CHIEFS OF ONTARIO

Chiefs of Ontario

First Nations and the Carbon Economy in Ontario: a Primer

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Frequently Used Acronyms and Abbreviations

CER	Canada's Energy Regulator
COO	Chiefs of Ontario
CO_2	Carbon dioxide
ECCC	Environment and Climate Change Canada
GHG	Greenhouse gas
GGPPA	Greenhouse Gas Pollution Pricing Act
HJBL	Hudson and James Bay Lowlands
IPCA	Indigenous Protected and Conserved Area
Mt	Megatonnes (i.e., millions of tonnes)
tCO_2e	Tonnes of carbon dioxide equivalent

Executive Summary

Through decades of advocacy and leadership around the climate crisis, including the adoption of the *Water Declaration of the First Nations in Ontario* as well as the *We Are the Land Declaration*, the Chiefs of Ontario has developed a mandate to advance the rights, jurisdiction, authority and governance of First Nations with respect to environmental and climate-related decision-making. In asserting First Nations' inherent rights, natural law and obligations to protect the environment, the Chiefs of Ontario recognizes that:

- First Nations are stewards of their lands
- Traditional knowledge is valid and must be recognized as such by other governments
- The legal duty to consult, including the principle of Free, Prior and Informed Consent, must be respected for any development impacting Aboriginal and treaty rights
- First Nations will exercise their authority to engage in climate change mitigation and carbon economies on their own terms.

As the urgency of the climate crisis continues to mount, global climate change actions are increasingly focused on reducing carbon emissions to meet international and domestic targets. First Nations have had limited engagement in setting these targets yet continue to bear a disproportionate burden of the impacts involved in meeting them. In their pursuit of such targets, governments, private interests, non-profit organizations and others are seeking collaborative arrangements with First Nations to access the carbon storage potential of their territories. First Nations are thus once again caught in a position of having to react to initiatives without being fully informed. At the community level especially, First Nations have limited access to credible knowledge about the carbon economy and their potential role in it.

The goal of the primer is therefore to assist Ontario First Nations in analyzing potential opportunities for participation in emerging carbon markets in Ontario and elsewhere. As carbon markets continue to develop, First Nations' opportunities to benefit economically, socially and culturally from work in which they are already engaged, and/or are interested in being further engaged, around ecological conservation on their territories and the potential for the generation and sale of carbon credits therefrom, should continue to expand. The primer provides background information aimed at starting First Nations down that road should they wish to move in that direction, as well as decision-making information which may help in deciding whether such a move is the best thing for their specific communities.

In detailing such information, the primer is comprised of 3 main sections: Part 1 is a discussion on the nature of carbon and its role in climate change. Part 2 discusses the current Ontario 'carbon landscape' including information on Ontario's major sources of carbon emissions and the natural carbon sinks that must be protected if the worst impacts of climate change are to be avoided. Part 3 is a discussion of the basic features of carbon economies, including different types of carbon markets, current legislation that offers both opportunities for and barriers to participating in such markets, and some arguments from both sides of the coin regarding the merits of carbon market participation.

It is hoped that First Nations leaders and technicians will come away with a significantly improved understanding of the topic of carbon markets in relation to fighting climate change, and whether participation in such markets is something they and their First Nation wish to pursue further. Should they decide against such participation, they should have sufficient information to articulate why. Conversely, if participation is something they wish to pursue, they should have enough information available to explain this choice as well as an idea of people and organizations to contact to help them

take the next steps. Following, then, is a brief review of the highlights of each of the 3 main primer sections.

Part 1: Carbon: What is it? And Why Does it Matter?

Carbon is one of the world's, and the universe's, most abundant elements. It makes up nearly a fifth of our body weight and is an essential structural component of all living things. It is also found in the structure of rocks and soils, as stored carbon dioxide (CO_2) in the deep waters of the ocean, in vast underground reservoirs of fossil fuels, and as a constant component of the atmosphere and the air we breathe. As First Nations people, we understand that, just as we are the land, we are carbon.

The current problems involving carbon, especially in the form of CO_2 and other greenhouse gases, have been entirely human caused, in that human activity has, and is increasingly continuing to, upset the balance of the global carbon cycle that has existed for at least the 10,000 years prior to the start of the industrial revolution in the mid-1800s. In this balanced system, which is necessary for the continuation of life as we know it, carbon is released into the atmosphere through natural occurrences such as wildfires, volcanic eruptions, and the respiration of living things. In turn, atmospheric carbon is constantly sequestered and stored in living and non-living things on land and in the waters through processes such as photosynthesis and chemical absorption.

As part of this cycle, some carbon is always present in the atmosphere, providing what we call a 'Greenhouse Effect', meaning that the atmospheric carbon (particularly in the form of CO_2) acts a kind of a 'blanket' covering the earth. This results in some of the sun's heat reflecting from the Earth's surface to be prevented from travelling back out into space. Life on Earth can thus exist within the temperature ranges with which we are familiar as part of our 'normal' climate.

With the advent of the industrial revolution, human activities, particularly those involved in the burning of fossil fuels, began to release far more carbon into the atmosphere in a far shorter period of time than has happened for thousands if not millions of years, such that atmospheric carbon levels are now higher than at any point in human history. The Greenhouse Effect is thus much stronger than previously and continues to grow. As a result, the Earth's average temperature is climbing rapidly (in geologic terms), and familiar climate patterns are becoming destabilized.

The challenge then becomes a question of what to do about this massive problem, with offered solutions ranging from protection of natural areas known to be major carbon sinks, to transitioning to an electricity-based low-carbon future, to technological 'carbon-capture' experiments and innovations. While all these ideas and more will no doubt be necessary in resolving the issue, the most efficient and effective ways of mitigating climate change involve reducing and eliminating human-caused emissions wherever possible as well as conserving those natural features of the Earth, including healthy oceans, peatlands, soils and forests, that act as natural carbon sinks. These natural carbon sinks are exponentially more effective at trapping atmospheric carbon than any human technology designed to date, and also provide all the ecological, economic and social benefits with which we are familiar.

Part 2: First Nations and the Carbon Landscape in Ontario

When it comes to carbon markets, First Nations in Ontario are generally focused on maintaining balanced relationships with the Earth, and whether, or how, participation in carbon markets might help or hinder that goal. While there are a variety of opinions on participation in carbon markets, the policy positions shared are heavily connected to land rights and self-determination. There are divergent opinions among organizations, both Indigenous and non-Indigenous, regarding the pros and cons of participating in carbon markets, with some organizations strongly in favour and some adamantly opposed. Some groups argue that the potential revenue streams generated through the sale of carbon credits could provide much needed support for projects undertaken to both conserve

and restore vital landscapes and foster a revitalization of Indigenous knowledge and ways of relating to the Earth, including the Indigenous languages that embody such knowledge. While both camps would seemingly like to see this happen, those opposed to carbon market participation argue that carbon economies are designed in such a way as to allow polluting industries to maintain or even increase their current levels of carbon emissions simply by supporting carbon offset projects located elsewhere.

In 2022, Ontario produced 157 of the 708 Mt CO_2e (megatonnes of carbon dioxide equivalent) reported as released by human activity across Canada. Currently in Ontario, the largest carbon-emitting sectors are transportation (32%), industry and manufacturing (24%), and buildings (23%). While the province's use of both nuclear and hydroelectric power, combined with the closing of coal-fired power plants in 2015, have resulted in a net decrease in emissions since 1990, it remains the second highest emitting province in Canada, after only Alberta. It should also be noted that wildfire emissions, whether directly human-caused or as a result of human-caused climate change, are rising rapidly and are starting to be included in total emissions reporting, which could alter emissions reporting in the coming years.

Ontario is also home to one of the world's largest terrestrial carbon sinks, in the form of the Hudson and James Bay Lowlands, known by some as "the breathing lands". Both wetlands and peatlands are critically important forms of carbon sinks, and the HJBL is estimated to be storing roughly 30 billion tonnes of carbon, dwarfing all other Ontario carbon stores combined (although the boreal and other forests, as well as forests and wetlands wherever they are found, continue to be vitally important carbon sinks as well). As is often the case with ecologically sensitive areas, there is considerable 'development' pressure to exploit the HJBL, in this case for the large stores of minerals they contain which could be used to supply the increasing demand for the manufacture of electric vehicles and other technologies. Mining in the HJBL, however, stands to release as much if not more stored carbon than would be avoided through the manufacture of such new technology, not to mention the multitude of other cultural, ecological and economic benefits the intact HJBL provide that would be irreversibly disrupted, including those based on the inherent and treaty rights of First Nations whose territories cover the area.

Part 3: Opportunities and Challenges in Ontario's Emerging Carbon Economy

To date, both the Ontario provincial and Canadian federal governments have created what are known as compliance carbon market systems. In Ontario, the system is based on the Greenhouse Gas Emissions Performance Standards Regulation, while federally it is the Greenhouse Gas Pollution Pricing Act. Both systems use an output-based pricing model, where industrial operations that emit CO_2 (or CO_2e) above a given annual threshold (e.g., 50 000 tonnes) must invest in reducing their annual emissions to below the threshold and/or pay a price per tonne of excess emissions. Set at $95/tonne in 2025, the price per tonne is to increase by $15/year to $170 in 2030, thereby predictably increasing the incentive to companies to find ways to reduce their emissions.

The carbon market aspect of these systems exists because those companies that manage to reduce their emissions below the set threshold are awarded carbon credits (referred to by the Ontario government as 'emissions performance units', and federally as 'surplus credits') for the number of tonnes of CO_2e emitted below the threshold (i.e., 1 credit for each tCO_2e below threshold). These credits can then be sold to companies emitting above the threshold as a way for these high emitters to compensate for each tonne they emit above threshold and still comply with the regulations.

A key way in which the federal system differs from that in Ontario is that operators not directly involved in the regulated industries have a few limited ways of earning carbon credits which can be sold to the industrial market. Such operators must qualify under one of the areas listed in the federal 'Compendium of Federal Offset Protocols', of which, as of this writing (August 2025), there are only three: Landfill methane recovery and destruction; Reducing greenhouse gas emissions from refrigeration systems; and, Improved forest management on private land. Of these and given the

location of many First Nations in forested areas, the Improved forest management protocol would seem to be the most readily accessible to First Nations in Ontario. As it is presently worded, however, the Improved forest management protocol applies only to the improvement of existing forest operations, and not to First Nations or other entities wishing to protect their forest from timber extraction altogether, or to reforest/rehabilitate areas previously damaged by logging or other industrial activities.

Aside from limited opportunities to participate in existing compliance markets, there may be more options available in voluntary carbon markets. Voluntary carbon markets exist where participation is open to a much wider array of operators who can demonstrate, for example, that conserving their forest/wetland/peatland or other ecologically valuable lands/waters is resulting in carbon being removed from the atmosphere (sequestered) and stored for the foreseeable future. Independent standards verification systems (e.g., Verra, Gold) can review, monitor and certify projects as well as issue carbon offset credits to such operators, which can then be sold to buyers both locally and internationally who are aiming to achieve emissions reductions and even net-zero targets for their businesses and/or other operations. While there are many hurdles and an extensive timeframe involved in a First Nation becoming certified to earn saleable credits in a voluntary carbon market, there is a growing number of First Nations across Canada who, with the assistance in some cases of ENGOs with expertise in the area like Ecotrust Canada, are embarking on a journey to make this dream a reality. The aspirations driving such projects are as varied as the individual First Nations involved but tend to relate to the establishment of a revenue stream that enables First Nations to engage with their lands in ways that align with their understandings of Natural Law and their responsibilities to the Earth.

Whatever their final decision, it is hoped that this primer provides the necessary information to First Nations as they enter the carbon market conversation, as the transition to a low-carbon future is, while complex, ever more urgent.

Introduction

The Chiefs of Ontario (COO) is a regional coordinating body for 133 First Nations in Ontario whose mission is to support all First Nations in Ontario as they assert their sovereignty, jurisdiction and chosen expression of nationhood (COO, n.d.).

Vision of the Chiefs of Ontario
First Nations in Ontario are united towards self-sufficiency and vibrancy while never forgetting who we are; this unity is facilitated through the Chiefs of Ontario. We envision a future where our inherent laws, lands, and traditions are recognized and respected by governments, industry and the general public (COO, n.d.).

Advocacy for environmental justice by the Chiefs of Ontario for over two decades led to the adoption of the *Water Declaration of the First Nations in Ontario* (COO, 2008) and the *We Are the Land Declaration* (COO, 2010). As part of long-term advocacy regarding the severity of the **climate crisis**[1], the Chiefs of Ontario was given a mandate to engage in forums to advance the rights, jurisdiction, authority and governance of First Nations. More specifically in relation to **climate change**, various Chiefs of Ontario resolutions over the past 15 years state that First Nations are concerned about the past, current and future impacts of climate change on the natural world and future generations. First Nations have expressed concern that:

- Canada and Ontario continue to fail to meet their obligations to international, national and regional efforts to combat climate change, including specific targets relating to reducing carbon emissions (04/19)
- Current federal/provincial climate discussion tables lack First Nations input (08/74, 2018)
- First Nations are the most vulnerable population in Ontario with regard to climate change impacts (04/19)
- Current federal/provincial climate change plans and the **carbon economy**, more specifically the **carbon tax** as currently designed, may negatively impact First Nations (04/19).

Despite such challenges, First Nations continue to:

- Show leadership in carbon reduction through the protection of their rights and territories that serve as **carbon sinks** (04/19)
- Support the reduction of **greenhouse gas** emissions to sustain and protect the environment for future generations (04/19).

The Chiefs of Ontario's approach to meeting these challenges is based on the assertion of inherent rights, natural law and obligations to protect the environment. These principles include recognition that:

- First Nations are stewards of their lands (08/10)
- Traditional knowledge is significant and credible and should be recognized by other governments (08/10)
- The legal duty to consult and accommodate must be respected for any development that could impact Aboriginal and treaty rights (08/10)
- First Nations will exercise their authority to engage in climate change and carbon economy on their own terms (08/10).

[1] Terms highlighted with bold font in running text are explained further in the Glossary of Terms found in Appendix B of this report.

International and national climate change actions have been focused on reducing carbon emissions to meet international and domestic targets. First Nations have had limited engagement in setting these targets yet continue to bear a disproportionate burden of the impacts involved in meeting them. Governments, private interests, some non-profit organizations and others are seeking partnerships and collaborations with First Nations to access the carbon storage potential of their territories. First Nations are thus caught in a position of having to react to initiatives without being fully informed. At the community level, First Nations have limited access to credible knowledge about the carbon economy and their potential role in it.

About This Primer

The Chiefs of Ontario has developed this "First Nations and the Carbon Economy" Primer with the intention of providing First Nations in Ontario with information on the evolving carbon landscape. We hope that First Nations can begin to use this information in determining how they may restore, reaffirm and continue their sacred responsibilities to protecting, conserving and managing their respective territories within the context of this new carbon-centred reality. The goal is to assist Ontario First Nations in analyzing potential social and economic opportunities for participation in emerging **carbon markets** in Ontario and Canada.

The first phase of the project was the June 2023 delivery of a "Carbon 101" presentation by Hank Cauley and Steven Nitah, respectively the CEO and Canadian Managing Director of Nature for Justice, to the COO Environment Committee and Chiefs-in Assembly. The second phase has been the development of this Primer, with input from a First Nations technical working group as well as experts from Ecotrust Canada and the World Wildlife Fund. The third phase of the project will emphasize education and awareness more broadly through carbon economy webinars delivered to First Nations and Provincial Territorial Organizations and to gauge interest in establishing a First Nations carbon working group in Ontario.

Research was conducted to learn from similar work already undertaken across Canada and to develop an initial scope of reference for the Primer through allowing for review and input on a draft table of contents in February 2024. A First Nations and the Carbon Economy report framework was subsequently developed and presented to carbon experts convened by the Chiefs of Ontario in April and June of 2024. Further research of public domain information and the academic literature was then conducted in developing the initial draft of the Primer. In August 2024, the Chiefs of Ontario convened the First Nations technical working group who reviewed the Primer and provided invaluable feedback during a focus group session.

First Nations vary considerably in their experience, knowledge and views of the carbon economy and its potential to assist First Nations in realizing their goals. While it is not feasible to address the needs of every First Nation, this Primer reflects input provided by First Nations on the COO's technical working group. This Primer focuses specifically on the topic of carbon markets and whether current regimes hold potential benefits for First Nations.

Why Manage Carbon? First Nations Realities

First Nations in Ontario already have a foundation for why they need to address carbon management and climate change in their communities and territories. First Nations are currently managing carbon indirectly by asserting their rights and protecting their territories. They are also directly managing carbon by conserving land, as well as protecting habitat for species at risk, source water, and areas of cultural heritage.

Some First Nations in Ontario have long-running environmental projects in place that protect critical habitat (e.g., **wetlands**) and species, restore lands and waters and incorporate traditional knowledge

and language revitalization efforts. In addition, ongoing First Nations advocacy continues to strive to influence broader climate change and carbon policy, including legislation and regulation.

It is critically important that First Nations become recognized and respected as carbon managers. First Nations have the fastest growing population in the country and thus face increasing pressure for housing, education, water, land, and general infrastructure (AFN, 2023).[2] At the same time, First Nations face multiple crises in child welfare, housing, water, health and justice. There are thus increasing demands being placed on First Nations decision-makers for on-reserve lands, as well as for treaty and traditional territories. Similarly, there are clearly many reasons why First Nations must be familiar with the carbon economy and its impact on their communities, their lands, and the natural world.

