Nature-Based Solutions in Carbon Offsetting

// Southeast Asia //

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AlliedOffsets
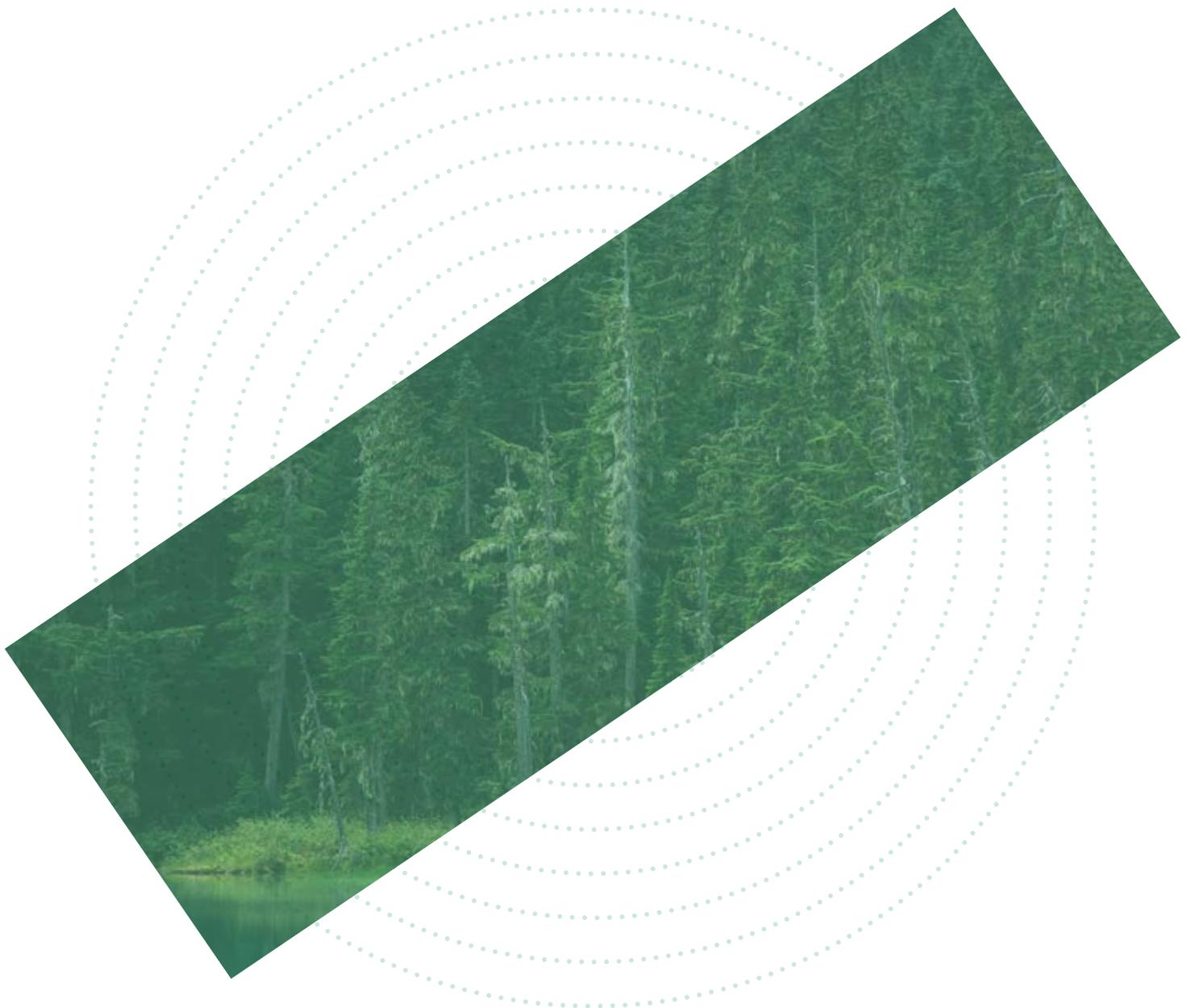
Executive
Summary

After a decade-long slumber, carbon offsetting is once again entering
the mainstream. Driven by net-zero pledges from corporates, government
commitments, and consumer demand, green projects that remove or avoid
the emission of carbon into the atmosphere are seeing increased demand.

Today, the market is opaque, with little clear information about
pricing, quality, projects, buyers, and auditors. Moreover, projects
are spread across multiple registries and verified under different
standards, making it difficult to consolidate the data and have
a clear snapshot of the market. We at AlliedCrowds created
AlliedOffsets to address some of these gaps in the market.
This is the first in a series of reports on carbon offsetting projects
around the world; the reports are data-driven and aim to provide
an overview of the environmental issues at hand, as well as how
carbon offsetting fits into the current suite of solutions and

mitigating efforts. In this report, we look at forestry projects in
Southeast Asia – a region that is seeing explosive economic and
population growth, coupled with high levels of deforestation.
If you have questions about the information in this report, or
would like to learn more about AlliedOffsets, please reach out to
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Anton Root
Head of Research

Introduction

Tropical forests play a pivotal role in the carbon cycle and climate change mitigation, but make up only 7% of the Earth's land surface. Globally, they comprise 66% of floral and faunal diversity and are considered the most efficient carbon sink, i.e. absorbers of carbon dioxide from the atmosphere. During the 1990s, 46 billion tons of carbon emissions were removed from the atmosphere, equating to 17% of all emissions from anthropogenic activities in those ten years. However, from 2010 to 2020, the absorption of carbon has decreased to 25 billion tons, only 6% of total emissions during the decade. Destruction from wildfires and clear-cutting for food production, cash-crops, and agribusiness are by far the most calamitous anthropogenic activities of tropical deforestation.

