VANCOUVER ECONOMIC COMMISSION

Carbon Markets in BC

A Guide to Leveraging Carbon Markets to Decarbonize British Columbia in the Post-Paris Agreement World

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Preface

Since the early days of carbon markets, British Columbia has aimed to be a leader in environmental protection and climate stewardship through innovative policies, strong regulations, and government programs.

This led to the implementation of BC's carbon tax, which proved to the world that a tax on carbon pollution can coexist with economic growth. The commitment of our government to become carbon neutral, and the establishment of the BC Offset Program and the Green Communities Committee, have shown that governments can themselves generate unique and innovative decarbonization approaches. The strong focus on forestry-based offsets in Indigenous communities – through mechanisms such as the Atmospheric Benefits Sharing Agreement (ABSA) – has shown that climate investments can also support reconciliation through land conservation and increased financial security.

With the Intergovernmental Panel on Climate Change (IPCC) making it abundantly clear that the future of our climate has never been more dire, the time for scaling action is now. The forest fires and floods that ravaged the province this year,, a are a grim reminder of the urgency of climate action. And with damages and losses extending throughout the economy, new avenues towards action for businesses and individuals are acutely needed.

BC is ideally positioned to continue to lead the world in fighting climate change by leveraging carbon markets to accelerate the decarbonization of key economic sectors and rewarding citizens and organizations who protect the planet.

But to do so, we need a new and updated approach – one that centres transparency and participation while ensuring that every action has a direct positive environmental impact. Existing carbon markets have the potential to generate strong financial incentives that drive decarbonization without tapping into taxpayers' dollars – something particularly critical during the post-pandemic recovery.

This report is an excellent reference for facilitating the development of carbon markets in our province. We hope it will help many in their efforts to address climate change.

Building on the strong foundations set over the last decades, the Government of British Columbia has a once-in-a-lifetime opportunity ahead: lead a cohesive BC carbon market strategy that helps meet decarbonization goals, drive innovation, investment and high-paying jobs, and advance reconciliation efforts with First Nations communities. Will our government seize the opportunity on behalf of all British Columbians?

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Executive Summary

Climate change is the largest social, economic, and environmental challenge humanity has ever faced.

The latest Intergovernmental Panel on Climate Change (IPCC) report shows it is still possible to limit global temperature rise to 1.5°C, but only if countries and businesses act now in decisive and effective ways.[1]

Today, around 70% of the global economy is committed to net-zero emissions by 2050.[2] Reaching these targets will require governments and businesses to work together. Thousands of companies are already taking action – setting 1.5°C-aligned, science-based targets and implementing plans to halve greenhouse gas (GHG) emissions globally by 2030. This voluntary corporate action demonstrates that businesses will innovate by developing and scaling effective climate solutions. Most critically, businesses must not only decarbonize their operations but their value chains as well.

This is where carbon markets have a crucial opportunity to accelerate – or hamper – successful action towards net-zero carbon. This is a critical decade of action. It will require addressing emissions that can be immediately reduced, offsetting those that cannot, and removing the accumulated historical emissions. This is a difficult proposition, and must be carefully orchestrated within a legal and financial framework that uses offsetting and other carbon trading mechanisms as a bridge to a net-zero future and a catalyst to wider-spread emissions reductions and sequestration.

BC is in a unique position to be a part of this effort. It was one of the first jurisdictions in the world to implement an effective carbon tax and develop a carbon-neutral government through the BC Offset Program. Building upon this foundation will not only accelerate decarbonization in BC, but also attract investments to develop and scale climate solutions.

However, to reach this goal, the **Government of British Columbia must first develop a cohesive strategy to scale carbon markets**. The building blocks already exist – through our carbon tax regime, the BC Offset Program, and our growing regulatory pathways to net-zero emissions – for BC to play a major role in global carbon markets.

This report explains the processes and concepts related to developing, selling, and using carbon offsets. It subsequently analyzes how BC can scale carbon markets to support decarbonizing the economy while generating economic, social, and environmental benefits for all British Columbians.

Working towards net-zero targets and supporting decarbonization across the province, this report lays out five key recommendations in support of a more accessible, scalable, and transparent carbon market:

1. Build a clear net-zero regulatory system that creates a fair and effective role for offsets.
2. Enable offset projects from key economic sectors, especially from industries that generate the largest carbon footprint.
3. Develop mechanisms to facilitate the purchase of BC-based offsets from national and international buyers through the BC Offset Program.
4. Develop formal accreditation schemes for key carbon market players by leveraging existing financial regulators.
5. Transform the BC Offset Program into a (near) real-time trading marketplace.

The opportunity is within reach – it is up to governments, businesses, and individuals to harness it. There is no time to waste.

1 IPCC. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2021)

2 IEA. Net Zero by 2050. (Paris, 2021)

1.0 Carbon Markets and Offsets

Carbon markets are generally defined as market-driven instruments that help decarbonize sectors or economies.

Carbon markets exist around the world in many different shapes and forms, although they can generally be divided into mandatory (compliance) markets and voluntary markets. Compliance markets are created and regulated by government bodies, and usually set up as cap-and-trade (C&T) emission trading schemes (ETS) that enable emitters to trade allowances for the right to emit up to their allowed limit or cap.

Voluntary programs, on the other hand, are traditionally set up by independent non-governmental organizations (NGOs) or various types of consortia. Voluntary programs set rules for offset projects and establish an accounting framework for sellers and buyers to trade offsets under a public registry. In the voluntary carbon markets, organizations choose to voluntarily offset emissions that otherwise would not be possible, or very expensive, by purchasing carbon offsets from third-party projects that generate emission reductions or sequester carbon from the atmosphere. Demand for voluntary carbon offsets is driven by companies and individuals that take responsibility for offsetting their own emissions, as well as entities that purchase offsets before emissions reductions are required by regulation.

While compliance markets are an order of magnitude larger than voluntary programs, in recent years voluntary markets have gained recognition as an important tool to complement and support compliance efforts made by governments, blurring the line between the two systems.

A carbon offset is a tradable credit that is used to offset greenhouse gas (GHG) emissions. An offset unit represents a metric tonne, or 1,000 kilograms, of carbon dioxide equivalent that was either removed from the atmosphere or not released into the atmosphere as the result of direct, beyond business-as-usual action by a project proponent. These actions are validated and verified by an independent, accredited third party to ensure they are real, permanent, and additional.

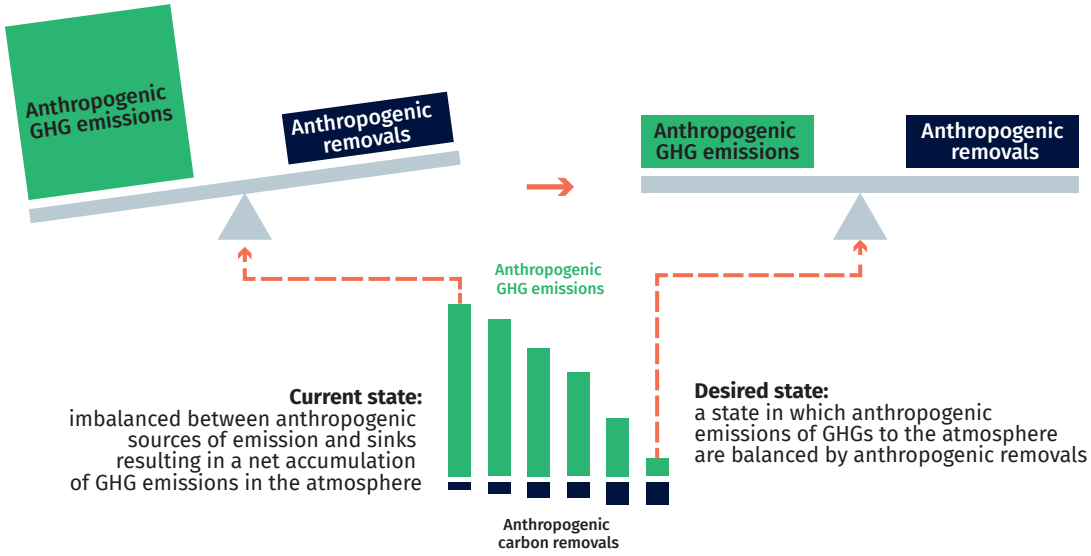
According to the United Nations, carbon offsetting offers a number of benefits:

1. **Offsetting is climate action:** in order to meet the objectives of the Paris Agreement (to limit the temperature rise to less than 2 degrees Celsius) we must all take urgent climate action. Offsetting triggers investments to rapidly deploy decarbonization solutions where it is economically most viable.

2. **Offsetting facilitates behavioural change towards a sustainable future:** leading offset programs and standards encourage participants to first measure their carbon footprint, then reduce it as much as possible, and only lastly, offset the resulting emissions via offsets, and to do so on a regular basis, further decreasing their emissions and the need to purchase offsets.

3. **Offsetting promotes social and environmental benefits:** high-quality offsets are those that provide social and environmental benefits to the communities where the projects are located. Furthermore, when aligned to UN's Sustainable Development Goals (SDGs), offsetting supports the sustainable development of developing nations by creating employment opportunities and improving health, education, access to energy, and more.

Figure 1. Current and desired state of emissions for a net-zero future



Source: SBTi, 2020

Why, then, should organizations consider offsetting in the first place? According to the Science Based Targets Initiative (SBTi), there are two major relevant and necessary rationales for the use of carbon offsets:

1. In the transition to net-zero, companies may opt to compensate or neutralize emissions that are still being released into the atmosphere while they transition to a state of net-zero emissions.
2. At net-zero, companies with residual emissions within their value chain are expected to neutralize those emissions with an equivalent amount of carbon dioxide removals.[3]

In recent years, carbon markets have experienced an unprecedented level of demand from public and private organizations, driven by an urgent need to slow climate change. Public opinion in Canada and around the world has pushed most large corporations to acknowledge the need to act responsibly, disclose their carbon footprint, and actively pursue decarbonization strategies, not only for their own corporate emissions (known as Scope 1 and 2) but also indirect emissions caused as a result of their activities and/or products and services (known as Scope 3). This has pushed carbon prices higher, reaching historic levels. In the EU, allowances recently surpassed 60 Euros/tonne, a 12x increase in the last four years alone. The Government of Canada has established a price on carbon of $170 per tonne by 2030. In the voluntary carbon market, prices are reaching historic highs. Some of the largest investment firms worldwide have committed to prioritizing responsible businesses, and ESG (Environmental, Social and Governance) has jumped to top-of-mind for most CEOs and boards.

3 *Foundations for Science-based Net-Zero Target Setting in the Corporate Sector*. Science Based Targets Initiative (September, 2020) Pg 8

Table 1. Overview of the potential universe of offset project activities worldwide*

Agriculture • Biodiesel production and use • Compost addition to rangeland • Diesel production via vegetable oil mix • Feed activities • Improved irrigation management • Manure methane digester • Nitrogen management • Rice emission reductions • Solid waste separation • Sustainable agriculture	**Carbon Capture and Storage** • Carbon capture and enhanced oil recovery • Carbon capture and storage in concrete • Carbon capture and storage in plastic	**Chemical Processes** • Advanced refrigerants • HFC refrigerant reclamation • HFC replacement in foam production • HFC23 destruction • N2O destruction in adipic/nitric acid production • Ozone depleting substances recovery and destruction • Propylene oxide production • Refrigerant leak detection • SF6 replacement
Forestry and Land Use • Aforestation/reforestation • Avoided forest conversion • Avoided grassland conversion • Improved forest management • Sustainable grassland management • Wetland restoration	**Household and Community** • Biodigesters • Bundled energy efficiency • Bundled fuel switching • Clean water • Community boreholes • Cookstoves • E-commerce • Lighting • Weatherization	**Manufacturing and Construction** • Aluminum smelters emission reductions • Brick and cement displacement • Brick manufacturing emission reductions • Energy efficiency • Fuel switching • Leak detection and repair in gas systems • Mine methane capture • Oil recycling • Pneumatic retrofit • University campus emission reductions • Waste gas/heat recovery
Renewable Energy • Biomass • Geothermal • Hydropower • Renewable energy bundled • Solar – centralized/distributed • Solar cookers • Solar lighting • Solar water heaters • Tidal • Wind	**Transportation** • Electric taxiing for aircraft • Electric vehicle charging • Electric vehicles and hybrids • Fleet efficiency • Fuel switch in transport • Mass transit • Modal shift – road to water/rail • Modal shift – liquid fuels • Modal shift – SOV to low carbon • Truck stop electrification	**Waste Management** • Composting • Landfill methane • Methane recovery in wastewater • Waste diversion • Waste incineration • Waste recycling

* Note: this is a comprehensive list, and this report does not endorse any particular project type.

