



TIMBERLAND
INVESTMENT RESOURCES_{LLC}

Carbon Insetting and Timberland: Investing with Impact

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Executive Summary



Carbon offset credits – where a company gains credit for reducing emissions outside its own operations (e.g., purchasing a credit in the carbon credit market) – are often discussed in the media.¹ Capturing less attention, but equally relevant, are carbon insets. We define a carbon inset as *an investment or activity (often with nature-based solutions)² that reduces a company’s carbon footprint in a quantified and verifiable manner and diminishes its need to buy credits for either voluntary or compliance purposes.*

Timberland is rich in carbon insetting opportunities. We identified six methods by which a timberland owner can create carbon insets: (1) accumulate carbon in a forest ecosystem through biological growth and reduced harvests; (2) convert land that holds very little carbon – such as degraded agricultural land – into a healthy forest; (3) situate renewable energy projects such as a solar farm or wind farm on forestland; (4) develop bioenergy using timber from sustainably managed forests; (5) store carbon deep in special geologic formations; and (6) account for carbon stored in long-lived wood products made from timber produced from the forest.

The key question for an investor or organization seeking to reduce its carbon emissions profile is whether carbon insets from a forest are the best option. An argument for insetting is that it avoids the price volatility of carbon markets. That is important in budgeting and long-term planning. Another advantage of insets is that a company has full control of the quality of the carbon credits. In addition, insetting helps avoid some of the fees and commissions faced by carbon markets.

However, there are certain downsides to insets. First, there is no universally accepted definition and measure for carbon insetting. Second, insets take time to develop – often months or as long as years – while offsets can be purchased immediately in the voluntary carbon market. Other potential

¹ One carbon offset credit represents the equivalent of one metric ton of carbon dioxide equivalent (mtCO₂e) that is not added into the atmosphere. They are typically certified by an independent registry and are sold from one party to another.

² According to The International Union for Conservation of Nature (IUCN), Nature-based Solutions (NbS) “are actions to address societal challenges through the protection, sustainable management and restoration of ecosystems, benefiting both biodiversity and human well-being.”



factors include the reduced optionality of the forest asset when encumbered by an inset project as well as the increased complexity and capital demands it entails.

The big benefit of timberland is that it can do double-duty. Not only can it provide a financial return, but it can also provide an impactful non-financial return through the provision of environmental and social benefits that accrue to the investor and to the public.

Introduction

Many people are familiar with *carbon offset credits*. These are measured units of carbon dioxide (CO₂) or equivalent greenhouse gas (GHG) that will not enter the atmosphere – all with the intended goal of mitigating global climate change. Forests and forestry have long played a large role in producing carbon offset credits. In fact, of the 244 million metric tons worth of carbon dioxide offsets that were purchased in the voluntary markets in 2022, 46% were forestry and land use related, the largest of any category.³ Capturing less attention, but equally relevant are *carbon insets*. Think of insetting as creating carbon offsets for one's own use. Here are some recent examples of forest-based insetting:

In 2021, a timberland manager acquired with client capital close to 90 thousand acres of forestland in Maine with the primary goal of carbon sequestration. Some of that stored carbon will be used to reduce the timberland manager's own net carbon emissions. The rest were to be sold in the voluntary carbon markets.⁴

A timberland manager owned by a leading global bank announced in February 2024 the purchase of 250,000 acres in the Southeast on behalf of institutional investors. The land will be managed for both carbon capture and timber production.⁵

What these cases have in common is that the forest owners are choosing to manage their timberland assets so that they can better meet their climate-impact goals. They can do so to reduce or avoid purchasing carbon credits from an outside source.

The concept of insetting is not new. The first known carbon inset project occurred in Peru back in 2008.⁶ However, the meaning and application of insetting has evolved over time. It can mean different things to different people. To keep it simple, we define a carbon inset as *an investment or activity (often with nature-based solutions)*

³ Ecosystem Marketplace: *State of the Voluntary Carbon Markets 2023*. (November 28, 2023)

⁴ Who Will Own the Forest? Conference 2021 "Forest Opportunities for Climate Impact." By Eric Cooperstrom.

