

ACCELERATING GREEN BONDS FOR MUNICIPALITIES IN SOUTHEAST ASIA



Acknowledgments

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Abbreviations

ACGF	ASEAN Catalytic Green Finance Facility	IPCC	Intergovernmental Panel on Climate Change
ACMF	ASEAN Capital Markets Forum	LVC	land value capture
ADB	Asian Development Bank	OECD	Organisation for Economic Co-operation and Development
ASEAN	Association of Southeast Asian Nations	PRC	People's Republic of China
ATB	ASEAN Taxonomy Board	SLB	sustainability-linked bond
Climate Bonds	Climate Bonds Initiative	SOE	state-owned enterprise
EU	European Union	UOP	use of proceeds
GBP	Green Bond Principles	US	United States
GDP	gross domestic product		
GSS+	green, social, sustainable, and other labeled bonds		Note: The Asian Development Bank recognizes “China” as the People’s Republic of China and “Korea” as the Republic of Korea.
ICMA	International Capital Market Association		Figures: USD (United States Dollar), LHS (Left-Hand side, RHS (Right-Hand side
IFC	International Finance Corporation		

Foreword

Cities and municipalities are at the forefront of climate challenges. They contribute to greenhouse gas emissions, while at the same time, concentrating populations and assets that are vulnerable to environmental impacts such as extreme weather, air pollution, and sea-level rise. As key centers of growth, employment, and human activity, cities must strike a balance between economic, social, and sustainable development—and, in turn, on development plans, operations, and financing decisions taken locally. Statistics from the C40, a global network of city mayors, reveal that 70% of cities worldwide are already experiencing the serious effects of climate change. This number is expected to increase further by 2050. Cities play a crucial role in implementing climate-responsive solutions to mitigate and adapt to climate-related impacts due to their close relationships with stakeholders, including businesses, communities, and households. This proximity positions cities to lead global actions toward achieving climate goals by implementing policies that drive green growth and social inclusivity.

In 2023, the Asian Development Bank (ADB) estimated that developing countries in Asia and the Pacific will require \$1.7 trillion annually between 2006 and 2030 to meet their infrastructure needs to maintain growth, reduce poverty, and address the impacts of climate change. Various financial instruments and innovative solutions can be mobilized to meet these financing needs. Recently, there has been a rise in the use of municipal bonds, both globally and in Asia, as a funding channel for developing climate-resilient and sustainable municipalities and smart cities. There are robust municipal debt markets in the United Kingdom and the United States, provincial and municipal bonds in Canada, and similar municipal instruments in Europe, like in Sweden and Finland. In Asia, municipal bonds have been issued in the People's Republic of China and Japan.

Recognizing the financing potential of sustainable bonds, including those issued by municipalities and cities, ADB introduced the green, social, sustainable, and other labeled Bonds (GSS+) for Southeast Asia Initiative in 2022. Supported by the Association of Southeast Asian Nations (ASEAN) Catalytic Green Finance Facility—a partnership among ASEAN member states and development finance institutions—this program assists national and subnational governments across Southeast Asia, including municipalities, to issue sustainable bonds. The GSS+ Initiative, implemented jointly with the ASEAN+3 Asian Bond Markets Initiative, has catalyzed over \$2 billion in sustainable bonds since 2020, with more than \$12 billion in subsequent deals by August 2024. An Accelerator Program was launched in Indonesia under the GSS+ Initiative to promote the issuance of sustainable bonds, including municipal bonds in May 2024. Furthermore, ADB's Creating Investable Cities initiative supports municipalities in developing green, inclusive, resilient, and sustainable cities. This initiative leverages ADB experts, finance, and partnerships to enhance livability in cities, strengthen local resource mobilization, and increase access to private sector capital.

This municipal bond report evaluates the role of sustainable debt markets in supporting municipal financing in Southeast Asia. It examines the current state of the market, identifies challenges and opportunities, and extracts lessons learned from developed markets that can be adapted to localities in the region.

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Executive Summary

Transitioning to a climate-resilient and environmentally sustainable pathway in Southeast Asia requires substantial investment at the city and municipality levels. Municipalities are key to the climate transition because of the dual impacts of climate change and rapid population growth and urbanization.¹ By virtue of their granular knowledge of the local requirements and solution paths, municipal governments can take the lead on sustainable solutions and infrastructure in their communities. This paper sets out an approach to accelerate this process, highlighting the crucial role of cities in climate action and exploring the role of capital markets and innovative financing mechanisms to attract private capital and fund the transition. It reviews examples of city and municipal financing models globally and focuses on the potential to mobilize new sources of sustainable financing for municipalities in Southeast Asia through green and sustainable bond markets. It also acknowledges the efforts required to create and build these markets, with recommendations for developing early-stage, de-risking mechanisms and discovery processes for eligible local projects. In this way, cities and local administrations in Southeast Asia can tap into sustainable finance markets and join larger federal institutions on the journey to decarbonization.

