social Sciences and Humanities Research Council of Canada and the New Brunswick Innovation Foundation. RAVEN is an associate member of the New Brunswick Environmental Network and a member of the Coalition for Responsible Energy Development in New Brunswick. I am the RAVEN project lead investigator. As a social scientist with expertise in technology adoption, I lead a team of researchers, students and policy analysts studying rural and environmental issues in New Brunswick.

The RAVEN project comment consists of this introduction letter and the attached RAVEN report, "The Future of Point Lepreau: Option B." Our interest in the PLNGS, the health and safety risks it poses, and the length of the operating licence is twofold: 1) NB Power's response to the climate crisis, and 2) the need for more, not fewer, opportunities to intervene on the technologies we use to respond to the climate crisis.

1) How we tackle the climate emergency and end the production and use of fossil fuel energy is the most important environmental challenge of our time, in New Brunswick as well as globally.

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The Intergovernmental Panel on Climate Change (IPCC) report issued in August 2021 was so alarming that the UN Secretary General called it a "code red for humanity." It is incumbent on everyone to heed this wake-up call and to do what we can to address the climate emergency.

Our public utility NB Power has a pivotal role in tackling the climate crisis but has chosen an irresponsible approach. It is relying on unfounded industry promises that speculative new nuclear technologies will be ready in time to replace the Belledune coal energy plant that must close by 2030. It has no plans to prepare the infrastructure that will be required for new sources of energy generation when the Lepreau nuclear plant is closed, scheduled for ~2040. Successive iterations of its Integrated Resource Plan force nuclear energy production without considering more reliable and economical alternatives.

In the RAVEN report, "The Future of Point Lepreau: Option B," you will see that the RAVEN project has taken a clear position against continuing nuclear power generation in New Brunswick. Our report advocates for a climate justice approach. We drafted the report after considerable analysis and reflection and hope you will find and consider not only the authors' perspectives in the report but also those who are quoted and add essential frames of reference.

Our report was conceived and written in the spirit of the Peace and Friendship Treaties. It aims to respectfully include information about Indigenous perspectives on relationships with the land and environment around Point Lepreau and the Bay of Fundy. We argue that a sustainable future for Point Lepreau must take a path that respects Indigenous sovereignty and knowledge, specifically the Peskotomuhkati peoples who have lived on that unceded territory since time immemorial. This path must also acknowledge and include the expertise of the environmental community in New Brunswick, of which the RAVEN project is an active member.

As we make clear in the report, there are many options for the land and waters at Point Lepreau. The RAVEN project position is that the most responsible way forward for NB Power to address the climate crisis is to heed the voices of Indigenous leaders connected to the land and waters, and to begin planning now for the scheduled shut down of the Lepreau nuclear plant.

2) We need more, not fewer, opportunities in New Brunswick to inform and educate the public about the risks and rewards of our energy choices and give them opportunities to engage with the people making the decisions.

In reviewing NB Power's application, I found no clear rationale for requesting a nuclear power reactor operating licence for 25 years–five times the length of the current licence.

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The youth I work with at university care deeply about the climate crisis and our current and future choices for generating energy. They want to have their perspectives heard and considered. Granting an operating licence for 20 or 25 years would effectively remove from an entire generation the ability to engage with the Commission. For this reason alone, the Commission should consider instead a much shorter licence period.

The power reactor at the PLNGS creates radioactive elements that pose significant risks to human health, safety and the environment. The public's understanding of these risks has evolved over time. For example, when nuclear power was first introduced in Canada, the public utilities and the nuclear industry were not open about the dangers of radioactive waste. Following the nuclear meltdowns that occurred in other countries, the public became increasingly concerned about these risks. The recent threat to weaponize a civilian nuclear facility in Ukraine has spiked concern about nuclear power in New Brunswick, as evidenced by the many posts on social media on this topic.

Weighing the risks and benefits of the technologies we use to generate energy for our province is vital for our collective future. All citizens of this province must be given the opportunity for their concerns about the risks associated with nuclear energy technology to be heard and considered by the decision-makers, the CNSC Commissioners.

It is absolutely the wrong time for the nuclear regulator to send a signal that it is removing opportunities for public engagement with the Commission.

An operating licence hearing is not only the most significant opportunity residents of our province have to inform and educate ourselves about nuclear power and the ability of NB Power to deliver it safely in an environmentally responsible manner, but also the only opportunity for Commissioners to hear from and engage directly with the public about our concerns.

Divergent perspectives exist within my university, within New Brunswick and within Canada on the risks and benefits of nuclear power. That is the crux of our point. The public has different opinions about NB Power's ability to continuing operating the PLNGS and the risks and benefits of doing so. A licence hearing is the only opportunity for the Commission members to hear directly from us so they can weigh the different perspectives before making their decision.

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The RAVEN project submits that the Commission should:

1. Considering the significant need for a much shorter licence period, to continue a 5-year licence period and open the possibility for NB Power to begin planning the shut down and decommission of the Point Lepreau nuclear reactor.

2. As per the discussion in our attached report, support the recommendations of the Passamaquoddy Recognition Group who represent the Peskotomuhkati people in this hearing.

Thank you for your attention to our comment.

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Attached report: "The Future of Point Lepreau: Option B"

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The Future of Point Lepreau: Option B

A report from the RAVEN project at the University of New Brunswick

THE FUTURE OF POINT LEPREAU: OPTION B

A REPORT FROM THE RAVEN PROJECT AT THE UNIVERSITY OF NEW BRUNSWICK

FEBRUARY 2022

Reference:

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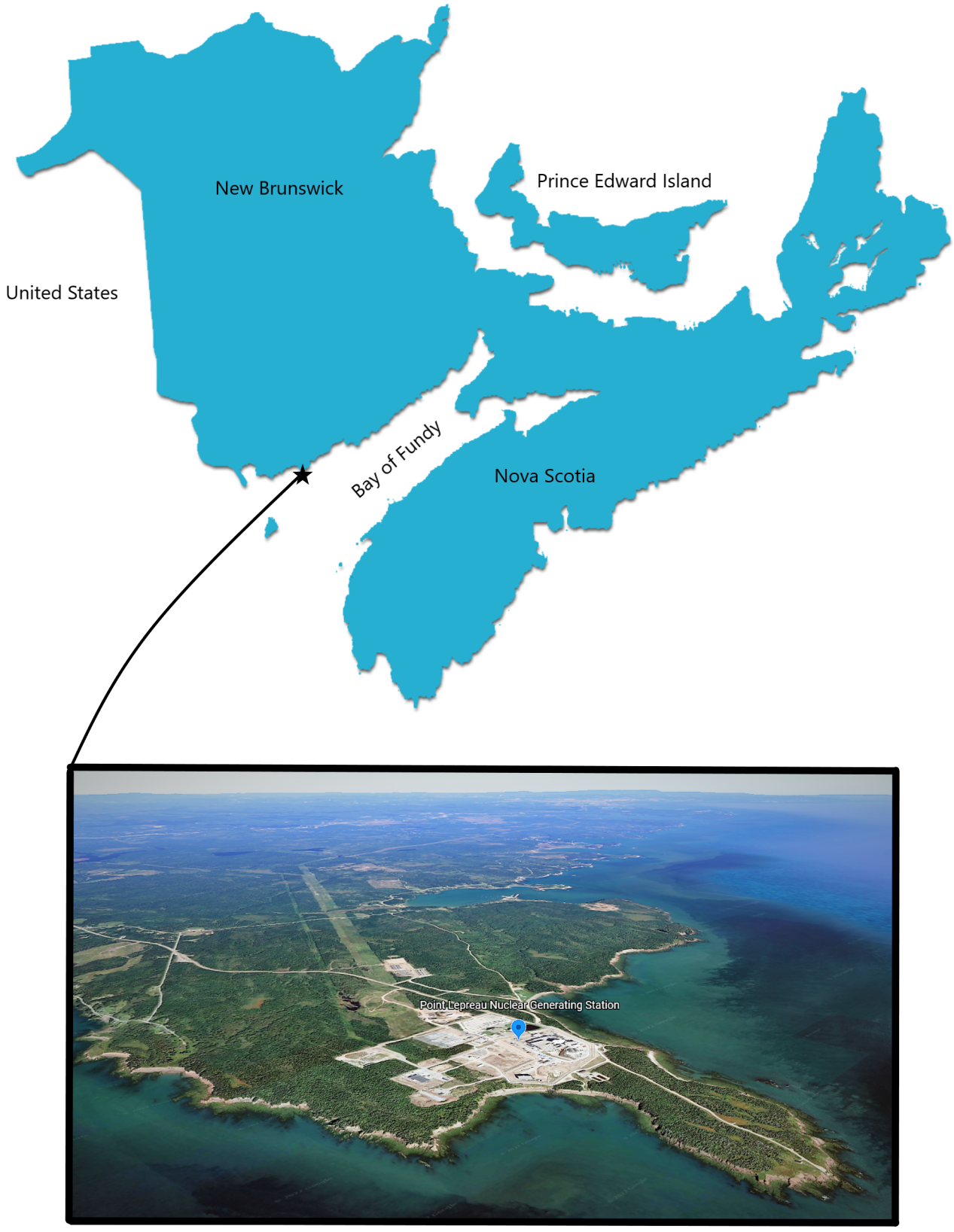
Brian Beaton, M.Ed. (Critical Studies), was a volunteer and formerly a research assistant with the RAVEN project at the University of New Brunswick.

RAVEN (Rural Action and Voices for the Environment) is supported by the Social Sciences and Humanities Research Council and the New Brunswick Innovation Foundation.

The authors would like to thank the many members of the environmental community who offered helpful suggestions on an earlier draft of this report.

Thank you to NB Power for the photos of the Point Lepreau Nuclear Generating Station (PLNGS) used in this report. The images of the Bay of Fundy are from the Government of New Brunswick's Images of New Brunswick site, Pat Mowatt, and many New Brunswick residents.

The cover has been designed using resources from Freepik.com.



Point Lepreau Nuclear Generating Station in relation to the Maritime provinces and the Bay of Fundy.
Imagery Adapted from Google Earth and pinclipart.com

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1. LAND ACKNOWLEDGEMENT

The authors acknowledge and are grateful for the ability to live in and work on Peskotomuhkati and Wəlastəkwiyik unceded and unsurrendered territories - meaning that this land was never 'won' by, or legally signed away to the British Crown. In fact, this territory is covered by the Treaties of Peace and Friendship which Peskotomuhkati, Mi'kmaq, and Wəlastəkwiyik Peoples first signed with the British Crown in 1726. The treaties recognized Peskotomuhkati, Mi'kmaq and Wəlastəkwiyik title and established the rules for an ongoing relationship of peace, friendship, and mutual respect between nations for two very different modes of life and land use.

We try to act in ways that reflect and promote understanding of our responsibility to each other and the ecosystem, of which we are part. We strive to be respectful partners as we search for collective healing and true reconciliation. We honour this beautiful territory together.

2. EXECUTIVE SUMMARY

The Rural Action and Voices for the Environment (RAVEN) project at the University of New Brunswick is producing media and information resources to support environmental activism across the province, with a specific focus on rural areas. Since 2019, RAVEN has taken a particular interest in Point Lepreau, situated in one of the most rural areas of the province.

Point Lepreau is located on the Bay of Fundy coast in a location of outstanding natural beauty. The Bay of Fundy, a natural wonder of North America, is one of the richest marine ecosystems on the planet as well as home to the only operating nuclear energy plant in Canada east of Ontario. The NB Power Point Lepreau Nuclear Generating Station (PLNGS) began operations in 1983, the nuclear reactor was rebuilt (refurbished) starting in 2008 and re-opened in 2012.