Source: UNFCCC CDM, Verra, Gold Standard, Carbon Direct, Greenlines Technology

1.1. Carbon Markets in British Columbia

British Columbia was an early entrant into global carbon markets and carbon pricing with the establishment of its carbon tax and carbon offsetting program in 2008. BC took a leadership role in doing so, particularly through its commitment to reach governmental carbon neutrality through offsetting – an approach that is still being adopted today by governments around the world. Being a first mover also came with controversy, particularly in 2013 when the Auditor General released a report that was critical on the lack of transparency and veracity of the government's offsetting through the Pacific Carbon Trust. Specifically, the report challenged the government's commitment to actually reduce emissions and not create an over-reliance on offsets.[4]

Today, the accountability and transparency of BC's carbon market has increased substantially, though challenges remain. Important, too, is the emergence of several markets for carbon, including the Voluntary Carbon Markets (VCM), the BC Offset Program, the BC Low Carbon Fuel Standard (BC-LCFS), the LNG Environmental Incentive Program, and the Green Communities Committee (GCC) for local governments.

This report focuses primarily on the Voluntary Carbon Markets and, to a lesser extent, the BC Offset Market, as they are most relevant to most industries. The BC-LCFS is primarily focused on organizations that produce or commercialize (Part 3) fuels, the GCC is used by a number of municipalities to reach its own carbon neutrality goals, and the LNG EIP is focused on the LNG sector.

Voluntary Carbon Markets (VCM)
VCM are administered by independent non-government organizations. Voluntary buyers purchase carbon credits from projects that generate emission reductions or sequester carbon anywhere in the world, including BC. Voluntary offset projects are managed by international standards and programs. See section 3 for more information related to voluntary carbon standards/programs.

BC Offset Program
The BC Offset Program, or the British Columbia Greenhouse Gas Emission Offset System, was created and is administered by the Government of British Columbia. Through this program, the Climate Action Secretariat purchases offsets to meet government-mandated carbon neutrality by Public Sector Organizations (PSOs) from private organizations that generate these credits according to protocols developed by the government: fuel switch and forest carbon offset protocol (FCOP).

See page 6 for a list of BC Government offset projects covered in the BC Carbon Offset Portfolio

In 2019 (the most recent year available), the Climate Investment Branch of the Ministry of Environment and Climate Change Strategy procured offsets from local offset projects at a cost between $8.00 and $15.00 per tonne of CO2e. On the other hand, BC's PSOs, including Crown Corporations (91,334 t CO2e), School Districts (153,413 t CO2e), Universities & Colleges (120,598 t CO2e), and Health Authorities (223,886 t CO2e) purchased those same offsets from the Ministry of Environment & Climate Change Strategy at $25 per tonne of CO2e to become carbon neutral.

BC Low Carbon Fuel Standard (BC-LCFS)
The BC-LCFS is a program created and administered by the Government of BC. In the BC-LCFS, the credit market creates a financial incentive, in the form of compliance credits, to reward low-carbon fuels in proportion to the amount of real, measurable emissions reductions they yield when substituted for conventional fuels. These compliance credits are different from offset credits as they can only be used to meet regulatory requirements and not as offset credits. These compliance credits generate revenue for low carbon transportation fuel suppliers and support investment in clean fuels and vehicles. In recent years, LCFS credits have seen value and volume growth from ~$200/t to over $450/t in the first quarter of 2021.

4 Auditor General of British Columbia. Report 14 – *An Audit of Carbon Neutral Government.* (2013)

Table 2: Offset projects covered in the BC Carbon Offset Portfolio (2020) for all Government of British Columbia entities

Project, Location	Proponent	Sector	Project type	$/tonne	GHG reductions (tonnes)	$ value
Low Emissions Facility, Dawson Creek	Arc Resources	Oil & Gas	Fuel switching	$8.00	50,000	$400,000
Electrification of Gas Production Plant (Noel), Dawson Creek	Blue Source LLC	Oil & Gas	Fuel switching	$8.00	13,843	$110,744
Electrification of Gas Processing Plant (Septimus), Taylor	Blue Source LLC	Oil & Gas	Fuel switching	$8.00	62,865	$502,920
Engine Fuel Gas Management (REMVue). Northeastern BC	Blue Source LLC	Oil & Gas	Energy efficiency	$11.00	1,000	$11,000
Natural Gas to Biomass Fuel Switch, Elko, Prince George, Fort St. John, Chetwynd, Mackenzie	Canfor BC Sawmills	Forest – Industry	Fuel switching	$8.50	20,007	$170,059
Cheakamus Community Forest, Whistler	Cheakamus Community Forest Society	Forestry – Land use	Sequestration	$14.00	7,712	$107,968
Forest Conservation/ Improved Forest Management, Great Bear Rainforest, Haida Gwaii	Great Bear Carbon Credit Limited Partnership BCCR	Forestry – Land use	Sequestration	$12.00	200,000	$2,400,000
Forest Conservation/ Improved Forest Management, Great Bear Rainforest, North and Central Mid-Coast	Great Bear Carbon Credit Limited Partnership BCCR	Forestry – Land use	Sequestration	$9.00	11,104	$99,936
Forest Conservation/ Improved Forest Management, Great Bear Rainforest, North and Central Mid-Coast	Great Bear Carbon Credit Limited Partnership BCCR	Forestry – Land use	Sequestration	$12.00	122,214	$1,466,568
Forest Conservation/ Improved Forest Management, Great Bear Rainforest, South Central Coast	Nanwakolas Offset Limited Partnership	Forestry – Land use	Sequestration	$12.00	136,079	$1,632,948
Clean Tech Biomass Gasification, New Westminster	Kruger Products	Forest – Industry	Fuel switching	$15.00	1,500	$22,500
Landfill Gas Collection, Salmon Arm	Columbia Shuswap Regional District	Waste – Landfill	GHG destruction	$13.00	3,000	$39,000
Switching to Biomass/ Installing Energy Curtains, Delta	Sun Select Delta	Agriculture	Fuel switching	$11.00	1,000	$11,000
Bus Fuel Efficiency Project, Metro Vancouver	TransLink	Transpor-tation	Energy Efficiency	$13.00	1,880	$24,440
Grand Total					**632,204**	**$6,999,083**

Source: BC Carbon Offset Portfolio (2020)

Atmospheric Benefits Sharing Agreement (ABSA)

ABSA enables First Nations to sell carbon credits from Crown lands, clarifying First Nations' ownership and the right to sell carbon offsets in local or international carbon markets. These agreements can only be entered into if the First Nation has signed a Reconciliation Protocol agreement. To date, 15 First Nations have signed five agreements with the provincial government.

The Forest Carbon Offset Protocol (FCOP), developed by the provincial government, is the protocol used to quantify and generate carbon offsets. Quantification, verification and other expenses are undertaken by each First Nation, while the government is responsible for program administration. The Government of BC, through the Climate Action Secretariat, purchases ~$5.6 million worth of offsets every year to offset carbon emissions from PSOs.

LNG Environmental Incentive Program
The Greenhouse Gas Industrial Reporting and Control Act ("GGIRCA") requires LNG operations to achieve a GHG emissions intensity benchmark ("LNG Benchmark") of 0.16 tonnes of CO2e per tonne of LNG produced. Participants in this program are eligible for compliance credits if their total GHG facility intensity remains below 0.23 t CO2e/tLNG, with a maximum compliance cost of $25/t CO2e.

Green Communities Committee (GCC)
The Province joined with the Union of British Columbia Municipalities (UBCM) to create the Green Communities Committee (GCC) under the Climate Action Charter. The GCC works with local governments to provide tools and resources, develop guidance materials and implement pilot projects that assist rural and urban communities. GCC emission reductions can be used by local communities to meet their obligations under the Climate Action Charter to become carbon neutral in their operations. Under GCC, local communities are allowed to purchase voluntary offsets to meet their obligations.

1.2. Controversies surrounding carbon markets and offsets

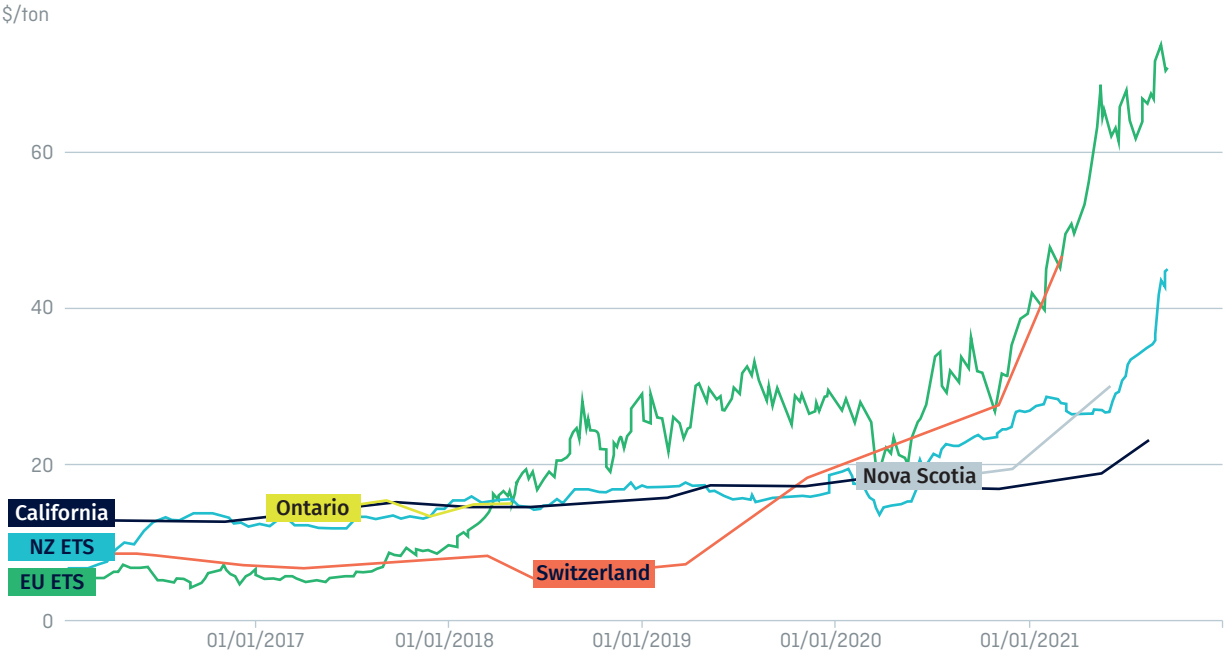
Despite all the buzz, many challenges remain. Carbon markets are still a relatively unknown and underutilized tool by many in the public and private sector, and are in urgent need of enhanced transparency and accountability.

Carbon markets have traditionally been a controversial topic – while some claim that carbon markets are nothing more than a greenwashing tool for bad behaviour, others argue they are an efficient tool to combat climate change. It is abundantly clear that, at a minimum, stronger accounting rules and proper use of carbon offsets are key to ensure real reductions. While uncertainty and debates remain, Article 6 in the Paris Agreement did cement an ongoing role for offsets in global climate policy.
For better or for worse, we now live in a global carbon market.