Southeast Asia (SEA) - particularly the members of the Alliance of Southeast Asian Nations (ASEAN) - is home to 15% of the world's tropical forests. Unfortunately, it is also ranked highest in biodiversity loss due to deforestation and conversions of forests to plantations for human inhabitation and agribusiness. Its archipelagic geography enables it to have highly productive agricultural lands, which in turn attracts agribusiness investments. An estimated 40% of SEA's biodiversity will vanish by 2100 if no mitigation efforts are made. In fact, from 2005 to 2015, there was a net loss of 80 million hectares(ha) of forest from the ASEAN states.

Growth of Carbon Market in SEA
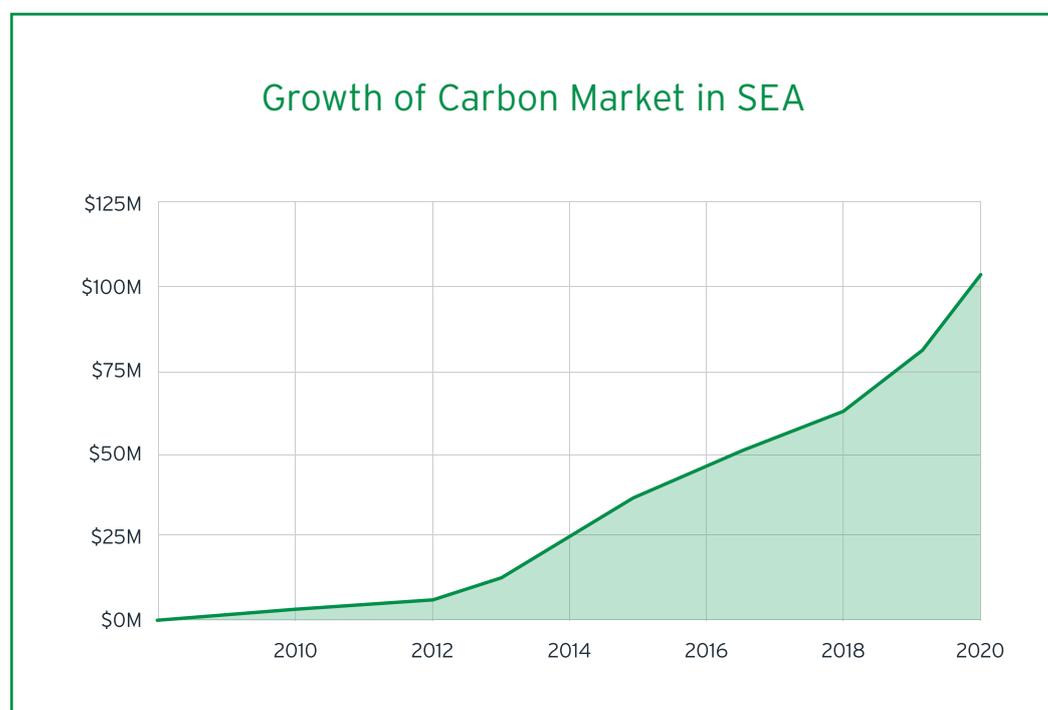
Wildfires are the most common form of deforestation in SEA, not only depleting natural carbon sinks, but also releasing previously stored carbon back into the atmosphere. Forests inhale carbon from the atmosphere and store it in plants and soil. When they are cleared, the storage door is opened, and carbon is released back into the atmosphere. For example, one hectare of tropical forest converted into palm oil monoculture emits 174 tons of carbon. As of 2015, SEA is still capable of storing 21.172 million tons of carbon in its above ground forests; the goal is to increase this by an additional 1.651 million tons by 2050 through reforestation and deforestation avoidance. This will allow it to contribute to the Paris Agreement of limiting global warming to well below 2 degrees celsius.

In order to help reach that goal, SEA has joined the rest of the world in participating in carbon markets. Restoring forests while increasing food production to meet the predicted population growth by 2050 will not be easy and, if done right, carbon prices can play a role. This report provides a unique analysis of SEA's voluntary carbon market trends, enabled by AlliedOffsets' database, interpreting the region's carbon governance, credits, prices, and allocations through data interpretation and spotlights on two SEA nations. This report aims to illustrate potential investment effects and its consequent prices.

Carbon Pricing in Forestry

Carbon pricing is the process of putting a price on carbon and equivalent greenhouse gas (GHG) emissions as a means to bring down levels of pollution and drive investment into sustainable options. It stimulates clean technology and market innovations to fuel new, low carbon drivers of economic growth. In 2019, the global carbon stock market grew by 34%, to $215 billion, with the compliance market much larger than the voluntary one.