The authors timed the release of this report to coincide with the hearings by the Canadian Nuclear Safety Commission (CNSC) to renew the PLNGS operating licence. NB Power requested an unprecedented 25-year licence renewal period, five times the length of the existing licence period.

NB Power plans to build more nuclear reactors on the Point Lepreau site. The Government of New Brunswick has already provided $30 million to two nuclear companies to develop their novel technologies for the site, in addition to the more than $56 million provided by the federal government for one of the nuclear projects.

One notable feature of the original build of the Point Lepreau nuclear reactor, its refurbishment, and the development of the proposed new nuclear reactors for the site, is the lack of meaningful consultation with Indigenous communities affected by these developments.

In the spirit of the Peace and Friendship Treaties, our report aims to respectfully include information about Indigenous perspectives on relationships with the land and environment around Point Lepreau and the Bay of Fundy.

Our argument is that a sustainable future for Point Lepreau must take a path that respects Indigenous sovereignty and knowledge. This path must also acknowledge and include the expertise of the environmental community in New Brunswick, of which the RAVEN project is an active member. Our report advocates for a climate justice approach.

Climate justice, Indigenous and environmental approaches require a holistic understanding of energy development. This report blends disparate themes that cannot be neatly separated because they are interdependent, for example, how colonialism influences our choice of nuclear energy over renewable energy.

There are many possible futures for Point Lepreau. This document is intended to stimulate discussion on these many options beyond the current NB Power and government plan. We outline the main themes that need to be considered before any further development of Point Lepreau takes place. We hope, therefore, that this document can spark a more meaningful discussion of the future of Point Lepreau.

3. BACKGROUND

3.1 Background

The purpose of this document is to spark discussion about a shared future for Point Lepreau, Option B, that respects the Treaties of Peace and Friendship, aligns with the vision of the environmental community in New Brunswick, and is economically sound. It can also be a resource for future discussion with Indigenous leaders, environmental activists, and political and policy leaders, including with the provincial department of Natural Resources and Energy Development (NRED).

NB Power's Point Lepreau Nuclear Generating Station (PLNGS) on the Bay of Fundy is scheduled to start shut down in approximately 2040. In 2021, NB Power applied to renew its licence to operate the PLNGS facility for another 25 years and also released its plan to develop prototype nuclear reactors and a reprocessing facility on the Point Lepreau site (NB Power, Ontario Power Generation, Bruce Power, SaskPower, 2021). The proposed reactor designs are still on the drawing board, the billions in funding required to build them not secured.

Also in 2021, the New Brunswick Environmental Network released Greenprint 2021, a plan for a sustainable future in New Brunswick (NBEN, 2021). The NBEN members include more than 100 environmental groups across the province, and Greenprint 2021 was developed by NBEN groups working on climate action projects, including the RAVEN project, an NBEN associate member. Our collaborative plan includes:

- **Prioritizing Indigenous communities' access to resources and infrastructure to meet their economic and social development needs, including enabling them to gain access to renewable energy.**

- **Increasing renewable energy production and reducing non-renewable energy production in the province with the goal of generating 95% of New Brunswick's electricity needs from locally based renewable sources, specifically solar and wind, by 2030.**

3.2 Why Do We Need an Alternative Plan for Point Lepreau?

The current plan by the government and NB Power is faulty. In Spring 2021, the RAVEN project lead researcher and four colleagues wrote a briefing paper for the NRED Minister and met with him twice to discuss it. Our briefing paper, available on the RAVEN website, outlines the problems with the government's plan to develop prototype nuclear reactors– so-called 'small modular nuclear reactors' (SMRs)–on the Point Lepreau site. Our briefing paper made the following conclusions:

- **Building new nuclear reactors (SMRs) is financially risky and will drive up the cost of electricity to New Brunswick ratepayers.**
- **New nuclear is not an effective climate change mitigation strategy, and SMRs will not help New Brunswick meet its 2030 climate action goals.**
- **Spending public money on unproven nuclear reactor concepts will raise power rates, increase long-term billion-dollar liabilities, and expand and complicate the radioactive waste legacy at Point Lepreau that will burden future generations far beyond any useful lifespan of these plants.**

Our argument in the current Option B report is that a sustainable future for Point Lepreau must take a path that respects Indigenous sovereignty and knowledge. This path must also acknowledge and include the expertise of the environmental community in New Brunswick.

There are many possible futures for Point Lepreau. This document is intended to stimulate discussion on these many options beyond the current government plan. We outline the main themes that we believe need to be considered before any further development of Point Lepreau takes place.

3.3 A Note from the Authors - *Reconciliation Starts the Path to Meaningful Consultation*

From its inception, we have been discussing the concepts and content of this document with Peskotomuhkati leadership to ensure that we are not perpetuating acts of colonialism or undermining Peskotomuhkati peoples' wealth of knowledge and experience. We share the following commentary as a 'north star' guiding the document.

Canada and Canadians are legally and morally obligated to recognize the rights and interests of Indigenous peoples. This obligation exists not only now and into the future but also into the past. Currently however, Canada's efforts to honour its duties are minimal.

When the Point Lepreau Nuclear Generating Station (PLNGS) was first proposed and then commissioned in the 1970s and 1980s, the governments of Canada and New Brunswick considered they had no obligation to inform or consult with Indigenous peoples of the territory, although the established treaties mandated a different course of action.

During the more than 40 years since then, governments continue to refuse to bring the original question to the table: Did the Indigenous peoples of this territory want the PLNGS in the first place? This question must be answered before deciding to extend the license, or life of this facility, or to add to the nuclear complex with more nuclear reactors. Governments have never fulfilled their original Duty to Consult. Plans for the future of the Lepreau site must not move forward until we reconcile the past.

Court decisions instructing Canada to have meaningful consultation have been turned into a question (another delay mechanism): What does consultation mean? While debates continue internally (using the Canadian legal system to decide), Indigenous input is ignored to reach unilateral government decisions. Governments maintain their status quo both in thinking and result. NB Power and the provincial and federal governments are now planning to build more nuclear reactors, so-called 'small modular nuclear reactors (SMRs)' at Point Lepreau. Nuclear proponents claim SMRs are a 'non-emitting' technology, but international organizations such as the Intergovernmental Panel on Climate Change (IPCC) as well as industry and environmentalists have documented the emissions and devastating social effects of uranium mining process, as well as the toxic releases of radioactive gasses generated by nuclear power plants and the forever legacy of dangerous radioactive waste.

The nuclear power lifecycle creates environmental sacrifice zones and harmful consequences associated with health and justice. Criticisms can also be made about the current attempts to consolidate and house Canada's nuclear waste in Indigenous territory in Ontario without attaining Free, Prior and Informed Consent (FPIC) (United Nations General Assembly, 2007).

Who is going to hold Canada's feet to the fire for enabling the desecration of shared territories with radioactive toxins for hundreds of thousands of years?

3.4 Use of Language

Confusing terminology about nuclear reactors is usually the product of marketing efforts by the industry. Communication can be confounded by jargon, specialized terms or phrases developed to expediate in-house conversations that are difficult for others to understand. Jargon therefore excludes 'non-experts', and many times, those with first-hand experience from participating in designing and deploying solutions.

On the topic of energy, in this document and in other writings on similar topics, it is important to be aware of the author's intent when using the terms, 'renewable energy', 'clean energy,' and 'zero carbon'. The word 'carbon' is often used as a proxy term for greenhouse gases and CO2.

'Clean energy' and 'zero-carbon' generally refer to energy production that produces less CO_2 than would be considered business as usual, and 'net zero' or 'carbon neutral' refer to processes which produce carbon but can be off-set somewhere else in the system, such as a process which generates CO_2, but also captures and stores it.

In this document, renewable energy refers to energy derived from sources that can naturally replenish themselves — wind and sun are the two most obvious examples. In our current system, no technology is truly zero emissions. Even the greenest technologies have associated emissions.

In communicating across sectors and stakeholder groups, another term that tends to cause confusion is 'colonial'.

The territory now referred to as Canada was first visited many times by explorers from Europe who came to North America before they eventually began establishing colonies in the 1500s. Colonies were developed based on the rules, cultures and traditions of the countries left behind. Therefore, colonists prioritized their own cultural values, behaviors, physical appearances, and objects while diminishing and destroying the colonized territory and its inhabitants. During colonization, the terms 'savage,' 'wild' and 'uncivilized' were used almost exclusively to describe the indigenous peoples. Europeans' sense of cultural and biological superiority, led to "civilizing missions" to save the uncivilized races from themselves (Paris, 2002).

The colonial mindset is the basis of our culture in Canada. To build a thriving and healthy society, we must reconsider what we believe to be common sense. In this document, we will provide only a small sampling of the numerous ways in which 'colonial mentality' continues to affect our daily lives. Canada's current policies, programs and procedures leave irrefutable evidence that it remains correct to describe Canada as a colonial society, in the present day. Many theorists and legal scholars have written extensively about Canada as a settler colonial society (see for example: Coulthard, 2014; Palmater, 2011; Wolfe, 2006).

4. NUCLEAR ENERGY IN NEW BRUNSWICK

4.1 History of Point Lepreau Nuclear Generating Station (PLNGS)

As described by Andrew Secord in his 2020 article, "Nuclear Power Decision-Making in New Brunswick, 1971-1975", the NB public utility first attempted to gain federal support for a New Brunswick based nuclear reactor in 1971. However, the federal Department of Finance did not support the proposal in the manner New Brunswick sought. The federal government was unwilling to take on the risk of capital cost overruns and poor operating performance of a provincially owned electrical generator and were doubtful that the utility could manage its own financial exposure (Reisman, 1972 as cited in Secord, 2020).

Secord further highlighted an analysis typical of the federal Department of Finance officials, reflected in the memo of Myles B. Foster on 29 March 1972, in which he concluded: "The corporation is a small, high cost utility with barely enough cash flow to finance its present debt. Its acquisition of two large nuclear reactors is the equivalent of a Volkswagen family acquiring a Cadillac as a second car." (Foster, 1972, as cited in Secord, 2020).

After the first failed initiative, new conversations regarding a heavy water/nuclear complex began in 1973. However, by October of the same year, the New Brunswick government had accepted the failure of its heavy-water nuclear proposal (Austin, 1973, as cited in Secord, 2020).

The next attempt for establishing nuclear in New Brunswick was the concept of two 600MW regional reactors, and although the federal government would still not provide the financing New Brunswick sought, by March 1974 the public utility's Board of Commissioners officially approved the nuclear reactor project (Board of Commission Minutes of 19 and 20 March 1974, as citied in Secord, 2020).

However, the public was still not won over, and in July 1974 a local meeting on the proposed generation station was held in Dipper Harbour, a small fishing village and the closest community to

the current Lepreau reactor. In a vote on the subject, three-quarters of the 200 people in attendance stood to express their opposition to the proposed Lepreau nuclear reactor (Thompson, 1974).

Beyond public approval, another hurdle for New Brunswick's nuclear project was the federal Environmental Assessment and Review Process. However, the official guidelines for a comprehensive environmental review were quickly adjusted to postpone the requisite one-year comprehensive assessment and require only a preliminary assessment to be competed in a period of four weeks. The resulting environmental report was released and one day was designated to hear public responses on April 3, 1975, in Saint John. The participants at the Saint John meeting were opposed to the nuclear reactor by a 5-to-1 ratio (Secord, 2020).