1.3. Carbon markets size and offset pricing

Carbon market values are at all-time highs on recorded traded volumes. Compliance markets, because of their highly regulated nature, are easier to track (and are much larger than voluntary ones), but even the more opaque voluntary markets are growing exponentially. By early 2021, compliance carbon markets in total are estimated to be worth a record US $272 billion, a 20% increase over 2019, with a total traded volume estimated at 10.3 billion tonnes of carbon.[5] European allowances (also called 'EUAs', or EU compliance credits) - the fundamental "units" of the European carbon market - reached 88 euros per tonne in early December 2021, another historic record. EUAs' pricing has seen a meteoric rise, a growth of almost 18x, from 5 euros per tonne only four years ago.

Figure 2: Carbon allowances January 1, 2016 – November 15, 2021



Source: ICAP

As of June 2021, there were 64 carbon pricing initiatives in the compliance market, including Emission Trading Schemes (ETS) and carbon tax schemes, implemented, scheduled, or under consideration:

- 45 national jurisdictions are covered by the initiatives.
- 35 subnational jurisdictions are covered by the initiatives.
- In 2021, these initiatives would cover 11.65 GtCO2e, representing 21.5% of global GHG emissions.

In Canada, some provinces have developed their own initiatives that cover certain economic sectors. In 2019, the federal government implemented a charge on fuels and a baseline-and-credit ETS for emissions-intensive and trade-exposed industrial facilities called Output-based Pricing System (OBPS). In 2021, the federal government announced the launch of the Federal GHG Offset System, a voluntary program designed to encourage cost-effective domestic GHG emissions reductions and removals from activities that are not covered by carbon pollution pricing and that go beyond legal requirements.

5 *Refinitiv. Carbon Markets Year in Review*. (January, 26 2021)

In BC, the BC Offset Program is the only program available, despite being limited to covering the carbon neutrality needs (~630 kt CO2e/yr) of PSOs.

Table 3: Comparison of regional carbon programs within Canada

Jurisdiction	Program / ETS	Average Offset Pricing ($/tCO2e)
British Columbia	BC Offset Program	$8.50 – $15 (2020)
Alberta	Alberta TIER	$40.00 (2020)
Quebec	Cap-and-Trade	$22.76 (2020)
Nova Scotia	Cap-and-Trade	$24.50 (2020)
Federal	Canada federal OBPS	$40.00 (2020)
Federal	Federal GHG Offset System	Not yet operational

Source: various provincial and federal programs

Voluntary Market Size

Voluntary carbon markets are poised to expand dramatically in the years ahead, driven by the global commitment to reduce emissions by 50% by 2030 and to net-zero by 2050 from 2010 levels, to meet the Paris Agreement's 1.5°C targets.

> **"Meeting the Paris Agreement's 1.5°C targets will require at least a 15-fold scale-up of voluntary offsetting by 2030 to meet expected demand."**

It is estimated that, in addition to direct emission reductions, this will require at least a 15-fold scale-up of voluntary offsetting by 2030 to meet expected demand, according to the Taskforce on Scaling Voluntary Carbon Markets (TSVCM) led by Mark Carney, former governor of the Bank of Canada and England. However, it is important to ensure voluntary carbon offsetting maintains quality while its size increases dramatically.

The exponential growth of this market began in 2017, when prices and volumes began to simultaneously diverge by project and offset category, type, vintage, standard, and location. Today, offsets can be purchased in BC ranging from less than $1 per tonne to over $100 per tonne (compliance credits). Generally, voluntary offsets from reputable projects and programs trade at a value between $20 and $35 per tonne in BC.

2.0 Macro View of Carbon Markets

Carbon markets have dramatically evolved over the years, starting from a belief in rewarding "good behaviour" in climate terms to becoming a substantial pillar of the global climate policy regime.

2.1. Kyoto Protocol

The Kyoto Protocol, adopted in 1997 and in force by 2008, was an international treaty that extended the 1992 United Nations Framework Convention on Climate Change (UNFCCC). Importantly, Kyoto successfully established three international so-called "flexible mechanisms", or carbon markets, including the Clean Development Mechanism (CDM) and Joint Implementation (JI).

2.2. United Nations Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM) is a UN-run carbon offset scheme allowing countries (mostly developed economies) to fund GHG emissions-reducing projects in other countries (mostly developing economies) and claim the saved emissions as part of their own efforts to meet international emissions targets. To date, CDM projects have been responsible for avoiding more than 1.8 billion tonnes of GHG emissions, while the CDM program has generated between $15 and $24 billion dollars, with China, India, South Korea, and Brazil the largest producers of carbon credits (collectively accounting for more than 80%) and recipients of revenue.

Over the years, the CDM has been criticized for supporting projects of dubious veracity and quality. An EU-commissioned report stated that approximately 85% of CDM projects did not meet the necessary safeguards to ensure claimed emissions reductions were real.[6] Despite its failures, the CDM Program is credited as the catalyst that led to carbon trading schemes becoming mainstream in power, forestry, and other sectors. To this day, it remains a primary reference point in the carbon sector.

2.3. Paris Agreement – Article 6

The 2016 Paris Agreement further enhanced the role of carbon markets as a key tool to fight climate change. Fundamentally, Article 6 established the international accounting rules required to govern a global carbon market and, although lacking in details, outlined the cooperative approaches that parties can take to achieve their nationally determined carbon emissions reductions (NDCs). The Paris Agreement, therefore, is undergirding the emerging global carbon market(s).

Paragraphs 6.2 and 6.3 establish a framework to govern the international transfer of mitigation outcomes (ITMOs), enabling parties to use emissions reductions outside of their own jurisdiction toward their reduction goals (NDC), in a system of carbon accounting and trading. In order to avoid double-counting, regional and/or national emission trading systems must be linked under the UNFCCC.

The newly minted Glasgow Climate Pact from the UK-led COP26 included the completion of the carbon market elements of the Paris Rulebook under Article 6. The decisions made in Glasgow provide clear accounting guidance for emission trades between countries, and launch a new crediting mechanism that will give market access to all countries interested in attracting green investment through the global carbon market. The final text is clear that offsetting must rely on "real, verified, and additional" emissions removals that take place after 2021. There are also requirements of co-benefits from every project, with countries putting 5% of nationally sold proceeds into adaptation work. This will be particularly critical to ensure developing nations have additional funds for adaptation needs.

6 Cames, Martin et al. How additional is the Clean Development Mechanism? Analysis of the application of current tools and proposed alternatives. Report to the European Union Directorate General for Climate. (Berlin: 2016).

Although the decision allows post-2013 CDM credits to enter the new market, a group of nations have vowed to take a stronger line on carbon credits, pledging not to use pre-2020 CDM credits and apply corresponding adjustments to voluntary carbon units. While voluntary carbon markets have not been formally included in the text, under the revised Article 6, companies will be able to trade their voluntary carbon offsets to help governments meet their reduction targets.

As a proxy for the positive reception of this news, CORSIA (see below) credits continued their meteoric increase in value of 944% this year and closed on November 12 at $8.35/mtC02e – a signal that a strong global framework for carbon markets increases the value of mitigation activities.[7]

2.4. ICAO – Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

Developed by the International Civil Aviation Organization (ICAO) and adopted in October 2016, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) aims to lower CO2 emissions for international flights and reduce the impact of aviation on climate change. The scheme is voluntary for all countries until 2027, where it becomes mandatory for jurisdictions with large aviation industries. As of 2019, airlines from 80 countries representing more than 77% of international aviation emissions volunteered to participate. Critically, **emissions from domestic air travel are not included in the scheme.**

A common criticism is that CORSIA focuses on emissions trading rather than reducing emissions, as aviation-related emissions are not capped within it. Instead, it relies on member companies to make efforts to reduce its carbon emissions to avoid the cost of offsetting. Since CORSIA may not be as stringent as other international trading schemes, many fear that it could lead to the use of offsets that fail to generate the promised emissions reductions, or lead to environmental damage such as deforestation.

> It is worth noting the rejection of the British Columbia Offset Program to supply carbon units to CORSIA participants, which highlights the need to make improvements to the program, its quantification protocols, and generally the alignment to international standards recognized elsewhere.

Table 4: CORSIA - Applicant Offset Programs and Approved Programs

Applicants in 2019	Approved Applicants as of March 2021
1. American Carbon Registry (ACR)	1. American Carbon Registry (ACR)
2. British Columbia Offset Program	2. China GHG Voluntary Emission Reduction Program
3. China GHG Voluntary Emission Reduction Program	3. Clean Development Mechanism (CDM)
4. Clean Development Mechanism (CDM)	4. Climate Action Reserve (CAR)
5. Climate Action Reserve (CAR)	5. Global Carbon Trust (GCT)
6. Forest Carbon Partnership Facility	6. Architecture for REDD+ Transactions (ART)
7. Global Carbon Trust (GCT)	7. Gold Standard (GS)
8. Gold Standard (GS)	8. Verified Carbon Standard (VCS)
9. myclimate	
10. Nori	
11. REDD.plus	
12. Thailand Greenhouse Gas Management Organization	
13. The State Forests of the Republic of Poland	
14. Verified Carbon Standard (VCS)	

7 Watson, Frank. *"COP26: Nations strike deal on international carbon markets at Glasgow summit,"* S&P Global Platts, November 14, 2021

Under CORSIA, aircraft operations must offset their emissions by purchasing carbon offsets from the market. The medium-term deal is expected to provide more than $40 billion in funding for climate projects and offset over 2 billion tonnes of CO2 emissions between 2021 and 2035.[8]

In 2019, ICAO invited applications from emissions programs worldwide to qualify as eligible carbon units to supply CORSIA participants. ICAO received 14 applications, including one from the Government of British Columbia and its BC Offset Program.

2.5. Market trends

Global governance, regulation, and standards coming to carbon markets
Carbon markets, particularly the voluntary market, have commonly been described as the "Wild West". Some market actors have created significantly different approval and verification structures, and transparency within some markets varies greatly. In addition to sowing confusion and mistrust, this has limited the evolution of many markets. However, markets are beginning to mature: a global governance structure, as well as strict regulations around reporting, accounting, and trading frameworks, are being established through Article 6 of the Paris Agreement Paris Agreement and being clarified further as part of the Glasgow Climate Pact follow up. The industry, meanwhile, is not sitting on the sidelines: the Institute of International Finance's (IIF) Taskforce on Scaling Voluntary Carbon Markets (TSVCM) is a major initiative set to structure and drive growth in voluntary carbon markets. Similarly, the International Sustainability Standards Board (ISSB) is leading work to establish international sustainability reporting standards. Most recently, the Voluntary Carbon Markets Integrity Initiative (VCMI) launched to ensure voluntary carbon markets support the goals of the Paris Agreement, and develop guidance around claims companies can make when purchasing and retiring carbon credits that credibly reduce global emissions and benefit people.

Mid-century commitments to net-zero emissions
Corporations and governments around the world are increasingly making public commitments to achieve "carbon neutrality" or "net-zero emissions" by mid-century, less than 30 years from today. These commitments are expected to dramatically increase the demand for high-quality carbon offsets – in fact, demand has already begun to drive volumes and pricing higher in most markets, and experts seem to agree that demand is poised for explosive growth within the next decade if we are to meet the goals set by the Paris Agreement. As a reference, it is estimated that the average price per tonne should be set at USD $80 to meet the 1.5°C goal.

Growing recognition of nature and human-based solutions
Since the creation of the first carbon market, offset projects have primarily benefited financially the project developers, either corporations or non-profit organizations who protect forests, install high-efficiency equipment, or capture methane. More recently, nature-based solutions (NbS) beyond forestry are gaining traction – these are defined as actions to protect, sustainably manage, and restore natural or modified ecosystems, and are increasingly interesting to both project developers and offset buyers. Similarly, human-based solutions (HbS), defined as actions taken by individuals that generate a positive impact on the environment, are also gaining traction, where buyers recognize the need to reward individuals for making more sustainable choices, such as commuting using low-carbon transport modes, replacing their gas-burning car with an electric vehicle (EV), buying sustainable fashion, or switching to a vegan diet. Of particular excitement is that a growing number of these nature- and human-based offset projects aggregate emissions reductions from individual actions across larger groups. **Voluntary buyers seem particularly keen to purchase offsets produced by local projects close to where they operate. As one of the most climate-concerned jurisdictions in the world, this is a critical opportunity for BC.**

8 The COVID-19 pandemic is expected to force a revision of these projections. However, no updates have been provided to date.