Carbon prices are determined by a variety of factors, such as the supply and demand of credits, government regulations, type of offsetting projects, and resources required to both maintain and monitor the offsets. In this report, AlliedOffsets will introduce and explain some of the deciding factors of SEA forestry carbon prices.

Cumulative Market Size Across All Sectors and Countries in SEA

Year	Market Size
2009	$178,397
2010	$1,720,788
2011	$4,227,217
2012	$6,476,687
2013	$11,625,860
2014	$23,470,941
2015	$36,336,793
2016	$44,233,972
2017	$55,844,706
2018	$65,244,281
2019	$82,030,436
2020	$107,211,092

ASEAN states are particularly rich in natural resources such as palm oil and timber, which remain SEA's top exports and sources of domestic and foreign investment. Additionally, the threat of hunger and starvation remains a challenge; food insecurity increased from 48 million in 2015 to 71 million in 2016. According to a study done by Copernicuz, if rice and other cereal crop yields were solely decreased to match the Paris Agreement goal of 2 degrees celsius, 600 million people in SEA would be at nutritional risk. Population growth is also estimated to increase from 643 million in 2017 to 800 million in 2050. Food production and population pressure are major driving factors in deforestation in the region.

In recognizing the association between the rapid growth in socio-economy and deforestation, in September of 2017, ASEAN Ministers on Agriculture and Forestry agreed to guidelines for promoting sustainable investment in Food, Agriculture, and Forestry. One of the meeting's major policies is contributing to community resources where agribusinesses take place, while fostering food security and nutrition of its growing population. ASEAN leaders are committed "to forge a more resilient future by reducing existing disaster and climate related risks, preventing the generation of new risks and adapting to a changing climate through the implementation of economic, social, cultural, physical, and environmental measures which address exposure and vulnerability, and thus strengthen resilience". The overall goal in connection to the carbon market is to be more efficient with carbon prices and making sure they cover the financial costs of opportunity, management, and transaction.

2020 at a Glance

2020 was a big year for the carbon offsetting market in SEA. The charts below break down the market by country, project type, and over the year. Indonesia leads the way with over $20m in estimated carbon transactions last year. Second-place Cambodia is a distant second at just over an estimated $2m. Forestry and Land Use projects are the dominant ones in the region, with over $20m estimated to have gone to those projects in the region. Stay tuned for updates on these numbers throughout the new year.

Monthly Transactions in 2020, SEA

Total Market Transactions, 2020 (Sector)
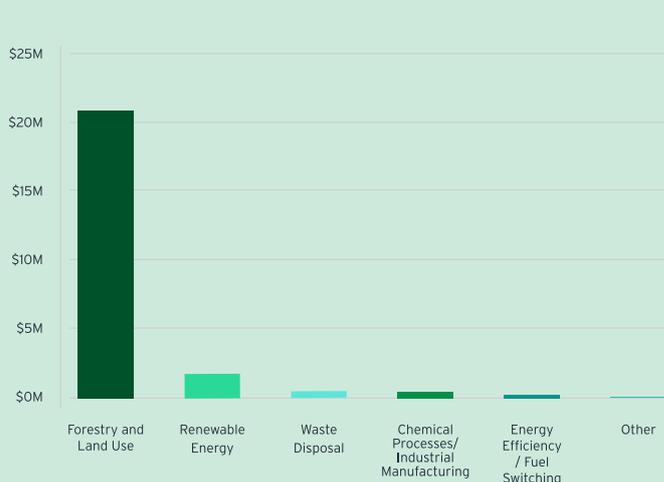
Total Market Transactions, 2020 (Country)
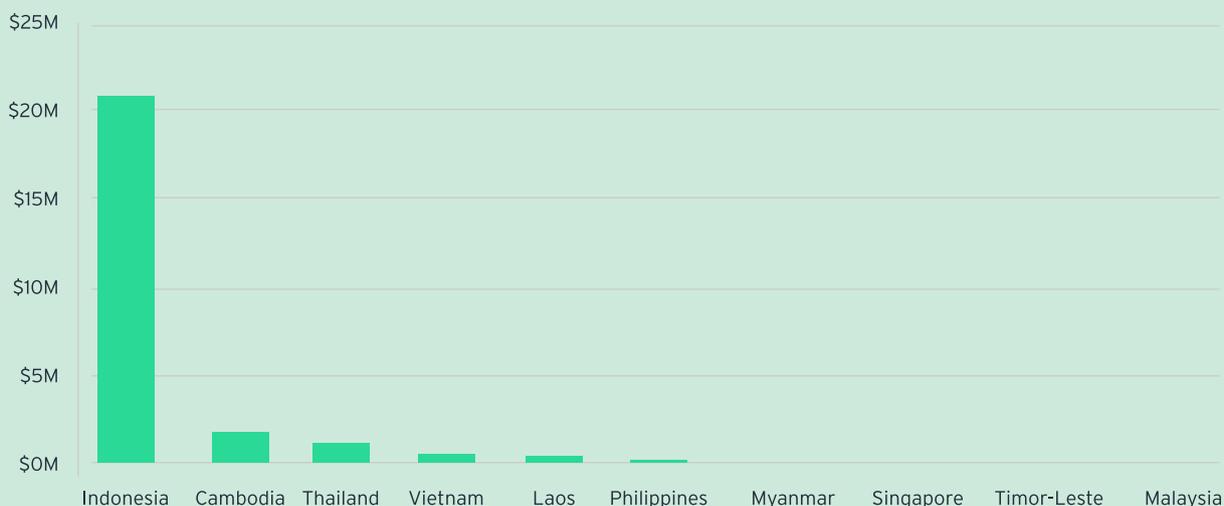
The data above comes from AlliedOffsets, which combines publicly available information with internal proprietary analysis and supplements this with self-reported data from project developers.