Committed to a nuclear path they were unwilling to abandon, and despite public disapproval, as well as the federal Finance department's concerns of inadequate economic and financial analysis (Gow, 1974, as cited in Secord, 2020), in 1975, a significant federal loan for the nuclear project was approved.

Nuclear energy has thus been part of New Brunswick's energy mix since Point Lepreau Nuclear Generating Station (PLNGS) was turned on in 1983, after years of construction delays and cost overruns. Indigenous nations were not consulted about the plan to build the PLNGS.

Photo above: Opponents of nuclear energy performing street theatre with a white elephant in front of NB Power's headquarters on January 26, 2011 in Fredericton.

Two decades later, the Lepreau nuclear plant was aging prematurely, and NB Power faced a decision: either shut the plant down or refurbish it (rebuild the reactor) at a cost of billions. Despite significant opposition by environmental groups and a recommendation from New Brunswick's Energy Utility Board to not refurbish the plant, NB Power went ahead. The refurbishment was a financial disaster, taking years longer than planned, and was $1 billion over budget (Bissett, 2012). The Lepreau plant opened again in 2012.

Indigenous nations were not consulted about the refurbishment of PLNGS, though during the relicensing process both the Peskotomuhkati and the Wəlastəkwiyik spoke against it.

4.2 PLNGS and Plans for Point Lepreau Today

The Lepreau nuclear plant currently supplies about 30% of the province's electricity usage however the supply is intermittent. In February 2020, NB Power's chief financial officer, Darren Murphy, acknowledged that Lepreau's record of breaking down more than expected has been the single largest weight dragging down the utility's financial results (Jones, 2021).

In October 2021, Herb Emery, the Vaughan Chair in Regional Economics at the University of New Brunswick, in his blog post, "Was Refurbishing the Point Lepreau Nuclear Generation Station a Mistake?" contextualizes his post by stating, "… the Point Lepreau Generation Station is most often discussed in terms of its operational challenges, cost over-runs and resulting debt for the province without delivering on the promised economic benefits." Emery goes on to quote the 2002 New Brunswick Board of Commissioners of Public Utilities' (the Regulator) recommendation that refurbishing Point Lepreau was "not in the interests of the province," as well as mentioning CBC news articles which pointed out that due to maintenance and disruption, Point Lepreau has doubled its 2002 refurbishment proposal 'downtime' projections.

Also In 2020, the Auditor General of New Brunswick reported that $3.6 billion of NB Power's $4.9 billion debt (or 74% of NB Power's total debt) is directly attributed to PLNGS. This amounts to a staggering debt load of more than $4,500 for every adult and child in New Brunswick.

Since nuclear energy production began at Lepreau in 1983, hundreds of tons of radioactive waste in used nuclear fuel rods have accumulated at the site, in aging concrete silos and cooling pools. NB Power pays more than $5 million annually as a member of the industry's Nuclear Waste Management Organization (NWMO) that has an annual budget of more than $100 million. The NWMO spends a significant portion of its budget in payouts to small rural communities in Ontario, trying to convince them that it is safe to build a "deep geological repository (DGR)" nearby.

However, no DGR is licenced to operate anywhere in the world, and there is significant opposition to the NWMO plans for a DGR in rural Ontario. Several Indigenous groups, including Chiefs of Ontario and the Wolastoq Grand Council in New Brunswick, have passed resolutions opposing both the proposed DGR plans and the construction of more nuclear reactors.

Despite the Lepreau plant being a financial boondoggle for the utility and provincial ratepayers, NB Power is keen to build more nuclear power plants on the Point Lepreau site. By September 2021, the New Brunswick government, in consultation with NB Power, had committed $30 million, and the federal government $56 million, to two foreign start-up companies recently set-up in Saint John to develop their speculative designs for prototype small modular nuclear reactors (SMRs), with a small part of the federal money going to NB Power and the University of New Brunswick. Importantly, the proposed new reactors are very different from the CANDU reactors and will take decades and billions of dollars to design and build, with no guarantee of success.

One of the New Brunswick SMR companies is proposing to build a reprocessing plant to extract plutonium from the existing spent nuclear fuel at Point Lepreau. The company, NB Power and the government are calling the process "recycling" even though less than 1% of the material could be used as new reactor fuel, and the remaining 99% would be transformed into highly radioactive liquid that will be difficult to manage and store safely. This risky and dangerous process has never been done commercially in Canada, and never with spent CANDU fuel.

Experts worldwide have condemned the use of reprocessing which has created some of the most radioactively contaminated sites on the planet. The reprocessing technique proposed for New Brunswick, called "pyroprocessing," is highly experimental. Environmental groups in New Brunswick have spoken out against it because of the potential risks to Peskotomuhkati territory at Point Lepreau, on the shores of the world-famous Bay of Fundy. New Brunswick's plutonium-extraction plan has also raised serious nuclear weapons proliferation concerns from American experts (O'Donnell & Edwards, 2021).

A statement by the Wolastoq Grand Council (2021) has pointed out the lack of consultation with Indigenous leaders, for the construction of the existing Point Lepreau CANDU reactor, the proposal for the new nuclear reactors on the site, and the plans to reprocess spent nuclear fuel.

Other Indigenous leaders in New Brunswick have also expressed opposition to plans for nuclear expansion in the province. In Saint John in 2018, an 'Indigenous Engagement Session' regarding the federal government's "SMR roadmap" was attended by Kopit Lodge - Elsipogtog First Nation, Mi'gmawe'l Tplu'taqnn Inc., Mawiw Council Inc., NB Power, Qulliq Energy Corporation, Ontario Power Generation, the Canadian Nuclear Association, Natural Resources Canada, the New Brunswick Ministry of Energy and the Project Coordinator, the Canadian Nuclear Association. As reported by the Nuclear Division of Natural Resources Canada (2018) some Indigenous participants expressed the view that nuclear energy has more drawbacks, or at least drawbacks that are perceived as being more serious, than other energy sources. Indigenous participants' comments and questions included one participant saying: "We Indigenous people are born asking the question - how do we stop the Earth from being killed?" Another Indigenous participant inquired, "What is the good of international conventions and agreements [such as those governing nuclear technology] that do not have enforcement mechanisms?"

The Wolastoq Grand Council's Resolution (March 2021) refers to UNDRIP articles and demands an end to nuclear energy generation and expansion in New Brunswick. The statement echoes a similar demand by the Chiefs of the Assembly of First Nations in 2018 (AFN, 2018).

The Peskotomuhkati and Wolastoq Grand Council have demonstrated leadership and demanded meaningful inclusion by intervening during the past two re-licensing hearings for PLNGS. Since autumn of 2021, the Peskotomuhkati have been preparing for their third intervention for the PLNGS relicensing hearings scheduled for early 2022.

Given the nuclear industry's many unfulfilled promises over decades, and opposition to expanding nuclear power by Indigenous communities and environmental groups in the province, many people are asking the obvious question: Why do government and political leaders continue to support and promote the industry? The answer is related to our political and economic structures, which are also responsible for the mismanagement of the natural ecosystem that has led to the climate crisis.

5. THE CLIMATE CRISIS

Indigenous societies once lived in balance with the natural world. However, over the centuries, political and corporate leaders have re-oriented the world to a socio-economic, political, and cultural system that has estranged most people from nature.

Canada's current economic goal is continuous growth through virtually unrestrained extraction of natural resources to maintain that growth. This goal does not consider ecological relations and has created the perilous state in which our culture and economy rewards self-interested behavior over care for shared cultural and natural resources.

Corporate institutions, including our governments, continue to destroy the retention and practise of Indigenous, land-based, and ancestral knowledge, for example, through the denial of access to lands and the destruction of territory. Such actions, as well as the insistence of Indigenous participation in the Indian Act, 1876, and Canadian political, education and justice systems, are exterminating the language, practises and ceremony used to share knowledge.

The same worldview that leads to the destruction of this knowledge is ingrained deeply in our socio-economic system. Industry and government partners block, often with force, the implementation of alternative worldviews (for example, the 200 member RCMP deployment in Rexton, NB, in 2013, and the confrontation with Sipekne'katik First Nation at St. Mary's Bay, NS in 2020, among many others).

The system is restraining our ability to re-create alternative systems of governance and economy that honour biological and cultural diversity. Our current ecological, economic and climate crises are direct results.

5.1 Global Strategies for Tackling the Climate Crisis

The global consensus is clear and identified in the latest reports of the Intergovernmental Panel on Climate Change (IPCC 2018, 2021): we are in a climate emergency; we need to rapidly reduce our use of fossil fuels by 2030. Recognizing the devastating results of status quo, three main strategies have been identified worldwide to address the climate crisis, reduce greenhouse gases, and meet commitments made in global agreements:

- **Cut energy waste as much as possible (reduce energy demand)**
- **Make the electricity supply as low carbon as possible (decarbonize electricity and other fuels)**
- **Use clean electricity to power activities now largely powered by fossil fuels (electrification of energy).**

Today, there is an extra push to advance these strategies for a sustainable economic recovery from the COVID-19 pandemic. Recently, the International Energy Agency (IEA) (2020) urged governments worldwide to ensure their COVID recovery efforts are used to modernize energy systems.

5.1.1 Reducing Demand

Most energy systems rely on the 'grid,' the infrastructure used to produce, use, and store electricity. To retain the service levels expected, while relying increasingly on renewable energy, the grid needs to become more flexible or responsive.

'Flexibility' in an electrical grid means the ability to balance supply and demand in near real-time; it is the coordination of the system.

Reductions in energy demand are encouraged in two ways: changing habits of energy use (getting people and organizations to reduce energy consumption) and lessening energy waste (building smarter and retrofitting to reduce loss from leaky infrastructure). For decades, energy conservation messaging and programs have been promoted with varying degrees of success.

More recently in Canada, federal and provincial governments and energy utilities have supported enabling some consumers to produce their own renewable energy and receive credit on their power bills (net-metering). These programs have engaged customers interested in energy consumption, but these programs will not necessarily reduce energy demand, and many people cannot afford to participate.

Various grants for home renovations leading to reduced energy usage are available from time-to-time from federal and provincial governments. In recent years, many of these programs have been in high demand. While many of these programs are successful in reducing energy waste, overall, the same cannot be said for their role in climate justice. Whether designed for low income, seniors, commercial property owners or landlords, most programs require the participant to pay for costs upfront and be reimbursed later. This requirement excludes the participation of many low-income earners. Other challenges of these programs include budgets that do not meet the demand. For instance, in New Brunswick, the program designed for low-income earners has a backlog of approximately 300 applicants which will remain on hold until more funding is directed to the program.

In New Brunswick, NB Power charges big industrial organizations a lower cost than household consumers for each unit of electricity, which does not encourage industries to focus on energy conservation.

The newest focus for reducing energy demand is Smart grid technology. As the internet is a network for exchanging information, so Smart grid technology will exchange electricity and offer increased opportunity for interaction, with the goal of making the energy infrastructure more efficient. The Smart grid aims to respond in real-time to ever-changing electricity supply and demand and to identify transmission and distribution problems more quickly. Many other programs and strategies could be implemented in the near future to support reductions in energy demand and more rapid household transition to renewable energy, including a net-metering system and tax incentives including removing HST on solar panels.

5.1.2 Decarbonization and Electrification

The goal of the two other main greenhouse gas reductions strategies, decarbonization and electrifying our energy supply, is to rid ourselves of thermal power sources based on combustion of fossil fuels (gas, diesel, oil, coal).