Primer Purpose

The goal of the Primer is to generate awareness among Ontario First Nations by providing information on the emerging carbon economy. As explained in Part 3, the term "carbon economy" refers to carbon market systems being established in Canada and around the world that a) put a price on the emission of greenhouse gases into the atmosphere, and b) allow for the trading (buying and selling) of "**carbon credits**" (including offset credits, allowances, and performance units; as will be explained, there are slight differences in the meaning of these terms) that can be earned by those who emit less carbon and/or actually remove carbon from the atmosphere and sold to those who emit more and/or who wish to voluntarily purchase credits. Providing First Nations with this information is intended to assist those Nations in deciding whether participation in carbon economies/markets is right for them, as well as to offer an overview of what such participation might look like should they decide to proceed in that direction.

Many First Nations are already engaged in conservation-related projects that positively impact carbon management. Such projects continue to be incredibly important not only for carbon management but for broader environmental and First Nations cultural goals. If determined to be appropriate by the involved First Nations, and upon meeting certain criteria, such projects can also potentially lead to carbon market participation. It is beyond the scope of this Primer, however, to address the nature and benefits of the wide variety of such projects.

This primer will provide an understanding of the general structure, potential, and possible drawbacks of carbon markets, such that First Nations in Ontario can begin to make informed decisions about whether or not to participate in these rapidly evolving markets. Participation in the carbon economy has both opportunities and pitfalls, depending in part on the capacity of First Nations and the environmental conditions of their territories. Engagement in the carbon economy should be aligned with the *rights, authority, jurisdiction and governance* of First Nations.

[2] The report *Closing the Infrastructure Gap by 2030: A Collaborative and Comprehensive Cost Estimate Identifying the Infrastructure Investment Needs of First Nations in Canada* (AFN 2023), a joint effort led by the Assembly of First Nations and Indigenous Services Canada, provides estimates for capital and operational investments required to address the infrastructure gap that exists between First Nations and other communities in Canada. An infusion of this kind of "investment" in First Nations signals a need for increased carbon management at the community level. In proposing major new infrastructure development, First Nations must be prepared to make decisions that contribute to the goal of net reductions in carbon emissions rather than the reverse, despite the fact that First Nations have **not** been the main contributors to such carbon emissions.

Guidance from the Chiefs of Ontario

Guidance in Ontario for how to approach the mandate given by the Chiefs in Assembly through the advocacy work of the Chiefs of Ontario includes the recognition of nationhood, rights, traditional knowledge and responsibilities to the natural world and future generations.

Chiefs of Ontario Climate Change *Resolution (08/74)* states:

First Nations in Ontario know and understand that the basis of Indigenous law is the protection and management and caring for the water, the lands, the plants, the air and all our relations including the animals, the fish and the birds;

The Chiefs of Ontario Species at Risk *Resolution (0/10)* states:

First Nations in Ontario have a sacred relationship with the land and have never relinquished their responsibility for protecting, managing and caring for all of their lands, including the plants, the animals, the fish and the birds.

The Chiefs of Ontario was directed to develop and implement educational tools to assist First Nations in meeting the challenge of climate change in their communities. In keeping with the guidance already provided to Chiefs of Ontario, this Primer advances the role of First Nations as climate leaders and managers who carry responsibilities to care for and protect their territories for future generations and all life. This includes a responsibility to govern and care for carbon stored in our territories in the lands, forests, and waters (including wetlands) and for decision-making regarding what happens to carbon.

The carbon economy, markets and rights have been discussed at the First Nation leadership level, but such knowledge has not yet trickled down to the community level. This Primer is intended to assist First Nations in managing carbon-related decision-making at the community level and to help assess whether they wish to participate in the carbon economy and markets. This is essential as colonial governments continue to fail to adequately consider First Nations rights, interests, authority and jurisdiction with respect to carbon and carbon-based initiatives.

The Primer will assist First Nations in:

- understanding how carbon emissions relate to climate change and why carbon use needs to be managed
- understanding the carbon economy and markets
- gaining insight into how carbon projects may impact First Nations rights and livelihoods, and providing key information to help address those concerns
- promoting the importance of First Nations traditional knowledge and laws around the understanding of carbon
- understanding national and provincial carbon policies, initiatives and projects
- assessing whether carbon market-related initiatives are of benefit to them, including understanding what risks and opportunities may be involved
- enhancing their ability to be carbon managers
- becoming familiar with case examples of First Nations carbon-related projects
- understanding the significance of the Hudson and James Bay Lowlands as the largest carbon store in not only Ontario but North America, as well as the impending threats to this vital ecosystem.

Part 1: Carbon: What is it? And Why Does it Matter?

What is Carbon? We Are the Land and the Land is Us

We are composed of carbon, and we need carbon to live. This fundamental fact is based in natural law and is expressed in the *Water Declaration of the First Nations in Ontario* (COO, 2008) and the *We Are the Land Declaration* (COO, 2010). We are literally 'of the Land'.

Carbon is also known as a chemical element: the 15th most abundant element in the Earth's crust and the 4th most abundant element in the universe by mass. It is the second most common element in the human body, making up 18% of the body by mass (the first is oxygen, which makes up 65%). Carbon's role is mostly structural, forming the "backbone" of many organic molecules (Davey, 2021). These scientific facts coincide with First Nations' understanding of our relationship to the land. Caretaking for carbon in our territories is not only linked to our rights, but also to our well-being. *We are carbon*.

Carbon in the Natural World

Carbon plays a crucial role in various natural processes, shaping the planet's ecosystems and affecting everything from the towering trees in the Amazon Rainforest to the microscopic plankton in the ocean depths. Its pure black form, perhaps most universally familiar as the primary constituent of charcoal, has been turned into an array of products, from lightweight vehicle and aircraft parts to sports equipment and even the carbon graphite in pencils. Diamonds are also pure carbon, formed naturally over a billion or more years of intense heat and pressure deep in the earth's crust. Carbon continues to be used extensively in archaeology and geology to determine the age of objects and materials through the process known as carbon dating.

Figure 1: Charcoal is the primary constituent of charcoal.

Where in the World do we Find Carbon?

- **Atmosphere:** As of May 2025, **carbon dioxide** (CO_2), a vital greenhouse gas that traps heat from the sun thus allowing life on Earth to thrive, comprised 430ppm (parts per million, or 0.0430%) of the Earth's atmosphere (NOAA Global Monitoring Laboratory (NGML), n.d.). Though this number appears small, it is more than 50% greater than the amount that existed during the 10,000 years before the start of the industrial revolution in the mid-1800s (about 280ppm), and continues to climb (Eggleton, 2012).

- **Biosphere:** From plant cell walls to the proteins in our muscles, carbon forms the basic structure of all living things. In plants, carbon dioxide captured from the atmosphere fuels photosynthesis, creating the organic compounds that form their structure and sustain their growth. Densely vegetated areas such as forests thus act as major carbon "sinks," drawing carbon out of the atmosphere and storing it in the bodies of plants and in soils. Animals, including humans, also rely on carbon-based molecules for energy, respiration, and building their bodies.
- **Geosphere:** Also known as the lithosphere, the geosphere is the hard surface of the Earth that we commonly refer to as Land. On land, carbon is locked away in vast reservoirs of materials like fossil fuels (coal, oil, gas) formed from the remains of ancient organisms. Limestone, a major component of rocks and soil, also stores significant amounts of carbon.
- **Hydrosphere:** Oceans, particularly through the action of phytoplankton which send CO_2 into deep waters for long periods, absorb and store vast amounts of carbon dioxide, playing a crucial role in regulating the planet's climate (Figure 2).

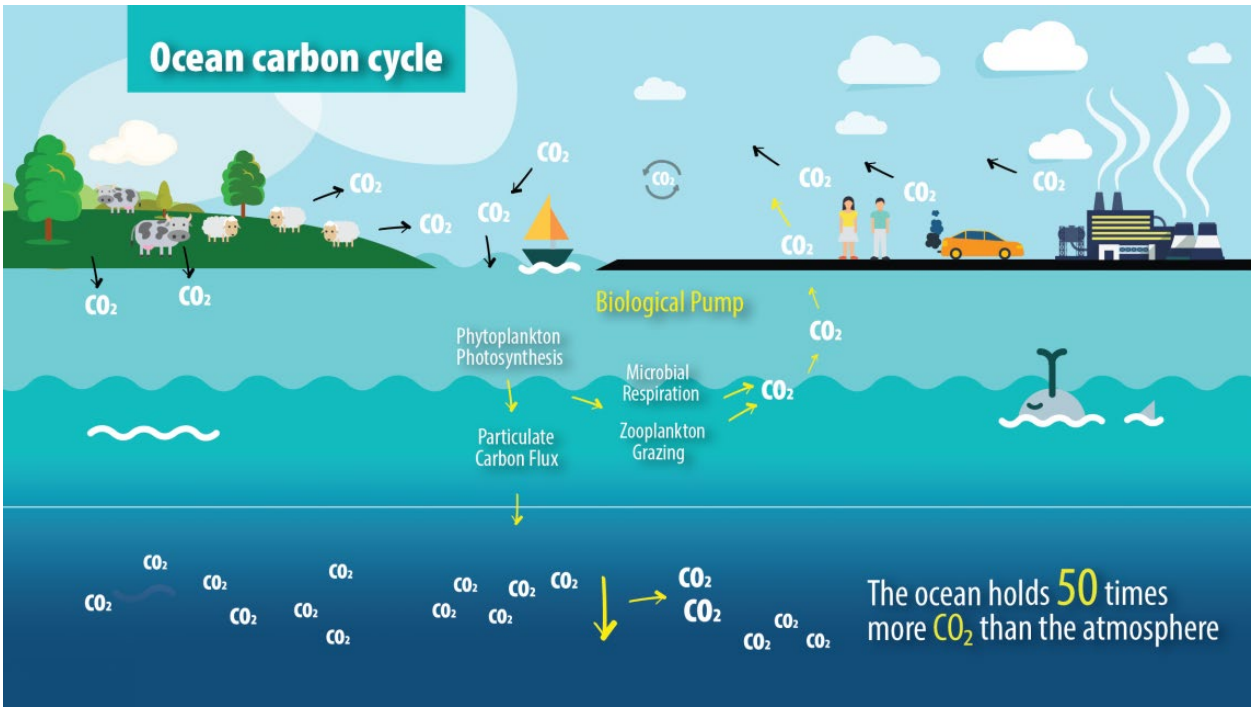

Figure 2: The Ocean Carbon Cycle. Source: International Atomic Energy Agency (IAEA), n.d.

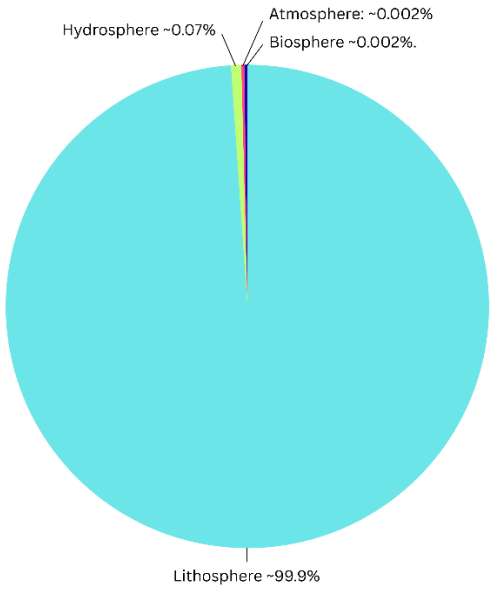

Figure 3: Pie chart showing approximate percentage of world's carbon stored in each of the 4 Earth spheres.

Carbon's Vital Functions

- **Plant Growth:** Through photosynthesis, plants use CO_2 from the air to build carbohydrates, providing energy for themselves and food for all other living beings.
- **Animal Life:** We humans, and all other animals, consume carbohydrates and other carbon-based substances for energy, using oxygen during respiration to release CO_2 back into the atmosphere.
- **Ecosystem Balance:** The natural **carbon cycle**, the exchange of carbon between living organisms and the environment, maintains a delicate balance essential for life.
- **Global Temperature Regulation:** Essential to preserving ecosystem balance is carbon's role in producing the '**Greenhouse Effect**', discussed further below, which maintains Earth's surface temperature within the limited range suitable for the existence of life.

Human Activity and the Carbon Cycle: Why is Carbon a Problem?

While carbon plays a vital role in nature, human activities have significantly disrupted its natural balance. The burning of fossil fuels like coal, oil, and natural gas for energy releases large amounts of CO_2 and other types of greenhouse gases into the atmosphere, exceeding the Earth's ability to maintain its natural balance. Degrading natural landscapes (e.g., cutting down trees for wood products, clearing land for agriculture or for urban development) both releases stored CO_2 and limits the amount of CO_2 that can be stored going forward, which further contributes to climate change (United Nations, n.d.).

This excess CO_2 traps more heat, leading to an enhanced "greenhouse effect," which can be likened to a giant blanket wrapped around the Earth. Like a blanket, greenhouse gases such as CO_2 trap heat radiating from the Earth's surface, causing it to warm. This phenomenon is essential for maintaining a habitable planet. However, human-caused increases in CO_2 (and other significant greenhouse gases which, while currently less abundant, have even higher **global warming** potential) have intensified this effect, leading to climate change.

The world is now warming faster than at any point in recorded history (United Nations, n.d.). Warmer temperatures over time are changing weather patterns and disrupting the usual balance of nature, posing many risks to human beings and all other forms of life on Earth (United Nations, n.d.).

Rising temperatures disrupt weather patterns, causing an increase in both the frequency and intensity of extreme weather events like heatwaves, droughts, floods, and wildfires. Melting glaciers and polar ice caps raise sea levels, threatening coastal communities and ecosystems. Ocean acidification, caused by excess CO_2 absorption, harms marine life and disrupts ocean ecosystems as well.

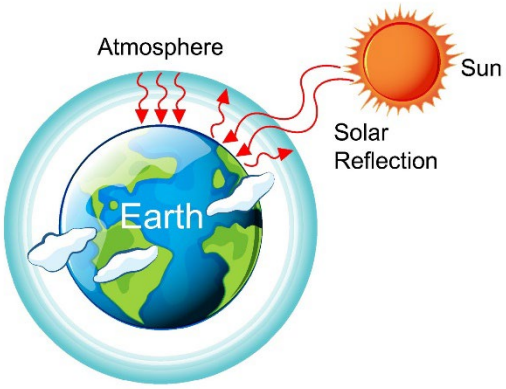

Figure 4: Greenhouse Effect graphic, Vecteezy

Figure 5: Images of climate change impacts (storms, wildfires, floods…)

The Sources of Excess Greenhouse Gas

Globally, the largest contributors to greenhouse gas emissions are:

1. Extracting and burning fossil fuels for electricity and transportation.
2. Degrading and converting natural ecosystems, including forests, for roads, farms, plantations, and urban areas.
3. Mining and manufacturing processes, for example for steel and cement production.
4. Methane and other emissions from agriculture.

Figure 6: Resource extraction is a contributor to greenhouse gas.

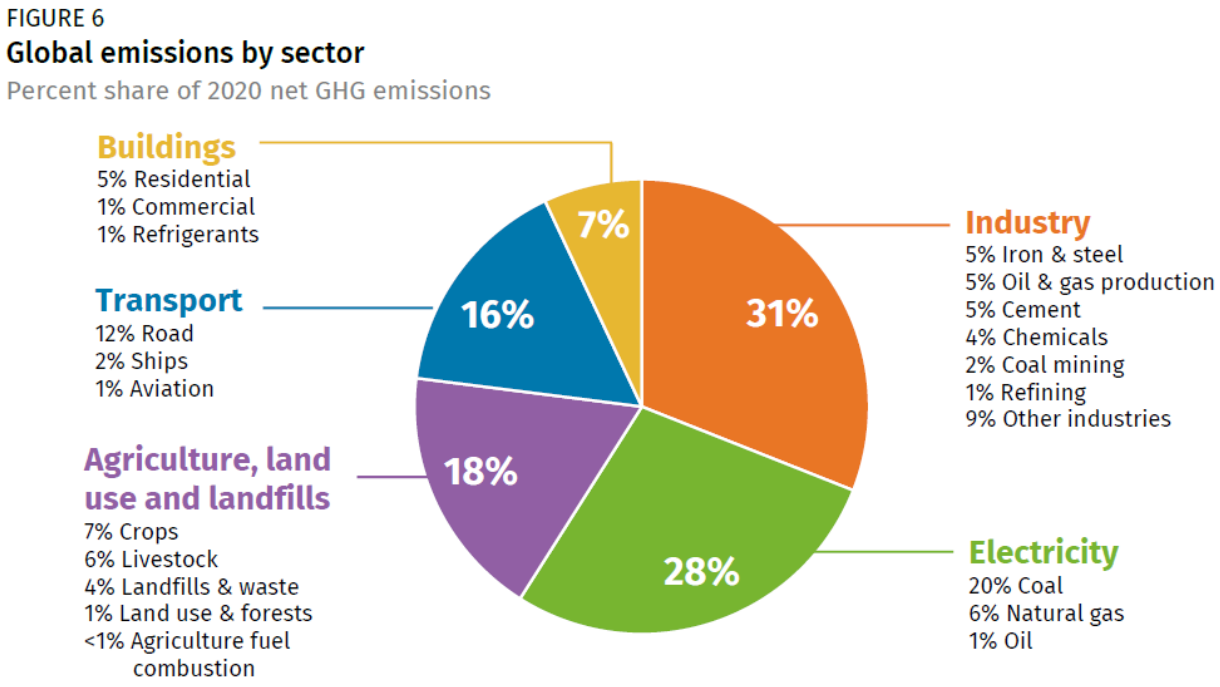

Figure 7: Pie chart showing percentage contribution of various sectors to carbon emissions. Image: Rhodium Group

Combating Climate Change

The traditional world views of Indigenous peoples embody a living framework for understanding how to live sustainably with the Earth. If the "transformational change" that the United Nations calls for to limit global warming to 1.5 degrees Celsius is to be achieved, mainstream societal values must be reprioritized. Key elements of a sustainable approach to our collective relationship with the planet would require recognizing and respecting that the Earth and the Sun provide humans and all life forms everything we need to survive and thrive but can only continue to provide in this way if we actively care for lands and waters.