3.0 Producing and Selling Offsets

The process of developing and maintaining an offset project can seem daunting. Unfortunately, there is no single path towards a successful offset project, which might explain why BC has only a handful of successful large and long-term offset projects in existence outside the forestry sector. Until a unified and simplified approach is agreed upon, the process will continue to be complex to most.

This section focuses on the development of voluntary offset projects in BC, not those for compliance purposes at the provincial or federal levels. Similarly, given the many avenues and possibilities, this report tries to simplify the overall process and provide the key building blocks to successfully develop and run a voluntary offset project in BC.

3.1. How are carbon offsets created and transacted?

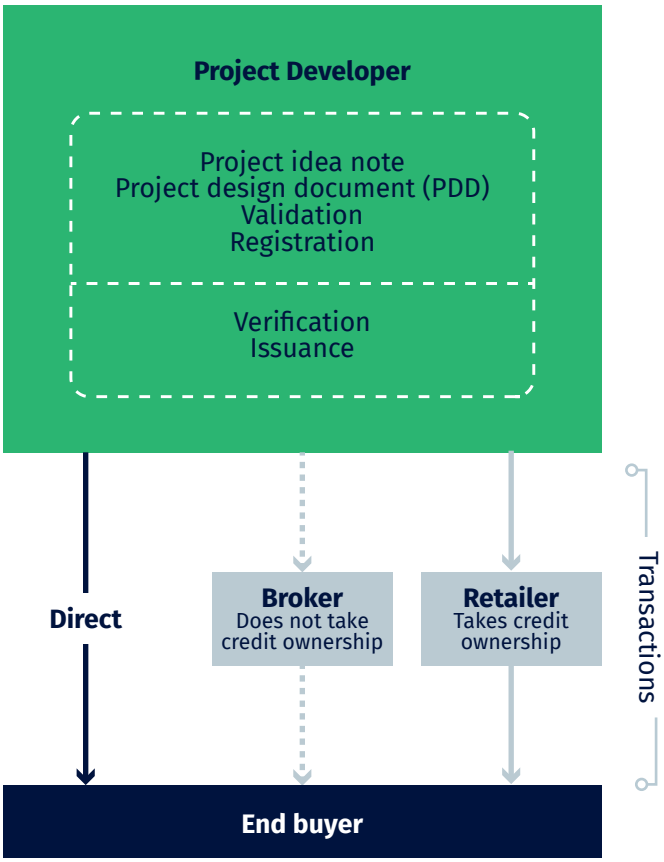
Developing a carbon offset will vary from place to place, but in BC and most jurisdictions there are two broad phases – project development and project maintenance – that collectively cover seven "steps," some of which are cyclical, once the project has been initiated. The key actors in this structure are the project developer, project owner and end buyer.

3.1.1 Project Development – Selecting the Standard

To develop an offset project, a project developer (or project owner) must first select the offset standard or program under which the project will be developed. This could include the BC Offset Program, or major voluntary offset programs such as the Verified Carbon Standard or Gold Standard. More importantly, these standards and programs, as well as their requirements and guidance, are based on the ISO 14064-2 standard.

Selecting the right standard or program will center on a combination of factors, including project eligibility, geographical relevance to potential buyers, costs, and program expertise with the proposed project. Full-fledged voluntary standards such as VCS and Gold Standard should fit most project types as long as the proposed activity is already defined within an existing quantification methodology or protocol.

Figure 3: Process to produce and sell a voluntary carbon offset



Each standard or program has an administrative body called “Program Authority”. The Program Authority oversees the project approval process to ensure the offset projects developed meet established program requirements.

They also develop and maintain a set of quality standards, including validation and verification processes, registries and third-party auditors.

Figure 4: Credits issued, registered activities, average 2020 price, and sectors covered by crediting mechanisms

Name of the mechanism	Credits issued ($MtCO_2e$)	Registered activities	Average price (USD)	Sectors covered
American Carbon Registry	7.30	15	5.36	
Climate Action Reserve	4.61	33	2.34	
Gold Standard	34.35	59	5.27	
Verified Carbon Standard	140.37	127	1.62	
Clean Development Mechanism	74.00	15	2.02	
Joint Implementation Mechanism	-	-	N/A	
Alberta Emission Offset System	8.40	17	15.92 - 21.49	
Australia Emissions Reduction Fund	16.30	128	12.02	
Beijing Forestry Offset Mechanism	-	-	2.10 - 9.28	
Beijing Parking Offset Crediting Mechanism	-	N/A	N/A	
British Columbia Offset Program	1.60	3	6.37 - 11.94	
California Compliance Offset Program	46.00	62	13.71	
China GHG Voluntary Emission Reduction Program	-	-	1.52 - 3.04	
Fujian Forestry Offset Crediting Mechanism	0.16	-	1.52 - 3.04	
Guangdong Pu Hui Offset Crediting Mechanism	0.60	10	2.59	
J-Credit Scheme	0.30	16	13.54 - 19.78	
Québec Offset Crediting Mechanism	0.11	1	14.6	
Republic of Korea Offset Credit Mechanism	17.61	308	20.31 - 36.02	
RGGI CO_2 Offset Mechanism	0.01	-	5	
Saitama Forest Absorption Certification System	-	-	N/A	
Saitama Target Setting Emissions Trading System	1.00	-	4.23	
South Africa Crediting Mechanism	-	-	N/A	
Switzerland CO_2 Attestations Crediting Mechanism	2.10	8	59.19 - 159.61	
Thailand Voluntary Emission Reduction Program	6.01	156	0.64 - 9.46	
Tokyo Cap-and-Trade Program	-	12	1.62 - 57.77	
Joint Crediting Mechanism	0.03	9	N/A	

Source: World Bank - State and Trends of Carbon Pricing 2021

3.1.2 Project Development – Project Design Document (PDD)

Once a standard or protocol is selected, project developers must develop a project idea note for consideration of the standard. Although not always mandatory, it is recommended to ensure the proposed project falls within the scope and capabilities of the selected standard.

Once a positive response is received, a Project Design Document, or PDD (sometimes called a Project Plan), must be developed. The PDD, developed according to the selected standard, will contain the key elements of the proposed project, including proposed activity or activities, project boundaries, leakage, and baseline and additionality considerations – where the project wouldn’t have occurred without the offset revenue.

Each standard has multiple existing quantification methodologies or protocols available for project developers to use at no cost. These methodologies/protocols are the core of the PDD. If no methodology or protocol is available that provides a quantification framework for the proposed activity by the project developer, it may be possible to develop a new methodology. However, the development of a new methodology should only be pursued as a last resort as it is a lengthy and costly process with uncertain outcomes.

3.1.3 Project Development – Project Validation and Registration

Once completed, the PDD must be submitted to an accredited independent third-party validator (i.e. an external auditor) who validates that the PDD meets the requirements set by the chosen standard. In most cases, following the successful validation of the PDD, the project developer or owner will register the project in one of the multiple public registries available. In BC, proponents can use either registries from large standards such as VCS or Gold Standard, or regional ones such as CSA. Some programs, such as the BC Offset Program, require the use of their own registry in order to trade the offset credits generated.

3.1.4 Project Maintenance – Data Collection and Monitoring

Once the offset project has been validated, the "maintenance" phase of the project starts – in other words, the project developer (or owner) must monitor the project (project data collection) and regularly develop a monitoring report. At regular intervals, usually annually or biannually, the monitoring report must be verified by an accredited independent verifier (i.e. audit company).

3.1.5 Project Maintenance – Verification

Once the monitoring report is successfully verified (claimed emissions reductions or removals are accurately quantified according to the proposed PDD), verified carbon units are issued to the project developer (owner).

3.1.6 Project Maintenance – Sale

Once the project developer has successfully completed the third-party verification and carbon units issued, these can be traded either using a third-party broker or retailer or sold directly to end buyers. End buyers have the ability to retain or retire them.

3.2. What determines the price of an offset?

When producing/selling or buying carbon offsets, the pricing is likely to determine whether the offset project happens in the first place. Offset pricing is primarily determined by market participants based on the "quality" of the offset. The "quality" of a carbon offset credit, frequently referred to as preserving "environmental integrity", is usually based on the level of confidence one can have that the use of the credit substitutes the GHG emissions that an organization would have made on its own.

The basis of these quality criteria is the ISO 14064-2 standard. Therefore, for offset credits to be considered quality offsets, they must be associated with GHG emissions reductions or removals that are:[9]

1. **Additional.** GHG reductions or removals are additional if they would not have occurred in the absence of a market for offset credits. If the reductions/removals would have happened anyway, they are not additional. This is often referred to as going above and beyond "business-as-usual", or BAU. For example, if an activity is mandated by law, it is not additional.

2. **Not overestimated.**
   - Baseline emissions must not be overestimated.
   - Actual emissions must not be underestimated.
   - Indirect emissions must be accounted for (a term usually referred to as "leakage", where a project generates unintended emissions elsewhere).
   - The project must be scientifically sound and must have methodologically robust measurement, data collection, and calculations.
   - Robust monitoring and third-party verification of project performance must be established.

3. **Permanent.** GHG emissions reductions or removals can't be reversed. For most projects, reversals are either physically impossible or extremely unlikely. In the case of forestry projects, if impacted by forest fires or diseases reversals may occur, and carbon is subsequently released into the atmosphere.

4. **Not claimed by another entity.** A key element to qualify carbon offset credits is that they must convey an exclusive claim to GHG emissions reductions or removals, sometimes referred as "double-counting". This can happen in one of three ways: first, double issuance, where two different entities are issued carbon offset credits for the same reductions or removals (for example, the manufacturer and the buyer of EV buses claim the same GHG reductions associated with the fuel switch from diesel to electric). Second, double use, where two different entities count the same credit offset towards their GHG reduction claims. Third, double claim, where credit offsets are issued to one entity, but another entity counts the same GHG reductions towards its own GHG reduction goal.

5. **Not associated with social or environmental harms.** For a project to produce high-quality offsets, it should not significantly contribute to social or environmental harms. For example, projects must comply with all legal requirements in the selected jurisdiction. Some programs also require that projects demonstrate social and environmental co-benefits.

In recent years, buyers have increasingly required added certifications and assurances that projects align with certain initiatives or social and environmental goals, such as UN's SDGs. To meet this demand, new labels from independent organizations (e.g. SD VISta from Verra) have been created and are available to offset buyers and developers.