The benefits of electrification vary depending on the resources used to generate electricity. Decreasing energy from combustion can be accomplished by replacing fossil fuels with renewable energy sources such as solar, wind, geothermal and hydro.

Energy is renewable when it comes from a source that is not depleted when used. Notably, nuclear energy is not renewable, and, as will be discussed shortly, new nuclear does not have a role to play in tackling the climate crisis.

In the residential and commercial buildings sector, electrification currently focuses on converting fossil fuel energy sources of heating and cooling. Heat pumps are one technology enabling widespread building electrification and have been popular due to government sponsored incentive programs.

The transportation sector is another large opportunity for electrification and transition away from fossil fuels. Electrification is underway with passenger vehicles and public transportation, as well as short haul trucking. Research is also in progress to make air travel electric.

The industrial sector has diverse energy needs. Currently most of its energy consumption is fossil fuels. In 2020, McKinsey & Company (Roelofsen et al., 2020.) estimated that of all the fossil fuels that industrial companies use for energy, almost 50 percent could be replaced with electricity using technologies available today. Over the next 10 years, advancing technologies and innovative policy assures the conversion of industrial energy sources beyond the currently secured 50%.

5.2 The Need to Integrate Environmental Racism and Climate Justice Considerations

Environmental racism refers to the deliberate targeting of Indigenous and racialized communities for waste facilities, as well as the official sanctioning of life-threatening presence of poisons and pollutants in their communities. The climate justice path is guided by the perspectives of Indigenous and other communities resisting environmental racism (Deranger, 2021; LaDuke, 1994; LaDuke & Cowen, 2020; McGregor, Whitaker & Sritharan, 2020; Roosvall & Tegelberg, 2015; Spiegel, 2021; Waldron, 2018).

There are many Canadian examples of environmental racism, including the ongoing crisis in First Nations that do not have safe drinking water, unresolved mercury pollution on the Grassy Narrows First Nation where a staggering 90 per cent of residents have mercury poisoning, the devastating impact of uranium mining on Indigenous communities in Saskatchewan as well as the Serpent River First Nation near Elliot Lake in Ontario, and the manipulation of Indigenous communities to accept the country's toxic waste from nuclear plants. Research shows that Indigenous and racialized communities, including women and gender minorities, disproportionately experience the effects of environmental destruction (Lieu et al., 2020; Terry, 2009).

In the Maritimes, the names Indian Point and Africville recall communities denied the most basic of services such as running water, electricity, indoor plumbing, or garbage removal. In Africville, after pushing people into areas deemed inhospitable, the city of Halifax further developed fertilizer plants, slaughterhouses, prisons, human waste disposal pits, and the Infectious Disease Hospitals to be placed within the Africville community (Khan, 2021). In Saint Andrews, New Brunswick, land once known as Qonasqamkuk, is an area now commonly referred to as Indian Point. This ground, sacred to the Peskotomuhkati, is the burial grounds for the Nation's chiefs, but has been desecrated with an RV park and the town's sewage lagoon.

Anti-racism perspectives insist that, instead of enabling and rewarding ecological destruction and human exploitation, our energy systems must support and require ecologically restorative, socially just, and culturally rejuvenating human activity (Occidental Arts & Ecology Center, 2019).

A National Resources Canada analysis of wildfire data dating back to the 1950s found that about four million people – 12 per cent of the country's total population – live near or within at-risk forest areas. But for First Nations people living on-reserve, 32.1 per cent were at risk of natural disasters driven by climate change (Erni et al., 2021). In 2013, the Auditor General of Canada reported that flood emergencies occur more often in First Nations communities than elsewhere in Canada (Auditor General of Canada, 2013, as cited in Thistlewaite et al, 2020).

Forced migration, for most people, is simply a move to a better place but for Indigenous peoples it is a move from all the things that define them as Aboriginal people and the homes of their Nations.

Many environmentalists are arguing that swift conversion to renewable energy sources instituted to avoid the worst potential effects of climate change, must centre on climate justice.

Climate justice has been discussed for decades, but one can credit Naomi Klein's widely cited books This Changes Everything: Capitalism vs the Climate (2015) and On Fire: The Burning Case for a Green New Deal (2019) for popularizing the term. Klein's books explain how climate injustice is linked to social, economic and political systems, with its roots in capitalism, colonialism, the patriarchy and other systems of oppression.

Climate justice acknowledges that climate change can have different social, economic, public health, and other adverse impacts on underprivileged populations. The central argument for climate justice focuses on reshaping climate action from a technical effort to cut emissions, into an approach that also addresses human rights and social inequality (Gabbatiss & Tandon, 2021).

Many massive hydroelectric projects–in Canada and elsewhere–have destroyed or radically reduced the ecological integrity of Indigenous territories, adding social injustice to the list of hydro's negative impacts. The mining associated with battery storage solutions, and solar panels and their recycling (as with nuclear), also have many detrimental effects on communities and the environment.

Integration of climate justice into renewable energy and climate action discourse has only started and is beginning to be addressed through industry-led, volunteer, responsible sourcing and certification initiatives. Principles grounded in the frameworks of international and regional human rights law, that are guiding climate justice initiatives include: respect for and protection of human rights; supporting the right to development; sharing benefits and burdens equitably; ensuring that decisions on climate change are participatory, transparent and accountable; highlighting gender equality and equity; harnessing the transformative power of education for climate stewardship; and using effective partnerships to secure climate justice (Mary Robinson Foundation, 2020).

An example of global energy trends that consider climate justice, is Distributed Energy Resources (DER). DER systems are small-scale renewable power generation sources located close to where electricity is used, contributing to decarbonization. Examples range from household to community installations of solar, wind and geothermal. Many DER systems can feed into the grid or isolate from the grid. These systems are an expression of energy sovereignty, and an opportunity to lower electricity bills. However, many barriers to participation exist.

Proposed New Brunswick-based solutions steeped in climate justice principles are integrated into the work of Chris Rouse, detailed in section 6.5, New Brunswick's political landscape and energy discourse.

5.3 Nuclear Energy and the Climate Crisis

There is no such thing as a “non-emitting” energy production technology. All energy sources have a greenhouse gas footprint. According to Sovacool (2008), nuclear energy from reactors like the CANDU, using uranium mined and processed in Canada as fuel, has a life-cycle carbon footprint higher than onshore wind energy but less than PV solar energy.

However, wind and solar energy do not emit dangerous gasses during operation. The nuclear industry promotes itself as “non-emitting”, but nuclear reactors produce and emit radioactive gasses including tritium–a carcinogen–when operating. In addition, the large amount of concrete used to build the reactors and the storage silos that house the spent fuel is a major emitter of GHG. The cement industry is the biggest single emitter of CO2 globally. A 2018 landmark report by Chatham House found that cement is responsible for around eight per cent of global emissions (Preston & Lehne, 2018).

Nuclear energy played a large role creating the climate crisis. Soon after the first commercial nuclear power reactor entered service in Ontario in 1968, nuclear proponents promised Canadians energy that would be “too cheap to meter,” thereby creating an unsustainable demand for energy. We are using too much energy, and the wrong kinds. The nuclear promise of inexpensive energy was never realized - it is the most expensive baseload energy on the grid. Given the very poor economic performance of large nuclear reactors, the industry is now promoting small nuclear reactors.

The nuclear industry is claiming nuclear energy is required to tackle the climate crisis, but this is also untrue. The World Nuclear Industry Status Report 2021 noted that large reactors have failed and have become irrelevant in the fight against climate change. Mycle Schneider (2021), the report lead author, noted that small modular reactors would never be ready in time to make a difference to the climate crisis, and even if they worked, it would take centuries to build enough to make a difference.

Among other authors, Makhijani & Ramana (2021) found that small modular reactors cannot make a significant dent in the need to transition rapidly to a carbon-free electricity system. Prospects are dismal that any SMR can make a difference. The prospects for reactors of the speculative designs proposed for New Brunswick are even more remote. Small modular reactors will not achieve cost parity with large reactors, which themselves are prohibitively expensive. Even if SMRs could achieve cost parity with the large reactors, the electricity they produce will still be far more costly than alternative sources of carbon-free electricity.

It is important to note that many groups across Canada have voiced their opposition to spending public funds to build new nuclear reactors as part of a climate action plan. More than 120 civil society, public interest and Indigenous groups–including 16 groups in New Brunswick–signed a public statement calling the proposed new nuclear reactors (SMRs) a “dirty dangerous distraction” from climate action. Signatories included our project RAVEN and the Coalition for Responsible Energy Development in New Brunswick (CRED-NB) of which RAVEN is a founding member.

6. THE SPECTRUM OF ENERGY FUTURES AND CLIMATE DISCOURSES

6.1 The Socio-economic Landscape of Renewable Energy

Worldwide, most versions of COVID recovery include a focus on reinvigorating the 'economy.' We note the original concept of 'economics' translates to 'management of the home.' When we consider 'home,' we think of not solely our income but also physical places, the natural environment, and our communities and institutions, all of which build wealth of another kind.

We know for certain that the sun will travel across the sky each day, wind patterns will persist over time, water will always flow downhill, and geothermal heat will always dissipate. These perpetual and predictable sources of 'fuel' are generally abundant, widely accessible, and freely available (Stephens, 2019), thereby representing huge potential to re-shape an inclusive economy and energy system. Compared to fossil fuel production, deriving energy from renewables is not tied to geographic location, giving people access to energy without leaving their communities, and to potentially develop new livelihoods, locally.

Renewable energy generated and deployed locally can enable individuals, households, communities, and organizations to own and manage their energy infrastructure, offering widespread opportunities for local control and financial benefit. Widespread operation of personal energy storage technologies - including batteries in electric vehicles - will make a community-deployed nuclear-free renewable energy future possible.

One commonly quoted challenge with renewable energy systems is intermittency (sun does not always shine, and the wind does not always blow). However, system reliability can be assured by drawing on expanded locally appropriate mixes of renewable energy within a larger energy infrastructure including varied current storage technologies and advances in grid management. This avoids the vulnerability of large, centralized power sources where a single shutdown or transmission breakdown can have greater reliability impact (Lovins & Ramana, 2021).

Scientists in Canada and around the world are developing models for transforming our energy systems to reliance on renewables. For example, a newly released Pembina Institute report, “Towards a Clean Atlantic Grid”, found that in New Brunswick and Nova Scotia clean energy portfolios can provide the same services as gas and nuclear power plants at a lower cost per unit of energy over the lifetime of the energy source, even without reliance on imported hydroelectricity (Gorski & Jeyakumar, 2022). Prominent Stanford University professor Mark Jacobson also recently outlined a roadmap for the United States to meet its total energy needs using 100% wind, water and solar by 2050 (Clifford, 2021).

While encouraging an all-inclusive view of the economy, it is easy to tout the benefits of the renewable energy transition using only monetary indicators. In 2020, during the COVID pandemic, while the globe experienced the largest collapse in energy demand since World War II, renewable energy grew worldwide, at its fastest pace in almost two decades (Clean Energy Canada, 2021).

In Canada, between 2010 and 2017 the sector grew a third faster than the Canadian economy as a whole (Clean Energy Canada, 2019). The clean energy transition requires significant amounts of renewable energy to be installed and integrated and continues to create varied economic activities.

The clean energy sector is providing employment opportunities related to both energy supply and demand. Examples are emissions detection and control, low carbon machinery and processes, field and maintenance technicians, and cybersecurity. Opportunities also exist for growth in clean buildings and transport systems, including green architecture and construction, HVAC and buildings control systems, and energy-saving building materials. The clean transportation sector can provide more than half of clean energy jobs by 2030 (Clean Energy Canada, 2019).