⁵ PR Newswire. "J.P. Morgan's Campbell Global Acquires Over 250,000 Acres of Commercial Timberland Valued at More than \$500 Million." (1 February 2023)

⁶ International Platform for Insetting: *A Practical Guide to Insetting*. (9 March 2022)



that reduces an organization's carbon footprint in a quantified and verifiable manner and diminishes its need to buy credits for either voluntary or compliance purposes.

The big benefit in combining insetting with timberland is that it enables two important benefits to be realized simultaneously. Not only can it provide a financial return, but it can also provide a non-financial return through the provision of environmental and social benefits that accrue to the investor and to the public.

This paper covers three topics:

- How carbon insets are created from forest assets;
- What are the advantages and disadvantages of insetting; and
- Recommended strategies for a timberland investor.

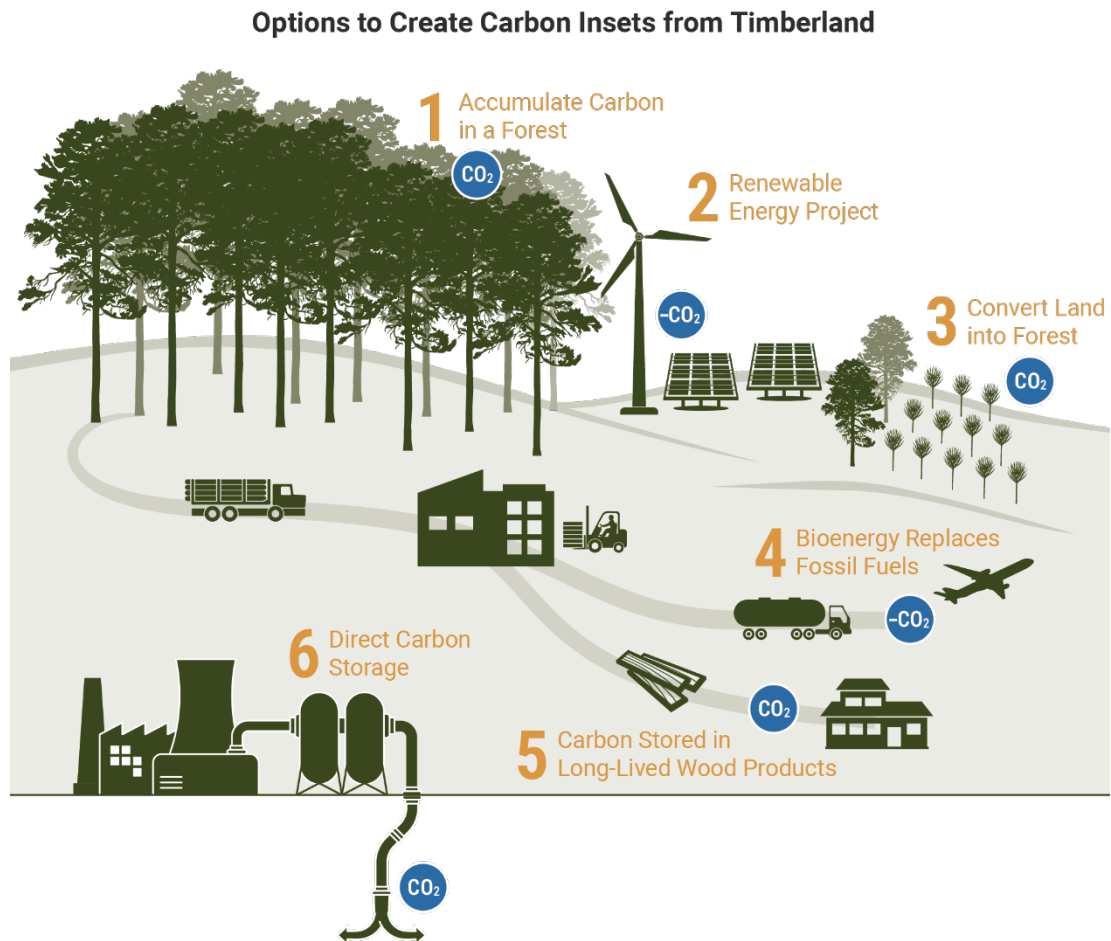


How Carbon Insets are Created from Forest Assets

Carbon insets can be created on forestland in a variety of ways. Regardless of the process, to be high-quality and credible they should aim for these five criteria: (1) offer permanence⁷; (2) account for any leakage; (3) be truly additional in removing carbon from the atmosphere; (4) validated with measuring and monitoring; and (5) prevent any double-counting of the same carbon from other parts of the supply-chain.