SEA Carbon Markets Past, Present, & Future

As of Q3 2020, SEA has 96 projects, of which only 10 are forestry and land use based. These forestry projects cover at least 38.5 million ha of the 204 million ha of tropical forests in SEA, with at least another 50 million hectares pending protection approval. Forestry projects often have numerous social and environmental benefits other than carbon sequestration, including ecosystem conservation and social heritage protection.

Geographical Distribution of Projects

- Cambodia 1.8%
- Indonesia 18%
- Laos 4.4%
- Malaysia 15.9%
- Maynmar 2.2%
- Philippines 24.8%
- Singapore 1.2%
- Thailand 23%
- Timor-Leste 0.1%
- Vietnam 24.8%
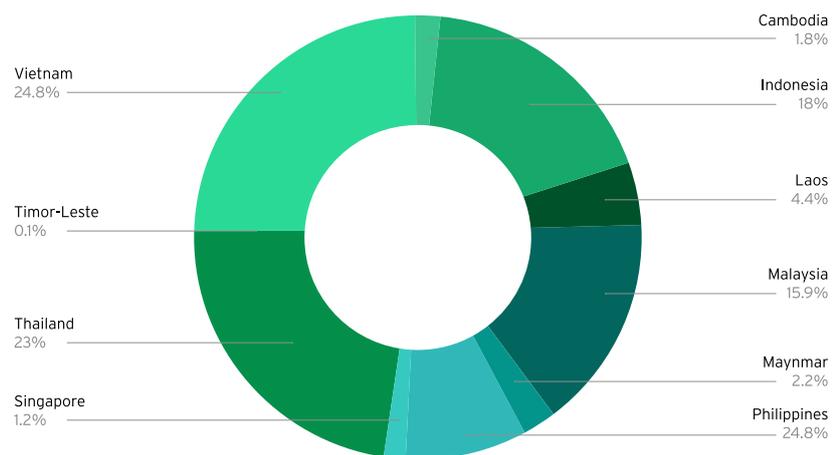
Geographical Distribution of Forestry Projects

- Myanmar 10%
- Malaysia 10%
- Laos 10%
- Cambodia 30%
- Indonesia 40%

Number of Transactions per Project Type
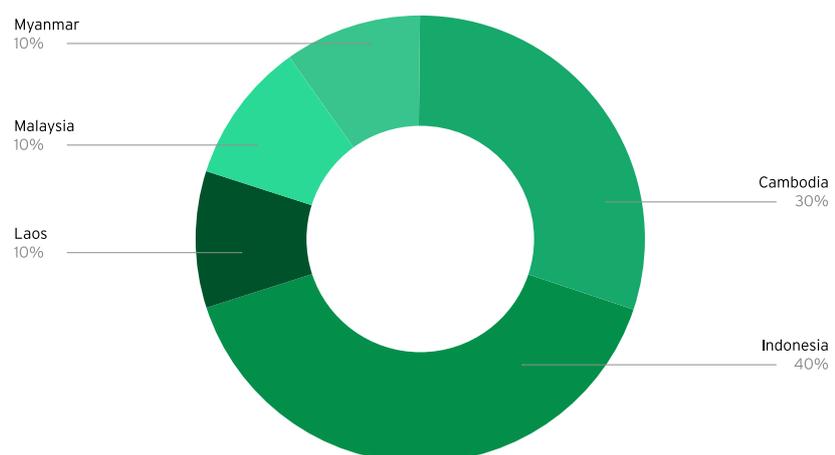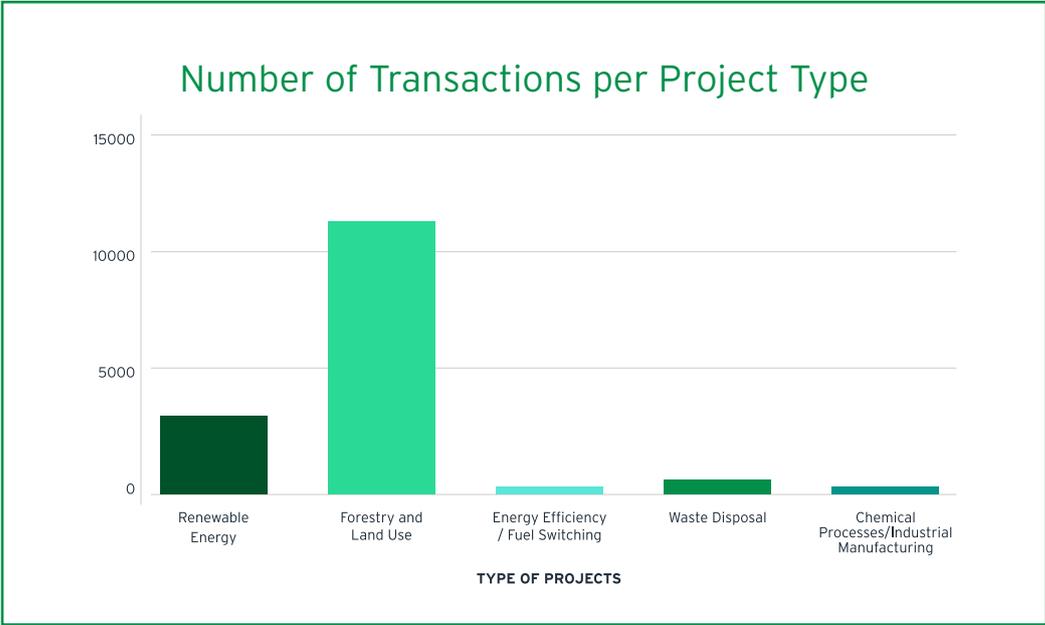
For example, Indonesia is the world's largest palm oil producer and exporter. Its value in the last decade totalled $180 billion, which accounts for 11% of total export earnings.