The need for equity among peoples is paramount: the ongoing frequent confinement of certain groups, including First Nations and other racialized groups, to a lower status in society is not only unjust but unsustainable. The concept of the "rights of nature" is also useful in thinking about how we might approach a renewed relationship with the Earth (Berge, 2022). Protecting natural ecosystems, including primary forests and **peatlands**, adopting sustainable agriculture methods, and minimizing waste can contribute significantly to lowering emissions as well.

Technological approaches to addressing climate change remain controversial. "Renewable" energy sources such as solar, wind, and geothermal all currently require fossil fuel inputs for mineral extraction, manufacturing and other stages of their development. Improving energy efficiency in buildings, transportation and appliances conserves energy, but reductions in overall (global) energy use will be essential in order to reduce carbon emissions. **Carbon capture** and storage technology, often pitched by corporate energy interests, is viewed by many as an unconstructive approach to addressing climate change because this option does not involve preventing carbon emissions but removing them after they've been released already. Indeed, much of the CO_2 captured in Canada is used in pumping out *more* oil and gas that otherwise would have been unreachable. In addition, the cost per tonne of carbon captured continues to be prohibitive. Carbon capture facilities constructed to date have only managed to sequester a tiny fraction of the carbon that would be required to make a dent in overall emissions (David Suzuki Foundation, 2025).

Part 2: First Nations and the Carbon Landscape in Ontario

Position Statements Regarding Carbon Markets

First Nations

There is no single First Nations perspective on carbon. Community perspectives are shaped by factors specific to a community's tradition, land, values, and goals. For decades, First Nations and their associated regional and national organizations have consistently addressed threats to the wellbeing of Mother Earth, often the root causes of climate change and carbon imbalance.

These efforts, reflected in declarations, resolutions, and strategies, have always been guided first and foremost by inherent rights and responsibilities to care for the natural world and ensure reciprocal relationships between people and the rest of Creation - obligations that come directly from the Creator and that cannot be delegated or ignored.

In recent years, these efforts have been more explicitly connected to climate change. Initiatives have employed methods for understanding how climate action requires ongoing commitments to First Nations' inherent rights and responsibilities. These, in turn, are inseparable from First Nations' legal and governance systems, language, culture and spiritualities and corresponding duties to protect the land, air, and water.

The focus of First Nations is with the process of maintaining balanced relationships with the Earth, and whether, or how, participation in carbon markets might help or hinder that goal. While there are a variety of opinions on participation in carbon markets, the policy positions shared are heavily connected to land rights and self-determination. As stated, the aim of this primer is to provide information that can assist each interested First Nation/First Nations organization in determining whether and/or how this might be considered within their own unique context.

Indigenous and Non-Indigenous Organizations

There are divergent opinions among organizations, both Indigenous and non-Indigenous, regarding the pros and cons of participating in carbon markets, with some organizations strongly in favour and some adamantly opposed. Some groups argue that the potential revenue streams generated through the sale of **carbon credits** could provide much needed support for projects undertaken to both conserve and restore vital landscapes and foster a revitalization of Indigenous knowledge and ways of relating to the Earth, including the Indigenous languages that embody such knowledge. While both camps would seemingly like to see this happen, those opposed to carbon market participation argue that carbon economies are designed in such a way as to allow polluting industries to maintain or even increase their current levels of carbon emissions simply by supporting **carbon offset** projects located elsewhere.

Again, the purpose of this primer is to help First Nations and First Nations organizations along the path of deciding which position makes the most sense to them. Key arguments for and against carbon market participation being made by such groups are summarized in Section 3 of this primer.

The Geography of Carbon in Ontario

Sources of Carbon Emissions in Ontario

In 2022, Canada's greenhouse gas emissions totaled 708 million tonnes (or megatonnes) of **carbon dioxide equivalent** (Mt CO_2e), an increase of 16.5% (100 Mt CO_2e) since 1990 (Environment and Climate Change Canada (ECCC), 2025b). Of this total, Ontario produced 157 Mt CO_2e, roughly equivalent to running 34 million cars on the road non-stop for a year. As Canada's Energy Regulator (CER) reports, "The largest emitting sectors in Ontario are transportation at 32%..., buildings (residential and commercial) at 23%, and industries and manufacturing (including iron, steel, and chemicals) at 24%" (see Figure 8. (CER, 2025)).

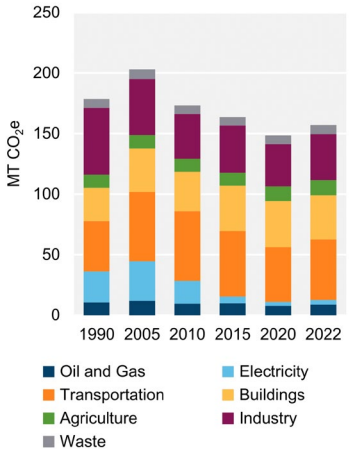

Figure 8: Ontario's Greenhouse Gas Emissions From 1990-2022.

Ontario's per capita emissions are the third lowest in Canada, due to the province's reliance on nuclear energy (roughly 60%) (World Nuclear Association, 2025) as well as hydroelectric power. While Canada's overall emissions have increased, Ontario's have actually declined 12% since 1990, due in large part to the phasing out of coal-fired electricity production between 2005 and 2014 (CER, 2025).

Despite having lower *per-capita* emissions than all but 2 other provinces or territories, and the 12% decrease in total emissions, Ontario still produces the second-highest *total* carbon emissions in Canada (Figure 9).

Figure 2–3 **GHG Emissions by Province and Territory in 2005, 2010, 2015, and 2022**

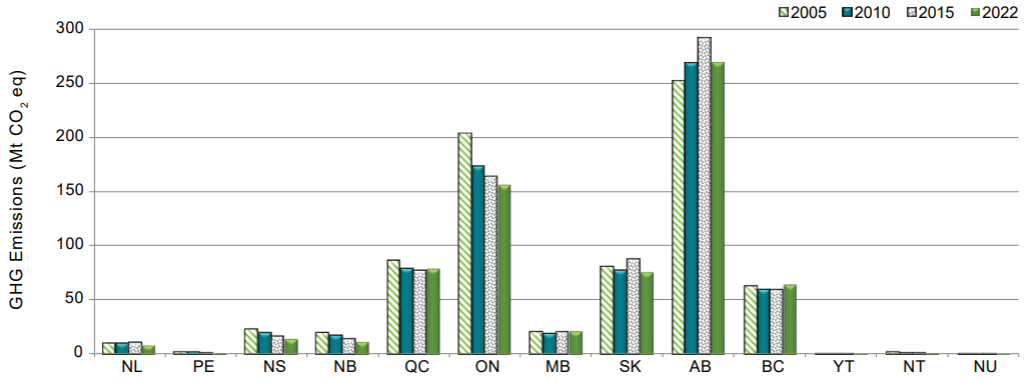

Figure 9: Canada's greenhouse gas emissions by province and territory. Source: ECCC (2024)

Overview of Greenhouse Gas Emissions

For this section, note that emissions data unless otherwise specified include all greenhouse gases. Most sources do not directly list carbon emissions. However, carbon is contained in the vast majority of GHGs, and for ease of comparison, greenhouse emissions data are generally adjusted to CO_2 equivalents, or CO_2e. There are seven classes of GHGs which warm the planet and are represented in

emissions data: carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, perfluorocarbons, hydrofluorocarbons and nitrogen trifluoride. Of all these GHG emissions, carbon dioxide makes up about 79.5%, while methane is about 11.5%. Both carbon dioxide and methane contain the element carbon (CO_2 and CH_4 respectively). 3% of emissions are fluorinated gases, many of which also contain carbon. Taken together, about 93% of GHG's contain carbon. The remainder contain nitrogen or sulphur (USEPA, 2025). Since the different gases have different global warming potentials, the cumulative emissions are adjusted to the equivalent warming potential of carbon dioxide.

Human-Made Carbon Emissions

Transportation: The transportation sector is responsible for one-third of Ontario's overall emissions, the largest portion of emissions for the province. These emissions come primarily from gasoline and diesel fuel from all vehicles on Ontario's roads (Shekarrizfard & Sotes, 2021). The high density of highways and expressways helps put Ontario's transportation emissions in perspective. With as many as 450,000 vehicles passing daily through sections of Highway 401 around Toronto, it is North America's busiest highway (Hocking, 2023).

Heavy Industry and Manufacturing: Industrial processes, from the production of steel and cement to fertilizers and other chemicals, constitute 23% of Ontario's annual GHG emissions (Sinha, 2022). Heavy industry relies on energy-intensive processes, uses carbon-based raw materials and is a relatively large emitter of the heat-trapping gas methane.

Industrial logging: Until recently, emissions resulting from logging have not been included in Canada's official emissions calculations. While prior to 2022 the logging industry was presented as **carbon neutral** or even a carbon sink, in 2024 the federal government updated its emissions reporting methods to conclude that human-caused emissions on forest lands across the country from 1990-2022 accounted each year for anywhere between 25 and 85 megatons of carbon emissions (up from a previously reported -5Mt (i.e., a carbon sink) for 2021) (ECCC, 2024). A recent report by Nature Canada and others found the government emissions numbers reported should have been much higher, at 147Mt. If this assessment is accurate, then logging-related emissions would be the third highest emissions source in Canada, after oil and gas production (217MT) and transportation (156MT) (Polanyi et al., 2024).

Buildings (Residential and Commercial): Heating, cooling and operating buildings is currently the second largest source of emissions in Ontario, at 23% of total emissions(Office of the Auditor General of Ontario (OAGO), 2020). The direct use of natural gas in buildings in Ontario has increased by 15% since 2005, and currently represents 76% of the emissions from buildings in the province (OAGO, 2020). Until alternate energy sources are employed across the province, it is likely that buildings will continue to contribute a sizable portion of Ontario's GHG emissions.

Other Carbon Emissions

Wildfires in the Forest: While wildfires have been burning across the world for millions of years, human activities have increased the frequency and severity of such fires. Human-started fires account for an estimated 84% of all wildfires in the United States (Balch et al., 2017). In 2023, more than 6100 fires burned over 16.5 million hectares of land in Canada (Natural Resources Canada (NRC), 2023). In addition to the human activities that start a large proportion of such fires, we also know that industrial forestry creates fire-prone landscapes (Lindenmayer et al., 2023). It is important to note that emissions from wildfires are not included in Canada's official calculations. This is despite the fact that, "In Canada, annual carbon emissions from wildland fires alone can equal the annual total carbon emissions from burning fossil fuels across the country." (NRC, 2022). While data from Ontario wildfires is difficult to isolate, national data reveal that Canada produced 23% of the global wildfire carbon

emissions for 2023. There were over 2 billion tonnes of carbon emitted from global forest fires in 2023, meaning that over 400 million tonnes of carbon were emitted by Canadian wildfires. This is more than double what Ontario emitted in 2020 in greenhouse gas emissions across all sectors (CER, 2025).

Ontario's Major Carbon Sinks

While it is vitally important to reduce carbon emissions, it is also critical to protect carbon sinks, which are areas that capture more carbon than they release (ClientEarth Communications, 2025). Human-created carbon capture projects are being developed, with thus far controversial and limited degrees of success (Anthony, 2023). Natural carbon sinks provide virtually all of the world's ability to capture and store carbon, and preserving the full functionality of these sinks represents our best chance, in addition to severely limiting human-caused emissions in the first place, of reducing overall emissions and the resulting climate impacts.

As can be seen from the map below (Figure 10; WWF, 2022), Ontario, and particularly far northern Ontario, is home to some of the largest carbon stores in North America. Given that a large proportion of the population of these areas is made up of First Nations people, and that these lands are all First Nations traditional territories, the role of First Nations in the management of carbon in northern Ontario stands to be of major importance.

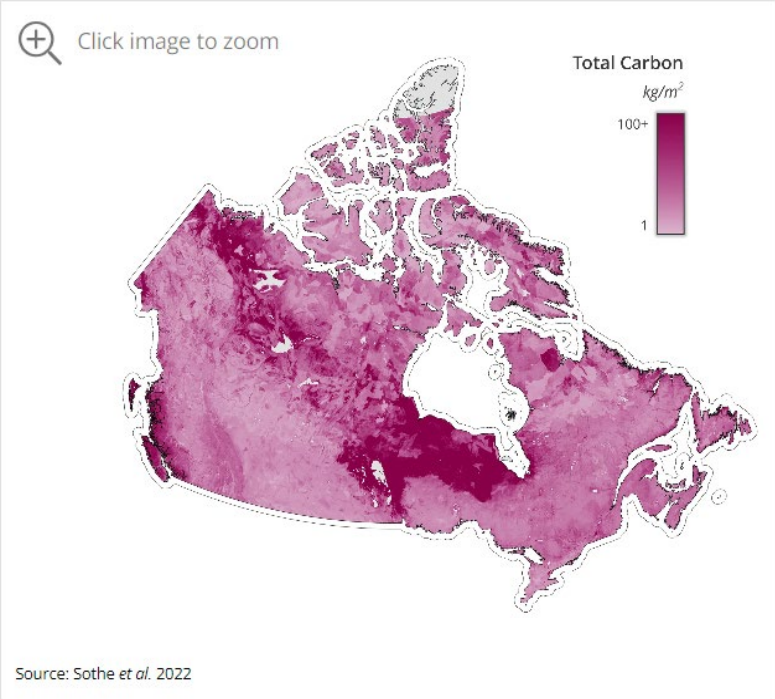

Figure 10: Total terrestrial ecosystem carbon storage across Canada. Darker shades represent largercarbon stocks. (WWF, 2022)

Boreal Forest

Ontario has a broad range of carbon sinks, from natural features like wetlands and boreal forests to human-dominated areas like agricultural lands and urban greenspaces. Ontario's most significant carbon sinks include a variety of natural ecosystems, each playing a crucial role in sequestering carbon and mitigating the effects of climate change.

One such carbon sink comprises Ontario's boreal forests, covering vast areas in the far north. Across Canada, these forests are estimated to contain 67 billion tonnes of carbon (WWF, 2007). These forests,

which are among the least studied in North America, have until relatively recently proven to be reliable carbon sinks, even when considering the impacts of wildfires (Kurz et al., 2013). However, with increases in wildfires due to climate change there has been a net release of carbon from Canadian forests in recent years (van Loon, 2022).

Agricultural lands

Agricultural lands also act as carbon sinks when managed in ways that enhance soil **carbon sequestration**. There are approximately 47M ha of cropland in Canada, while managed grasslands, used for pasture or rangeland, occupy approximately 6.2M ha (CCA, 2022). Rounding out the list of carbon sinks are parks, gardens, and other green spaces within urban areas that can also contribute to carbon sequestration. Trees and plants in these areas capture CO_2, contributing to the reduction of greenhouse gases in the atmosphere. However, total carbon sequestration from urban green spaces is fairly low.

The Hudson and James Bay Lowlands

By far the largest store of carbon in Ontario, and the largest single store in North America, is formed by the Hudson and James Bay Lowlands (HJBL, Figure 11) (Wells, 2017), dwarfing all other carbon sinks combined.