Key Findings

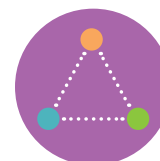
- i. The Climate Bonds Initiative recorded a total aligned municipal green bond volume issuance of \$160 billion at the end of 2023.²
- ii. At the end of 2023, the total volume of aligned sustainable debt originating from Southeast Asia reached \$93 billion. The subregion's municipal bond markets are developing at a slower speed relative to the general bond market. Although two municipalities in Viet Nam have deployed green bonds, overall labeled public sector issuance remains rare with limited activity.
- iii. Sustainability-linked bonds (SLBs) are an emerging instrument type for municipalities, such as the issuance by the Arizona Industrial Development Authority in 2022. SLBs require issuers to have a credible transition plan. Municipalities can align themselves with their country's Nationally Determined Contributions with accountability through trackable SLB targets.
- iv. The use of blended finance solutions by entities such as PT Sarana Multi Infrastruktur (PT SMI), Indonesia's state-owned infrastructure financing institution, is growing and can serve as an example for other member states of the Association of Southeast Asian Nations (ASEAN) to scale up infrastructure investments, de-risk projects, and mobilize funds to projects across several municipalities and provinces.³ Such a pooled funding model for municipalities is also well-established in Canada, Japan, and the Nordic countries and has led to substantial growth in green bond market borrowing, which could be replicated in ASEAN markets with the necessary policies and regulations put in place.
- v. Supportive policies have been introduced to scale up sustainable finance at the regional and national levels by many ASEAN member states. Further targeted policies would encourage a strong pipeline of projects suitable for inclusion in green municipal debt instruments and grow this segment of sustainable debt markets.



Recommendations

This report explores options for moving the market forward through five actions.

1. Prioritize the development of local debt markets to mobilize sustainable capital and harness investor appetite for green and sustainable bonds. Development finance institutions can concentrate capacity-building efforts to develop local debt markets.



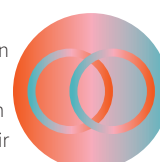
2. Encourage pooling platforms for aggregation to enable small borrowers to access capital markets and obtain the benefits of scale, including a broader investor base, liquidity, and competitive pricing.



3. Leverage sovereign borrowing capacity to encourage the development of local sustainable debt markets, including dedicated pools of capital.



4. Standardize blended finance solutions so they can be rapidly deployed at scale. Blended finance solutions can enable issuers to diversify their sources of financing.



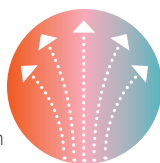
5. Grow the pipeline of eligible projects by prioritizing green development to ensure a continuous flow of high-quality, eligible use-of-proceeds options for green bond financing.



Introduction

The Scale of the Climate Challenge and Financing Needs

The estimated total gross domestic product (GDP) of all Association of Southeast Asian Nations (ASEAN) member states amounted to \$3.8 trillion in 2023, making it the fifth-largest economy in the world.⁴ At the same time, Southeast Asian economies sit above the global average in terms of vulnerability to environmental shocks. This vulnerability is exacerbated by increased population growth and economic dependence on environmentally sensitive industries, such as agricultural commodities. Estimates suggest that climate change under the high-emissions scenario of the Intergovernmental Panel on Climate Change (IPCC) could impose GDP losses of 24% in developing Asia and 30% in Southeast Asia by 2100.⁵



The shift toward a more sustainable development path will require substantial investment in green projects and activities. The IPCC has highlighted that rapid changes are required in energy generation, land use, urban development, and industrial production to put the world on a global warming trajectory of 1.5°C and avoid a “climate emergency.”⁶ Adaptation and especially infrastructure will be key: the Asian Development Bank (ADB) estimates that Southeast Asia will require \$210 billion per year (or 5.7% of the region’s annual GDP) between 2016 and 2030 to support investment in climate-resilient infrastructure.⁷ However, the current level of investment, particularly that financed by public sources, is well below the required amount. ADB has also estimated the infrastructure investment gap for selected ASEAN members to be between 3.8% and 4.1% of GDP from 2016 and 2020.⁸