In terms of the carbon emissions involved, converting a hectare of forest into palm oil in Indonesia earns $24,000 over 25 years, which equates to $170 per ton of emitted carbon annually, which is much higher than the prices of carbon credit per ton for any registered project (they range from under a dollar to over $10 on the wholesale market). Thus, cheap forestry projects are limited in reducing emissions because the revenues from converting forests into palm oil far outweigh the revenues from trading carbon credits on the voluntary market. Reducing palm oil plantation and production is too costly for SEA's overall economy, especially Indonesia. However, if efforts are extended to moving palm oil permits to already degraded but suitable lands, then the overall cost efficiency may be increased as it does not put the economy in jeopardy, and emissions can be offset, totaling to a net-zero carbon position. In fact, in 2020, Indonesia passed a new job creation bill, regulating various sectors including labor and the environment.

Our data shows that the carbon price of reducing emissions in SEA's voluntary market ranged from $1.51 to $6.21 per ton of avoided carbon emissions. Reforestation is the most costly to implement due to labor and material resources required, but it's the cheapest strategy per ton of carbon reduced because it has the largest future benefits.

In the future, SEA projects hope to obtain more domestic investors for carbon projects, which helps to incentivize responsibility while maintaining market desirable prices. When foreign investors over-exploit the natural resources without intending to redevelop the land after clearing, local communities are left with the resultant costs. Domestic landowners are often faced with a tradeoff of exploiting the land and preserving it where the payoff from the former materially outweighs the compensation offered through the later, e.g. receiving $170 per ton of carbon emitted versus receiving $3 per ton of carbon reduced. According to Dr. David Ganz, Executive Director of RECOFTC, a project's story plays a pivotal role in, "maintaining forest cover and providing alternative livelihoods to the local community, compared to what they might be doing if the investments had been converted to palm oil or other commodities." Overall, the major concern for national and local governments is the loss in both domestic and foreign investment. Investing in forestry projects would not only be environmentally beneficial, but it would also assist in maintaining green investment revenue within the ASEAN states.

Case Studies

Project Spotlight

The first carbon project to receive validation from the UN's Reducing Emissions from Deforestation and Forest Degradation (REDD+) program under the Verified Carbon Standard (VCS) is Infinite Earth's Rimba Raya Biodiversity Reserve Project (RR). Located in Central Kalimantan, which absorbs more than 75% of Indonesia's GHG emissions, RR protects an estimated 65,000 ha of forests. It is home to 300 species of birds, 122 species of mammals, and 180 species of trees and plants. It's also home to 105,000 endangered Bornean Orangutans. It also claims to be the single largest REDD+ project in the world, in terms of avoided emissions delivered to date. Based on their own records, RR has avoided 130m tCO2e in 30 years, which equates to 4.5m tCO2e annually.