9 Source: ISO 14064-2, ICROA (International Carbon Reduction and Offset Alliance), Offsetguide.org, Verra, Gold Standard, UNFCCC

Table 5: Offset buyers' preferences

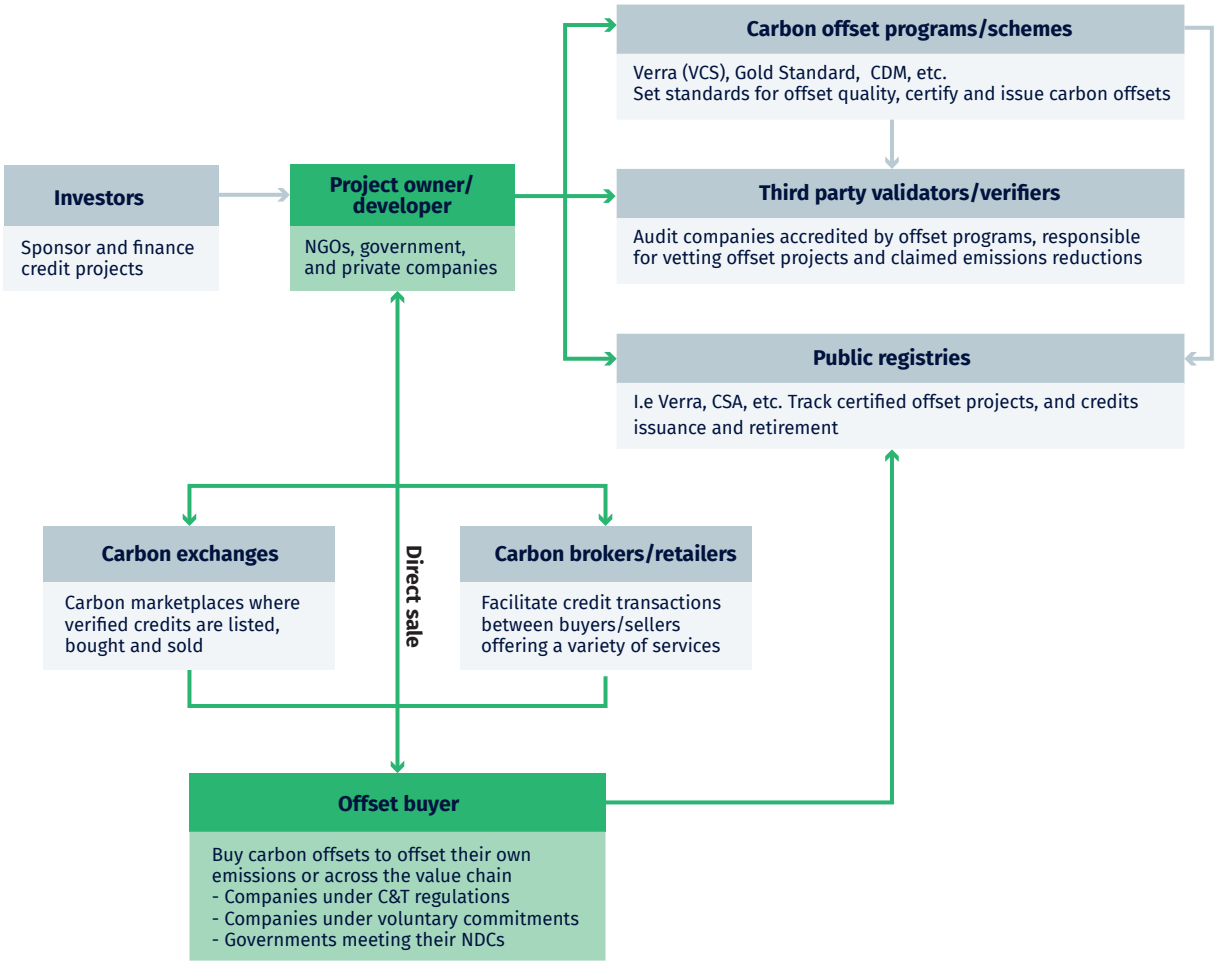
What are the buyers' preferred co-benefits?	Where are the offset projects located preferred by buyers?
1. Community benefits 2. Biodiversity 3. Adaptation 4. Employment and/or training	1. Buyers' operations 2. Buyers' headquarters 3. Buyers' customers 4. Buyers' suppliers

Source: Forest Trends' Ecosystem Marketplace

3.3. Key players in the carbon markets ecosystem

In order to produce, sell, or purchase carbon offsets, it is critical to understand the market participants and their role in the value chain. The graphic below provides an overview of a generic carbon market.

Figure 5: Key stakeholders in the carbon markets ecosystem



Source: Greenlines Technology

3.4. Costs to develop and commercialize an offset project

The costs associated with production and commercialization of carbon offsets can usually be split into offset project development costs and offset project maintenance costs. While each of these costs vary depending on a range of factors, it is important to understand the basic principles of cost estimates when determining the financial viability of an offset project.

Costs will vary depending on these three factors:

1. Complexity of the offset project.
2. Whether or not a new methodology needs to be developed.
3. Vendors'/consultants' fees.

Table 6: Example project development and maintenance costs for carbon offsets

Activity	Description	Cost Estimate (CAD)[10]
Project development		
Project concept	Document that describes at a high level the proposed project, location, activity or activities, and other key elements. In most cases, a project owner/developer will subcontract the development of the project concept to a qualified consultant.	$2,000 – $5,000
New methodology development (optional)	In some cases, the development of a new quantification methodology may be required for the proposed project, if no methodology is available from existing programs/standards for the proposed activity or activities.	$30,000 – $250,000
PDD development	The project plan (PDD) describes the proposed project in detail according to the selected program/standard. In most cases, the project owner/developer will subcontract the PDD development to a qualified consultant.	$10,000 – $35,000
Project validation	Once the project plan, or PDD, is complete, a third-party auditor (validator) must approve the project, according to the selected offset program/standard. This is a key step in order to successfully develop an offset project; therefore, most first-time offset project owners/developers are likely to leverage specialized support for this step.	$1,000 – $3,000
Project registration	Offsets produced by the offset project are typically placed on a public registry that transfers ownership and tracks the offsets' use/retirement. The offset project owner/developer may choose to have its own registry, or use the one selected by the buyer.	$500 – $2,000
Offset project maintenance (costs incurred on every sale instance, usually on an annual basis)		
Monitoring report	In order to convert emissions reductions or removals into carbon offsets, the project owner/developer must prepare a monitoring report that contains the data collected during the verification period. Most elements of the monitoring report are usually the same on each verification process.	$2,000 – $10,000
Data verification	A third-party auditor (verified) is responsible for auditing the monitoring report and project data provided while ensuring it meets the goals and requirements set by the PDD and the regulations of the selected offset program/standard. In most cases, the process is handled by a third-party consultant who facilitates communication between the project developer and the verifier.	$2,000 – $10,000
Brokerage fees (optional)	If a project owner/developer chooses to engage a broker/retailer to trade the offsets, fees are typically proportional to the revenue generated by the offset sale.	2%-7%

In some cases, it may be necessary to engage a third party to develop a feasibility study to determine overall costs, potential revenue, and risks associated with the project, before making a final investment decision.

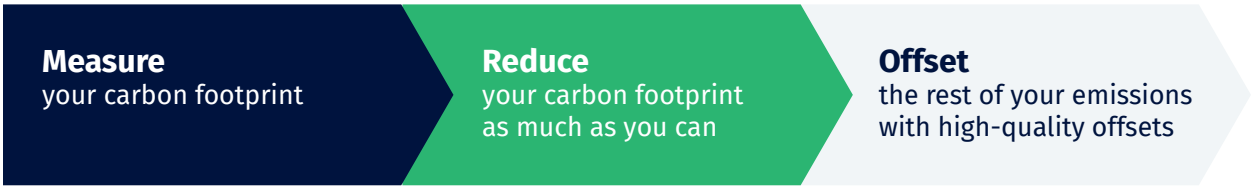
10 Authors' calculations; estimates only, real project costs will vary, but these represent reasonable estimates based on past experience.

4.0 Buying Carbon Offsets in BC

The first step that any potential offset buyer should take is to understand its emissions.

To do so, organizations should carefully select an environmental consultant/GHG accountant that can quantify its direct emissions (usually called Scope 1 and 2 emissions) and indirect emissions, which are generated as a consequence of activities such as products and services (usually called Scope 3 emissions). The first goal should be to reduce those emissions to the lowest possible, before considering purchasing carbon offsets.

Figure 6: Decarbonization strategy pathway



> **"Reduce what you can, offset what you can't"**

When considering purchasing carbon offsets, buyers need to proceed carefully and assess whether offset vendors (whether brokers, retailers, or the offset developers themselves) are selling offsets that actually deliver a climate benefit – whether carbon sequestration or avoided emissions.

Unfortunately, voluntary offset buyers in BC, as in most other jurisdictions, are faced with several major challenges when approaching carbon markets, which may deter them from taking the next step:

- Lack of transparency around the process to select a suitable offset project (or projects), purchase the offsets, transfer ownership, and retirement.
- Assessing the "quality" of the carbon offsets being offered to them prior to purchase. This includes concepts such as "additionality" (the project wouldn't have occurred without the offset revenue), "permanence" (emissions reductions or removals should be permanently removed), or "verifiable" (project and offsets provided must be audited by an accredited verifier).
- Ensuring the price of carbon offsets is aligned with the market and the "quality" of the offsets themselves.
- Lack of clarity in the role that voluntary offsetting plays in sectoral, corporate, or even voluntary net-zero and/or carbon neutrality commitments, when compared to other offsetting mechanisms such as carbon allowances, voluntary or compliance RECs, renewable energy PPA, renewable energy investments, or energy efficiency certificates (EEC). Additionally, lack of clarity related to compliance with semi-regulatory mechanisms such as the Task Force on Climate-related Disclosures (TCFD) as they are interpreted or implemented in the BC and Canadian context.

These are some of the challenges that offset buyers face. In a worse-case scenario, an unsophisticated offset buyer may end up purchasing low-quality carbon offsets produced from a questionable offset project, with unverified environmental claims, through one or several intermediaries, and where the actual project developer received a minor portion of the revenue. Even worse: some projects may not

even generate a climate benefit. In fact, a study commissioned by the European Commission found that 85% of the offset projects used by the EU under the UN's Clean Development Mechanism (CDM) failed to reduce emissions.[11]

So, how can a buyer overcome these challenges and ensure that offsets purchased are real, priced accurately, and from suitable projects? BC, as other jurisdictions, lacks a central repository or database where transactions happen transparently – where one can review projects, purchases, pricing (including forward crediting) and contractual terms, and have access to accredited verifiers, standards, and registries. As the market matures, robust and transparent frameworks will develop that enable price discovery and buyer protections. BC has an opportunity to lead the way and demonstrate its potential while attracting foreign investment that helps decarbonize the province.

4.1. Purchasing process and options

A voluntary offset buyer can purchase carbon offsets via several options in BC:

Buy directly from an offset project developer	Purchasing carbon offsets directly from the project developer provides direct access to the offset project and deeper understanding of its co-benefits, while minimizing transaction costs when compared to using a third-party broker. However, buyers should perform their own due diligence to ensure environmental claims are met, and ensuring contracts and risks are well understood. An example is the City of Richmond, which purchased carbon offsets directly from a building energy efficiency project developed by the Pacific Gateway Hotel, or from an asphalt recycling operation at Mitchell Island developed by Lafarge Canada.
Invest in an offset project	In recent years, as the price of offsets has grown exponentially, some offset buyers have started to invest directly in the offset project itself, in return for the right to (some or all) the carbon offsets the project is expected to generate. Investing in the offset project provides a deeper understanding of the strengths and weaknesses of the resulting offsets, and protects the buyer from future fluctuations in the price of carbon offsets in the market. In Canada, this formula is still relatively new, although organizations such as Carbon Streaming are leading the way in this area.
Buy from an offset broker	For years, this has been the most common path in North America, as they provide a simple, yet more costly, way to access a variety of offset projects. Brokers usually represent a portfolio of offset projects from different project types, and some provide their own due diligence. Brokers can provide access to large transactions, or serve the retail offset market facilitating low-volume transactions (usually via its own website). In most cases, brokers can retire offsets on the buyer's behalf. Buyers should be aware of the extra cost incurred when buying from an offset broker versus directly from the offset project developer, potential conflicts of interest, and environmental claims. Buyers should apply the same level of project due diligence as when buying from an offset project developer.

11 Cames, Martin et al. How additional is the Clean Development Mechanism? Analysis of the application of current tools and proposed alternatives. Report to the European Union Directorate General for Climate. (Berlin: 2016)

Buy from an offset retailer	Offset retailers share many characteristics with offset brokers. However, they take ownership of the carbon offsets transacted, and typically handle low-volume transactions (small companies or individuals purchasing offsets). Similarly to brokers, retailers can provide access to a wide range of offset projects and types. In most cases, retailers maintain an open account on a public registry, and will retire the offsets on behalf of the buyer without the need for the buyer to open an account.
Buy offsets on an exchange	While not the most common formula used to purchase carbon offsets in Canada, there are a number of exchanges that list carbon offsets for sale. These exchanges work in conjunction with public registries to enable these transactions. This formula is mostly used by volume buyers looking to access low-cost carbon offsets, and where transaction fees are lower than transactions through brokers.

In some cases, an offset buyer may unearth a new project type or activity that is particularly attractive, either because it relates to their business or the community where they operate. In this case, the buyer may be interested in developing a new methodology, and investing in an offset project that leverages this new methodology to generate carbon offsets. Although rare, this can be an effective approach that enables unique benefits to a certain sector or community. However, only the most sophisticated buyers should attempt this as the development of a new methodology is a risky and time-consuming process.