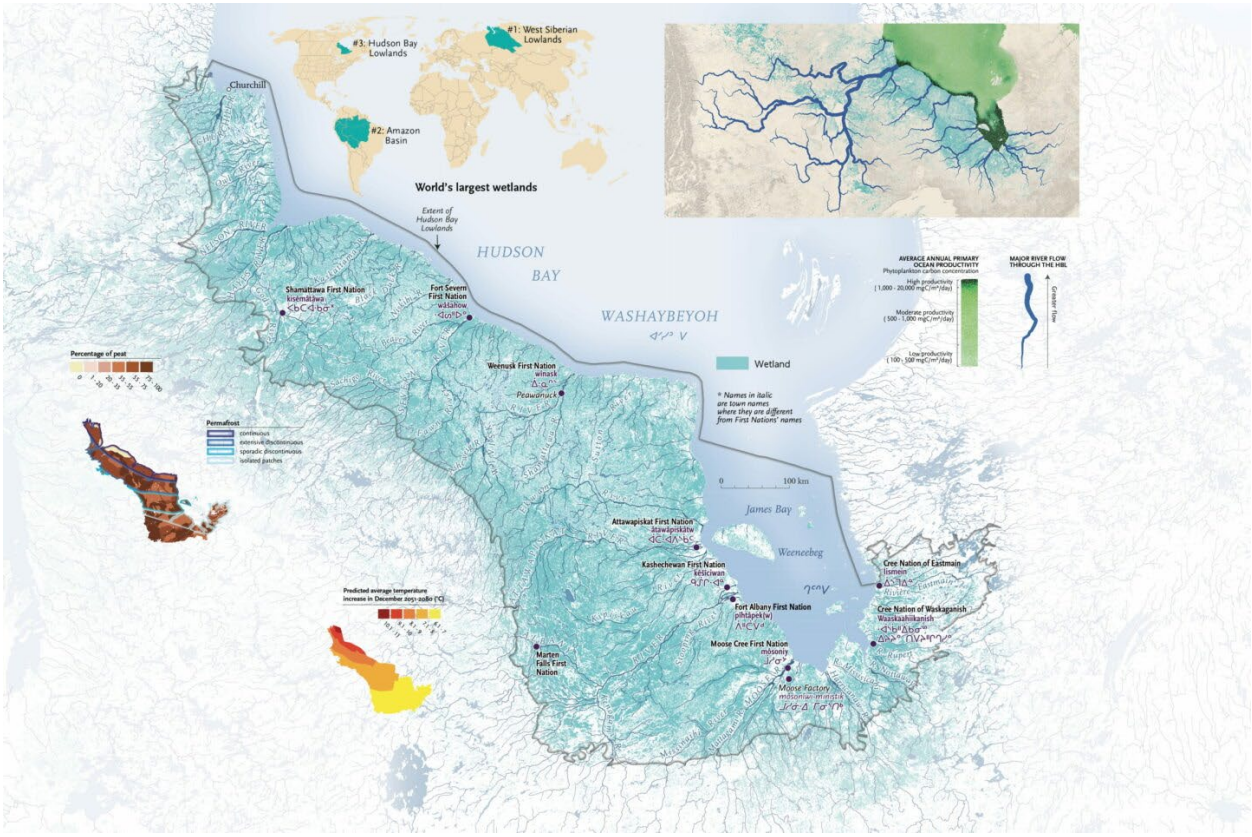

Figure 11: Map of Hudson and James Bay Lowlands. Source: (Brackley, 2022)

The HJBL are a large and complex wetland ecosystem that contain vast areas of peatlands (Figure 12), comprising "the biggest land-based carbon vault in North America, and the second-largest in the world." (Raman, 2022).

Wetlands in general, whether or not they specifically contain peatlands, are critically important carbon sinks, both in Ontario and across the globe (Ontario Nature, n.d.). Wetlands in southern Ontario have seen the greatest decline in the province to date, with as much as 90% having been lost due to human activity in the southwestern portion of the province (Snell, 1987).

In contrast, the HJBL currently remain relatively intact and comprise the second-largest peatland complex in the world, storing approximately 30 billion tonnes of carbon (five times more than the carbon stored in Ontario's managed forests) (Packalen et al., 2014).

Considering that peatlands cover just 3% of the Earth's surface and yet may contain up to 44% of all soil carbon, they are a critical carbon sink for Ontario and the world (IUCN, 2017). Of that 3%, one quarter (25%) are in Canada, and of these, most are found within Indigenous territories (WCS Canada, n.d.).

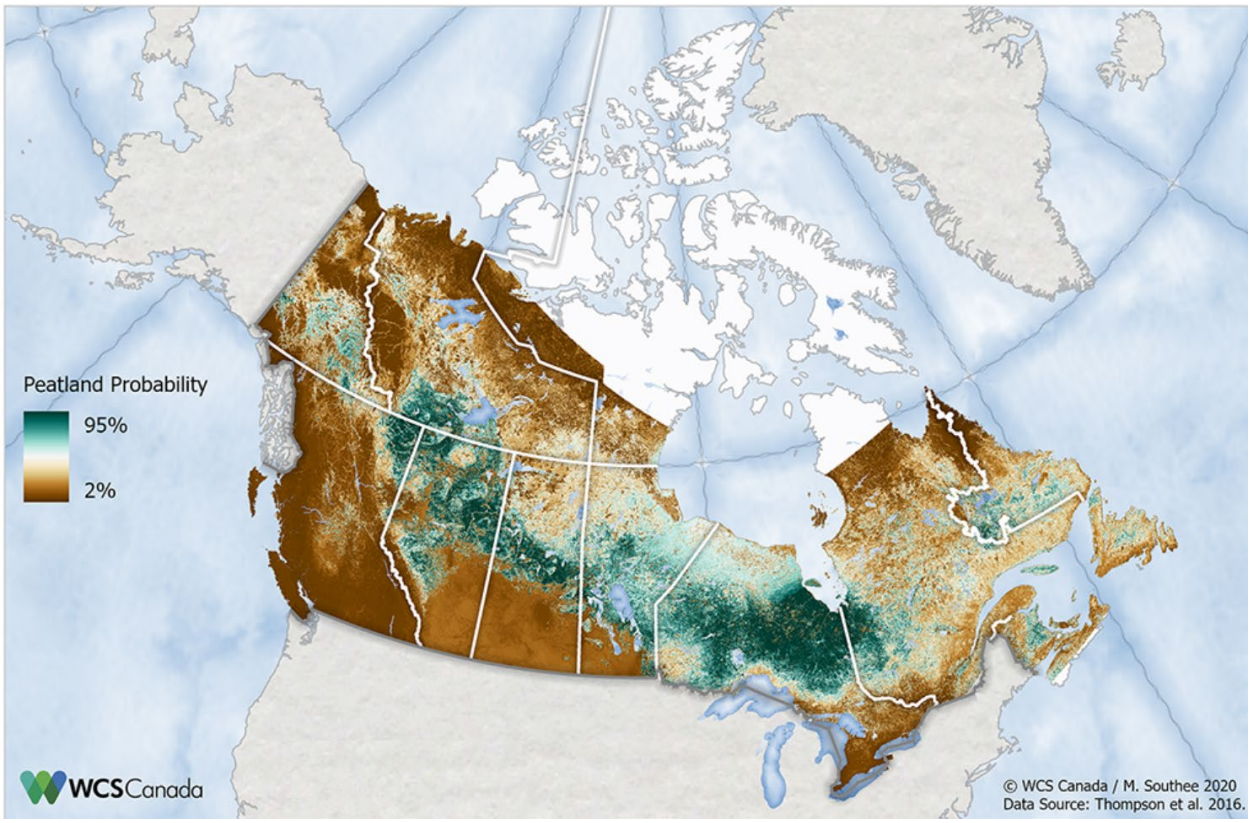

Figure 12: Concentration of peatlands in Canada. (WCS Canada, n.d.)

While peatlands are essential for a healthy planet, they have been increasingly threatened due to human activity. The Ontario provincial government is pushing for increased mining development, particularly in the much-discussed "Ring of Fire" (Wilt, 2020), situated on the western side of the HJBL (Figures 13 and 14). Covering some 5,000 km^2, the Ring of Fire itself contains approximately 1.6 billion tons of carbon (Raman, 2022). Pursuing such development in the region could have serious negative consequences for the environment in multiple ways, not least of which would be the resulting release of carbon into the atmosphere. "So, even if just half of this [carbon from the Ring of Fire region] was to be released as CO_2, that's one year of Canada's annual emissions....There's no way we can release this carbon, damage these peatlands and reach net zero....Having that stay in the ground is critical for global climate." (Raman, 2022).

First Nations in the HJBL Region

First Nations people have lived and travelled in the HJBL for thousands of years. Some call the land "Yehewin Aski" or "Nênêwin," Cree words that describe the peatlands as "the breathing lands" (Phan Nay, 2023).

Starting from the northern tip of the Ontario portion of the HJBL, there are seven Mushkegowuk First Nations, including Attawapiskat, Takwa Tagamou, Kashechewan, Fort Albany, Moose Cree, Chapleau Cree, and Missanabie Cree. Rounding out the northern tip of the province are the Weenusk and Fort Severn First Nations. Going further inland and towards the south of the peatlands are dozens of additional First Nation communities, including the Marten Falls First Nation, Webequie First Nation, Neskantaga First Nations, Eabametoong First Nation, and Aroland First Nations.

First Nations have been caretakers of the Hudson and James Bay Lowlands for millennia. As an example of this ongoing legacy, the Moose Cree First Nation has published a map of contemporary land management, based on family areas that have been identified by community elders (Moose Cree First Nation, n.d.).

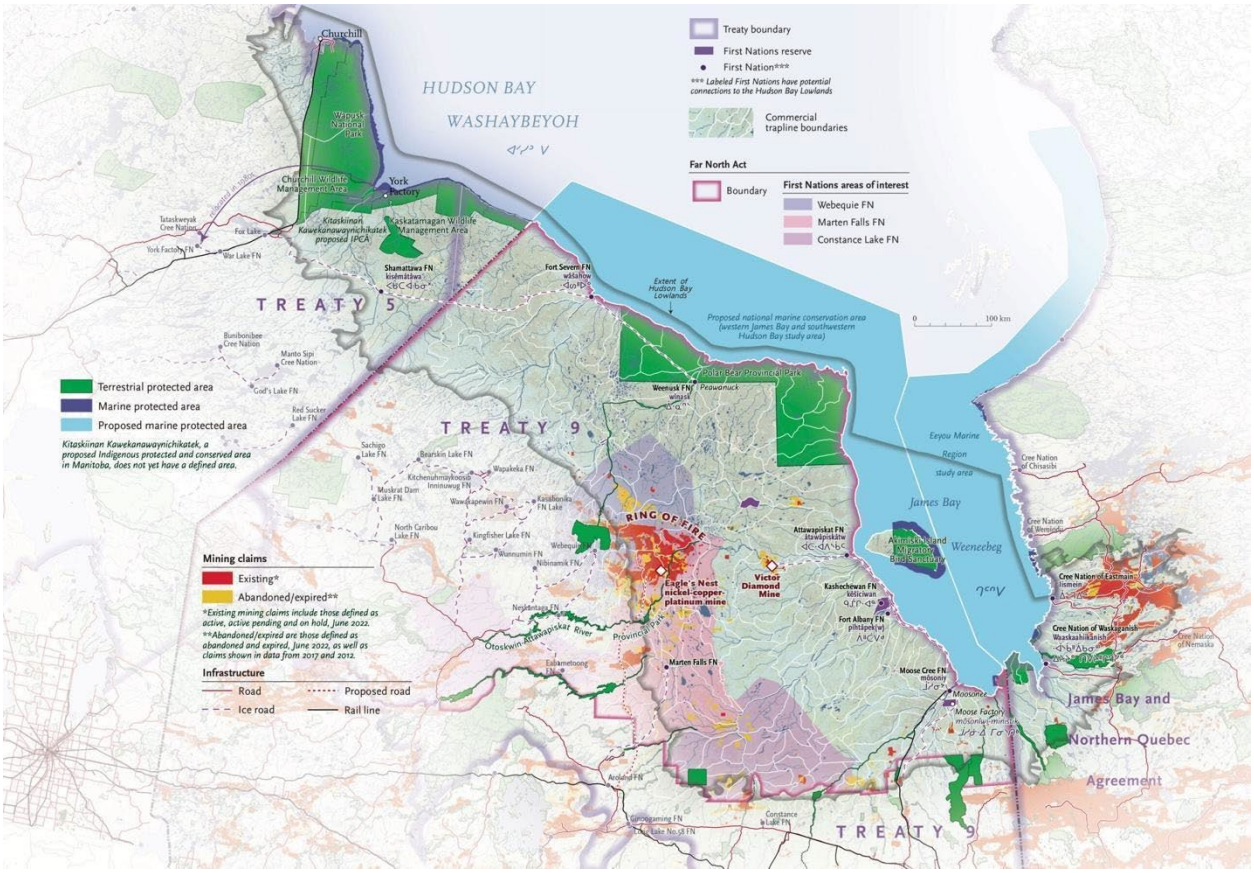

Figure 13: Map of the Hudson and James Bay Lowlands, including the controversial 'Ring of Fire' mining development area. (Brackley, 2022)

The HJBL is a particularly complex geographical region. While the peatlands themselves are one of the most critical carbon sinks on the planet, the region is also especially mineral-rich. The "Ring of Fire" on the western edge of the HJBL is estimated to hold over $60 billion worth of minerals, including highly profitable metals like nickel and chromite (Gamble, 2022). Recently, the Ontario government pledged $1 billion to encourage the further development of the mining industry and called on the Federal government to match this funding (Stone & Gray, 2023). Increased investment in mining in

these sensitive peatlands continues (nearly a 30% increase in 2023), with over 33 000 claims (covering 626,000 hectares of land, nearly 10 times the area of the City of Toronto) having been registered as of December 2023 (Hercus, 2024).

The Ontario government has been working with several First Nations communities, including the Marten Falls First Nation and the Webequie First Nation, to conduct environmental assessments to build all-season road projects to support such mining proposals (Wilt, 2020). Once the roads to the region have been built, proponents expect that mining projects, such as the Eagle's Nest Mine to extract copper, palladium, and nickel, will open to full capacity (Campbell, 2023).

Webequie and Marten Falls First Nations, however, do not belong to the Mushkegowuk Council, whose member First Nations' territory encompasses a large portion of the Ring of Fire and the peatlands in the area (Figure 14).

Figure 14: Map of Mushkegowuk territory First Nations and the location of the Ring of Fire mining development area. (Ostroff, 2022)

In 2021, the Mushkegowuk Chiefs called for a moratorium on all development activities in the Ring of Fire to ensure the sensitive peatlands are protected (Solomon et al., 2021b). While an agreement with the Federal government has led to the recent approval of plans to establish an 86,000 square kilometre (slightly larger than the province of New Brunswick) national marine conservation area along the western edge of James Bay and the lower Hudson Bay (Needham, 2024), work on the Ring of Fire development continues (Campbell, 2023).

Remote First Nations' Reliance on Fossil Fuels

Many of the same First Nations that call the HJBL home are also communities that rely heavily on carbon consumption, due to their remote location. Communities within the Nishnawbe Aski Nation (NAN) territory are particularly reliant on using fossil fuels. NAN territory encompasses Treaty 9 and some of Treaty 5 territories, including 49 First Nations (many of them are fly-in communities), and

covers two-thirds of Ontario's land mass . Many such communities rely heavily on the burning of diesel fuel for electricity as well as the use of oil burners for heat and cooking (Barnes et al., n.d.). It has been estimated that continuous diesel-fired electricity generation in Ontario's remote First Nation communities emits 65,000 tonnes of greenhouse gases annually (Government of Ontario, 2016). While these emissions are a small fraction of Ontario's total emission footprint, multifaceted strategies incorporating Indigenous perspectives can nonetheless help reduce carbon dependence in Ontario's far north.

In recognizing the importance of this goal nationwide, the federal government has committed to investing "an additional $300 million over five years to transitioning diesel-reliant rural, remote and Indigenous communities onto clean energy" across the country (Government of Canada, 2021).

Part 3: Opportunities and Challenges in Ontario's Emerging Carbon Economy

What is the Carbon Economy?

The "Carbon Economy" as discussed in this primer refers to the globally emerging system of pricing carbon in a way that incentivizes businesses and industries to buy and sell "carbon credits" to reduce the overall carbon emissions produced by these businesses and industries. Within this nascent global economy are an increasing number of distinct "carbon markets", some distinguished by geography and others by the nature of the market.

For the purposes of this primer, we have highlighted briefly below the Canadian federal and Ontario provincial legislation and regulations that provide an indication of the contexts in which trading of carbon credits might occur with respect to First Nations in Ontario, particularly in the case of Canada's federal carbon offset credits and Ontario's provincial emissions performance units. Such elements provide the basis for a developing carbon market in Ontario. (Note, however, that these regulations do not preclude First Nations from participating in certain international markets instead of or in addition to those based in Ontario.)

Carbon markets function as trading systems for the exchange of carbon emissions credits. Like many other commodities, carbon credits may be purchased and traded within a national or regional authorized market, sometimes even from one country to another, in the form of carbon allowances or carbon offset credits (McAfee, 2016). Carbon markets enable both corporations and individuals to offset their greenhouse gas emissions through the purchase of carbon credits from entities engaged in the removal or reduction of such emissions (UNDP Climate Promise, 2022). In this system, one marketable carbon credit represents one tonne of carbon dioxide, or the equivalent quantity of another greenhouse gas, (referred to as a tonne of carbon dioxide equivalent, or tCO_2e).

Ontario Provincial and Canadian Federal Laws and Policies on Carbon Management

Following is a snapshot of the Ontario provincial and Canadian federal legislation and policy related to the establishment of and participation in carbon markets. Further details can be found by referring to the documents cited and related government websites concerning each of the laws and policies highlighted below.

Ontario Provincial Legislation and Policy

Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan

This legislation stipulates that by the year 2030, Ontario will have reduced its CO_2e emissions by 30% below the levels recorded in 2005. This goal is aligned with Canada's 2030 Paris Agreement commitment made in 2016. It does not, however, keep pace with the revised federal target that in 2021 was increased to 40-45% below 2005 levels.

The Greenhouse Gas Emissions Performance Standards Regulation

In effect since 2022, this is Ontario's mechanism for establishing an emissions pricing system in place of the federal Output Based Pricing System (see below). This sets up a **compliance market** in which industrial operations exceeding 50,000 tCO_2e annually must comply with emissions limits set by Ontario's Greenhouse Gas Emissions Performance Standards (EPS). Facilities that exceed these limits can still comply with the Regulation by either purchasing **Excess emissions units (EEUs)** from the

Ontario government (set at a cost of $95/tCO$_2$e in 2025, these are non-tradeable and must be used in the year in which they are purchased), or by purchasing or using previously banked **Emissions performance units (EPUs)** (awarded for each tCO$_2$e a facility reduces its emissions below its set limit, these are both tradeable and bankable for up to 5 years from the year in which they are obtained) (OMOE, n.d.). As part of this system, Ontario's *Greenhouse Gas Emissions: Quantification, Reporting and Verification Regulation* requires facilities regulated under the systems to submit an annual report to the Ontario Ministry of Environment, Conservation and Parks. This report undergoes third party verification to ensure the company is meeting its emissions performance standards.