Total Forestry / Land Use Transactions in Indonesia vs. Rimba Raya in 2019
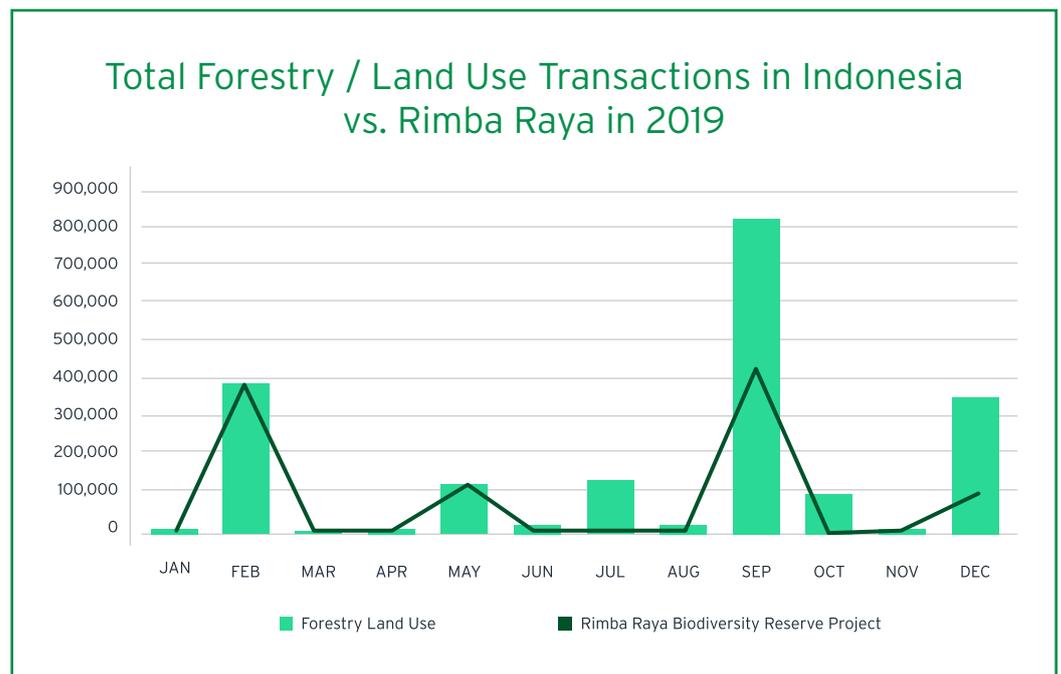
Moreover, RR protects tropical forests from palm oil conversion by engaging local communities through education and agroforestry training. According to its site, it is ''providing alternative income streams through capacity building, investments in microfinance, programs that provide basic necessities and access to a conservation model that does not put the developing world's need for economic growth at the odds with our collective desire to protect a fragile ecosystem.'' It claims to enact all seventeen of the UN's Sustainable Development Goals (SDGs) to end poverty, protect the planet, and ensure prosperity for all. RR does so by investing both financially and environmentally to the community, biodiversity, and climate. According to the co-founder, Jim Procanik, SDGs play a pivotal role in the carbon credit market, providing buyers with transparency on investment allocations. RR efforts include but are not limited to:

- Floating clinic - providing healthcare
- Education and literacy - providing supplies and pocket money
- Clean water - installing water filtration systems to 100% of all households within the reserve
- Biodiversity protection - housing 94 endangered species
- Microfinance opportunity for health and employment - community run recycling units
- Community farms - forest conservation through locally runned sustainable food plantations
- Renewable light sources - providing 100% of all households within the reserve with solar powered lamps
- Fire fighting brigades - providing locals with supplies and training to prevent and suppress wildfires
- Locally run forest restoration - providing employment and income through repairing damaged land and mangroves

RR's financing sources mainly consist of the sale of carbon credits on the voluntary market, boosting the regional economies.

> "The communities and their livelihoods are our priority. The reserve has been their home for generations, and so our strategy in protecting both the region and them is providing resources that would live beyond the project itself, such as scholarships, water filtration systems"
>
> Jim Procanik,
> Infinite-Earth co-founder

Breakdown of Market Transactions to Date

Waste Disposal
3.6%

Renewable Energy
7%

Other
0.1%

Chemical Processes
3.3%

Forestry and Land Use
85.8%
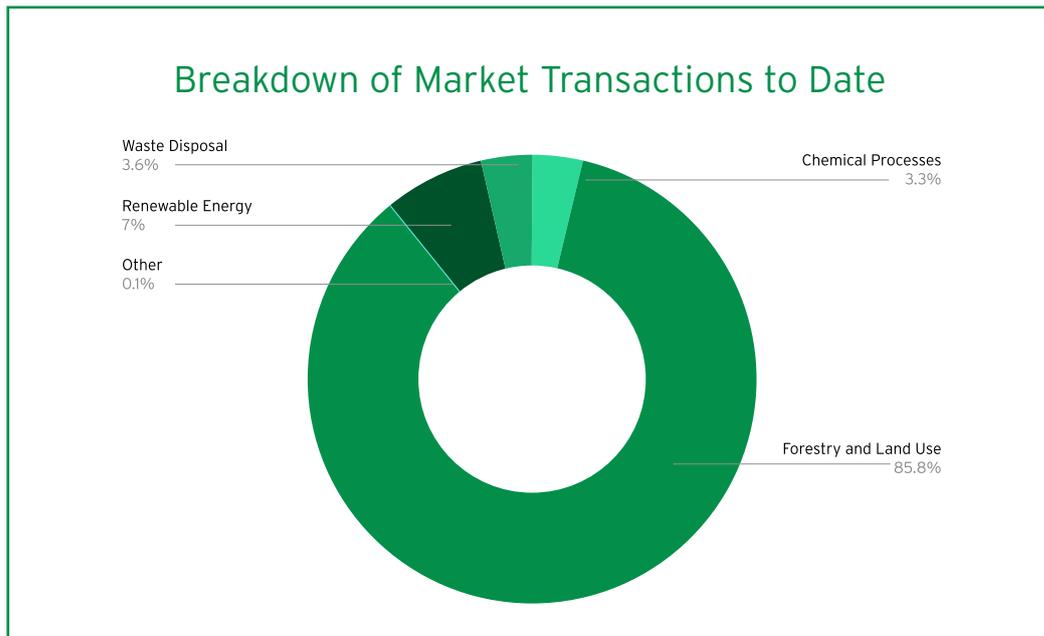
We used AlliedOffsets's data to focus on the pricing difference between ASEAN states, with a focus on Indonesia and Vietnam. Before we discuss the specific studies of these two countries, it's important to understand why forestry carbon prices are higher than other project types'. For example, forestry projects average at $3.20 per tCO2e, compared to the $1.70 per tCO2e for renewable energy projects. Part of the reason is the risk of undetected reversal in emissions reductions due to illegal logging and unexpected wildfires, which are two factors to its higher marginal price.