When buying carbon offsets, particularly large volumes, a buyer generally requires an account on a public registry system under the carbon offset program that issued the credits. The registry serves to track each carbon offset issued, and once an offset is acquired the credits are transferred to the buyer's account, where they can be retired when counted towards a GHG reduction target. These registries generally require an annual fee, in addition to small fees per offset transaction. For low-volume buyers, sellers typically maintain accounts they use to retire the offsets purchased on behalf of buyers.

One important consideration that offset buyers should evaluate is whether to purchase carbon offsets post ante (once the offsets have been issued), or ex ante, also called "forward crediting" (before offsets have been generated or issued). Each option provides certain benefits and risks, and buyers should consider both when performing their due diligence and selecting the right offsets. In the case of post ante, the buyer will take ownership of the carbon offsets as they are issued, meaning there is no risk of failing to deliver; in the case of ex ante, buyers carry the risk of failing to deliver the contracted amount of offsets or maintaining the promised quality. For example, forestry offsets carry an increased risk given the current wildfire seasons across the Pacific Northwest in recent years.

4.2. Carbon offset uses

Today, carbon offsetting is used by individuals, companies, and governments to achieve one of two outcomes:

- **Achieve voluntary carbon neutrality.** In most cases, corporations and other organizations looking to achieve publicly disclosed carbon neutrality goals reach out to carbon offsets as a convenient and cost-effective way to reduce GHG emissions. In other words, carbon offsets are used to "offset" an organization's GHG emissions, in lieu of reducing those emissions directly.
- **Meet an established GHG emissions cap, usually under a regulated 'Cap-and-trade' (C&T) scheme.** In some cases, organizations may use carbon offsets to "offset" (reduce) its GHG emissions to meet a certain cap established under a regulated C&T scheme, and avoid penalties. In these cases, only selected offset programs and offset types are acceptable, and typically a maximum amount of carbon offsets can be used against GHG emissions.

In recent years, there is a growing trend where carbon markets and offsets (also called carbon financing) are increasingly seen as a key instrument for countries to meet their Nationally Determined Contributions (NDCs), enabled by the Paris Agreement's Article 6. Climate-related financial disclosure from corporations and countries alike is widely seen as a cornerstone of a successful global carbon market to ultimately drive down GHG emissions and reach a low-carbon economy. Today, initiatives such as the TCFD Task Force on Climate-related Financial Disclosures (TCFD) led by Financial Stability Board are leading the way to ensure that climate-related financial efforts, including carbon offsetting, made by organizations and governments, are disclosed and reported appropriately to achieve wide adoption levels.

5.0 Innovative Carbon Initiatives in BC

BC is blessed with a growing number of innovative offset projects, as well as leading organizations that support both offset project developers and offset buyers.

The following is a sample of highly innovative local initiatives:

ORGANIZATION		WEBSITE
BC Non-Profit Housing Association (BCNPHA)		www.bcnpha.ca
INDUSTRY	**LOCATION**	**PROJECT TYPE**
Non-profit housing	British Columbia, Canada	Energy efficiency in residential construction

About the Company
BCNPHA is the provincial umbrella organization for the non-profit housing sector in BC. The association serves more than 500 members, including non-profit housing societies, businesses, individuals, partners and stakeholders, with education and professional development opportunities, research and advocacy, and asset management services.

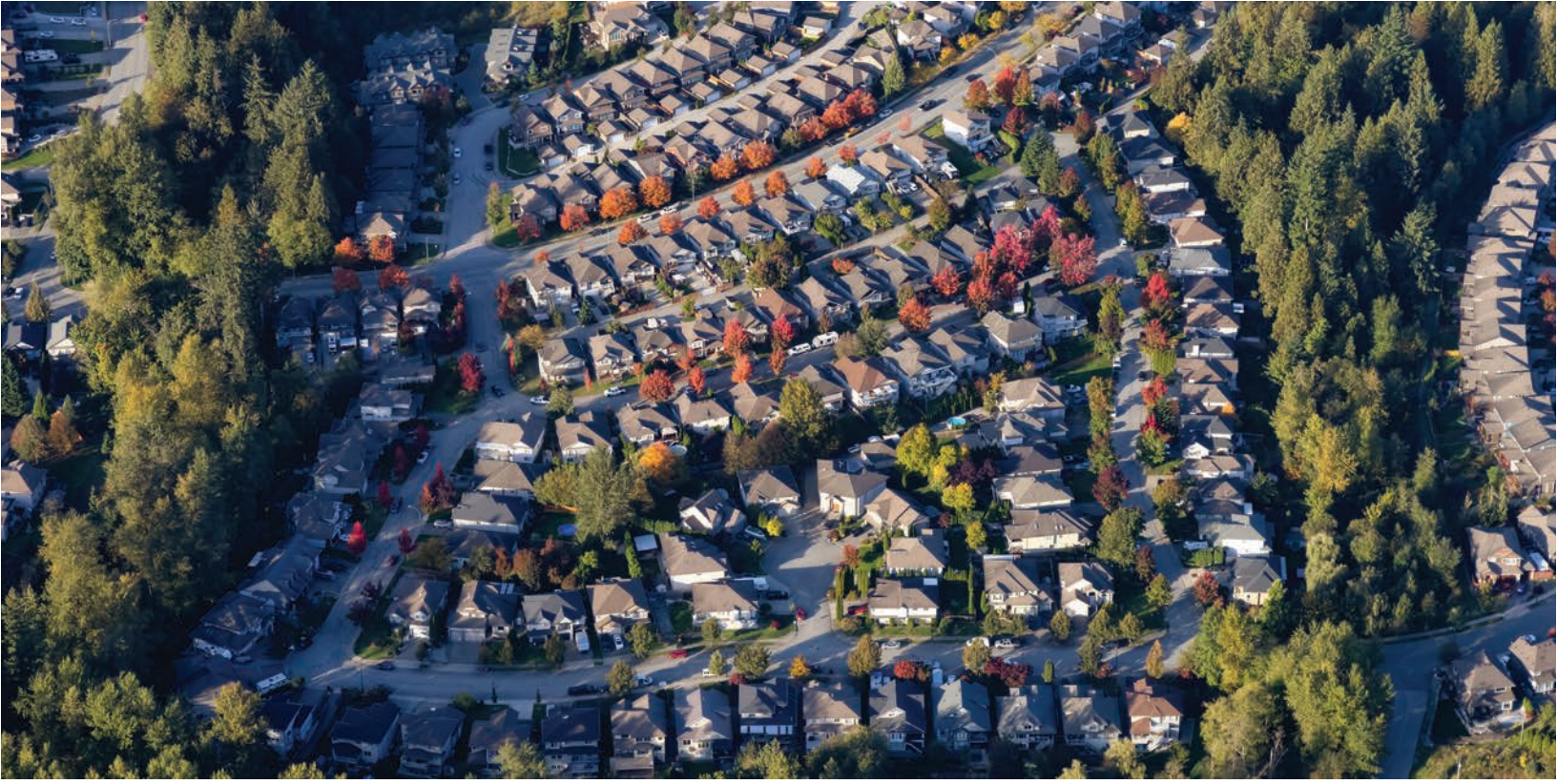
Project Description
In alignment with its mandate, over the last decade the BCNPHA has collected a database of over 3,200 buildings in the non-profit sector and supported retrofits that have resulted in over 14 GWh in electrical savings and 128,000 GJs in gas savings. These are achieved through a number of energy reduction measures, including lighting, boilers, MUA, laundry, envelop, insulation, windows, and deep building retrofits.

BCNPHA is looking to develop a province-wide voluntary offset project that enables the accurate quantification and aggregation of emissions reductions generated by actions taken by non-profit housing organizations when retrofitting and developing new housing projects. BCNPHA will act as the aggregator and program administrators, handling the verification process with an independent validator to support retrofits and construction through the sale of the resulting carbon offsets.

In the future, BCNPHA is looking to incorporate not only operational emissions reductions (such as heating/cooling energy savings) but also embodied carbon reductions (such as those generated by low-carbon construction materials).

Although the program is currently targeting VCM, BCNPHA hopes that the BC Offset Program will expand to include offsetting projects like theirs.

How offsets can help
As a non-profit organization, BCNPHA has a mandate to support the development of affordable yet sustainable housing in the province. However, new energy-efficient equipment and retrofits come with extra capital and operational costs that are hard to overcome. Revenue provided by carbon offsets can help close the gap in order to accelerate the incorporation of energy efficiency into most housing projects.



ORGANIZATION
CarbonSense Technologies

WEBSITE
www.carbonsense.ca

INDUSTRY
Residential real estate

LOCATION
British Columbia, Canada

PROJECT TYPE
Fuel switching in residential buildings

About the Company

CarbonSense is a Vancouver-based technology non-profit organization that aims to accelerate the decarbonization of households across BC and Canada. CarbonSense pools the efforts of households when switching to lower carbon fuels, and rewards them with revenue generated from the sale of carbon offsets.

Project Description

Households are one of the largest contributors to carbon emissions in BC and across Canada. CarbonSense has developed the first offset project that quantifies, aggregates and enables the monetization of these emissions when they are eliminated by changes in individual behaviour.

Incentive programs targeting consumer behaviour have demonstrated the potential to accelerate carbon reductions; however, domestic fuel switching isn't happening fast enough. Whether emissions generated by household operation or embodied during construction, CarbonSense bundles domestic emissions, sells them, and returns the proceeds of sale in proportion to the reductions achieved.

CarbonSense provides permanent rewards in addition to any government incentives across multiple economic sectors, from heating and cooling equipment to emissions-free transportation. It is currently in discussions with BC's Climate Action Secretariat to participate in the BC Offset Program.

How offsets can Help

Currently, there are no market-based mechanisms that reward users who make sustainable choices in their households. Instead, governments are forced to provide rebates and incentives at the expense of taxpayers. Carbon offsets can provide a strong financial incentive for individuals to make sustainable choices when purchasing a heat pump or e-bike.

ORGANIZATION		WEBSITE
veritree		www.veritree.com
INDUSTRY	**LOCATION**	**PROJECT TYPE**
Forestry	Worldwide	Forestry reforestation

About the Company

veritree is a Vancouver-based organization with a mission to accelerate the adoption of natural climate solutions (NCS) through technology.

Through a comprehensive suite of tools, veritree utilizes blockchain to provide planting organizations with an integrated platform to support standardized ground-level data collection, inventory management, and impact monitoring, bringing traceability and legitimacy to NCS. veritree is designed to be inclusive of local communities, involving them in the monitoring, reporting and verification (MRV) process to safeguard the project while creating incentives to ensure permanence.