Listed below and illustrated in Figure 1 are six methods by which a timberland owner can create carbon insets. Importantly, these methods are not mutually exclusive to each other. Depending on the characteristics and features of the forest asset, it is possible to mix and match more than one type of inset with another.

Figure 1.
Six Methods
by Which a
Timberland
Owner Can
Create
Carbon
Insets.



⁷ The Integrity Council for the Voluntary Carbon Market (ICVCM), a governing body for voluntary carbon offsets, considered 40 years the minimum span for “permanence” that qualifies with their Core Carbon Principles standard.



- 1 Accumulate Carbon in a Forest Ecosystem:** Through appropriate forest management and changes to harvest activity, the overall sequestration ability of a forest can be enhanced. This will accumulate more carbon in the trees, along with potentially more carbon stored in the understory vegetation and in the soil. All the carbon stored above a certain established baseline can be claimed as an inset or offset. The most established and proven method to create forest-based carbon credits has been the deferral of harvests. The downside is that there is an opportunity cost of reduced income from a reduction in timber sales. For productive commercial-grade forests, that opportunity cost can be significant. Forisk Consulting, for example, calculated that withholding harvest for a mature loblolly pine forest in the Piedmont region of the U.S. South to increase the carbon inventory in trees is effectively forgoing \$40 an acre of timber income each year.⁸ For comparison, a forest property could typically produce around 1 to 2 carbon credits per acre per year for the first two decades (at a price today of \$6 to \$15 per mtCO₂e in the voluntary market).
- 2 Convert Land to Forest:** It is possible to get credit for converting land that holds very little carbon – such as degraded agricultural land – into a healthy forest. This is known as *afforestation*. However, most afforestation opportunities lie in emerging economies rather than in developed regions such as North America and Western Europe where most of the options to add forest cover on private land have been achieved.
- 3 Situate Non-Biogenic Renewable Energy Projects on Forestland:** Replacing electricity made from fossil fuels with renewable energy helps cut greenhouse gas emissions. Installing a solar farm, wind farm or a geothermal plant on forestland that is near the power grid are examples of this type of inset. The removal of trees to install solar panels or wind generators must be applied against the net carbon balance of the project to ensure proper accounting. Also, the timberland owner will need to retain an equity interest in the renewable energy project on their forestland to claim carbon insets.
- 4 Develop Bioenergy from Sustainably-Grown Trees:** Timber from a sustainably-managed forest can be made into bioenergy products that serve as a substitute for fossil fuels. Wood fiber can be made, for example, into charcoal, syngas or biogas, wood pellets, biodiesel or sustainable aviation fuels (SAF). These can then be used to produce electricity, generate feedstocks for industrial chemicals, or fuel vehicles. The greatest challenge is to avoid double-counting. Utility companies, for instance, may claim the use of wood pellets towards their CO₂ emissions goals. Airlines, such as Delta, that use sustainable aviation fuels, would likely count this against their net-zero targets. For these reasons, bioenergy may have limited inset potential for a timberland owner when done in isolation. On the other hand, it may offer greater opportunities when combined with direct carbon storage (see below). The term for this approach is *bioenergy carbon capture and storage* (BECCS).

⁸ Forisk Consulting blog, “Forest Carbon Markets: Reality Check and Pricing Trends.” (December 19, 2024)



5 Carbon Capture and Storage: Some forestlands sit above special geology that allow for the direct injection of CO₂ into porous rock formations deep below the surface that can hold liquified carbon dioxide for several millennia. This is known as *geologic carbon storage* (GSC), which is one form of *carbon capture & storage* (CCS). It is possible to combine CCS with carbon pulled directly from the air (*direct air capture* or DAC) or from bioenergy (i.e., BECCS).