Average Price of Carbon Credit per Country

$1.87 $6.21
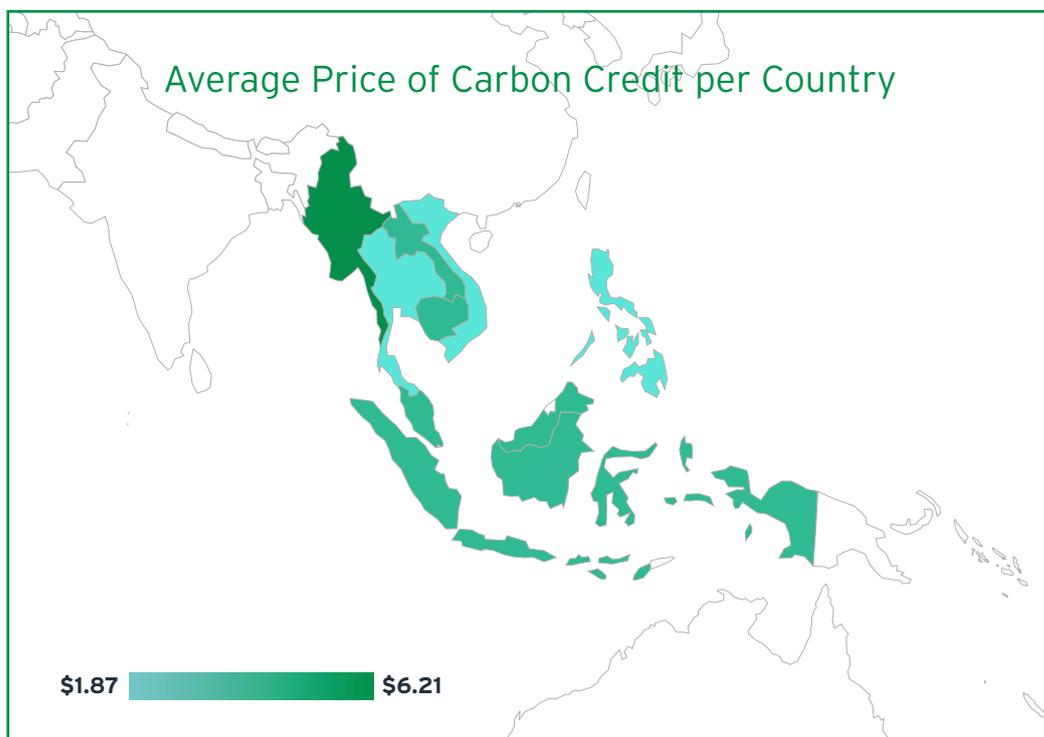
Furthermore, there is a long lag between supply and demand as it takes six to twelve months to source long term commitments from landowners. Secondly, it's difficult to calculate actual carbon offsets without long-term monitoring. Thirdly, wildfires present a significant enough risk that forestry projects require extra funding to obtain permanent land while providing sufficient security. As of 2004, ASEAN Agreement officially includes a section on transboundary haze pollution. It's the world's first regional arrangement binding a group of states into a joint effort to monitor, prevent, and mitigate transboundary pollution from land and forest fires. However, despite these efforts, wildfires continue to be a problem due to illegal clearing and leakage from already existing plantations.

Spotlight on Indonesia

Indonesia remains ASEAN's most populated country; it's also very urban, with an estimated 54% of its population living and working in cities like Jakarta. Although the growth in population is partially due to its steady economic growth of an estimated 5% in GDP annually since 2000, Indonesia's acclaimed ecosystem is paying the price. From 2005 to 2014, SEA lost an estimated 80 million ha of forest; Indonesia accounted for nearly 2/3 of that. As of 2015, SEA is covered with 206.5 million ha of forest, containing a total of 21.172 billion tons of aboveground forest carbon stock (AFCS). Within SEA, Indonesia is the largest contributor both in terms of forest cover and AFCS at 56 and 65%, respectively. Additionally, 35% of SEA's forest cover are old growth forests, which is half of the region's current AFCS and cannot be restored easily or at a sufficient pace to the 2050 Paris targets.

Indonesia contains 83% of this carbon sink pool in addition to hosting 80% of SEA's peatland forests. Peatland forests play a pivotal role as a global carbon pool. While only covering 3% of the earth's land surface, they contain an estimated 500-700 Gt of carbon, which is between 32 to 46% of the total forest carbon pool. Indonesia's peatland carbon pool also comprises 74% of the country's total forest carbon pool.