Job growth is reliant on government policies, transition planning, investment, and committing to an emission-free electricity supply by 2035. For example, clean energy jobs would grow twice as fast under the federal government’s updated (2020) climate plan, representing 85,000 more positions by 2030 than under the 2017 federal plan (Rolfe, 2021).

6.2 Climate Capitalism vs Climate Justice

In Canada, as in many other countries, we increasingly encounter extreme heat, wildfires, droughts, and flooding, year after year. Experts agree that climate change is responsible for many of these extreme weather events. At the same time, we see an emerging political debate about how to tackle the climate crisis.

Traditional Indigenous knowledge as well as modern climate science informs us of a crossroad, one path leading to ever increasing climate disruption, and another path where global CO2 emissions are rapidly reduced, with a decline of 50 percent or more by 2030.

The two ends of the debate spectrum, illustrated in Chart 1 below, cannot be neatly separated but clearly have different visions. At one end is corporate energy growth. “Climate capitalism” describes the elite energy transition, coordinated actions to address the climate crisis with top-down high-technology strategies (Newell & Paterson, 2010; Sapinski, 2015, 2016, 2019; Adkin, 2017) including carbon capture and storage (Markusson et al., 2017) geoengineering (Sapinski et al. 2020; Surprise 2018) large scale corporate-owned renewable generation (Di Muzio, 2015), and new nuclear reactors (Edberg & Tarasova, 2016; Makhijani & Ramana, 2021).

In climate capitalism, low-carbon energy sources slowly replace fossil energy to “ecologically modernize” the capitalist order without further changes to the structures of economic growth and political power (Carroll, 2021; Graham, 2021; Sapinski et al., 2020). A growing section of the elite capitalists now promote projects to reduce greenhouse gas emissions, such as new nuclear power plants, provided these technologies offer financial benefits to the promoters; their end goal is to ensure the continuation of the free-market, growth economies (Graham, 2021; Sapinski et al., 2020).

Competing with the growth and high-technology narrative is the renewable energy and wider climate justice discourse, embracing an anti-capitalist, anti-colonialist and feminist perspective. It highlights reductions in energy use and solidarity with communities experiencing the impact of resource extraction associated with energy production.

This end of the spectrum aims to face head on, conflicts between growing renewable energy and storage capacity and “the destructive social and environmental effects [of] mining the metals and minerals required to create that capacity” (Mining Watch Canada, 2020). Climate justice also acknowledges that continued economic growth is incompatible with sustaining ecological integrity (Dhara & Singh, 2021). Climate justice advocates must “come up with plans that balance the different kinds of justice within the ecological limits of a finite planet” (Ddamba, Nelson & Ramana, 2020). A degrowth future will necessarily involve a transition to a post-capitalist and post-colonial society.

Climate justice advocates insist that the human desire for energy must respect the availability of the ecosystem’s energetic gifts, not demand sacrifice. Transitioning to renewable energy not only is necessary for our survival but also offers much more than only environmental benefits. Renewable energy can potentially transform society by redistributing wealth, health, and political power in ways that nuclear energy cannot (Stephens, 2019).

Chart 1: Spectrum of Energy Futures

UNLIMITED GROWTH/ CLIMATE CAPITALISM	ISSUE BEING ADDRESSED	DEGROWTH/ CLIMATE JUSTICE
Energy expansion / growth energy	**Overall vision**	Energy conservation / climate justice
Expensive purchased acceptance of groups, communities, individuals	**Indigenous knowledge**	Aligns with Indigenous teachings, relationship with all our relations
nuclear, carbon capture, coal	**Energy production**	renewable: wind, solar, storage
intensified encroachment on nature	**Environment**	enhances biodiversity
centralized in specific communities	**Community development**	spread out over more communities
provincial grid infrastructure for distribution of energy	**Transmission infrastructure**	micro-grids, shared storage and distribution connected to Smart-grid
large infrastructure footprints, sacrifice zones, expensive operations and maintenance	**Impact on local wildlife**	local management and maintenance, need for better technologies, i.e., wind farm impact on birds
High impact	**Lifecycle environmental impact**	medium or low impact
Requires heavy, very expensive private security operation	**Relation to military-industrial complex**	Contributes to local security systems (fire, policing, etc.) through local tax base
Production of radioactive materials	**Health risks**	Minimal health risks
Anti-nuclear movement	**Social license / social acceptability**	Wind issues would need to be worked out
Nuclear meltdown	**Potential for critical catastrophe**	Need to be mindful of impact of mining impact of renewables
Nuclear and carbon capture are prohibitively expensive	**Economic costs**	Renewable energy costs are lower and dropping
Nuclear waste impact, impact of large-scale hydro	**Impact on water sources**	Need to be mindful that even small-scale hydro has an impact on water sources
Large infrastructure creating permanent sacrifice zones	**Land and water requirements / footprints**	Alternative land use (solar installations on car parking lots, rooftops, etc.); local, smaller installations of wind farms
Expensive marketing and sales teams required to maintain expensive administration and convince public	**Marketing efforts**	Local enterprises with local employment and immediate investments recognized
Large infrastructure requires high administrative costs and regulatory needs/ oversight	**Administrative Cost requirements**	Distributed energy network has local administration requirement, smaller scale
Very expensive Federal regulatory requirements	**Government involvement**	Provincial and municipal oversight and engagement addressing local desires
Benefits one region	**Tax benefits**	Benefits all communities and municipalities
Skills concentrated into one region	**Energy expertise**	Local skill development, providing local choices and opportunities

6.3 Indigenous and Canadian Climate Discourses

Recent centuries have witnessed the horrific and purposeful destruction of Indigenous societies and ancestral knowledge globally, including here in Canada. Over the last few decades, Canadians have begun to understand the violent history of our country through formal investigations, including the Royal Commission on Aboriginal Peoples (1991-1996), and more recently the Truth and Reconciliation Commission (2008-2015) and the National Inquiry into Missing and Murdered Indigenous Women and Girls (2016-2019). Canadian judicial, science and educational institutions have started to learn from the expertise of Indigenous knowledge systems.

Society is slowly transforming from long-held colonialist and reductionist views to learning that relationship is the key to survival. This awakening to the 'whole' is changing perceptions of reality and the understanding of human duties to other life forms (Sapinski et al., 2020). However, the implications of these new understandings have not reached society at large, as evidenced in Canada's two recent climate plans.

Last year, the Indigenous-led organization Indigenous Climate Action released Decolonizing Climate Policy in Canada: Phase 1 Report (ICA, 2021). The work investigated whether Canada's two climate action plans, the 2019 Pan-Canadian Framework on Clean Growth and Climate Change and the 2020 A Healthy Environment, A Healthy Economy, address the causes of climate change and both respects and meaningfully includes the rights, knowledge, and approaches to climate action of Indigenous Peoples.

Indigenous Climate Action researchers found that although both federal plans repeatedly mentioned Indigenous peoples and their rights, knowledge, and climate leadership, they were excluded from the plans' development. In some cases, there was active exclusion which, as stated in the ICA report,

> **"…constitutes a violation of Indigenous rights to self-determination and to free, prior and informed consent (FPIC), as defined by the United Nations. Additionally, this blatant exclusion conflicts with the Liberal government's commitments to reconciliation and Nation-to-Nation, Inuit-Crown, and government-to-government relationships. It also ignores many of the Calls to Action emanating from the Truth and Reconciliation Commission report and other important government-led inquiries, including the Royal Commission on Aboriginal Peoples (RCAP) and the National Inquiry into Missing and Murdered Indigenous Women and Girls (MMIWG)."**

Additionally, Indigenous Climate Action researchers identified that policies and proposed actions contained within the federal climate plans are also problematic. Both plans allow for continued fossil fuel production – a primary source of GHG emissions and a major contributor to Indigenous rights violations in Canada. Both plans also fail to address the inequalities continually reproduced through ongoing colonial relations and policies in Canada. The failure adds to negative impacts to Indigenous peoples and violations of Indigenous rights, perpetuating the causes of climate change.

In 2018, the federal government released the industry-led Canadian Small Modular Nuclear Reactor (SMR) Roadmap, claiming that the proposed nuclear technologies will contribute to climate action. This initiative represents the latest strategic tactic by the nuclear power industry in Canada, active for more than half a century, to anchor its place in the energy generation mix. The industry works closely with the government to maintain its dominance in the public imagination and the public sphere (Babin, 1985; O'Donnell, 2021; Secord, 2020; Sovacool & Ramana, 2015).

Coordinating with the SMR Roadmap, the governments of Canada, New Brunswick, Ontario, Saskatchewan and Alberta are currently referencing the climate crisis as a rationale to support the nuclear industry. The federal and New Brunswick governments as well as the public utilities are subsidizing the development of new nuclear reactors, claiming that their future development is essential to lower GHG emissions (NB Power et al., 2021). As already noted, independent research has debunked these claims: in fact, these nuclear plans delay climate action (Makhijani & Ramana, 2021; Ramana, 2016).

Delayed climate action represents a continued assault on Indigenous nations and all Canadians. An energy transition aligned with climate justice, Treaty rights, the recommendations of the Truth and Reconciliation Commission and the United Nations Declaration on the Rights of Indigenous Peoples, will require transformative social change but this will happen safely when guided by Indigenous principles. Orderly transformation of our energy system will prioritize local and community-controlled renewables, scale-up and mainstream cooperative models, and increase publicly-owned renewable energy infrastructure (Bozuwa, 2018; Stephens, 2019).

6.4 Atlantic Energy Landscape and Discourses

The Eastern Interconnection is a grid with interconnections from New Brunswick, Quebec, Prince Edward Island, Nova Scotia and New England that extends west to the US Great Plains, and south to Florida. These interconnections lower the need for additional generation capacity to be committed and online at any given instant to serve customers. Connections that can balance highs and lows in supply and demand are very important for the successful transition from fossil fuels to renewables.

The federal government and provincial partners have been developing the Atlantic Clean Power initiative. Across the region, the initiative aims to: evaluate different 'clean' electricity options; forecast electricity demand; identify the most cost-effective and critical transmission projects needed to move power and further integrate markets; and determine the mix of electricity resources needed to meet future demand. In January 2020, Atlantic premiers agreed on the creation of a regional grid that transmits hydroelectricity from Labrador and Quebec to the Maritimes (Timmins and Booker, 2020).

These types of interconnections could help decarbonize electric power by creating more opportunities to add hydro, solar and wind generation where the best resources are available, sending the power generated to areas where the sun is not currently shining, and the wind is not currently blowing. Adding geothermal to the energy supply options could also provide for a constant contribution of renewable energy but that option is not widely discussed in the Maritimes. However, the importance of integrating and applying a climate justice lens has not yet been recognized or described in any government documents about the initiative.

Investigations led by the Conservation Council of New Brunswick (CCNB) and the Ecology Action Centre (EAC) and undertaken by East Coast Environmental Law show that government rules prevent utilities from considering the social and environmental costs of our electricity choices. The prevailing regulations also fail to signal the need to plan now for a zero-emitting electricity system over the next 20 to 30 years. These requirements stand in the way of spending now to help households spend less on energy in future. In other words, government rules pose barriers to securing the best outcomes for our health and households through clean renewable electricity choices (CCNB, 2021). Government rules can of course be changed.