Canadian Federal Legislation and Policy

The Pan-Canadian Framework on Clean Growth and Climate Change 2016

This is the central policy framework for tackling the issue of climate change, including the establishment of carbon pricing systems, in Canada. The regulatory instruments below all flow from this original framework.

The Greenhouse Gas Pollution Pricing Act 2018

This is the 2018 version of the 2016 Pan-Canadian Framework, and sets out two primary components that make up the federal carbon emission pricing system:

- A regulatory charge on fossil fuels, known as the fuel charge
- A regulatory trading system for industry, known as the Output-Based Pricing System (OBPS).

The Output-Based Pricing System is the element of relevance to this primer. Similar to the Ontario Emissions Performance Standards system, the OBPS covers large industrial facilities (emitting over 50ktCO$_2$e annually) operating in provinces that don't have their own carbon pricing system in place. Also similar to the Ontario system, annual emissions limits are set for industrial facilities based on their emissions per unit of production (the methods for calculating these limits are publicly available on both provincial and federal websites but are beyond the scope of this primer). Facilities that exceed their limits must either pay an Excess Emissions Charge ($95/tCO$_2$e in 2025, with funds collected to be returned to the jurisdiction of origin to support industrial emissions reduction projects) and/or remit compliance units, again similar to the Ontario system. In the federal system, the tradeable and bankable form of compliance unit earned for reducing emissions below the annual limit (Emissions Performance Units, or EPUs, in the Ontario system) are called **Surplus Credits**. In addition to Surplus Credits, the federal system has one important feature not found in the Ontario system: the acceptance of **Offset Credits** as compliance units (ECCC, 2018). Discussed further in the following pages, federal offset credits in general terms can be earned (and subsequently sold) by voluntary programs or projects not regulated by carbon pricing that result in GHG emissions reductions or the removal of GHGs from the atmosphere *that would not have occurred without the program or project's existence* (this requirement is termed '**additionality**', also discussed further below). The use of Offset Credits in the federal system represents at first glance a potential (though, as explained further below, not straightforward) opportunity for First Nations to participate, as credits earned by a First Nations project could potentially be sold to this market.

A Healthy Environment and a Healthy Economy: Canada's Strengthened Climate Plan

Building on the previous plans, this update establishes a $15 annual increase in the price of carbon pollution (from $65/tCO$_2$e in 2023 to $170/tCO$_2$e in 2030). The goal is to both incentivize the transition to less expensive energy sources as well as to set a clear path allowing everyone from small businesses to large corporations to effectively plan for this transition.

Canadian Net-Zero Emissions Accountability Act 2021

This 2021 Act raises Canada's commitment to reducing emissions from 30% to 40-45% below 2005 levels.

The 2030 Emissions Reduction Plan 2022

This plan details the federal government's strategy to decrease emissions by 40 to 45 percent below 2005 levels by 2030, aiming for net zero emissions by 2050.

The Greenhouse Gas Offset Credit System

This is the component of the federal Output-Based Pricing System described above that details the requirements for participation by proponents not regulated by the federal compliance market but who voluntarily establish programs or projects with an aim to sell credits to that market. While potentially an avenue for First Nations participation in the federal compliance market, the system does not yet make such participation readily achievable, as will be seen in the following pages.

The Offset Credit System applies nationally and establishes a framework for projects to obtain approval for participation and be awarded offset credits by meeting the requirements of federal offset protocols and by producing real, additional, verifiable, quantifiable, unique, and permanent reductions[114] in GHG emissions or increases in GHG removals from the atmosphere.

Currently, there are just three federal protocols under which the award of offset credits may be granted (although more are under development). These are (ECCC, 2025a):

Landfill Methane Recovery and Destruction, Version 1.1.
Reducing Greenhouse Gas Emissions from Refrigeration Systems, Version 1.2
Improved Forest Management on Private Land

Offset credits and the potential for participation in the federal offset credit system are discussed further in the compliance market Regulatory Framework section below.

Compliance and Voluntary Markets

Broadly speaking, there are two types of carbon markets: compliance and voluntary. Aside from regulatory frameworks, market size, and impact, there are significant differences between the two. Compliance carbon markets are developed by national or provincial governments or government partnerships with the goal of pricing emissions while also maintaining the competitiveness of the regulated industries or sectors (McAfee, 2016). An example of an international compliance market is the European Union Emissions Trading System (EU ETS), which was established in 2005 as the world's first and still one of the largest carbon markets, regulating approximately 40% of EU emissions (European Commission, 2025).

"Cap-and-trade" programmes (of which the EU ETS is one) are an example of compliance markets and are now in place in various countries including Canada, the EU, the UK, China, New Zealand, Japan, and South Korea, with more states contemplating their adoption (Carbon Credits.com, n.d.). In such systems, the amount of GHGs that may be released in a certain area, by specific businesses, or by

sectors of the economy, is legally limited or "capped" by regulators (generally governments or government-appointed agencies) and the entities subject to the restriction (generally large industrial operations and corporations responsible for large amounts of emissions annually) are subsequently granted or sold emissions allowances (McAfee, 2016). Businesses that do not reduce their emissions to the legal limit can still comply with the law by purchasing allowances/credits from other regulated companies who have successfully reduced their emissions below their annual limit (Figure 15), or from traders in the secondary market. This is the trade aspect of cap-and-trade.

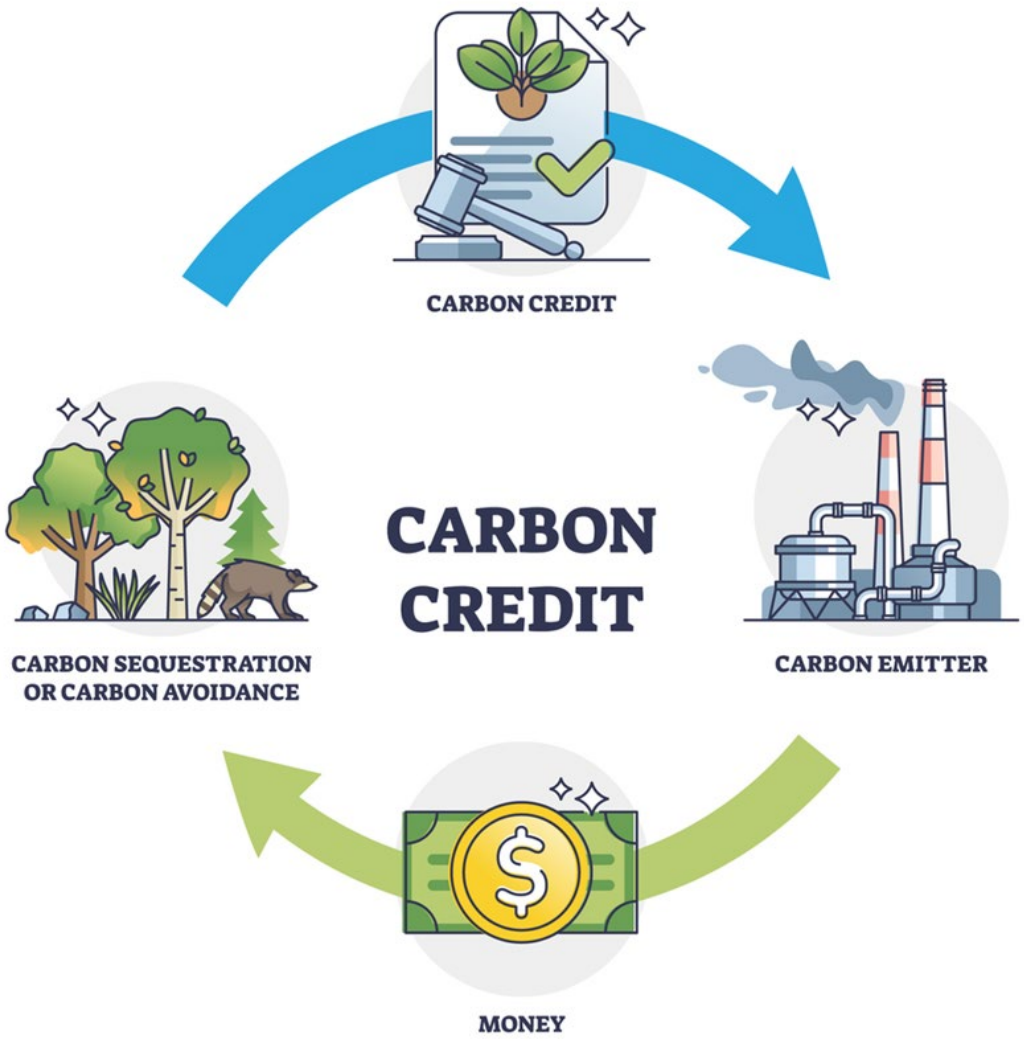

Figure 15: The basic premise of the carbon marketplace and carbon trading. Image: VectorMine

Industrial facilities that implement best management practices and that successfully reduce their emissions below a mandated limit are awarded 'carbon credits' (referred to federally as 'surplus credits', or in Ontario as 'performance units') which can either be banked or sold to industrial operators who are exceeding their emissions limits. Offset credits, on the other hand, can be awarded under Canada's Output-Based Pricing System to projects that reduce emissions and/or sequester

carbon from the atmosphere. These Offset Credits can also be sold to industrial facilities in the federal carbon market.

Cap-and-trade systems operate on the principle that once the cost of carbon has been priced into operations, regulators let market forces decide how industrial operators will best use their resources, whether through purchasing credits or cutting emissions, while gradually restricting the supply of emission allowances. These systems provide certainty around the quantity of emissions that will be produced, but there is some uncertainty around the price of carbon as this will be determined by market forces. For this reason, some jurisdictions opt instead for regulating the price of emissions (e.g., Canada's federal 'Output-Based Pricing System' or Ontario's 'Greenhouse Gas Emissions Performance Standards'). In these latter emissions pricing systems, the price per tCO_2e is set, but the quantity of emissions that will be produced is uncertain, as there is no firm 'cap' in place. To further incentivize emissions reductions in this case, the price of emissions may be raised over time, according to a set schedule.

In voluntary carbon markets (VCMs), private agencies establish the standards and norms for market players (Battocletti et al., 2024). Corporations, individuals, governments, and non-governmental organizations can voluntarily purchase carbon offsets from project developers (including First Nations with approved projects) in order to reduce or neutralize their **carbon footprint**s. For example, some airlines offer to sell passengers carbon offsets to make up for the carbon emissions produced by their flight. In selling the customer the offset, the company, in this case the airline, is promising the customer that it has invested in one or more projects that receive carbon offset credits for reducing the amount of carbon emissions being released into the atmosphere from this trip.

Carbon offset projects, developed by commercial and/or social enterprises and approved by governments or other regulators, that provide reductions or removals of emissions are the main sources of voluntary carbon credits. Projects that increase energy efficiency, absorb and sequester carbon and methane, reforest land, and employ renewable energy sources are among the most prevalent kinds of carbon offsetting projects (Carbon Credits.com, n.d.). Most projects adhere to rules set by independent standards bodies.

Numerous parties are driving demand for carbon credits in VCMs, including corporations with sustainability goals, individuals seeking to reduce their carbon footprints, and various organizations hoping to exchange credits for a profit at a premium. Voluntary carbon credits are highly flexible and not limited by national borders or political alliances. They can be accessed by a wide range of industries and organizations. Participating in voluntary carbon markets provides opportunities to offset emissions for those who are not regulated under a compliance system (Gastelle & Hispa, 2024).

Canada's Regulatory Framework for Compliance Carbon Markets

In Canada, the Greenhouse Gas Pollution Pricing Act (GGPPA) specifies the emissions limits for different industries (ECCC, 2025a). Industrial facilities exceeding their limits can either pay a fine (the 'Excess Emissions Charge'), remit surplus credits either purchased from facilities emitting below their allowed limit or banked from previous years, or purchase carbon offset credits from one or more approved offset projects that actively stores or sequesters carbon. A combination of these methods is also permissible.

The *Canadian Greenhouse Gas*[3] *Offset Credit System Regulations* ("the Regulations") outline the requirements that carbon projects must meet to generate offset credits under the GGPPA (ECCC,

[3] The federal documents referring to these regulations generally employ the term 'greenhouse gas', or GHG, so as to be inclusive of any potential offset project that reduces GHG emissions or removes GHGs from the atmosphere. Recall from Part 1, however, that carbon is the most abundant element in

2025a). Federal protocols, listed in the *Compendium of Federal Offset Protocols* ("the Compendium"), outline the implementation requirements for eligible project types and the specific method for calculating emission reductions for such projects (ECCC, 2025a).

In order to qualify for offset credits, the project proponent is required to do the following (ECCC, 2023c):

a. register the project
b. own an account in the tracking system for the GHG Offset Credit System
c. carry out the project in compliance with the relevant procedure
d. provide measurable, additional, verified, distinct, and permanent GHG reductions
e. compile a project report and arrange for a verification body to verify it (ANSI National Accreditation Board (ANAB, 2025)
f. submit project reports together with a prepared verification report
g. fulfil the requirements regarding the implementation of a reversal risk management plan (explained further below) and project monitoring, including the submission of monitoring reports
h. fulfil the obligation to remit compliance units, if applicable.

Figure 16 provides a flowchart of the key steps involved in implementing a greenhouse gas offset project.

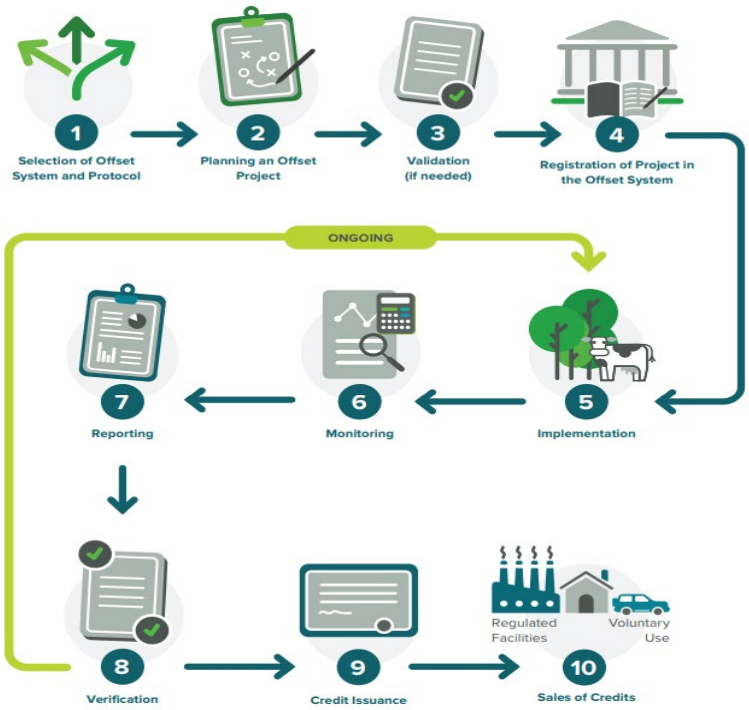

Figure 16: Essentials of Implementing a Greenhouse Gas Offset Project under Canadian Federal Compliance Market Regulations. (ECCC, 2023a)

greenhouse gases produced by human activity. Most GHG offset projects will be involved in managing carbon in one form or another, hence the use of the term 'carbon offset' elsewhere in this report.

Project Eligibility

To sell **offset credits,** a seller must qualify as the project developer (otherwise known as a project proponent) of an activity that reduces or removes GHG emissions. The project activity must be of a specific type for which a protocol already exists in the Compendium (ECCC, 2025a). Protocols under the Compendium outline project implementation and methods for quantifying the GHG emissions for different project types (ECCC, 2025a). As it currently stands, the Compendium has established three protocols: for landfill methane recovery and destruction, for reduction of GHG emissions from refrigeration systems, and for improved forest management leading to reductions in carbon emissions. (Four other protocols are currently in development: reducing enteric methane emissions from beef cattle; direct carbon dioxide capture and sequestration; enhanced soil organic carbon; and avoidance of manure methane emissions through anaerobic digestion and other treatments (ECCC, 2023c).)

At first glance, it would seem that the improved forest management protocol could provide the most immediately accessible entry point for First Nations, particularly those situated on forested lands. However, the protocol is currently designed strictly to improve certain timber extraction practices. It does not enable First Nations or other entities to generate funds from conservation of lands. As the protocol states under Section 4.3 Ineligible project activities (ECCC, 2023b):

> Any activity that involves a land use change, prevents a land use change, or change of land cover, such as afforestation/reforestation and avoided conversion of forestlands, is not eligible under this protocol. This excludes land use conversion for the purpose of carrying out forest management activities (e.g., construction of forest roads).

This clearly presents a barrier to First Nations wishing to generate revenue through conservation of forested lands, or through the reforestation of previously cleared lands. Currently it is unclear as to whether such projects will eventually be approved as part of federal protocols. An indicator that some sectors are seeing the value of forest conservation projects in carbon offset markets comes from the International Civil Aviation Organization (ICAO), which in 2020 specifically approved such projects as part of its voluntary carbon market protocols (Verra, 2020).