Despite their role as long-term carbon sinks, peatlands are increasingly vulnerable to destabilization through a combination of climate warming, land use change, and forest fires. In tropical peatlands, fires consist of both flames and smouldering combustion; flames only burn what's on the surface but smoulder burns into and below the ground, which remains persistent for long periods of time as it consumes soil and deep roots. This process reduces oxygen both beneath and above ground, which halts any possibility of regrowth of forests both on that plantation and neighboring lands. Smoulder also travels; in from 1997 to 2017, smoulder from Indonesian peatlands resulted in severe haze pollution that travelled to Malaysia, Singapore, Thailand, and even parts of the Philippines, resulting in serious economic and social impacts. From 1990 to 2013, Indonesia was ranked the second most affected country after Canada in cost to recovery due to haze events. Indonesian peatlands have switched from long term carbon sinks to short term carbon sources.

One of the major causes of peatland fires is the cheap means of clearing large areas for palm oil and pulpwood plantations, which increased by 12% from 2007 to 2010. In response to this, Indonesia passed a series of laws from 2014 through 2020. One of the major issues in protecting forestry is equally protecting the local communities and ensuring their resources are not depleted due to protection of a neighboring land. Peatlands alone are in a standstill of economic and political battles, non-locals who have the economic incentive of producing and exporting palm oil versus locals who depend on the peatlands for fish, farming, and cultural identification. In 2014, Forestry Law No. 6 on villages reallocates a portion of the state budget to village administrations, providing all of Indonesia's villages with annual discretionary funding for making local improvements that support poverty alleviation, health, education, and infrastructure development. In 2015, Presidential Decree No. 16 on the ministry of environment and forestry was passed; affirming the ministry of forestry as the lead authority for almost all things related to forests including governing affairs, determining the categories and labels, and administering legal relations between forests and their rights and relations to the people. Additionally, a moratorium policy that bans the clearing of primary forests and peatlands has also proven effective, achieving a 45% decrease in deforestation from 2016 to 2018. Since much of its forestry resources are a quintessential part of its socio-economy, extra amendments have been made to other sectors of its law to protect overall forestry while accounting for commercial utilization laws.

Spotlight on Vietnam

The nearby state of Vietnam has one of the highest rates of non-sustainable logging in the world. Vietnamese highlands are home to a range of economically valuable cash crops, such as coffee, tea, and sugar cane. Since 2000, Vietnam has lost 15% of its forestry coverage due to logging. Like Indonesia, Vietnam has one of the fastest growing economies in the world, an annual GDP growth of 7.31%. Its economy has also caused a vice versa surge in population growth of 1%, annually, which is roughly an increase of one million people each year. Vietnam is home to one of the largest coffee export industries in all of Asia, totalling a market volume of $5.3 billion USD annually, which means its economy is also highly dependent on forestry resources and space. Vietnam is also a sixth of the size of Indonesia, suggesting its population growth rate has a larger effect on urban spreading.

With settlement spreading and deforestation increasing, Vietnamese state governments have implemented a series of laws, in compliance with ASEAN guidelines. As a result all forests are managed by the forestry department under its national government, while agricultural land management is under the District Office of Agriculture and Rural Development. In order to combine the efforts of both systems, the central government introduced the "landscape policy design method" to help analyse adaptation and mitigation policies by engaging local stakeholders in dynamic scenario development. This is comprised of three steps:

1. Identification of policies

2. Analysis of local land use decisions

3. Entailing participatory development of land use scenarios via a role-playing game and simulation of the effects of the scenarios developed at the landscape level over decade using an agent based model

Policymakers receive the results of the exercise, helping them to reformulate policies and tailor them appropriately to the local context. Similar to the laws in Indonesia, such regulations render more effective and economically incentivizing methods of green efforts.

As a developing country with a rapidly growing socio-economy, Vietnam's development is strongly linked to economic growth, with a focus on infrastructural development. Therefore, a major effect on carbon pricing is the act of ensuring resources are used for state industrialization priorities while financial support is transferred to local communities to localize agriculture and the use of sustainable methods of cultivation.

Conclusion

Keeping Track of Carbon Offsetting

Due to the issues outlined throughout the report, it's important to protect and regrow SEA's forests. With efficiency in carbon pricing, SEA is still capable of reaching below the 2 degrees celsius Paris target. Considering the multiple dynamics of SEA's socioeconomic system, charting the path of the region's forest future is challenging and requires exploratory programme and price analysis. AlliedOffsets provides the structured process of evaluating prices that would provide project developers the opportunity and resources necessary to protect both forests and its impacted communities. In order to achieve a more sustainable and resilient environment in SEA, carbon prices must consider reduction of poverty, promotion of food security, environmental stability, biodiversity conservation, and enhance climate change mitigation and adaptation.

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In creating this report, we've had valuable input from the following individuals: DR. David Ganz (RECOFTC) Executive Director, Jim Procanik (Infinite Earth - Rimba Raya) Co-founder.
We truly appreciate their expertise and perspectives.