The Conservation Council of New Brunswick and the Ecology Action Centre have taken planning a step further than the government's Atlantic Clean Power initiative, with their Atlantic Vision for Clean Electricity (CCNB, 2021). The Vision discusses the transition of our energy to clean, renewable, and sustainable sources with a plan to focus on affordable and reliable power. The Atlantic Vision is embedded within a Just and Green Recovery from the COVID-19 pandemic. As described by the David Suzuki Foundation, a just recovery addresses the pre-existing crises of ecological degradation, climate change, colonialism, social inequity, and human rights abuses (David Suzuki Foundation, 2021).

Two significant differences exist between the government-led Atlantic Clean Power initiative and the non-government Atlantic Vision for Clean Electricity. The first is the climate justice component, the second is the definition of 'clean' power. The Atlantic Vision does not include nuclear power as clean electricity, an absence consistent with research and environmental perspectives (CCNB, 2021).

Although the governments' Atlantic Clean Power Initiative thus far focuses on hydro, the fact that New Brunswick has signed onto the SMR Roadmap ensures that nuclear is embedded in the provincial government's vision for the future.

6.5 New Brunswick's Political Landscape and Energy Discourses

New Brunswick has been described as a feudal society, with an economic and political arrangement led by an elite minority wanting to steer the economy in their favour (Deneault, 2019a; 2019b). In this rural province, with an economy largely dependent on extractive forestry and oil refining for export, the dominant energy proposals in New Brunswick envision continued economic growth with centralized energy production.

In 2016, the provincial government introduced "New Brunswick's Climate Change Action Plan: Transitioning to a Low-Carbon Economy" which included 118 actions aimed at reducing GHG emissions while promoting economic growth and increasing the province's resilience to climate change through adaptation.

The government's Standing Committee on Climate Change and Environmental Stewardship is currently holding mandated hearings to review the action plan. A presentation to the Committee by the Conservation Council of New Brunswick noted that although progress on the actions has been made, there is a need for strategic longer-term planning and more aggressive measures. The per-capita emissions in New Brunswick are among the highest in Canada (Comeau, 2022).

As evidenced by its successive Integrated Resource Plans (IRPs), the public utility NB Power remains entrenched as a nuclear energy player, refusing to look seriously at distributed and renewable energy alternatives. The situation does not appear to be changing, although there are some hopeful signs.

New Brunswick has been developing electric vehicle charging infrastructure and was the first fully connected province in Canada with a DC Fast charging network for electric vehicles. Most recently,

the New Brunswick government announced financial incentives for electric vehicles.

In New Brunswick, fewer than 300 households have renewable energy systems tied to the grid (Reeder, 2021). This low uptake of household-level renewable energy generation (such as rooftop solar panels) suggests many barriers to participation exist. An unknown number of households are off-grid using renewable energy. NB Power and partners are currently piloting two community, grid connected DER pilot projects, one each in Shediac and Moncton which aim to increase grid resilience and lower grid emissions.

Pressure for more renewable energy generation is coming primarily from non-government organizations and social movements. The climate action movement in New Brunswick is linked to a broad network of environmental and other social justice groups that becomes visible at the 'Fridays

for Future' and Extinction Rebellion protests in Fredericton, Moncton and other places across the province (O'Donnell 2020; 2019). The movement is supported by student groups in most of New Brunswick's universities, as well as academics who use peer-reviewed research to validate the movement's claims.

The public's desire for climate action is growing in strength yet has not translated to government action. The significant focus on nuclear energy expansion - justified as NB Power's contribution to climate mitigation – is on hypothetical and unproven technologies: small modular nuclear reactors (NB Power et al., 2021; Poitras, 2021).

As previously discussed, academic literature about small modular nuclear reactors (SMRs) in Canada (Froese, Kunz & Ramana, 2020; Ramana, 2021) demonstrates that this discourse requires further examination. The plans for New Brunswick, including a breeder reactor and a reprocessing unit to separate plutonium from used nuclear fuel, align with the energy growth paradigm, and promote the long-standing (but repeatedly failed) dream of limitless nuclear energy.

Another of the many problems with New Brunswick's dominant proposals is that citizens want climate action now. Research on attitudes toward energy choices found that most New Brunswickers desire a renewable energy future using low carbon technologies which can be deployed now, that do not produce nuclear waste. These values are at odds with the government's proposals (Comeau, 2021).

For transition efforts to ramp up, energy literacy is necessary for growing the confidence of utilities as well as residential, business, and industrial ratepayers. Government priorities, policy and programs will need to change. The Conservation Council of New Brunswick (CCNB) and the Ecology Action Centre (EAC) have already identified many of the necessary policy changes needed in their Atlantic Energy Vision, discussed previously.

In addition to the work of Louise Comeau, director of climate change and energy solutions at the Conservation Council of New Brunswick, methods for improving climate justice within New Brunswick's energy transition planning have been proposed by New Brunswick's "Canadian Energy Watchdog," engineering technologist Chris Rouse. Rouse has developed a plan, based on "least cost" environmental, social, and economic principles, which relies heavily on public financial investment using carbon tax funds and the resulting compound interest. The plan seeks to serve NB shareholders and ratepayers, and to eliminate NB Power's debt. Public financial investment makes sense in the context of non-capitalist energy production and shared benefits.

Based on his 2019 work, Rouse indicates the reinvestment plan would provide NB Power all the capital needed to transition NB to a low-carbon economy. Savings would come from displacing fossil fuels and instead use purchased power, increased sales from fuel-switching of the automotive and industrial sectors to electricity, as well as increased revenue from efficiency investments. The efficiency investments would generate $1.8 billion in net earnings over the next 10 years, providing the economic infrastructure for the transition. Rouse's plan was reviewed and verified by UNB Saint John Associate Professor of Economics Rob Moir (Korn, 2019).

Many rightsholders, locally and across the country, are demanding meaningful inclusion in energy planning and development and have offered leadership and pathways to solutions. Indigenous communities, including those in New Brunswick, have led and/or are developing renewable energy projects (Wisokolamson Energy Project, developed by the Woodstock First Nation and partners, Wocawson Energy Project, developed by the Tobique First Nation and partners as well as the Oinpegitjoig Wind Project, in development with Pabineau First Nation and partners).

7. OPTION B: IMAGINE THIS - POINT LEPREAU IN THE YEAR 2050

It's early June 2050 at the "Lepreau Energy Accelerator Project (LEAP)" site on the Bay of Fundy in New Brunswick. About 150 people are working outdoors on projects. LEAP staff, supervised by Indigenous elders, are moving plants from the native plant restoration gardens to the remediation sites. In two more decades, with continued TLC, almost all the former nuclear site will be covered with thriving native vegetation.

The retired Point Lepreau CANDU nuclear reactor and the storage compound for toxic high-level radioactive waste (silos filled with spent nuclear fuel rods) remain fenced off with high-security restricted access only. The facilities are the responsibility of the federal government, which is overseeing the forever legacy of toxic, dangerous radioactive waste created while the Lepreau reactor was operating. All federal taxpayers are on the hook for the major portion of the storage costs, with New Brunswickers paying a percentage, forever.

When the Point Lepreau CANDU reactor was finally shut down in 2030, the federal government bought the land from NB Power and transferred ownership to the Peskotomuhkati Nation, in a "land back" agreement, part of a decades-long transfer of authority and recognition to the local Indigenous peoples. Before its closure, the reactor provided about 30% of New Brunswick's electricity but also hundreds of tons of toxic radioactive waste. The site of the reactor and the high-level radioactive waste storage was leased back to the federal government in perpetuity.

When Lepreau closed, governments across Canada were continuing to promote new nuclear development. Their agenda was to delay climate action by running fossil fuel and coal energy power plants beyond 2030, claiming that inexpensive nuclear power was on the horizon. The nuclear industry had been making that promise for decades but had never delivered. By 2030, the public was finally fed up with the nuclear industry fantasy.

Finally, public outrage at the high costs of the operation of the Lepreau reactor forced the government to shut it down in 2030, and it took until now – more than 20 years later – to pay off the four-billion-dollar public debt the Lepreau nuclear plant had accumulated for the public utility NB Power. The costs of managing the spent nuclear fuel will continue forever.

Another 100 or so LEAP staff are busy inside the three-storey LEAP administration building. Thirty years ago, workers in the same building toiled on paperwork for monitoring procedures to ensure the dangerous radioactive elements produced by the CANDU reactor were as safe and secure as possible. When in operation, CANDUs gave off high levels of the carcinogenic material tritium.

Hopping around the Point Lepreau shoreline at low tide are the stragglers of the millions of migratory birds that use these feeding grounds. Rich marine life makes the Bay of Fundy one of the natural wonders of North America. Boats are bobbing offshore, testing water quality and doing fish counts. Now that the CANDU reactor is no longer sucking in cooling ocean water through its intake valve, thereby killing millions of fish every year, the natural balance of marine life is slowly returning to the Bay.

The jewel of the Renewal Project is the renewable energy demonstration centre with bladeless wind turbines and solar arrays connected to the electrical grid infrastructure. Point Lepreau is now famous for two things: the Indigenous-led nuclear reactor decommissioning project, and the renewable energy demonstration centre with models that will not disrupt bird migration.

By 2035, what was then the biggest bladeless wind energy centre in the world at Point Lepreau, with 3,000 units, was generating 300MW of power. Since then, another 1,000 units have been added.

Bladeless models were chosen to eliminate the potential disruption to the migratory bird routes. The vibrating bladeless models, each about 3 metres high, were installed very close to each other. Unlike wind turbines with blades, the bladeless turbines work better in a large community of units, so it was easy to scale up after the first models proved successful. Now the wind energy centre is generating four times the amount of energy that the experimental ARC nuclear reactor had planned to generate, plans abandoned when the project failed to raise the $2 billion required for its construction. The solar array project further inland in collaboration with local community landowners is a knockout. At a cost of $500 million, it is already generating 100MW power from renewable energy. The wind and solar plants combined generate almost as much power, more reliably and much more economically per MW than the former nuclear station.

The newest addition to the renewable energy demonstration centre is a cutting-edge energy storage facility with linked salt-water pools.

All this genuine clean energy production and storage was only possible after the government finally respected the wishes of New Brunswickers to have a nuclear-free renewable energy future in the province. The turning point came when it became clear that the two prototype nuclear projects that had been planned for the Point Lepreau site would cost billions more than the nuclear companies had originally promised and would not be fully tested for decades.

In New Brunswick, support ended for new nuclear development at the same time as the "land back" movement was strong and most residents in the province finally got serious about Indigenous reconciliation. The LEAP management structure is led by the Peskotomuhkati Nation with Indigenous, community, provincial and federal partners. Industrial partners include several solar, wind and energy storage companies.

From the start, the LEAP concept was to open Point Lepreau to all New Brunswickers. When the nuclear plant was operating, visitors needed a security clearance, effectively blocking access to the shoreline and migratory bird observatory to casual visitors. Now, year-round, Point Lepreau welcomes a steady stream of birders and hikers who enjoy the natural beauty of the land and coastline.

The Centre of Excellence for Radioactive Waste Monitoring Information Centre welcomes visitors from all over the world. The exhibits explain the transformation of the site from nuclear waste production to permanent monitoring and storage. When the CANDU nuclear reactor was shut down, the toxic cooling ponds and aging concrete silos were at their end of life. It would have been a major concern to run the facilities for much longer.

NB Power had planned to move the high-level radioactive waste to Indigenous territory in Ontario, bury it and abandon it. Now, instead, the hundreds of tons of spent nuclear fuel is stored on the site in above-ground, attack-resistant, reinforced vaults, away from the water's edge, until an acceptable, permanent, and safe method to neutralize the waste is found. Until then, Canadian and New Brunswick taxpayers will continue to pay for the decades of radioactive waste made when Lepreau was operating.