In addition to ensuring that a project type falls within a protocol outlined in the Compendium, project proponents must also have exclusive entitlement to claim the offset credits from the emissions generated by the project (ECCC, 2023c). If a project is on private land, then exclusive rights are usually with the landowner of the property (ECCC, 2023a). If the project is on Reserve land or land owned by the community, the project proponent is the community (ECCC, 2023a). If the project is on First Nations traditional territory which the Canadian federal/provincial government sees as 'Crown' land, then currently entitlement rests with the government unless otherwise assigned (ECCC, 2023a). To show exclusive entitlement to all the emission reductions resulting from the project, proponents usually provide documentation of land ownership. This requirement can be a notable barrier for First Nations working to establish carbon offset projects on traditional territories (ECCC, 2023c; Townsend & Craig, 2020).

Project Registration

Once a project proponent has developed an idea for an eligible project, they must register their project by completing a project registration application. The application requires proof of exclusive entitlement (ECCC, 2023c) and information about the project location, the project activity, and the estimated emissions reduced or removed (ECCC, 2023c).

Eligible projects must reduce or remove emissions in a manner that is real, additional, quantifiable, verifiable, unique and permanent (ECCC, 2023a). A project is **additional** if the reduction or removal of

GHG emissions would not have occurred without the project. Project proponents will be required to measure the 'baseline case' (GHG emissions without the project) and consider any **carbon sources, sinks, and reservoirs.**

Project proponents may also need to develop a reversal risk management plan, where they assess different situations in which previously sequestered and stored carbon may be released due to unforeseen events, such as wildfires. The risk management plan should outline the different ways in which the risks identified are mitigated (ECCC, 2023a). The application will also need to take into account any possibilities of '**carbon leakage**', which denotes situations in which changing the activities in one location may shift the demand to another. There are two related types of such leakage. An example of 'activity-shifting leakage' would be when stopping logging in Location A merely shifts that now unmet demand for timber to Location B (ECCC, 2023a). In 'market leakage', changes in the market in one location due to emissions reductions efforts, for example, alter the supply and demand equation in another location, leading to different business decisions and increased emissions in the new location. Both of these types of leakage need to be factored into the risk management portion of the application.

Project Implementation and Monitoring

Once registered, the project proponent should implement the carbon project as outlined in their application and quantify the GHG emissions reductions based on the relevant methodology. Regular monitoring and record-keeping are crucial to support findings. The project proponent is expected to regularly provide the offset systems administrators with all findings (ECCC, 2023a).

Verification and Credit Issuance

If all requirements are met, officials will verify eligibility and the project's emission records. At such time the project proponent will be issued the earned offset credits, which can be sold (ECCC, 2024).

The Regulatory Framework for Voluntary Carbon Markets

The voluntary market differs from the compliance market in terms of flexibility (ECCC, 2023a). Project proponents are not required to follow *GGPPA* regulations (although they can do so if it meets their needs) and can pursue project activities without being limited to the protocols listed in the Compendium. Further, unlike with compliance credits, buyers do not have to be strictly Canadian individuals or businesses (see Figure 17); buyers can be international organizations (Deloitte LLP, 2023).

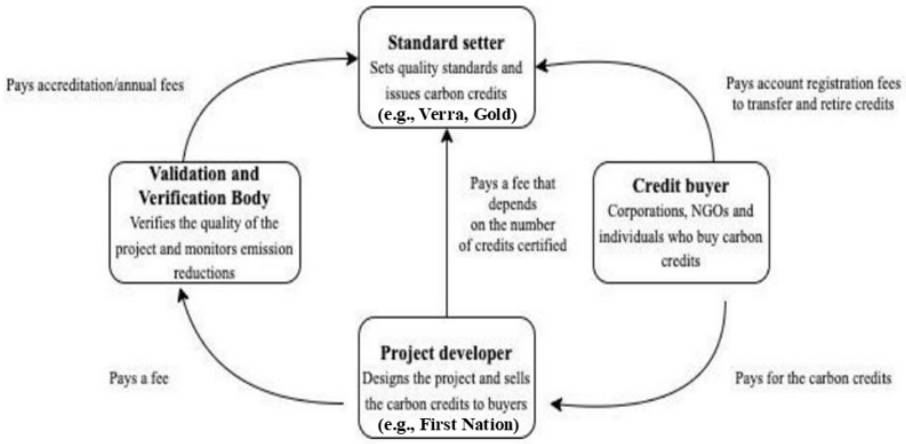

Figure 17: The Key Players in a Voluntary Carbon Market. (adapted from Battocletti et al., 2024)

Project Eligibility and Verification Standards

Voluntary carbon offsets must still be credible in their emission reductions and follow recognized third-party standards such as the Verified Carbon Standard (Verra), Gold Standard, Climate Action Reserve (CAR) or the American Carbon Registry (EcoCart, 2023). Verra is currently the most widely used crediting program (Verra, n.d.). Each standard has requirements for project eligibility, emissions quantification, monitoring, reporting, and verification. When engaging in the voluntary market, it is crucial to review in detail the specific standards and guidelines that apply to your project to ensure you meet the requirements to generate voluntary offset credits. More about the Verra standard in particular can be found at Verra.org (Verra, n.d.).

The requirement for exclusive entitlement persists in the voluntary market, and presently, First Nations are frequently unable to advance projects in the voluntary market that are defined by the government as being on Crown lands (Deloitte LLP, 2023). Only British Columbia has a formal mechanism in place that allows First Nations to negotiate for carbon rights on Crown land through an Indigenous Atmospheric Benefit Agreement (IABA) (Deloitte LLP, 2023). (Some have noted that IABA's shift the onus onto First Nations and other Indigenous governments to actively seek out their carbon rights, which, in practice, is quite demanding and time-consuming, but it has been accomplished (Deloitte LLP, 2023).

Project Development Registration

Project proponents may still be required to create an extensive project report and plan to register their project. However, proponents will register with the chosen third-party organization instead of registering the project with the government.

Project Implementation and Monitoring

Similar to the compliance market, each third-party issuer will have requirements on the extent and frequency of monitoring once a project has been successfully implemented. Every carbon credit issuer will have its preferred quantification method, which project proponents will need to follow. The quantification method is one of the factors impacting the quality of carbon credit, as more rigorous monitoring requirements are viewed as producing a more accurate and higher quality carbon credit (ECCC, 2023a). Therefore, project proponents should pay special attention to the monitoring standards set out by a potential issuer, as their perceived quality may impact the value and worth of your carbon credit (Nielsen, 2021).

Verification and Trading

Once a project has been implemented and monitored for a specified period of time, project proponents will likely need to verify their emissions reductions in a manner prescribed by the third-party issuers. Verra requires an independent auditor to verify all emissions reductions (Verra, n.d.). Once verified, the project proponent is issued certified credits to be traded on the voluntary market.

Transitioning to Compliance Market

Projects that were first registered under a voluntary offset system can transition into Canada's compliance system if the project meets all of the regulatory conditions described above (ECCC, 2023c). However, the project can no longer be registered in the voluntary system once the election to switch markets has been made (ECCC, 2023c).

What are the Arguments Against Participating?

It is up to First Nations communities to decide whether to participate in carbon markets. Charlotte Streck, director of the international climate and carbon market consulting firm Climate Focus, highlights that carbon markets can either bolster or weaken community rights related to carbon (Selibas, 2021). She stresses that communities should determine their participation and the manner in which they participate with these market initiatives (Selibas, 2021).

The Indigenous Environmental Network (IEN) raised a number of concerns about carbon offset projects in a letter regarding the Article 6.4 mechanism of the Paris Agreement (Goldtooth et al., 2023). While some of the concerns raised relate more specifically to international settings, some are of particular relevance to First Nations in Ontario. For example, the problem of 'leakage', where emissions saved in one location simply allow more emissions to be released elsewhere, is seen by some as an ongoing flaw in the goal of carbon markets to reduce overall emissions (Morse, 2022). Another issue is the question of 'additionality', where the claim that the existence of the carbon market has resulted in additional reductions in carbon emissions is frequently highly debatable (Song & Temple, 2021). Another concern is that land used in carbon offsets projects may become restricted in terms of the uses that may be applied to that land. The duration of a carbon offset project might vary from 10 to 30 years or more, depending on the project's particulars (ECCC, 2023c). In addition, many project verification standards include a 'permanence requirement', meaning that once a project is completed, the outcome needs to be maintained for an extensive period, often as long as 100 years (Sylvera, 2022), to ensure that carbon sequestered by the project remains out of the atmosphere for as long as possible. This has the potential to limit the land use options available to a community should its land use needs change within such time frames. In some cases, long-term allocation of land for carbon offset projects may provide challenges for First Nation communities, including limiting access to ancestral lands to engage in traditional activities such as hunting, fishing, farming, and gathering, as well as spiritual practices.

In light of these potential pitfalls, the IEN believes that Indigenous peoples should lead the consent and engagement process, drawing on traditional Indigenous knowledge. They should also have the freedom to refuse to participate.

What are the Options for First Nations who Wish to Engage in the Carbon Economy?

Indigenous people and communities play a crucial role in managing numerous vast carbon sinks that are increasingly contributing to carbon markets globally (Gordon, 2022). On a global scale, 80% of the world's biodiversity, including 22% of tropical and subtropical forest **carbon storage** and 17% of total forest carbon storage, is located on Indigenous and communal lands (Forest Stewardship Council Indigenous Foundation (FSC-IF), 2021). Deforestation rates are lower in forests maintained by Indigenous people; research has shown that these forests perform just as well as, or even outperform, protected national parks in preventing deforestation (Gordon, 2022). In Ontario, forest degradation by industrial logging also threatens carbon storage in forests and is even more widespread than deforestation.[4]

Given the above, most forest carbon offsetting projects target Indigenous lands and territories (Gordon, 2022). While globally there have been numerous challenges experienced in carbon market participation (Souza et al., 2023), Voluntary Carbon Markets currently represent a significant potential avenue for First Nations communities to engage in carbon markets.

[4] For more on the topic of deforestation in Ontario, see Wildlands League (2019).

As we have seen, there are conflicting viewpoints on whether participation in these markets is the best way to approach emissions reductions. While there are many who argue against participating, there are others who see these marketplaces as a vital means of protecting lands, customs, and traditional forms of subsistence (Pairomahakij & Ganz, 2023).

First Nations and the Carbon Economy: Some Considerations

First Nations are poised to be leaders in the carbon economy through exercising Aboriginal and treaty rights, asserting authority and jurisdiction over territories and governing for the well-being of Mother Earth and future generations. These actions are already enabling the appropriate stewardship of carbon, although this may not have been stated explicitly until recently, if at all.

First Nations hold treaties and inherent rights to their territories; it is therefore considered to be unlawful to proceed with any carbon-impacting project initiatives without the free, prior and informed consent of the Nations as per their own treaties, laws and governance structures. Any development activity that occurs on First Nations territory, which may affect Mother Earth and First Nations stewardship of carbon, must abide by the inherent authority and jurisdiction of First Nations.

First Nations climate solutions, as potentially offered by carbon market-based initiatives, must be rooted in natural law and those responsibilities and obligations related to the healing and recovery of Mother Earth. These initiatives must also facilitate a reconnection and reconciliation with Mother Earth by restoring a balance with the Earth. With this in mind, First Nations must be wary of predatory and opportunistic interests seeking to exploit carbon initiatives in ways that will ultimately compound the climate crisis and be further detrimental to the well-being of Mother Earth and First Nations communities. The following considerations will assist First Nations in determining whether a carbon market system aligns with their own aspirations and goals.

The current climate crisis, of which the excessive release of carbon is a central component, is not a problem that First Nations created. Similarly, the concept of a 'carbon economy' did not originate from First Nations. Carbon economies are externally-derived mechanisms based on non-Indigenous worldviews. Among the holders of such worldviews, however, some parties hold values that can align to some degree with First Nation goals, laws, knowledge and rights. As First Nations decide whether or how to engage more in the carbon economy through various methods,[5] collaborations and partnerships with groups whose values coincide significantly with those of First Nations become vitally important for realizing a sustainable future. It is thus essential to assess the merits of potential partners and collaborators. Some questions to consider that may assist in this process are noted below.

Collaborations and partnerships are invaluable if they contribute to the goals of the participating First Nation. Given the pace at which carbon markets are evolving, however, many First Nations risk engaging in these processes without a clear climate change plan or strategy in place and thus may not be certain about how such engagement will (or will not) contribute to their overall community vision. In the spirit of self-determination, First Nations must assume their role as stewards of the carbon in their territories as quickly as possible, with all the planning that entails, and thus be prepared to respond to coming opportunities in the most informed way they can, for the benefit of all current and future generations.

[5] E.g., by accessing government funding for Indigenous guardian programs, through Indigenous Protected and Conserved Areas, or via other novel market-based approaches as may yet emerge (see Appendix A).

Challenges to Overcome

Increasingly, there are potential opportunities for First Nations to design carbon offset projects and become leaders in the carbon economy. Despite this potential for growth, First Nations face several challenges when engaging with this emerging economic landscape. This section outlines the opportunities and challenges that First Nations encounter, drawing from the responses of several different First Nations and other Indigenous communities interviewed by the Conservation through Reconciliation Partnership research project (Townsend et al., 2020).

Limited resources and clarity on carbon opportunities: Despite strong interest from many First Nations to engage in the carbon economy, there is a lack of accessible resources and information on how to pursue carbon opportunities. Most of the available guidance is highly technical and scientific, making it less accessible. Further, common market standards and revenue benchmarks often remain private, providing scant insight into market norms. (The goal of this primer is to help alleviate this barrier by demystifying carbon market opportunities.)

Unrecognized carbon rights: Canada has to date not recognized carbon rights for First Nations, creating uncertainty regarding establishing carbon ownership for First Nations engaging in activities that store or regulate carbon. Internationally, lack of legal recognition of Indigenous carbon rights has been described as putting climate change solutions on Indigenous lands at significant risk (Lofts et al., 2021). In Canada, the Centre for Indigenous Environmental Resources (CIER) in 2006 proposed 3 categories of legal argument that could be made to confirm First Nations carbon rights (Centre for Indigenous Environmental Resources (CIER), 2006). Townsend and Craig (2020, p.75) summarized these arguments as follows:

> **1.** Claiming ownership to carbon as a resource that was not ceded by First Nations to the Crown specifically, and thus ownership and rights of use is still retained by the First Nation.
> **2.** Asserting territorial jurisdiction over forests and areas that can be managed and conserved in a way that is compatible with recognising the existence of carbon offset credits. This could happen in areas controlled by First Nations governance structures under settled land claims agreements, on reserves, and off-reserves through assertion of Aboriginal title.
> **3.** First Nations can argue that they have Aboriginal and treaty rights to or related to the conservation and environmental management practices that would also create for them interests in owning and selling carbon offset credits.

For their part, First Nations assert that Aboriginal and treaty rights extend to carbon rights. These rights are protected in the Canadian Constitution Act (Section 35). First Nations traditional laws also form an important source of carbon rights and responsibilities, as noted in various Chiefs of Ontario declarations and resolutions. Canada's *United Nations Declaration on the Rights of Indigenous Peoples Act*, which pledges Canada's agreement to implement UNDRIP, can also be interpreted to support the carbon rights of First Nations.

For First Nations to fully participate in the carbon economy, their rights to land and to the carbon within it must be secured and legally upheld. These rights are not yet commonly recognized by Canadian or provincial governments, representing a significant challenge to be overcome in developing carbon offset projects (Unique arrangements such as '**Atmospheric Benefit Sharing Agreements**' have nonetheless allowed carbon offset projects to be developed in some instances, such as the Great Bear Rainforest Initiative in British Columbia) (Coastal First Nations, 2022). Some nonprofit organizations and initiatives (e.g., Ecotrust Canada, World Wildlife Fund, Conservation through Reconciliation Partnership) support the recognition of First Nations carbon rights and are collaborating with First Nations on carbon-related projects.

Unclear land tenure: First Nations without clearly delineated land tenure struggle to participate in carbon initiatives, such as carbon offset projects, that require exclusive land jurisdiction (Townsend et al., 2020). Further, some communities' carbon projects may take place in areas shared or overlapped with another community, which causes confusion over project ownership.

Financial Constraints: Carbon projects require significant financial resources to initiate and maintain, and community spending may be allocated for more pressing and immediate initiatives. Though such projects can be effective and impactful, it may take a number of years before a return on investment can be realized. A First Nations community should reflect on its current and future financial needs and determine whether it can afford to wait until it has a project that generates regular revenue.

Funding through partnerships, government grants, and donations may not cover the entire project cost, including upfront costs and the ongoing costs of project monitoring, reporting, and maintenance. Some sources of funding, including government funding, may impose restrictive conditions that prevent a project proponent from participating in the carbon offset system, so it is important to review the project restrictions attached to a funding agreement (ECCC, 2023c).

Technical Limitations: Carbon projects require specialized technologies and expertise to measure emissions, which can be challenging to access and set up in varying ecosystems.

Conflicting Economic Priorities: Some carbon projects clash with existing economic activities that a community engages in, such as logging or mining, that employ community members. This may create intra-community tensions and impact buy-in for the carbon projects.

Additionality Requirement: Carbon offsets must satisfy the principle of 'additionality,' which means carbon offsets must demonstrate that emissions reductions would not have occurred without the existence of the carbon project. Projects involving land stewardship often do not satisfy the additionality requirement, limiting First Nations' ability to pursue carbon offset projects that include ongoing stewardship obligations (Townsend et al., 2020).