6 Carbon Stored in Long-Lived Wood Products: The carbon stored in long-lived wood products made from the harvested timber could count against the forest owner's net carbon balance. When logs are turned into wood products such as lumber, plywood, oriented strandboard or even pulp, they will eventually end up in durable products like single-family homes, apartment buildings, furniture, and books. The carbon stored in such wood products can remain out of the atmosphere for many decades. This is particularly effective when a carbon insetting project is directly connected to significant long-term carbon storage in harvested wood products (a "carbon vault" like a mass timber building) with "chain of custody" documentation. Another long-lived wood product is biochar, which is a carbon-dense, charcoal-like material that is made when wood (or other type of biomass) is heated to high temperatures in a low-oxygen environment known as pyrolysis. Biochar can be put into deep storage as a carbon bank or used in soil remediation for agriculture and ecosystem reclamation. At the time of writing, forestland owners have not attempted to claim carbon credits from this insetting approach. However, this could change soon. See the adjacent call out box for more details.

Can A Timberland Owner Take Credit for Carbon Stored in Wood Products?

Thus far, no timberland owner has claimed carbon credits (offset or insets) for the timber harvested for their land and stored in long-lived wood products. However, the theory is sound and is backed by a growing body of research measuring the storage life of carbon in wood products. For example, a recent study published in *Carbon Balance and Management* estimated that wood products made from annual southern pine timber harvests in the U.S. South stores 29.7 million metric tons of carbon (MtC) a year, of which 11.4 MtC remain stored after 120 years (enough to cover the annual carbon emissions of 2.7 million U.S. homes). Furthermore, the paper estimates a pine plantation in the South on a sawtimber regime could sequester between 667 to 901 tC per acre if both the standing timber and the long-lived wood products made from the harvests over a 120-year period are accounted for. For perspective, a typical passenger vehicle emits 1.25 tC (or 4.6 tCO₂) a year.

We expect that a formalized framework will soon be developed to recognize this source of carbon storage. In that regard, the Council of the European Union and the European Parliament in February 2024 agreed to work towards a certification framework for permanent carbon removals, carbon farming, and carbon storage in products. Once it is in place, other policy and regulatory bodies would likely follow suit behind the EU and recognize carbon embedded in products. With the backing of a regulatory framework, the options could widen significantly for a timberland owner interested in insetting.

Citation:

Puls, S.J., Cook, R.L., Baker, J.S. et al. "Modeling wood product carbon flows in Southern US pine plantations: implications for carbon storage." *Carbon Balance and Management* Vol. 19, Article 8 (2024).



The six methods listed here are not an exhaustive list. The takeaway message for the timberland investor is to think comprehensively. While it remains a valid option, forest-based carbon insets do not necessarily have to rely simply on scaling back harvests and letting the inventory of the current timber crop grow. As discussed, there are a variety of ways to generate insets through sustainable forestry without sacrificing harvest income and economic impact.

Pros and Cons of Insetting

The next question an investor or organization seeking to reduce their carbon emissions profile should ask is whether carbon insets from a forest are the best option. This can be broken into two parts. First, is it better to develop insets in-house or buy offsets directly from the carbon markets? Second, if the choice is to develop insets, are forests the better way to create an inset over other methods? Below we weigh the pros and cons for these two choices.

Choosing Insets Over Purchasing Offsets

There are four good arguments for insetting over buying offsets from a third-party source.