The nuclear plant decommissioning was a financial boon for the province. As soon as NB Power announced the shutdown of Lepreau, it triggered the release of the $800 million in funds that had already been set-aside, and the federal government added another $2 billion when it became clear that the plans would include the LEAP project as part of a "land back" deal. The re-packaging jobs for the nuclear waste have lasted 20 years so far, and there will be monitoring jobs at the site forever, as the waste bundles will be toxic for hundreds of thousands of years.

It is hard to believe that humans had been so misguided as to create this deadly "forever" poison that long outlasts the energy that produced it. Governments of the time were responding to the demands of the nuclear industry and industry-funded researchers, instead of heeding the counsel against nuclear power from independent researchers. The spent fuel bundles at Point Lepreau will remain a permanent reminder of how far we strayed from the original teachings of this territory and respect for the planet.

8. CONCLUSION

8.1 The Bay of Fundy and Passamaquoddy Bay

As the sun rises over the horizon each day, rays of light work in concert with the flux of fresh and marine waters, relations of the animate and inanimate, and the natural cycles of life and death of the Bay of Fundy and Passamaquoddy Bay. Energy is exchanged between large whales and microscopic plankton, foundational rocks and sediment, as well as the surrounding cliffs, marshes and rolling hills.

The Bay is infused with nutrients released by morphing energies. By observing these connections, the cause-and-effect relationships, and the feedback loops of the Bay, we can understand that ecosystem survival is based on diverse and complex relationships.

8.2 Voices of the Bay

From the Bay and its surrounding lands, we also learn of historic and current colonial practices, reflected in damaged rivers, biological depression and nuclear waste. Indigenous communities are fighting to have their rights acknowledged and respected. Based on the European ideology of terra nullius, or 'empty land,' the newcomers reduced the Bay's ecosystem to a commodity – fuel for capitalism.

These lands, however, were not empty, evidenced by the signing of Peace and Friendship Treaties. Acknowledged for a short time by the Crown, these treaties were meant to govern the relationship between Indigenous and settler communities. However, the colonizers' thirst for expansion and domination was unending. They defaulted to the fiction of discovery to justify the eradication of people and exploitation of nature – the clearing, development and overhunting of forests and fields, and the scouring of the Bay for fish with entire species decimated and essential habitat destroyed.

These devastating actions continue today, under modern regulation. Where once colonial forces attempted the eradication of the Bay's peoples, today colonialism is evidenced with triple violence: cultural violence through negation, economic violence through exploitation and political violence through oppression (Aráoz, 1988, as cited in Voskoboynik, 2018).

Living by the pulse of these waters, the Peskotomuhkati people have been an essential part of this ecosystem for at least 14,000 years. The Bay's patterns were the basis of Peskotomuhkat values, language, technology, and knowledge of lands and waters. The DNA of the Peskotomuhkati people is built of this territory.

Due to the destabilizing effects associated with past and continued colonialism, Peskotomuhkati territory remains occupied and depleted. Many foundational elements of Peskotomuhkati culture endure relentless assault, such as their namesake, the Pollock. Regulations and policies deny (notionally or in practise) access to natural elements for food, ceremony, traditional and modern livelihoods, well-being, as well as to access to each other through international borders.

As evidenced by the Bay, natural systems, from living beings to whole ecosystems, are sustainable because they are regenerative. The Bay offers the opportunity to see the world in a different way, an ecological world view in which nature is the model, functioning in harmony with traditional knowledge systems and western science.

8.2 Principled Planning

Since time immemorial, the Peskotomuhkati Nation and their neighbours of the Wabanaki Confederacy have thrived on the shores of the Bay of Fundy and her connected rivers and lands. Their livelihoods are dependent on the wellbeing of these lands and waters. They entered into agreements among themselves and with outsiders to ensure future generations would have access to healthy territories.

However, because of past and continuing dishonourable and illegal actions it is impossible for Indigenous peoples to live and work on their traditional lands, free from the burdens of the newcomers' regulations and laws.

Traditional medicines, foods, and teachings were accessible to Peskotomuhkati people until these lands were taken through settler processes and given the sole purpose of facilitating the PLNGS.

When the Point Lepreau nuclear facility opened in 1983, there was no discussion with the Peskotomuhkati Nation. When the nuclear facility was refurbished and re-opened in 2012, and re-licensed in 2011 and in 2017, the Nation spoke against it. Instead, the Nation is working to find strategies of mutual economic and social benefit to support the shared use and bounty of their territory.

As the PLNGS approaches its end-of-life, Free, Prior and Informed Consent must be attained from the Peskotomuhkati Nation regarding the approach to the site's recovery. Dangerous radioactive wastes and materials being accumulated at the PLNGS must be managed and monitored in a way that ensures the safety of future generations. Processing these deadly radioactive materials must not produce new forms of dangerous wastes.

Accepting economic and social responsibility for radioactive products at Point Lepreau provides a mandate for creating secure methods of permanent storage of these toxic materials. We cannot escape the toxic legacy of PLNGS by moving wastes to other Indigenous territories.

8.3 Looking Forward

The brutal impact of the climate crisis is already being experienced by the most marginalized peoples in the world, resulting in rapidly changing landscapes forcing mass migrations and conflicts. Transitioning to renewable energy must happen in a way that empowers, rather than further marginalizes, Indigenous peoples and other communities most affected by our changing climate.

With better systems for energy coordination (a more flexible grid), and rigorous social and environmental policy, regulation and enforcement, we can responsibly increase our renewable energy sources through both large- and small-scale installations. This work is urgent and needs to meet and surpass the rapid demand for renewable energy.

The sun will travel across the sky each day, wind patterns will persist, water will flow downhill, and geothermal heat will dissipate. These perpetual and predictable sources of 'fuel' are abundant, accessible, and free, therefore representing huge potential to re-shape an inclusive energy system (Stevens, 2019).

Renewable energy can enable individuals, households, communities, and organizations to own and manage their energy infrastructure, offering widespread opportunities for biological protection, local control and financial benefit. However, New Brunswick's nuclear ambitions block the implementation of efforts to re-create systems of governance and economy that honour biological and cultural diversity.

Indigenous and environmental approaches encourage a holistic view of the economy that support renewable energy generation. Capitalist metrics also highlight the benefits of a renewable energy transition. Even during a pandemic, in 2020, renewable energy grew worldwide, at its fastest pace in almost two decades (Clean Energy Canada. 2021). The clean energy transition requires significant economic activities. Opportunities for job growth relative to the transition are reliant on government policies, investment, and committing to an emission-free electricity supply by 2035.

Settler society is starting to acknowledge the interdependent and essential relationships which are key to survival - our duties to other life forms. However, delayed climate action in the form of nuclear schemes represent a continued assault on Indigenous nations, Canadians and all our relations including land and waterscapes.

New Brunswick's significant focus on nuclear energy expansion–justified as NB Power's contribution to climate mitigation–relies on hypothetical and unproven technologies. Proponents claim nuclear as a 'non-emitting' and 'clean' technology, though an examination of the nuclear energy supply chain documents otherwise, with the most obvious examples being uranium mining and the forever legacy of dangerous radioactive wastes.

This vision document aims to foster dialogue regarding an alternate future to that proposed by NB Power, governments and the nuclear industry for the PLNGS site. We offer a starting point for discussion regarding a holistic and contemporary approach for just climate action and economic recovery from COVID. We encourage multi-purpose developments at the site, which enable the use of the current transmission infrastructure while significantly increasing benefits to current and future generations.

Creating new research and installing currently available renewable energy technology at the Point Lepreau site provides the opportunity to train future workers in the preservation and protection of all life forms, instead of a single-minded focus on the production of energy for consumption.

As PLNGS is transformed for renewable energy production, the site will return to its role as an integral part of Peskotomuhkati territory, offering its potential once more, for multiple, diverse and responsible, social and economic activities.

9. REFERENCES

Adkin, L. (2017). Crossroads in Alberta: Climate capitalism or ecological democracy. Socialist Studies/Études Socialistes, 12(1), 2.

AFN (2018). Resolution 62/2018, Small Modular Reactors. Passed at the Special Chiefs Assembly of the Assembly of First Nations, December 4, 5 and 6, 2018, Ottawa. http://www.ccnr.org/AFN_resolution_SMRs_2018.pdf

Auditor General of New Brunswick (2020). NB Power Debt Challenges Report of the Auditor General – Volume II, Chapter 3.

Babin, R. (1985). The nuclear power game. Montreal: Black Rose Books.

Bisset, K. (2012). Point Lepreau reactor returns to service after lengthy refurbishment. Canadian Press, November 23. https://atlantic.ctvnews.ca/point-lepreau-reactor-returns-to-service-after-lengthy-refurbishment-1.1051087

Bozuwa, J. (2018). Opportunities for publicly-run energy utilities to revolutionize generation and the grid. Public Ownership for Energy Democracy. The Next System Project, September 3. https://thenextsystem.org/learn/stories/public-ownership-energy-democracy

Butler, C. (2022). 30,000 shipments of nuclear waste would move through Ontario cities, farmland under draft plan. CBC, January 18.

Carroll, W. K. (Ed.). (2021). Regime of obstruction: How corporate power blocks energy democracy. Athabasca University Press.

Clean Energy Canada (2021). "The New Reality", June. https://cleanenergycanada.org/wp-content/uploads/2021/06/Report_CEC_CleanJobs2021.pdf

Clean Energy Canada (2019). "Missing the Bigger Picture: Tracking the Energy Revolution," May. https://cleanenergycanada.org/wp-content/uploads/2019/05/Report_TER2019_CleanJobs_20190516_v3_ForWeb_FINAL.pdf

Clifford, C. (2021). U.S. can get to 100% clean energy with wind, water, solar and zero nuclear, Stanford professor says. CNBC, December 21. https://www.cnbc.com/2021/12/21/us-can-get-to-100percent-clean-energy-without-nuclear-power-stanford-professor-says.html

Comeau, L. (2022). "Updating New Brunswick's Climate Action Plan: A Strategic Opportunity." Presentation to the Standing Committee on Climate Change and Environmental Stewardship, January 18.

Comeau, L. (2021). "Public understanding of Atlantic electricity issues: Results of Atlantic-wide research." Conservation Council of New Brunswick, September 9.

Conservation Council of New Brunswick (2021). About the Atlantic Energy Vision. https://www.conservationcouncil.ca/about-the-atlantic-electricity-vision/

Coulthard, G. S. (2014). Red skin, white masks: Rejecting the colonial politics of recognition. Minneapolis: Minnesota.

David Suzuki Foundation (2021). Green and Just Recovery. https://davidsuzuki.org/project/green-and-just-recovery/

Ddamba, L., Nelson, S. & Ramana, M.V. (2020). Energy, Injustice & the Green New Deal, Progressive International, June 8.

Deneault, A. (2019a). “It is New Brunswick that enriches the Irvings, not the Irvings that enrich New Brunswick:” An interview with Alain Deneault. NB Media Co-op, April 15.

Deneault, A. (2019b). The Irvings, Canada’s robber barons. Le Monde Diplomatique, April.

Deranger, E. (2021). Indigenous rights are a counterforce to the climate crisis. The Breach, July 30.

Dhara, C., & Singh, V. (2021). The Delusion of Infinite Economic Growth. Scientific American, June 23.

Di Muzio, T. (2015). Carbon Capitalism: Energy, Social Reproduction and World Order. Rowman & Littlefield.