Concerns Around Greenwashing and Environmental Efficacy: Some view carbon projects that partner with large industrial polluters as enabling greenwashing (Raji, 2023). Greenwashing is a phenomenon where organizations try to portray themselves or their products as more ecologically friendly than they are in practice (Raji, 2023). As mentioned earlier, carbon 'activity-shift leakage' is a potential example of this, where carbon stored or sequestered in one location merely allows more carbon to be released in another (Amorelli et al., 2021; Morse, 2022). Similar to greenwashing, such activity leakage can arguably be intentional. As such, some argue that carbon credit systems do not incentivize corporations to change their core production habits but instead allow them to shift the burden onto others (Amorelli et al., 2021).

Regulatory Uncertainty: Ontario has experienced significant political disagreement over carbon pricing and legislation. In 2018, Ontario's **cap and trade** program was cancelled (Ontario Ministry of the Environment, Conservation and Parks (OMOE), 2025). In 2021, the federal Greenhouse Gas Pollution Pricing Act was challenged by the province of Ontario as being unconstitutional but was upheld (Supreme Court of Canada, 2021). In February of 2024, Ontario's provincial government announced plans for new legislation under the *Get it Done Act* that requires a referendum to take place before any new carbon pricing legislation can be implemented in Ontario (Vollmer, 2024). These frequent changes create uncertainty for those considering carbon projects.

Lack of trust with project partners: Some First Nations have expressed concern about entering into agreements with government or corporate partners due to power imbalances, financial disparities, and potential risks to land rights.

Opportunities and Benefits

Continuing with findings from the Conservation through Reconciliation research project, interviewees provided the following insights into the potential opportunities offered by participation in carbon markets:

Indigenous-led Carbon Projects: First Nations should continue their role as caretakers of natural spaces that can be part of high-impact carbon projects, positioning them as leaders in carbon offset economies. As more First Nations partake in carbon opportunities, the space becomes increasingly Indigenous-led, with First Nations projects, conservation spaces, and knowledge meaningfully leading Canada's carbon offset economy.

Financial Benefits: Many carbon projects offer the opportunity to generate revenue that can be directly returned to the community and used to support a wide range of community initiatives, including language and cultural revitalization, land stewardship programs and the operation of the carbon project itself.

Employment Opportunities: Carbon projects can create jobs for participating community members, both at the initial implementation stage and ongoing through monitoring and maintenance. There are already numerous **Indigenous Guardians** programs (see Appendix A) underway across Canada where funds earned for environmental services stemming from careful land stewardship are used to employ local youth and other community members.

Strengthening Self-Determination: First Nations-led carbon projects can enhance self-determination by enabling communities to have greater control over land conservation and development decisions.

Bolstering IPCA programs: Carbon offsets can help finance a community's participation in **Indigenous Protected and Conserved Areas (IPCAs)**, which have co-benefits to First Nations communities (Ecotrust Canada, 2023).

Reforestation and Degradation Mitigation: Many carbon opportunities involve reforesting specific land areas that have been degraded. These projects benefit community members who can re-engage with the land for knowledge, tradition, and ceremony.

Protecting biodiversity: If a carbon project conserves a natural ecosystem, it will also protect biodiversity.

Significant Impact on Reducing Emissions: First Nations-led carbon projects have the potential to be high-impact and instrumental in reducing carbon emissions, contributing to meeting **net-zero** targets. As climate change disproportionately impacts First Nations, efforts to minimize carbon emissions can have a considerable positive impact on communities.

Cultural Revitalization: First Nations-led carbon projects allow communities to work together to conserve land based on community knowledge, traditions, and customs. These projects engage elders and knowledge keepers alongside other community members, invoking the community's language, traditions, and oral history. This, in turn, helps revitalize traditional culture and language.

Considerations Regarding Compliance vs. Voluntary Market Participation

Several factors should be considered by a project proponent before determining whether to participate in a compliance or voluntary market.

- **Differences in Requirements:** Generally, requirements and standards for offset credits in the compliance market are stricter than those in the voluntary market.

- **Price and Demand:** The price of an offset credit is a function of demand—where there is an oversaturation of a type of credit or very little demand, prices will be low. Demand in the compliance market relates strongly to the stringency of the regulations and the subsequent costs for project proponents to comply. Generally, compliance credits are sold at a higher price than those in **voluntary markets**.

- **Limitations on Purchaser:** Organizations purchasing credits for compliance reasons can only purchase carbon offsets from sellers whose credits have been generated by government actors (meaning credits can only be sold to Canadian organizations). On the other hand, project proponents in the voluntary market can sell their credits to international buyers.

- **Project Type:** Currently, there are only three protocols in the Canadian compliance market (landfill methane recovery and destruction, refrigeration emissions reduction, and improved forest management on private land), which means that only projects that qualify for carbon credits under one of these protocols can participate. In contrast, the voluntary market is less restrictive, and project proponents have several types of projects they can pursue. Some experts have noted that if a project has several co-benefits, such as fostering biodiversity, in addition to emissions removal or reduction, then it may be a project that is better suited to the voluntary market; whereas a project that is particularly well suited for the GGPPA protocols may be more successful in the compliance market (ECCC, 2022).

- **Credibility and Quality:** Compliance offset credits undergo stringent and well-recognized evaluation requirements. Given the range of third-party issuers within voluntary markets, some experts have raised concerns over the quality of offset credits issued by certain private entities.

Conclusion: The Role of Indigenous Peoples' Knowledge, Laws and Responsibilities in the Carbon Economy

> *First Nations have exercised inherent jurisdiction on Mother Earth since time immemorial. This jurisdiction is embedded in the various traditional constitutions of the First Nations that originate from the Creator and the ancestors of our people. This is sometimes referred to as "the sacred relationship to Mother Earth." First Nations are the original stewards of the land. They feel their duties and responsibilities to Mother Earth are not being respected and integrated by Crown governments at all levels.*
>
> (Chiefs of Ontario (COO), 2009)
>
> *We, as humans, are made up of water (oxygen/hydrogen) and carbon, as is the Earth itself. We are the Land. We are the Water. Our well-being is inextricably tied to the health of Mother Earth. "We are the Land. The elements, cycles and life force of the land is the law."*
>
> (COO, 2009)
>
> *The Water Declaration of the Anishinaabek, Mushkegowuk and Onkwehonwe also states that we have laws, knowledge and protocols to ensure the ongoing presence of clean water for all living things; and that we have ways to pass on this knowledge to current and future generations.*
>
> (COO, 2008).

Our role in the carbon economy should be consistent with such directions already given by leaders, Elders, knowledge holders, and technicians and as expressed in Chiefs of Ontario declarations and resolutions. These directions describe our roles and responsibilities to the natural world, Mother Earth, and current and future generations.

A repeated call to action emphasized in COO declarations and resolutions is the requirement to support the healing of Mother Earth. Mother Earth has been harmed by historical and ongoing colonial violence. Harm to the Earth means harm to the people. These harms are exacerbated by climate change. Guidance from Elders and knowledge holders points to the need to reconcile our relationship with Mother Earth through the following actions:

- Supporting Mother Earth to heal herself
- Renewing relationships with Mother Earth through land-based practices, cultural activities, ceremonies, language revitalization efforts, and related undertakings
- Further reconnecting with Mother Earth by realizing our caretaking duties, obligations and responsibilities to her
- Asserting traditional laws, knowledge and forms of governance that guide healing with Mother Earth
- Ensuring that youth remain involved as leaders of actions that facilitate healing and reconnecting with the Earth.

Like water, carbon is a source of life, but it can be a source of harm if humans abuse or exploit it, as evidenced by human-induced climate change caused by the excessive release of carbon dioxide and other carbon-based greenhouse gases. At this juncture in time, reconciliation with Mother Earth is

critical. Any carbon initiative must enable this directive. As First Nations considering participation in the carbon economy, we must ask ourselves “How can our participation in carbon markets help us heal our relationships with the natural world and ensure that future generations flourish?”

To enable fulfilment of the leadership role they stand to assume in the carbon economy, First Nations must be prepared. It is recommended that First Nations develop their own climate change strategies that specifically include plans for how carbon will be managed in their communities and territories. This will assist First Nations in assessing the desirability, feasibility and alignment of proposed carbon projects with their own goals and aspirations (Chiefs of Ontario (COO), 2009).

First Nations must continue the essential work of protecting, asserting and exercising their rights. Assertion of rights, authority, jurisdiction and self-determination is essential to any dialogue regarding First Nations involvement in the carbon economy.

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List of Appendices

Appendix A: Case Studies and Related Examples

Case Study: Great Bear Initiative Carbon Project

The Great Bear initiative is a landmark project that represents one of the largest carbon offset agreements in the world (Coastal First Nations (CFN), n.d.). In 2009, The Coastal First Nations entered into an agreement with the government of British Columbia, which purchases these credits to reduce their carbon footprint (Conservation through Reconciliation Partnership (CRP), 2019). The Coastal First Nations set out to reduce GHG emissions by improving their forest management strategies. Specifically, the project set out to convert commercially logged forest into a protected forest. The Coastal First Nations entered into an agreement with the province, at the time referred to as an Atmospheric Benefit Sharing Agreement, to confirm their rights to own and sell the carbon offsets generated in their own territory (Tree Canada, 2022). The Coastal First Nations negotiated a revenue-sharing agreement that gave them 80% of the revenue from these sales (CFN, n.d.). The Coastal First Nations sell up to one million tonnes of carbon offset credits per year (CRP, 2019).

The Coastal First Nations reduced the rate of logging, deployed more ecosystem-friendly forest management practices, planted trees in new areas and replanted in areas where trees have previously grown (CFN, n.d.). Many of their efforts are rooted in Ecosystem-Based Management, which has a particular focus on biodiversity (Kinship Conservation Fellows, n.d.). Through their efforts, the project activities have resulted in an 85% reduction in logging in the Great Bear Rainforest (Ostrom Climate, n.d.).

There are a number of benefits that have occurred as a result of the Great Bear Carbon initiative. The Coastal First Nations have been vocal about how this carbon offset arrangement has generated significant revenue for the community, ultimately leading to economic self-sufficiency. The revenue the coastal First Nations receive goes directly into other related initiatives, such as complementary conservation and stewardship programs, community-wide initiatives, and continued capacity-building. Marilyn Slett, President of the Coastal First Nations, notes the carbon offsets have bolstered employment opportunities, and stewardship has been strengthened.

Further, this project has positively impacted the Coastal First Nations' people's spiritual and mental well-being. Revenue from the initiative has contributed to the building of a Big House on Heiltsuk Nation, a space for community spiritual and ceremonial events (CRP, 2019). Some have noted that the Big House contributes to the cultural revitalization of the community. Slett also explained that the carbon offsets have resulted in many more people taking part in conservation efforts with the land and subsequently experiencing a lot more land-based healing (CRP, 2019). Overall, the Great Bear Carbon Initiative is an example of how First Nations communities can develop an innovative, holistic, and culturally appropriate solution to climate change through carbon offsets.

Indigenous Protected and Conserved Areas (IPCAs)

In 2018, Canada's 'Indigenous Circle of Experts' (ICE) defined Indigenous Protected and Conserved Areas (IPCAs) as "lands and waters where Indigenous governments have the primary role in protecting and conserving ecosystems through Indigenous laws, governance and knowledge systems" (ICE, 2018, 5). All IPCAs share three components: they are Indigenous-led, they are a long-term commitment to conservation, and they elevate Indigenous rights and responsibilities. Other than these three components, IPCAs are quite broad and varied.

The scope and approach of each IPCA are decided entirely by the participating First Nations. First Nations can decide to collaborate with other organizations or government bodies to achieve the

goals of their IPCA. The Conservation through Reconciliation Partnership created a thorough IPCA Creation Guide, which outlines information about the law, financing, governance, partnerships, operations, and design considerations involved with an IPCA (CRP 2022). In addition, Ecotrust Canada released a detailed report on the possibilities for carbon offsets to be used to finance IPCAs. To date, no one has successfully used carbon offsets to fund an IPCA, but Ecotrust finds this approach could have numerous positive impacts, such as encouraging land stewardship, economic independence, and job creation (Ecotrust Canada, 2023).

Although IPCAs are initiated by First Nations and do not require government permission, they have been recognized and endorsed by the Federal government (ECCC 2024). The province of Ontario has not recognized IPCAs, which, although not required to establish an IPCA, may cause challenges in asserting jurisdiction amongst non-Indigenous interests (Mousavi, 2022).

One example of this reality is seen in the case of the Grassy Narrows First Nations. In 2018, the Grassy Narrows First Nations decided to designate a specific area as an IPCA and therefore banned industrial logging activity within its bounds (Youdelis et al., 2021). The Federal government supported Grassy Narrows' IPCA, but the government of Ontario undermined the IPCA by asserting claims to mining exploration within the designated area (Youdelis et al., 2021). In a report by the CRP, they note that this represents a common paradox associated with IPCAs, in which the federal government will express its support, but then other actors within the same Crown government will undermine it.

Further, Ontario created a Protected Areas Working Group, which strongly recommended that Ontario's conservation efforts prioritize IPCAs to effectively address conservation goals. Despite these recommendations, the Ontario government has not made the Working Group recommendations public, nor have they engaged in discussions with the group or other stakeholders (McIntosh, 2023). Therefore, it appears that in Ontario, a designated IPCA may not shield communities from the province attempting to undermine their claims. The Canadian Environmental Law Association created a briefing note outlining existing legal mechanisms that may be of use in the establishment of IPCAs in Ontario (Blaise, 2020).

Case Study: Moose Cree First Nation

In 2021, the Moose Cree First Nation (MCFN) announced that it was establishing an IPCA in the North French River Watershed (MCFN, 2021). The North French River Watershed is a particularly important place for the MCFN as it serves as a place for fishing and hunting and a space where tradition is practised and spiritual and cultural connection is maintained.[213] MCFN received funding from the Federal Government to support protecting the watershed under the Canada Target 1 Challenge (Government of Canada (GC), 2021). The Metcalf Foundation and the International Boreal Conservation Campaign, as well as the Wildlands League and Nature Canada, are providing financial, technical and scientific support for the IPCA (MCFN, 2021). In a 2022 update, MCFN noted that they met with the Ontario Minister of Environment to discuss the IPCA and its implementation and both parties committed to prioritizing the success of this project (MCFN, 2022). The IPCA offers the promise of future economic opportunities through carbon credits (MCFN, 2022).

Case Study: Poplar River First Nation

The central Manitoba First Nation of Poplar River has partnered with the International Institute of Sustainable Development in pursuing a 'Payments for Ecosystem Services' (PES) model that considers not only the societal benefits of carbon sequestration but also the numerous other benefits that

effective and long-term ecological conservation measures bestow upon not only local inhabitants but also society as a whole (IISD, 2020). Garnering attention through a UNESCO World Heritage designation, efforts are ongoing to determine a variety of possible revenue streams to sustainably fund conservation and related work on traditional territories.

Case Study in Progress: Draft Omushkego Wahkohtowin Conservation Plan

In 2022, the Mushkegowuk Council's Omushkego Wahkohtowin Conservation was included as one of 4 Indigenous-led 'Project Finance for Permanence' initiatives to receive $800 million in support from the federal government. While not yet established as a carbon offset project, one of the stated goals of the initiative is to explore such a designation and related potential revenue streams as part of establishing a 'conservation economy' for the region. Phase 1 of the project has been the establishment of a National Marine Conservation Area along the western Hudson and James Bay coasts with the support of the federal government (Omushkego Nations, 2024).

Indigenous Guardian Programs

Guardian programs are community initiatives where designated individuals serve as the "eyes and ears" of a community and are usually tasked with activities involving the management of key land areas. The Government of Canada has created several funding opportunities for Guardian programs to be implemented that support a number of initiatives that include but are not limited to: species and habitat identification, monitoring and protection; habitat conservation and land use planning; and enforcement and compliance support through observation, recording and reporting (GC, 2023).

The difference between the Guardian program and IPCAs is that the Guardian program is less about designating a specific area of land for protection and more about having a Guardian actively manage lands and resources. A Guardian program is not an exclusive effort; it can be implemented in conjunction with another carbon management approach, such as a wetland restoration initiative. A Guardian may conduct the restoration work and also be the authority that collects the data and monitors its progress. Guardians may be key players in helping manage an IPCA or in implementing a First Nations-led carbon project. A First Nations community may first pursue a First Nations Guardian program, which along with their knowledge and monitoring, can aid in identifying priority projects and designing an IPCA. The Government of Canada has designated funding specifically for First Nations-led projects via their Indigenous Guardians Pilot Program (GC, 2022). For more information on the Indigenous Guardians program, review the Indigenous Guardian toolkit online (Nature United, n.d.).

Case Study: Ahousaht Stewardship Guardian Program

In 2021, through the Indigenous Guardians Program, two individuals were hired as Guardians of the territories of the Ahousaht Hahoulthee and played a pivotal role in monitoring and restoring the community's traditional lands. The Ahousaht Guardians undertook comprehensive monitoring of diverse ecosystems, including monitoring sea lice in wild fish and sea star populations.

The Guardians used the data they gathered to help secure funding for a range of conservation projects. They also spearheaded four river restoration projects, which yielded remarkable results that surprised many community members with the speed and effectiveness of the restoration efforts. The Guardian program thus had a transformative impact on the Ahousaht Hahoulthee community. With just two Guardians, the Ahousaht Hahoulthee completed significant research, restoration, and environmental advocacy.