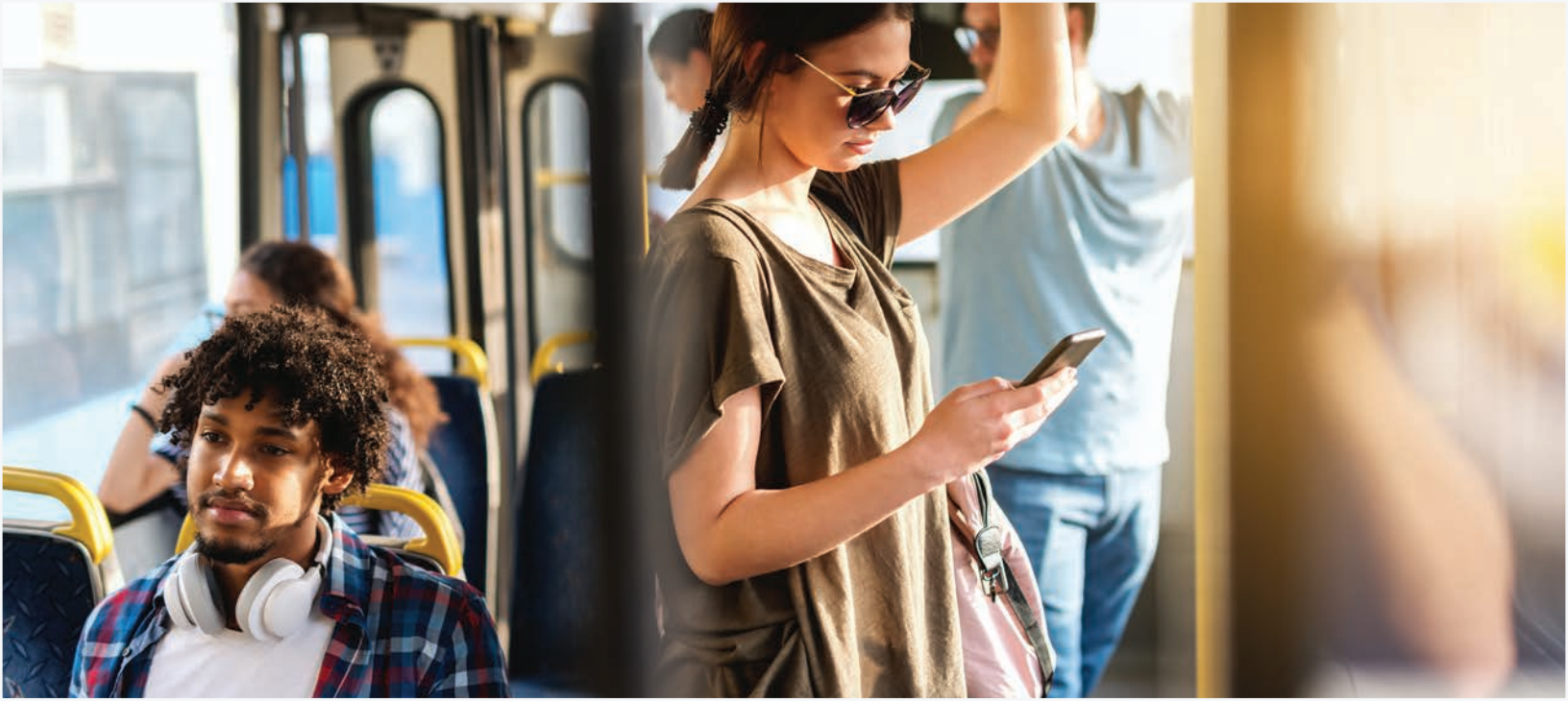
Project Description

While reforestation is one of the most effective ways to combat climate change, most reforestation projects lack the infrastructure to provide transparency, measurability, auditability, and permanence.

veritree aims to focus its efforts on NCS with the goal of planting well beyond 1 billion trees by 2030 with corporate partners. The number of trees and species planted will be tracked using veritree's platform, backed by traceable evidence collected at the site level. To quantify carbon sequestered from NCS, veritree will refer to best practice frameworks such as ICROA Code of Best Practice; The Oxford Principles of Net Zero Aligned Carbon Offsetting; and IPCC – Good Practice Guidance for Land Use, Land-use Change and Forestry. Since accounting for carbon sinks is still an evolving practice, veritree will continue to update its methodology over time. The company will also develop a Positive Impact Playbook, which will be used as a framework to standardize a set of metrics and the measurement, quantification and monitoring of these metrics associated with the NCS.

How offsets can Help

Revenue generated by the sale of carbon offsets provides reforestation projects the needed financial support to ensure their financial viability, while sequestering carbon to fight climate change.



ORGANIZATION
Greenlines Technology

WEBSITE
www.greenlines.cc

INDUSTRY
Transportation, e-commerce

LOCATION
Canada, US

PROJECT TYPE
Urban mobility – modal shift

About the Company

Greenlines is a Vancouver-based climatetech company that aims to foster the use of low-carbon products and services by developing systems that generate financial incentives for individuals who commute using low-carbon transport modes, or buy low-carbon products, by accurately quantifying, aggregating and monetizing emissions reductions. The company's patent-pending Mobility Carbon Engine (MCE™) and E-commerce Carbon Engine (ECE™) enable third-party players (mobility apps, transit agency apps, e-commerce platforms etc.) to generate offset revenues to reward and incentivize customers to accelerate the decarbonization of these sectors.

Project Description

In 2019, Greenlines launched the Cowlines app, a mobility app that enables individuals to switch from single-occupancy ICE vehicles to low-carbon transport modes when commuting around 60+ US and Canadian cities.

Cowlines' main goal is to serve as a demonstration platform for other mobility apps and players, showing the viability and potential of a large-scale deployment (multiple transport modes across multiple jurisdictions) of an app-based offset project, and the ability to generate revenue from mobility carbon offsets (MCOs) in the real world.

For more than two years, Cowlines has been operational and has successfully quantified, aggregated, independently verified, and sold carbon offsets produced by individuals riding TransLink, Uber, Lyft, Mobi bikes and taxis in Vancouver, Victoria, and most other large Canadian and US cities.

How offsets can Help

Urban mobility is a notoriously difficult business, even when companies handle ticketing payments. Most new mobility-only companies either operate at a loss (funded by VCs) or go bankrupt. Traditional business models, such as ads or data monetization, are not enough to develop, maintain and operate a mobility app. This is where carbon offsets can help – by leveraging offset revenue to provide a useful service to individuals and reward them when making sustainable transportation choices.

ORGANIZATION
BC Roadbuilders and Heavy Construction Association

WEBSITE
www.roadbuilders.bc.ca

INDUSTRY
Civil infrastructure

LOCATION
British Columbia, Canada

PROJECT TYPE
Energy efficiency, fuel switching, modal shift and others in road construction and maintenance

About the Company
The BC Road Builders and Heavy Construction Association (BCRB&HCA) is a non-profit organization that represents firms in the BC road building and maintenance industry. The organization's 250 member companies represent highway maintenance contractors, construction contractors, underground/utility contractors, paving contractors and the various service and supply companies in the industry.

Project Description
In BC, road transportation represents the main source of carbon emissions, comprising over 90% of the 37% of transportation carbon emissions.

In order to generate a financial incentive for BCRB&HCA member companies to further reduce emissions during road construction and maintenance, and emissions generated during use by vehicles, without requiring taxpayer's support, BCRB&HCA is exploring options to develop an environmental program that supports the implementation of above-and-beyond, direct and indirect, carbon-reducing activities by its members.

Under the proposed concept, BCRB&HCA member companies that go above and beyond required standards that lead to emissions reductions would be eligible to generate carbon offsets. These offsets would be aggregated and sold into VCM by BCRB&HCA. Specifically, BCRB&HCA would act as the program manager and coordinate the development of the offset project, conduct third-party validation and verification processes, and lead the sale of offsets into VCM to organizations looking to reach carbon neutrality.

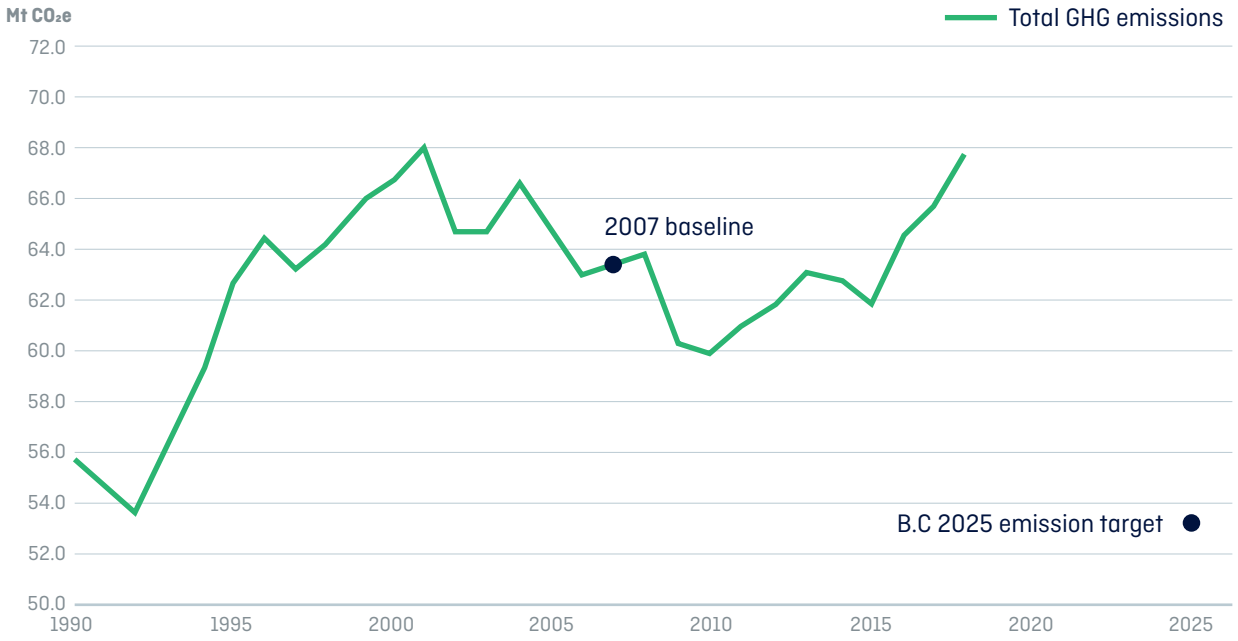
How offsets can Help
Today, reducing emissions in road construction is achieved either by regulations or taxpayer-based financial incentives. Alternatively, carbon markets can fund innovation in the sector without the need to tap into taxpayers' dollars. New revenues resulting from the sale of carbon offsets to third-party organizations can facilitate switching fleets to low-carbon fuels, increased utilization of low-carbon materials, and reduced fuel usage – a win for the environment, BC and the economy.

6.0 Key Recommendations and Opportunities for BC

While BC was widely seen as a leader a decade ago when it came to carbon markets, its leadership position has faded and other regions around the world are racing to capitalize on the opportunity that the post-Paris Agreement world provides.

More importantly, **BC's emissions are trending in the wrong direction**, with a 27% increase in emissions from 1990 levels, compared to a national average of 21% increase. Meanwhile, the UK has decreased its emissions by 43%, the EU by 28%, and the US is effectively flat compared to 1990 levels.

Figure 7: Greenhouse Gas Emissions in British Columbia 1990–2018



Source: Government of British Columbia

The Government of British Columbia should lower the barriers to entry, lower the costs of administering projects, develop new and/or adopt existing methodologies/protocols for key economic sectors, and facilitate the development of a healthy and strong market, while providing its long-standing credibility to BC-based projects on a proactive and timely basis. It is imperative that actions are taken now that the world is transitioning into the Post-Paris Agreement era, if BC has a hope of participating in, let alone leading, this growing market.

Thankfully, BC has an existing framework to build upon: the BC Offset Program, currently used to source carbon offsets to enable a carbon-neutral government. According to the government, and despite its limited scope, from 2010 to 2018 the BC Offset Program reduced 6.2 million tonnes of CO2e, approximately 1% of the total emissions generated by the province, demonstrating the potential for market-based mechanisms to generate effective emissions reductions and removals.

The question that arises is, could an "enhanced" version of the BC Offset Program reduce emissions by 10%, 20%, or 30%? How can the program be upgraded to accelerate the decarbonization of our province? Such questions cannot be answered yet, but if a transformative mindset is taken, far greater impact than today is assured. **Here are five key recommendations:**

1 Build a clear net-zero regulatory system that creates a fair and effective role for offsets

BC and Canada have increasingly ambitious net-zero emissions targets, yet haven't met a single historical target. Despite our rhetoric, and BC's historical climate leadership, we will quickly become laggards without the regulations and resources to get us to our 2030 and 2050 goals.

Mature, sophisticated carbon markets present meaningful opportunities to advance climate action in BC, but only in the context of a clear, transparent, and ambitious regulatory environment. With a meaningful regulatory framework in place for reducing emissions in buildings, transportation, and industry, offsets can fill the gaps and help raise the market price of carbon over time.

> "Mature, sophisticated carbon markets present meaningful opportunities to advance climate action in BC, but only in the context of a clear, transparent, and ambitious regulatory environment."