Edberg, K., & Tarasova, E. (2016). Phasing out or Phasing in: Framing the Role of Nuclear Power in the Swedish Energy Transition. Energy Research & Social Science 13, 170–79.

Emery, H. (2021). Was Refurbishing the Point Lepreau Nuclear Generation Station a Mistake? University of New Brunswick, Atlantic Institute for Policy Research, October 13. https://blogs.unb.ca/aipr/_media/images/lepreaumistakesoct7forlinkedin.pdf

Erni, S., Johnston, L. M., Boulanger, Y., Manka, F., Bernier, P., Eddy, B. G., ... & Gauthier, S. (2021). Exposure of the Canadian Wildland-Human Interface (WHI) and population to wildland fire, under current and future climate conditions. Canadian Journal of Forest Research, April 9.

Food and Agriculture Organization of the United Nations (2022). Free, Prior and Informed Consent. https://www.fao.org/indigenous-peoples/our-pillars/fpic/en/

Froese, S., Kunz. N. & Ramana, M.V. (2020). Too Small to be Viable? The Potential Market for Small Modular Reactors in Mining and Remote Communities in Canada. Energy Policy 144.

Gabbatiss, J., & Tandon, A. (2021). In-depth Q&A: What is ‘climate justice’? Carbon Brief. October 4. https://www.carbonbrief.org/in-depth-qa-what-is-climate-justice

Graham, N. (2021). Forces of Production, Climate Change, and Canadian Fossil Capitalism. Leiden, The Netherlands: Brill.

Hill, D., Hotaling, C. & Neme, C. (2020). "Atlantic Vision: Comparative Analysis of Long-Term Resource Plans and Energy Scenarios." Energy Futures Group, report prepared for the Conservation Council of New Brunswick, October.

Indigenous Climate Action (2021). "Decolonizing Climate Policy in Canada: Phase 1 Report," March.

International Energy Agency (2020). "Sustainable Recovery. World Energy Outlook Special Report." International Energy Agency, June.

IPCC (2021). Climate Change 2021: "The Physical Science Basis, the Working Group I contribution to the Sixth Assessment Report." Intergovernmental Panel on Climate Change, finalized 6 August.

IPCC (2018). "Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty." Intergovernmental Panel on Climate Change.

Jones, R. (2021). Sleeping giant: NB Power nuclear plant down for repairs again. CBC News, April 26. https://www.cbc.ca/news/canada/new-brunswick/point-lepreau-nb-power-1.6000854

Khan, A. (2021). Africville: A Story of Environmental Racism. Niche: Network in Canadian History & Environment, February 17. https://niche-canada.org/2021/02/17/africville-a-story-of-environmental-racism/

Klein, N. (2019). On fire: the (burning) case for a green new deal. Simon & Schuster.

Klein, N. (2015). This changes everything: Capitalism vs. the climate. Simon and Schuster.

Korn, L. (2019). “Doing nothing is going to cost more”: transitioning to a low-carbon economy in New Brunswick. NB Media Co-op, May 12.

LaDuke, W., & Cowen, D. (2020). Beyond wiindigo infrastructure. South Atlantic Quarterly, 119(2), 243-268.

LaDuke, W. (1994). Traditional ecological knowledge and environmental futures. Colo. J. Int'l Envtl. L. & Pol'y, 5, 127.

Lezen, M. (2015). Is nuclear power zero-emission? No, but it isn’t high-emission either. The Conversation, May 20. https://theconversation.com/is-nuclear-power-zero-emission-no-but-it-isnt-high-emission-either-41615

Lieu, J., Sorman, A. H., Johnson, O. W., Virla, L. D., & Resurrección, B. P. (2020). Three sides to every story: Gender perspectives in energy transition pathways in Canada, Kenya and Spain. Energy Research & Social Science, 68, 101550.

Lovins, A. & Ramana, M.V. (2021). Busting three renewable energy and grid myths. National Observer, December 21. https://www.nationalobserver.com/2021/12/21/opinion/busting-three-renewable-energy-and-grid-myths

Markusson, N., Dahl Gjefsen, M., Stephens, J.C. & Tyfield, D. (2017). The Political Economy of Technical Fixes: The (Mis)Alignment of Clean Fossil and Political Regimes. Energy Research & Social Science 23, 1-10.

Makhijani, A. & Ramana, M.V. (2021). Can Small Modular Reactors Help Mitigate Climate Change? Bulletin of the Atomic Scientists, 77(4), 207–14.

Mary Robinson Foundation (2020). Principles of Climate Justice. https://www.mrfcj.org/wp-content/uploads/2015/09/Principles-of-Climate-Justice.pdf

McGregor, D., Whitaker, S., & Sritharan, M. (2020). Indigenous environmental justice and sustainability. Current Opinion in Environmental Sustainability, 43, 35-40.

Mining Watch Canada (2020). "Turning down the heat: Can we mine our way out of the climate crisis?" Conference Report. Ottawa, November 14-15.

NBEN (2021.) "Greenprint 2021: Toward a Sustainable New Brunswick." New Brunswick Environmental Network. November.

NB Power, Ontario Power Generation, Bruce Power & SaskPower (2021). "The Feasibility of Small Modular Reactor Development and Deployment in Canada." March.

Newell, P. & Paterson, M. (2010). Climate capitalism: global warming and the transformation of the global economy. Cambridge University Press.

Nuclear Energy Division, Natural Resources Canada (2018). "Small Modular Reactor Roadmap Project's Indigenous Engagement Session, Saint John, April 18, 2018", May 18. https://smrroadmap.ca/wp-content/uploads/2018/12/Indigenous-Engagement-Session-Saint-John.pdf?x64773

Occidental Arts & Ecology Center (2019). Vision and Strategy. https://oaec.org/our-work/vision-and-strategy/

O'Donnell, S., Comeau, L., Harvey, J., Edwards, G. & Ramana, M.V. (2021). The proposed nuclear reactors (SMRs) for New Brunswick (Briefing Paper). Fredericton: RAVEN research project, University of New Brunswick. March 1. Available at: https://raven-research.org/smrs-nb-briefing

O'Donnell, S. & Edwards, G. (2021). Will Canada remain a credible non-proliferation partner? Bulletin of the Atomic Scientists. July 26.

O'Donnell, S. (2020). Throne speech signals Canada's support for new nuclear reactors as opposition builds. Rabble, September 29.

O'Donnell, S. (2019). Hundreds in Fredericton kick off the global week of climate action. NB Media Co-op, September 21.

Office of the Auditor General of New Brunswick (2021) Auditor General Report, February.

Palmater, P. D. (2011). Stretched beyond human limits: Death by poverty in First Nations. Canadian Review of Social Policy, (65/66), 112.

Paris, R. (2002). International peacebuilding and the 'mission civilisatrice'. Review of international studies, 28(4), 637-656.

Poitras, J. (2021). Irving Oil partnering with TC Energy to reduce emissions from refinery. CBC, August 18.

Preston, F. & Lehne, J. (2018). Making Concrete Change Innovation in Low-carbon Cement and Concrete. Chatham House Report, June 13.

Ramana, M.V. (2016). “Second life or Half-life? The Contested Future of Nuclear Power and its Potential Role in a Sustainable Energy Transition,” in Florian Kern, ed., Palgrave Handbook of the International Political Economy of Energy Part IV: Energy Transitions. Palgrave Macmillan.

Ramana, M.V. (2021). Small Modular and Advanced Nuclear Reactors: A Reality Check. IEEE Access, vol. 9, 42090-42099.

Reeder, K. (2021). Personal Communication with NB Power representative, November.

Roelofsen, O., Somers, K., Speelman, E. & Witteveen, M. (2020). "Plugging in: What electrification can do for industry. McKinsey & Company," May 28.

Rolfe, K. (2021). Canada's clean energy push to create more than 200,000 jobs by 2030: report. The Financial Post, June 23. https://financialpost.com/commodities/energy/renewables/canadas-clean-energy-push-to-create-more-than-200000-clean-energy-sector-jobs-by-2030-report

Roosvall, A. & Tegelberg, M. (2015). Media and the geographies of climate justice: Indigenous peoples, nature and the geopolitics of climate change. tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society, 13(1), 39-54.

Sapinski, J. P. (2019). Corporate climate policy-planning in the global polity: A network analysis. Critical Sociology, 45(4-5), 565-582.

Sapinski, J. P. (2016). Constructing Climate Capitalism: Corporate Power and the Global Climate Policyplanning Network. Global Networks, 16(1), 89–111.

Sapinski, J. P. (2015). Climate capitalism and the global corporate elite network. Environmental Sociology, 1(4), 268-279.

Sapinski, J. P., Buck, H. J., & Malm, A. (Eds.) (2020). Has it Come to This? The Promises and Perils of Geoengineering on the Brink. Rutgers University Press.

Secord, A. G. (2020). Nuclear Power Decision-Making in New Brunswick, 1971-1975. Acadiensis: Journal of the History of the Atlantic Region/Revue d'histoire de la region atlantique, 49(1), 123-150.

Schneider, M. (2021). "World nuclear industry status report." A Mycle Schneider Consulting Project, Paris, September.

Sovacool, B.K., & Ramana, M.V. (2015). Back to the future: Small modular reactors, nuclear fantasies, and symbolic convergence. Science, Technology, & Human Values, 40(1), 96-125.

Spiegel, S. J. (2021). Climate injustice, criminalisation of land protection and anti-colonial solidarity: Courtroom ethnography in an age of fossil fuel violence. Political geography, 84, 102298.

Stephens, J. C. (2019). Energy democracy: Redistributing power to the people through renewable transformation. Environment: Science and Policy for Sustainable Development, 61(2), 4-13.

Sterling, L. & Landmann, P. (2011). The duty to consult Aboriginal Peoples–government approaches to unresolved issues. Canadian Bar Association. https://www.cba.org/cba/cle/PDF/Constit09_Sterling_paper.pdf

Surprise, K. (2018). Preempting the Second Contradiction: Solar Geoengineering as Spatiotemporal Fix. Annals of the American Association of Geographers 108(5), 1228–44.

Terry, G. (2009). No climate justice without gender justice: an overview of the issues. Gender & Development, 17(1), 5-18.

Thistlethwaite, J., Minano, A., Henstra, D., & Scott, D. (2020). Indigenous Reserve Lands in Canada Face High Flood Risk. Centre for International Governance Innovation. Policy Brief No. 159, April 30.

Thompson, C. N. (1974). Shore residents don't want nuclear power plant. Telegraph Journal, July 27, 13. https://da.tj.news/viewer?opub=Telegraph_Journal&date=19740727&page=1

Timmins, T. & Booker, M. (2020). "A Clean Power Superhighway Down East: Canada's Atlantic Growth Strategy's Clean Energy Program." Gowling WLG, July 17. https://gowlingwlg.com/en/insights-resources/articles/2020/a-clean-power-superhighway-down-east/#_ftn4

UN General Assembly (2007). United Nations Declaration on the Rights of Indigenous Peoples: resolution, adopted by the General Assembly October 2, 2007.

Voskoboynik, D. M. (2018). The memory we could be: overcoming fear to create our ecological future. New Society Publishers.

Waldron, I. (2018). Re-thinking waste: mapping racial geographies of violence on the colonial landscape. Environmental Sociology, 4(1), 36-53.

Wolastoq Grand Council (2021). Resolution on nuclear power and nuclear waste. NB Media Co-op, March 12.
Wolfe, P. (2006). Settler Colonialism and the Elimination of the Native. Journal of genocide research, 8(4), 387-409.


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