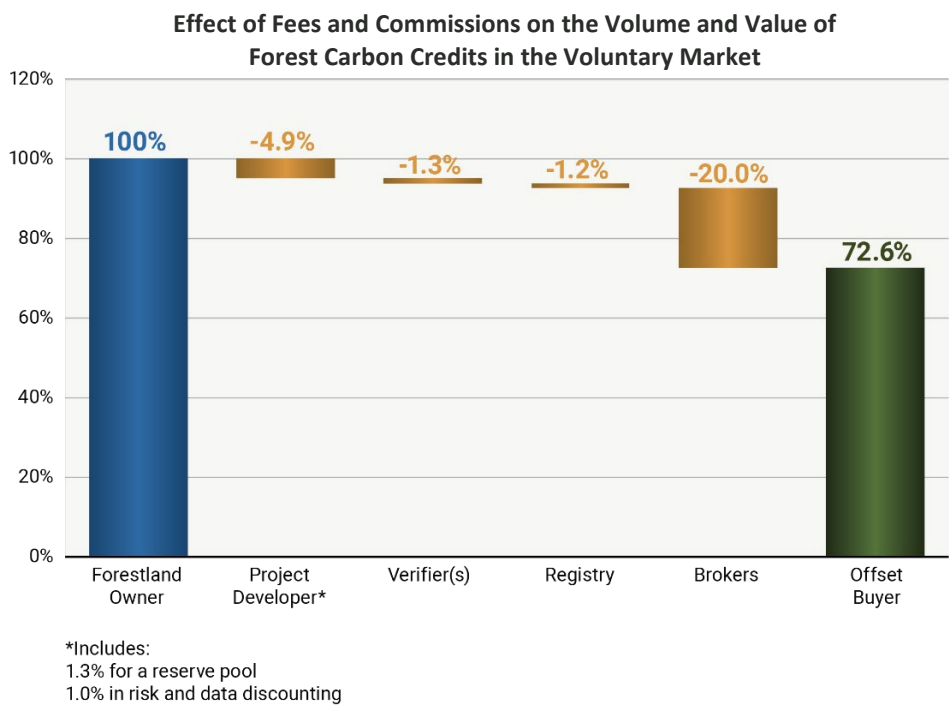
1. **Avoid Price Volatility:** A forestland owner has discretionary control of the costs to develop their insets. This is not the case with carbon offsets. Whether it is compliance or voluntary, carbon markets today are relatively thin, relatively opaque markets subject to large swings in supply and demand. That can create a volatile pricing environment which makes it difficult to budget and plan for the long-term. For example, the price of credits in the voluntary market, as tracked by Ecosystem Marketplace, averaged \$4.04 mtCO₂e in 2021, \$7.37 in 2022, and \$6.97 in 2023 (year-to-date through November 21). That is an 82% jump in price between 2021 and 2022 and a 5.4% drop for 2023, more than most other commodities like oil or gold.
2. **Control the Quality of the Credits:** Insetting allows the organization to have full control of the risks relating to permanence, additionality, and accuracy of the carbon removed from the atmosphere. No organization wants to be accused by the public for “greenwashing.” This is a valid concern as some nature-based carbon offset projects have come under public scrutiny for not making a measurable difference in climate mitigation. Most of the debate has focused on REDD+ projects (Reduced Carbon Emissions from Deforestation and Forest



Degradation) in emerging countries, but that heightened skepticism has spilled over to other parts of the voluntary carbon markets.⁹

3. **Capture More Credits for Oneself:** With insets, you eliminate the “middleman.” The process is more efficient, which means there are potentially fewer fees, expenses, and commissions extracted from the process. Based on pro forma work on an actual timberland property with a blue-chip carbon developer, TIR estimated that a carbon offset project can lose roughly one quarter of the carbon offsets by volume and value by the time it reaches the final buyer – who will retire the offset (see Figure 2). Through insetting, the timberland owner can avoid brokerage fees (~20%) and reduce some of the development fees (~5%) as well by concentrating on removal credits and self-insuring.

Figure 2. Estimates are derived from a project proposal by Bluesource, a leading developer of forest-based carbon offsets, for a timberland property managed by Timberland Investment Resources. Actual fees will vary by project depending on scale, stocking, productivity, and other factors.