There has been considerable frustration from those who have felt that carbon offsets, and BC's in particular, have impeded climate action. Offsets of dubious quality and additionality were called out by the BC Auditor General in its 2013 report. More recently, some have claimed that liquified natural gas (LNG) could be produced in BC and can use offsets to achieve net-zero emissions, at the same time as it could help reduce emissions in Asia by reducing coal usage.

As the International Energy Agency (IEA) has noted, successfully achieving net-zero emissions by 2050 would mean "**there are no new oil and gas fields approved for development**" by 2022.[12] It would be a grave mistake for BC to grow emissions via new oil and gas expansion, but allow for offsetting (particularly via avoidance measures), which will reduce the overall effectiveness of offsets (and voluntary actions in general) to advance climate action beyond mere regulatory compliance.

In simple terms, **it must be made clear that offsets are not the primary tool for addressing climate action for any organization – and that they are not to be used to allow the creation of net new sources of emissions, such as new fossil fuel extraction infrastructure.** This could, for example, mean that BC's Emissions Offset Regulation has a regularly updated table of pertinent climate and emissions regulations that a project proponent must connect to their proposal, showing there are indeed verifiable, net-new emissions reductions or sequestration taking place as a result of their project, and that these exist absent a regulatory requirement. Additionally, the Financial Services Authority and the Securities Commission could create guidance and a phased-in emissions allowance cap to mandate a maximum on how much a company may offset its emissions to show adherence to a sectoral or corporate target (for example, Quebec limits this to 8% of total entity emissions). A robust conversation should be had for how much anyone in BC will be allowed to use offsets for their emissions in 2050. Crucial in this conversation, too, is the linkages and alignment with the Government of Canada to ensure fulsome, transparent, and aligned accounting for offsetting in the final national carbon accounting.

As the 2013 Auditor General Report said, transparency within government and across project proponents is absolutely foundational to the success of an offsetting program and carbon market. With a more robust and transparent offsetting system in place, the role and value of offsets can be clarified, and a strong market can emerge to drive BC towards deeper decarbonization.

12 IEA. *Net Zero by 2050: A Roadmap for the Global Energy Sector*. (May, 2021.) Pg., 99

2 Enable offset projects from key economic sectors, especially those that generate the largest carbon footprint

Today, projects under the BC Offset Program must, in most cases, use one of two available protocols: fuel switch or forest carbon offset protocol (currently under public consultation). The lack of available protocols that cover a wide range of carbon avoidance or sequestration activities limits the number of possible projects in BC. It is key to have multiple protocols for different economic sectors available to increase the supply of offsets and projects. Alberta, in contrast, has 16 approved protocols[13] available, covering areas such as biofuel production, solar electricity generation, heat recovery and energy efficiency. CDM, under the UNFCCC, has hundreds of protocols available, covering a wide range of activities and economic sectors.

Another key issue is the fact that the BC Offset Program is primarily focused on forestry offset projects. This made sense when the program was used solely to enable a carbon neutral government, but if the goal is to help the province reduce emissions across all sectors, it is key to enable protocols across multiple reduction and removal activities. This would mean developing new or transposing existing protocols that cover sectors such as transportation, construction, buildings, manufacturing and heavy industry. However, as noted above, these should not include practices or protocols that would lead to the net-new generation of emissions (e.g. fossil fuel projects). There is no need to start from scratch: there are hundreds of available protocols developed by recognized international compliance and voluntary programs that could be transposed into BC.

3 Develop mechanisms to facilitate the purchase of BC-based offsets from national and international buyers through the BC Offset Program

Today, the main "buyer" in the BC Offset Program is the provincial government, which buys on behalf of PSOs. Although it is technically possible to purchase offsets via the BC Offset Program, most buyers are either unaware of this possibility or look elsewhere where the offering of offsets is larger, mainly in the voluntary markets. This limits the potential volumes to those "offset able" emissions generated by the provincial government (approximately 630,000 tonnes of CO2e in 2019). The program should allow any organization in BC, Canada, or internationally to purchase BC-based offsets using the same levels of quality protocols. Opening the door to national and international buyers could potentially increase the demand for high-quality BC-based offset projects, helping further reduce emissions, decarbonizing key economic sectors without the need to tap into taxpayers' dollars, and driving unique economic development benefits, if structured correctly, for organizations and communities looking to advance offsetting projects locally.

4 Develop formal accreditation schemes for key carbon players by leveraging existing financial regulators

As the market matures, it is key to ensure protection of consumers, businesses and organizations participating in the carbon market. The Government of BC, in coordination with other provinces and the Government of Canada, should explore formal accreditation schemes put forward for key stakeholders of this growing market, particularly those related to financial transactions such as offset brokers/retailers, as well as those facilitating the development of offset projects, or offset consultants.

The government should look internationally and replicate existing internationally accepted accreditation schemes such as the International Carbon Reduction and Offset Alliance (ICROA), which has a Code of Best Practice that members must adhere to and, where possible, replicate or validate them in BC. A strong accreditation scheme would generate an increase in confidence in this market, reduce risks for all those involved, facilitate transparency and accountability, and trigger further investments in this sector. Potential candidates for managing this function in BC could include the Financial Services Authority, or the Securities Commission, again in coordination with other Canadian financial regulators.

13 Government of Alberta. "Quantification Protocols – Alberta Emissions Offset System." (n.d.

5 Transform the BC Offset Program into a (near real-time) trading marketplace

Once a year, the Climate Investment Branch, after the emissions generated by the PSOs are determined, purchases a predetermined amount of offsets from qualified BC-based offset projects/developers (~640,000 offsets from 13 organizations for a total of $6.9 million worth of offsets in 2020). If we intend this "enhanced" program to become a driver to a decarbonized future, it must transform itself into a fully-functioning marketplace, where buyers and sellers can meet and trade BC-produced carbon offsets. This marketplace will need to handle orders of magnitude more volumes than today, and be able to do that on a regular (almost daily) basis. The use of a central voluntary offset registry for BC, one that aggregates all existing voluntary offset projects, can facilitate the expansion of the market and access to capital markets.

According to the latest forecasts, carbon credit markets will become a >$50 billion market by 2030.[14] If BC wants to maintain a leadership position, it must allow international buyers trade with local producers. However, we must resist the temptation to start from scratch for a seemingly unique, but ultimately more costly and derivative, "made in BC" marketplace. Many carbon marketplaces, or trading platforms, already exist – these include regional initiatives, or international organizations such as CBL from Xpansiv, ICE, or EEX. These marketplaces, which include trading software, security systems, buyer and seller verification checks, and integrations with existing voluntary standards, are already established and mature. BC would have the opportunity to choose from existing marketplaces as service providers (similar in some ways to listing with a stock exchange), and then work with them to maximize effectiveness of offsets created and sold in BC through regulations and programs.

In essence, this expanded BC Offset Program would set the rules, including standard contracts, pricing discovery mechanisms, floor pricing and forecasts, and transaction protections, and let market players trade with each other using existing trading mechanisms. The government then assumes less of the upfront coordination costs, while reaping greater environmental and economic benefits simultaneously.

A Vision of the Future Under the BC Offset Program 2.0

Here are some hypothetical examples of a future under a new, enhanced BC Offset Program:

- **Local taxicabs and ride-hailing companies accelerate the switch to EVs** by aggregating and monetizing carbon reductions as carbon offsets, sold to a Seattle-based tech company looking to reach carbon neutrality.
- **A Toronto-based pension fund purchases carbon offsets produced by energy efficiency measures** implemented in the portfolio of buildings of a BC non-profit housing association, as they go above and beyond retrofit requirements.
- **A Fortune 500 company based in Sidney, Australia purchases offset futures from a BC-based mass timber producer** to support low-income housing projects in BC.
- **A local non-profit is able to fund a bikeshare program by grouping and selling carbon offsets** produced by the modal shift generated by thousands of commuters leaving their cars at home and cycling instead, selling its offsets to an Amsterdam-based financial group seeking carbon neutrality.
- **A NYC-based pension fund purchases 10 years' worth of offsets from a BC-based cement plant**, producing low-carbon cement for local infrastructure projects as they reach their industrial decarbonization goals well ahead of regulatory deadlines.

14 McKinsey. A Blueprint for Scaling Voluntary Carbon Markets to Meet the Climate Challenge. (2020)

7.0 Conclusion

The development of a truly global carbon market is, at this point, **inevitable**. We now live in a carbon economy.

The meteoric growth of both compliance and voluntary carbon markets over the past few years proves this point, and the Glasgow COP26 conference has fortified this. And yet the global reputation of BC's carbon offsetting regime, as evidenced by the rejection from the ICAO-CORSIA marketplace, shows how much work must be done to successfully integrate and achieve the real benefits that carbon markets can provide.

If BC is to develop a more rigorous regulatory regime, and clarify where offsets can, and cannot, be used, our power can truly be unleashed. Over time, prices will rise, sequestration and avoidance projects will proliferate, and new sources of capital can be deployed to decarbonize our province. Particularly in an era of stretched public finances, post COVID-19, now, more than ever, we need every tool in the toolbox.

Enhancing the existing BC Offset Program to transform it into a fully-fledged offset marketplace is a powerful tool within reach, and BC must strive to reach that goal.

Resources

Type	Resources
Paris Agreement	• Paris Agreement • 26th UN Climate Change Conference of the Parties (COP26) – Goals • International Emissions Trading Association (IETA) – Carbon Pricing: The Paris Agreement's Key Ingredient (2016)
Offset guides	• Carbon Offset Guide • WWF – Making Sense of the Voluntary Carbon Market. A Comparison of Carbon Offset Standards • Pembina – Purchasing Carbon Offsets. A guide for Canadian Consumers, Businesses and Organizations • Becoming Carbon Neutral – A guidebook for local governments in British Columbia
Offset markets	• Taskforce on Scaling Voluntary Carbon Markets (TSVCM) – Phase 1 Final Report Summary • International Civil Aviation Organization (ICAO) – Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) • IETA – The Economic Potential of Article 6 of the Paris Agreement and Implementation Challenges • The Oxford Principles for Net Zero Aligned Carbon Offsetting – September 2020 • Task Force on Climate-Related Financial Disclosures (TCFD) • World Bank – State and Trends of Carbon Pricing 2021 • Forest Trends – State of the Voluntary Carbon Markets 2020
Offset Standards /Programs	• BC Offset Program • BC Green Communities Committee (GCC) • Federal GHG Offset System • Verified Carbon Standard (VCS) – Verra • Gold Standard • Plan Vivo • ISO 14064-2 • UNFCCC Clean Development Mechanism • Climate Action Reserve (CAR)

Offset registries	• BC Green Communities Committee (GCC) – **Local Carbon Registry (LCR)** • Verra – **Verified Carbon Standard (VCS) Registry** • Verra – **Climate, Community, & Biodiversity Standards (CCBS) Registry** • Canadian Standards Association (CSA) – **GHG CleanProjects® Registry** • **BC Offset Registry** • Canadian Standards Association (CSA) – **Alberta Emissions Offset Registry (AEOR) and the Alberta Emission Performance Credit (EPC) Registry** • **Québec cap-and-trade system for GHG emissions allowances (SPEDE)** • **American Carbon Registry (ACR)** • **Climate Action Reserve (CAR) Registry** • **Gold Standard Registry** • Markit – **Social Carbon Registry** • Markit – **Plan Vivo** • **UNFCCC CDM Registry**

VANCOUVER ECONOMIC COMMISSION

Carbon Markets In British Columbia

A Guide to Leveraging Carbon Markets to Decarbonize British Columbia in the Post-Paris Agreement World

Connect with us

For more information about the circular economy of food in Vancouver, visit our website:

→ **www.vancouvereconomic.com**

@VanEconomic **/VanEconomic**

Contact us

To learn more about carbon market opportunities in Vancouver, speak to one of our team members:

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VEC respectfully acknowledges that it is located on the traditional, ancestral and unceded territory of the Sḵwx̱wú7mesh (Squamish), Səl̓ílwətaʔ/Selilwitulh (Tsleil-Waututh) and xʷməθkʷəy̓əm (Musqueam) Nations.