Renewable and Clean Energy Projects

Creating and investing in renewable and clean energy projects is a significant way to reduce GHG and carbon emissions. According to the organization Indigenous Clean Energy (ICE), many Indigenous communities are participating in clean energy projects. Approximately 200 medium to large projects and an estimated 1700-2100 small projects are undertaken by Indigenous communities (ICE, 2024). There is an increased awareness that relying on fossil fuels, particularly diesel in many remote Indigenous communities, is no longer feasible due to its significant carbon emissions. Recent reports find that Indigenous communities are growing in their ownership of renewable energy projects —with around 42% entirely owned by the community and 92% having at least some part Indigenous ownership as of 2020 (GC, 2024). The most common projects for Indigenous communities to be involved in are hydroelectric, followed by wind (Hoicka et al., 2021). Clean energy projects range in scale; community-scale projects are the most common, providing enough energy for local supply. However, there are larger-scale projects that go beyond supplying energy for community needs and sell power to provincial grids (ICE, 2022). A recent report by ICE anticipates that participation in Indigenous clean energy projects will only increase in the coming years, with project partners ranging from industrial and commercial to institutional entities (ICE, 2022).

Clean energy projects require substantial capital and resources to implement, which can be a significant barrier for First Nations communities. Opportunities do exist, however, for obtaining investment funding, ranging from government sources to private firms, environmental organizations, and other non-profit groups. Equity from partners usually ranges from 10-15%, with the rest of the project typically funded through long-term debt (Hoicka et al., 2021). Indigenous partners, however, typically hold around 25% ownership in clean energy projects.

Communities may also collaborate on larger clean energy projects with other Indigenous partners to help manage costs. The return on investment for these projects is predicted to be 10%. In certain situations, clean energy projects may generate carbon offsets or energy credits (Hoicka et al., 2021) which may also serve as a form of revenue.

Clean energy projects also provide many employment opportunities, particularly at the design and implementation stage. Depending on the scale of the project, ongoing maintenance and upkeep may also offer long-term employment opportunities for community members (Hoicka et al., 2021).

Case Study: Henvey Inlet First Nation

In 2014, Henvey Inlet First Nation, in collaboration with Pattern Canada, an international renewable energy company, developed, constructed and began operating a 300-megawatt wind power site and transmission line (OHH LLP, 2024). This project, which became the largest First Nation wind partnership in Canada (OHH LLP, 2024), was a 50-50 joint venture between stakeholders. In undertaking the project, Henvey Inlet First Nation outlined an environmental stewardship regime per the *First Nations Land Management Act*. The project stakeholders also consulted with Canada Wildlife Services to assess biodiversity impacts. Construction of the project, which required approximately $1 billion in financing (OHH LLP, 2024), created around 1,200 jobs, which had sizable impacts on the economy and generated roughly 25 million dollars in economic activity for First Nations businesses (OHH LLP, 2024). Today the wind site generates electricity that meets the needs of approximately 250,000 individuals, which is sold to the Independent Electricity System Operator, with which they have a 20-year contract. This project is anticipated to yield an annual revenue of $10 million to the Henvey Inlet First Nations.

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Appendix B: Glossary of Terms

Additionality: In order for a carbon offset project to qualify for offset credits, many regulators require that the project proponents demonstrate that their project will result in 'additional' emissions reductions and/or removals of carbon from the atmosphere that would not have occurred without participation in a carbon market. The intention is that in this way carbon markets can ensure new (i.e., additional) reductions in atmospheric carbon rather than just award credits for things that are already happening. However, it can be particularly challenging for entities such as First Nations and ENGOs to 'prove' that the carbon reductions they are claiming are 'additional', when the perception is that such organizations would have worked towards making those reductions regardless of whether or not a carbon market existed.

Atmospheric Benefit Sharing Agreement: Atmospheric Benefit Sharing Agreements (ABSA) enable First Nations to sell carbon credits. Specifically, these agreements clarify First Nations ownership and the right to sell tonnes of carbon in local or international carbon markets. In Canada to date, British Columbia has been the leader in enacting such agreements.

Blue carbon: this is carbon captured by the world's ocean and coastal ecosystems. Systems such as seagrass beds, mangrove swamps and salt marshes are all efficient at storing carbon. These systems absorb carbon at a much higher rate than other carbon sinks, such as forests, and have the capacity to capture carbon for millions of years if left undisturbed.

Cap and Trade: Cap and Trade is one of two main types of government regulatory systems (the other being a Carbon Tax, see below) that engages market economies in reducing carbon emissions. In a Cap and Trade system, a limit is set on the quantity of greenhouse gas emissions that industries are authorized to release. Companies that emit below their established limit can choose to sell their resulting emissions reduction credits to other firms that have exceeded their allotted amount. While the government sets the emissions limits, market forces are left to determine the price of credits. The purchasing firms can use these acquired credits to offset the amount of emissions over their limit for that year. The total emissions cap for an industry is intended to be reduced over time, thus ensuring overall emissions reductions, while providing incentives for industries to find the most cost-effective means of achieving reductions targets.

Carbon Capture and Storage: Carbon capture and storage (CCS) refers to the set of emerging technologies aimed at capturing CO_2 from the atmosphere and either storing it in secure long-term locations such as underground rock formations or using it in industrial applications such as low-carbon concrete production. The process of capturing CO_2 can occur either as it is being released during industrial fossil fuel combustion (source capture) or after it has already been released into the atmosphere (direct air capture).

Carbon Credits (see also **Carbon Offset Credits):** Under a cap-and-trade carbon market system, one carbon credit is awarded to a company/organization for each metric tonne of carbon dioxide equivalent (tCO_2e, to account for cases where greenhouse gases other than CO2 may also be present - see **Carbon Dioxide Equivalent (CO_2e)** below) that the company emits over the course of a year **less**

than the company's allocated emissions, or cap, for that year. These carbon credits can then be sold to other companies who may have exceeded their emissions caps for the year, and who are now required to pay for those excess emissions through purchasing such credits. In Canada, carbon credits are also referred to as '**Surplus Credits**' by the federal government, and as '**Emissions Performance Units**' (EPUs) by the Ontario government.

Carbon Cycle: The flow of carbon in various forms—such as carbon dioxide, carbon in living things, and carbon dissolved in water—through the atmosphere, hydrosphere, and terrestrial and marine biospheres.

Carbon Dioxide (CO_2): Consisting of one carbon and two oxygen atoms, CO_2 is a colourless, odourless gas that is found naturally in the air around us and up into the atmosphere. Carbon dioxide is a significant heat-trapping gas, commonly referred to as a greenhouse gas. It is released through the extraction and combustion of fossil fuels (such as coal, oil, and natural gas), as well as during disruptive occurrences like wildfires and volcanic eruptions.

Carbon Dioxide Equivalent (CO_2e): Carbon emissions are frequently measured in and referred to as 'tonnes of carbon dioxide equivalent', or tCO_2e, to account for the fact that while the vast majority of carbon emissions occur in the form of carbon dioxide (CO_2), there are other potent greenhouse gases of concern as well. These include methane (CH_4), nitrous oxide (N_2O) and various fluorinated gases. While the amount of these gases emitted is small compared to the volume of CO_2 emissions humans cause each year, these gases are far more potent in terms of their heat-trapping potential per unit of volume.

Carbon Economy: Not to be confused with 'low-carbon economy', the emerging concept of a carbon economy is one in which carbon credits are bought and sold as part of cap-and-trade and similar systems where markets are created around the commodification of reductions in carbon emissions. Although different from a low-carbon economy, the goal of the carbon economy is to assist in eventually arriving at a low-carbon economy.

Carbon Footprint: A term used to describe the amount of emitted carbon dioxide equivalents (CO_2e) associated with an activity. It can be used to quantify the carbon impact of individuals, households, organizations or products. For instance, a person's carbon footprint may consist of greenhouse gas emissions from fuel they directly use, as when they drive or heat their home, as well as those released during the production of commodities or services that the person consumes.

Carbon Leakage: Carbon leakage refers to the situation where carbon emissions reduced or avoided in one location are simply transferred to another location. The concern is that a company could pay for carbon offset credits (a.k.a. carbon credits) sold by an organization that is reforesting some land or conserving an existing forested area, for example, which then allow the company to emit greater amounts at its operations in another location, using the offset credits to meet its carbon cap. While proponents of carbon markets state that annually decreasing carbon caps combined with increases in the cost of carbon credits will incentivise companies to reduce their emissions over time, critics argue that such market arrangements simply give companies permission to emit over the set limits.

Carbon Market: Carbon markets are carbon pricing mechanisms enabling governments and non-state actors to trade greenhouse gas emission credits (see Carbon Credits). The aim is to achieve climate targets and implement climate actions cost effectively.

Carbon Neutral: A carbon neutral status is achieved when the greenhouse gas emissions linked to an entity, product, or activity are effectively reduced and/or offset to zero for a specific period of time.

Carbon Offset Credits (a.k.a. Offset Credits)[6]: These are similar to **Carbon Credits**, discussed above, in that an organization that generates credits can sell the credits to another organization that either chooses or is required to offset some or all of its carbon emissions. In the case of offset credits, rather than being produced through emissions reductions by an industrial operation similar to the one making the purchase, the credits are being generated by an organization or project specifically designed to prevent the release of carbon into the atmosphere and/or to actually remove carbon from the atmosphere. Such projects could include forest conservation and tree planting initiatives or direct carbon capture, for example.

Carbon Reservoir: Carbon reservoirs are natural areas that store large amounts of carbon. Oceans, wetlands, peatlands, and forests are some of the main carbon reservoirs of the Earth.

Carbon Sink: Similar to a carbon reservoir, a carbon sink refers to a system, whether natural or artificial, that absorbs more carbon than it releases. Natural carbon sinks include peatlands, forests, oceans, and soils, whereas artificial carbon sinks involve carbon capture and storage technologies.

Carbon Sequestration and Storage: Related to carbon storage, which is the retention of carbon in a place where it will not be released into the atmosphere in the foreseeable future, carbon sequestration is the term for the actual extraction of carbon dioxide from the atmosphere as it is being put into storage. Carbon sequestration can be achieved using various methods such as biological processes like photosynthesis in plants and trees, or technological processes like storing carbon dioxide in underground reservoirs.

Carbon Tax: Like Cap and Trade systems (see above), a carbon tax is a government initiative aimed at reducing carbon emissions. In Canada we have recently witnessed the repeal of the consumer carbon tax, but the industrial carbon tax, which is the type of relevance to carbon markets and this report, remains in place at least for now. In Cap and Trade systems, the government sets the emissions limits and allows the market to determine the price of carbon emissions credits. A Carbon Tax system does the reverse. The government sets the price per tonne of emissions over a threshold amount (the Carbon Tax), but does not set an actual limit on emissions. Instead, industries are incentivized to reduce their emissions rather than pay the tax. This incentive increases over time with a set schedule of increases in the price per tonne of emissions, with the intention of allowing industries to plan for the changes they will need to make to reduce their emissions and associated costs.

Climate Change: According to the UN Framework Convention on Climate Change, climate change is "a change of climate which is attributed directly or indirectly to human activity that alters the

[6] Note that the terms carbon credits, offset credits and others do get used interchangeably at times, particularly in the grey literature and news articles, which can be confusing as there can be important differences among the concepts.

composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods".

Climate Crisis: The term climate crisis refers to the phenomenon of global warming and climate change and their resulting impacts. It has been employed to depict the peril of global warming to the planet and to advocate for proactive measures to address climate change.

Climate Emergency: Over the past few years, the world has witnessed a rise in the frequency and intensity of extreme weather events, which have garnered significant attention on a global scale. The heightened focus on these exceptional occurrences has given rise to the use of 'climate emergency' as a term even more impactful than 'climate crisis', and which aims to convey the gravity and urgency of the issue, especially in regions already experiencing the most severe consequences.

Compliance Market: This is a carbon market (e.g., a cap-and-trade system) established by a government or other regulatory body that requires certain emitters (e.g., all industries that emit over a certain amount per year) to participate (i.e., provide documented proof of meeting set emissions standards through emissions reductions and/or the purchase of carbon credits) in order to maintain their operating licence.

Emissions Performance Units: see **Carbon Credits**.

Global Warming: Global warming refers to the steady rise in the Earth's average atmospheric temperature over time. While some warming has been occurring naturally since the last ice age, this phenomenon has been greatly accelerated in recent decades through increases in the Greenhouse Effect due to excess greenhouse gas emissions caused by human activities such as burning fossil fuels.

Greenhouse Effect: The greenhouse effect is a natural phenomenon where certain gases in the Earth's atmosphere, particularly greenhouse gases such as carbon dioxide and methane, prevent some of the sun's heat reflecting off the surface of the earth from dissipating back out into space. The average temperature of the Earth would be significantly below freezing if it were not for the natural greenhouse effect. The problem, however, is that the rapid rise in atmospheric greenhouse gases caused by human activities is causing the retention of significantly more heat than would otherwise occur, resulting in an accelerated warming of the planet.

Greenhouse Gas: Greenhouse gases are the gases found in the atmosphere that contribute to the greenhouse effect and the associated global warming and climate change. Greenhouse gases that have been listed in agreements and protocols set up under the United Nations Framework Convention on Climate Change include: nitrogen trifluoride (NF3), hydrofluorocarbons, perfluorocarbons, nitrous oxide (N_2O), methane (CH4), carbon dioxide (CO_2), and sulphur-hexafluoride (SF6). Of these, CO_2 is being released due to human activity in by far the greatest amounts and is therefore responsible for most of the human-caused global warming we are currently witnessing. CO_2 is therefore the primary target of climate change mitigation strategies. Water vapour is another naturally occurring greenhouse gas, but its presence in the atmosphere is minimally impacted by direct human activities (global warming resulting from the release of other greenhouse gases caused by human activities, however, is causing increased levels of atmospheric water vapour as well).

Indigenous Guardians: Indigenous Guardians are trained individuals who assist in the monitoring and management of lands and waters on behalf of their Nations. They monitor animal and plant life, manage protected areas, and support language and cultural programs. They are on the ground, offering concrete answers to the questions of how to manage wildfire, how to reduce the risk of flooding, and how to make communities more resilient. And because Guardians work is rooted in Indigenous knowledge and culture, they help communities heal from the trauma of colonialism, including residential schools.

Indigenous Protected and Conserved Areas (IPCAs): IPCAs are areas consisting of both lands and waters where the conservation of the area is primarily the responsibility of Indigenous government(s) following Indigenous laws and cultural systems. In the right circumstances, the establishment of an IPCA represents one possible avenue for generating **carbon offset credits** that may be traded in a **carbon market**.

Low-Carbon Economy: The term 'low-carbon economy' generally refers to a desired future global economic system based on the utilization of low or zero carbon energy sources that minimize or eliminate the human-caused release of excess carbon into the environment.

Net-Zero: Net-Zero refers to the internationally supported goal of balancing all human-caused greenhouse gas emissions (measured in tonnes of carbon dioxide equivalents) with carbon sequestration, such that the net human-caused release of greenhouse gases each year is reduced to zero. Many countries, including Canada, have set 2050 as the year in which this goal will be first achieved and following which this net-zero status will remain in place. This goal has been deemed necessary by scientific research which suggests it must be achieved to have a reasonable chance of limiting the global average temperature increase to 1.5˚C above pre-industrial levels (in accordance with the Paris Agreement's goal of limiting global warming to 1.5°C by 2050).

Peatlands: are a subset of wetlands that form some of the largest and most effective carbon stores on the planet. They are ecosystems that are characterized by the accumulation of organic matter that is derived from slowly decaying plant material under permanent water saturation.

Surplus Credits: see **Carbon Credits**.

Voluntary Market: In voluntary carbon markets, participants are under no formal obligation to achieve a specific emissions reduction target. Instead, entities such as individuals, corporations, cities or regions seek to voluntarily offset their emissions, for example, to achieve self-determined mitigation targets such as becoming climate neutral. The motivator may simply be one of conscience or to be able to market a company as being 'climate friendly', for example.

Wetlands: are places in which the land is fully or partially covered by relatively shallow water—salt, fresh, or somewhere in between—either seasonally or permanently. Wetlands are home to a rich variety of flora and fauna and function as their own distinct ecosystems.

Appendix C: Supplemental Resources

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ADDITIONAL RESOURCES

IPCAs

https://publications.gc.ca/collections/collection_2018/pc/R62-548-2018-eng.pdf
https://conservation-reconciliation.ca/about-ipcas
https://conservation-reconciliation.ca/ipca-faqs
https://ipcaknowledgebasket.ca/resources/ipca-creation-guide#Operations
https://davidsuzuki.org/wp-content/uploads/2018/08/tribal-parks-indigenous-protected-conserved-areas-lessons-b-c-examples.pdf
https://ontarionature.org/transforming-conservation-blog/
https://www.canada.ca/en/environment-climate-change/services/wildlife-habitat/publications/protected-areas-report-2012-2015/chapter-4.html#_4_01

Clean Energy Funding

https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/reduce-emissions/reducing-reliance-diesel.html
https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2023/market-snapshot-indigenous-ownership-canadian-renewable-energy-projects-growing.html
https://coastalfirstnations.ca/climate-action/climate-action-in-coastal-first-nations-communities/community-clean-energy-projects/
https://www.canada.ca/en/environment-climate-change/services/environmental-funding/emissions-reduction-advancement-program.html

More Carbon Projects

Boreal Wildlands Carbon Project - NCC (Verra project page: (https://registry.verra.org/app/projectDetail/VCS/4587)

Darkwoods Forest Carbon Project - NCC (Verra project page: https://registry.verra.org/app/projectDetail/VCS/607)

Perimeter Forest's carbon projects: https://perimeterforest.com/nature-projects/


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