4. **Environmental Community’s Preference for Insets Over Offsets:** Offsets play an important role in decarbonizing an organization’s activities. However, the environmental community frowns on the use of offsets as they are framed as an excuse to continue polluting the atmosphere with more carbon. They can also

⁹ Mongabay News. “Leveraging the hypothetical: The uncertain world of carbon credit calculations” (January 15, 2024).



potentially remove a source of economic development for local/rural economies as they are often designed to limit commercial forestry in order to raise the carbon stocks in the forest, which in turn can hurt wages and employment in surrounding communities. Given the downsides for using offsets, the leading choice of many businesses is often to reduce their own emissions through changes in behavior or practices (see Figure 3). The second-best choice is insetting. Climate advocates generally believe the purchase of credit offsets should only be used as a final resort for an organization to achieve net-zero goals.

Figure 3. Order of Preference for Reducing Carbon Emissions



As there are reasons to choose insets, there are valid counter-arguments to avoid them. Here are four:

1. **Lack of Universal Standard for Insetting:** Presently, there is no universally accepted definition and measure for carbon insetting. This prevents clear accounting rules that an organization could use to show to the public and monitoring agencies that they are doing their insets properly. This is likely to change in the future, as discussed in the call out box on page 6. For now, companies should accept a more open-ended framework when they pursue their insetting efforts.
2. **Ramp-Up Period:** One must plan for a gestation period between planning and the claiming of insets. Depending on the type of project, creating insets can take months or sometimes years. In contrast, one can readily purchase CO₂ credit offsets from open carbon markets for immediate use.
3. **Reduced Optionality:** Certain types of carbon inset projects could encumber the timberland and limit the types of commercial activities that can take place or how timberland may be sold. For instance, an inset strategy of storing more carbon in living trees by harvesting less will harm the income producing potential from timber sales. In another example, committing a forest's small-log production to biochar (to store carbon) will mean selling fewer logs at a potentially higher price to nearby pulp mills or OSB mills. Performing insetting in such cases would reduce the economic optionality of the forest asset and lower the potential return from the forest investment.



4. **Complexity and Cost of Execution:** Some strategies for carbon insetting are technologically advanced or complex. These may require expertise and significant capital investment. This would apply to projects such as geologic carbon storage, a bioenergy facility with *in situ* carbon capture, or a solar farm. In comparison, buying carbon offsets is straightforward and easy.



Choosing Forest-Based Insets Over Other Types of Insets

There are many paths available to develop insets. We offer two reasons why an investor or an organization should choose timberland over other methods to create insets.

Pro: Dual Purpose of Income and Climate Mitigation

The first and probably most obvious reason is that forests can generate a financial return along with carbon credits. Sustainably managed forests can generate income through the growth and harvest of timber. Beyond the sale of timber, forests can provide many natural capital solutions that can be monetized. For example, forests can be the source of:

- **Environmental mitigation banking credits** (such as for wetland, streams, and biodiversity) and other opportunities for improving ecosystem services for nature-based solutions
- **Recreational leases** such as for hunting, fishing, or ecotourism
- Harvesting of pinestraw, mushrooms, botanicals, and other **non-timber forest products**, and
- **Conservation easements** to environmental organizations.

Many of these activities are compatible with the development of carbon insets. As a bonus, some insets could qualify for government subsidies, credits, or tax breaks. For instance, the U.S. Inflation Reduction Act of 2022 designates a \$85/tonne tax credit for direct CO₂ capture and sequestration.



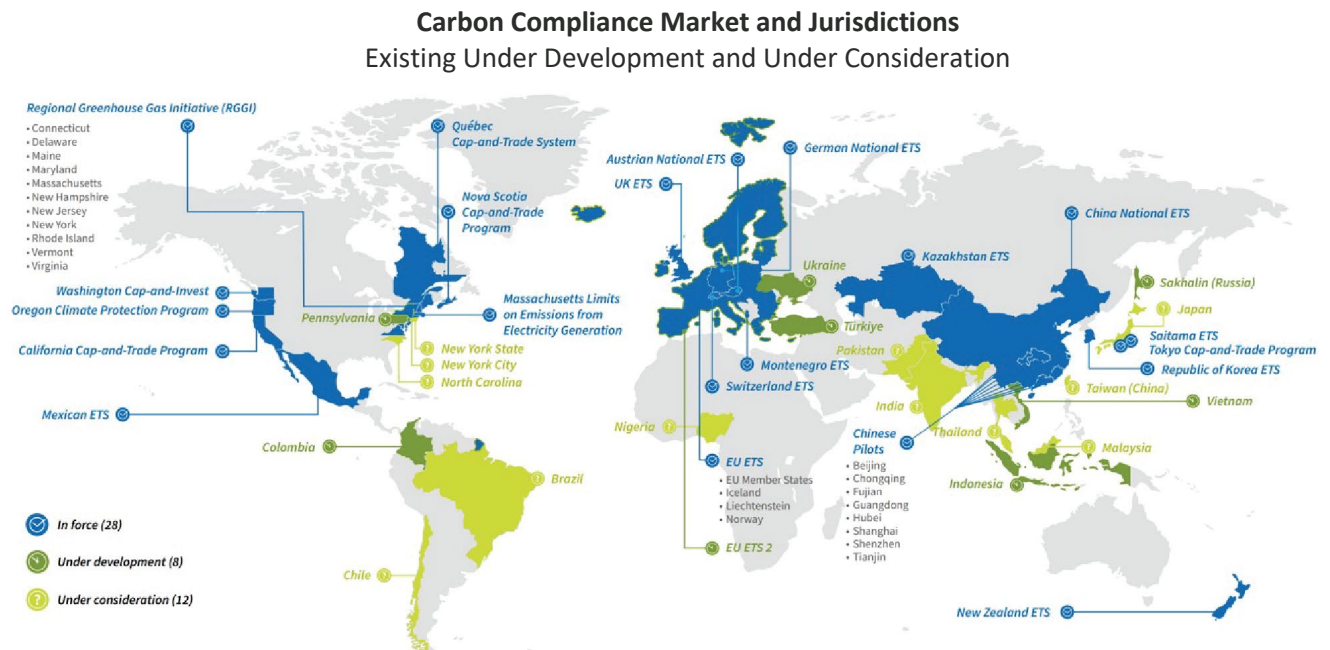
Pro: Co-Benefits to Insets

The second reason one should consider forests to develop insets is because of the many environmental and social co-benefits it offers. This could burnish a forestland owner’s sustainability commitments. For that role, it can be a part of a larger package where climate action is combined with addressing environmental issues, such as Sustainable Development Goals identified by the United Nations (UN SDGs), and the needs of the local communities near the forest properties. Forests provide recreational opportunities, clean air and water, watershed protection, and biodiversity protection. They also support jobs and the rural economy with forestry, tourism & recreation, harvesting, and wood processing. These nature-based co-benefits can elevate a regular carbon inset to a high-quality, more valuable inset.

Con: Qualifications to Compliance Bodies

However, there are instances where using forestland for insets would not be the right choice. If the purpose of insetting is not voluntary but to meet government-mandated emission targets, such insets may not necessarily be accepted by the regulating body or compliance market. There are a variety of mandatory, compliance carbon markets as well as carbon emission regulations around the world, including those covering the European Union, California, and New Zealand (see Figure 4). They have strict definitions of what counts as a carbon credit or as a greenhouse gas emission reduction. It is important to check carefully whether the insets that are to be developed from a forest holding would qualify under that regulatory body.

Figure 4. Source: International Climate Action Partnership, “Emissions Trading Worldwide: Status Report.” (March 2023)





Recommendations

A timberland investor who is considering carbon insets should have a robust decision-making framework that clearly sets out the costs and benefits. The first step is to ask three questions:

- Is it important for my organization to reduce its carbon emissions?
- How much am I willing to pay for producing the inset (either in out-of-pocket expenses or in lost opportunities for a better return)?
- What non-monetized benefits (costs – e.g., reputational) would I like to create (avoid) alongside the insets, such as improved biodiversity and supporting local rural communities with jobs?

After answering these three questions, the best strategy will probably fall into one of five buckets.

#1 No Insets: The first and default strategy is to not pursue insets. If an investor does not have a need to reduce their carbon footprint – or already has it covered from other sustainability efforts – then they should not pursue an inset strategy with their timberland portfolio. There is nothing to gain. Instead, there is risk of leaving money on the table through lost optionality. For example, every inset you take for yourself could be one less carbon offset that can be sold for cash.

#2 Generate Impact: If the goal of the timberland investor is to generate non-monetary benefits with their capital, then insets can be integrated into a portfolio focused on social and environmental impact. For this investor, driving transformation may be the primary goal. Generating a financial return is secondary. Insetting would then be viewed holistically as part of a program to generate nature-based solutions and improve the health of surrounding communities.

#3 Invest with Integrity: As mentioned earlier, creating carbon insets can be compatible with building value or generating cash flow from a forest. It is therefore possible to build an investment thesis focused on financial return yet also create carbon insets as an ancillary benefit. An investor seeking this strategy may need to set up a separate, individualized account with a timberland investment manager to achieve this customized solution, as funds featuring carbon insets are relatively rare.

#4 Extend the Business Model: A company belonging to an energy intensive, carbon-emissive (hard-to-abate) industry could decarbonize through a counterbalance of forestry. Examples include energy producers like an oil company, agricultural producers like a cattle ranch, building products companies such as a cement producer, or utilities that burn fossil fuels. Thinking more broadly, a forest insetting strategy could also help data centers, trucking companies and airlines achieve their



climate-action goals. Beyond being a good corporate citizen, a benefit for insetting is to achieve high sustainability rankings on certain environmental lists that will enhance the reputation of those companies with their stakeholders.

#5 Achieve Carbon Emission Targets: Depending on the jurisdiction and industry it belongs to, a company may be required by regulation or policy to limit their carbon emissions. Otherwise, it faces fines or needs to pay for offsets under a mandated carbon compliance market. It is also possible such emission targets are voluntary but self-imposed. Either way, forest-based carbon offsets can be an effective strategy if it is consistent with the applicable guidelines and regulations. One approach is to have a transition mix. Purchase offsets today to meet immediate carbon emission targets but as insetting builds momentum from a timberland portfolio, the share of insets will grow over time as it substitutes for offsets.

The five strategies are summarized in the table below (Table 1).

Table 1

General Carbon Insetting Strategies for Forestland

Carbon Insetting Strategy	Action	Goal
No insetting	Perform traditional timberland investment through commercial forestry combined with non-timber related income like recreational leases.	Maximize risk-adjusted return or meet cash flow
Part of an impact portfolio	Manage forests for non-monetized benefits to the environment and to society	Be a force of good
Hold a core investment thesis combined with climate-awareness	Incorporate insetting with the primary goal of adding value and generating income for the long-term	Generate a financial return while improving your environmental footprint
Extension of existing business model	Integrate carbon mitigation from forestland into the company's supply chain or business process	Raise your environmental standing with key stakeholders or the public
Need to meet climate-action obligations	Develop qualified insets from forest holdings that can help meet regulatory or self-imposed carbon emission targets	Achieve committed climate-action goals (government mandated or self-imposed)



Tips and Suggestions

Once you select a forest insetting strategy that best suits your objectives, here are some suggestions to help you better achieve your climate-action objectives.

Insetting is largely defined by what the investor wants to achieve. This presents both an opportunity and a risk. With no universally accepted definition or framework (yet), there is a lot of interpretation left to the investor. They can shape how it best fits their goals and objectives. However, that means the insetter needs to make an effort to get “buy-in” from their stakeholders or the public. When one claims carbon insets (forest-based or otherwise), the stakeholders or members of the environmental community could challenge those claims. The investor must be prepared to defend their insetting program. An important step to gain public support is to have the inset credits validated by an independent verifier or reputable auditor, who would certify them to accepted standards. Leading registries (standards bodies) for carbon credits, endorsed by The International Carbon Reduction and Offset Alliance (ICROA), an industry trade group for providers of voluntary carbon offsets include American Carbon Registry, Gold Standard, and Verra.

In that regard, the inset seeking investor may have a specific registry or protocol in mind (such as the American Carbon Registry or Verra mentioned earlier). Be upfront with the timberland manager on this before purchasing any forest assets for the portfolio. The choice of protocol (third-party or internally developed) will limit what kind of insets one can develop and claim.

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