Within this context, capital markets must play a critical role in mobilizing the necessary financing for climate-aligned infrastructure in Southeast Asia. By the end of 2023, the Climate Bonds Initiative (CBI) had recorded cumulative aligned green bond volumes of \$58 billion originating from Southeast Asia, demonstrating the role of capital markets in mobilizing private finance, which currently accounts for 25% of total green finance flows (mainly commercial loans) in Southeast Asia.⁹

The Risks and Opportunities for Municipalities

Municipalities are central to tackling the climate challenge. About 75% of global greenhouse gas (GHG) emissions and 70% of global energy use are generated and consumed, respectively, by cities, despite cities occupying less than 2% of the earth’s surface.¹⁰ The United Nations (UN) has identified that cities consume approximately two-thirds of the world’s energy while generating 70% of global anthropomorphic carbon dioxide emissions and 50% of all waste.¹¹ Meanwhile, rising global emissions will greatly impact urban areas, particularly through higher flood risks, as approximately 90% of cities are at risk from rising sea levels and extreme storms due to their coastal or riverine locations. Flooding in coastal cities currently causes average annual losses of \$6 billion globally, which is predicted to rise to \$52 billion by 2050.¹²



While the risks posed by climate change are significant, cities and municipalities are well-positioned to lead the transition through climate-resilient investments. Cities typically connect closely with stakeholders, including local businesses, residents, and institutions, and are well-placed to understand local investment needs and identify opportunities for decarbonization and climate resilience. Such connections can facilitate the implementation of sustainable development and green growth policies, ultimately contributing to long-term prosperity.

C40, a global network of city mayors, notes that transportation and buildings are the source of approximately 70% of GHG emissions in their cities, marking these sectors as prime targets for emission reductions.¹³ Meanwhile, a report from the UN Environment Programme states that rapid urbanization over the 30 years leading up to 2050 will require urgent infrastructure development, representing a once-in-a-lifetime opportunity to strategically plan for and build sustainable, resource-efficient, and inclusive infrastructure for future cities.¹⁴ The report identifies seven basic infrastructure sectors that dominate natural resource use and impact the environment and human well-being: buildings and shelter, public spaces, food supply, transportation, municipal water supply, waste and sanitation, and energy supply.

Climate projections also show that much of the losses in Southeast Asia due to sea-level rise are likely to be in heavily populated and economically important coastal cities such as Bangkok, Ho Chi Minh City, Jakarta, and Manila.¹⁵ In addition, growth from migration from rural to urban areas will substantially impact economic, environmental, and social dimensions of sustainable development in Southeast Asia, as cities consume more resources and produce more waste, with consequent contributions to climate change.¹⁶ In 2018, 48% of the population in ASEAN member states lived in urban areas, and this is estimated to grow to 65% by 2050.¹⁷ This growth will be driven not only by larger capital cities such as Jakarta, Manila, and Bangkok, but also by secondary regional cities with populations between 500,000 and 5 million, such as Penang, Quezon City, Bekasi, Hai-Phong, and Pattaya.

The Role of Capital Markets in Mobilizing Private Finance

The substantial financing needs of governments and cities to develop climate-resilient infrastructure projects necessitate capital markets—and especially sustainable debt markets—to mobilize private capital at scale. Specific to Southeast Asia, the ASEAN Capital Markets Forum (ACMF) introduced the ASEAN Green Bond Standards in 2017, the ASEAN Social and Sustainability Bond Standards in 2018, and the ASEAN Sustainability-Linked Bond Standards in 2022. To date, over \$50 billion of ASEAN-labeled Green, Social, Sustainable, and Other Labeled bonds (GSS+) have originated from the region, illustrating the catalytic effect of standards and taxonomies for developing green and sustainable debt capital markets.



This report will assess the role of the GSS+ debt market in supporting municipal financing. It provides an overview of the market’s current state, outlines the challenges and opportunities, and presents lessons learned from developed markets that can be adapted to the Southeast Asian context.

The Role of GSS+ Debt

Debt financing includes bonds and loans that promise capital repayment and incur interest payments as borrowing costs. Entities such as governments and corporations raise such funds directly from local and global debt capital markets. Bonds are often used to finance or refinance assets that are built and operated over long periods, including large-scale infrastructure projects. With predictable and regular cash flows, these assets are well-suited to lengthy repayment schedules for substantial capital expenditures.

Since the mid-2010s, a large and growing segment of the global bond market under the umbrella of GSS+ debt has been used to support environmental and social projects. The rapidly growing GSS+ debt market, generally referred to as “labeled bonds,” includes four themes (**Figure 1**).

The labeled bond market that includes green, social, sustainability, sustainability-linked bonds, and others is often described as the “GSS+” market.

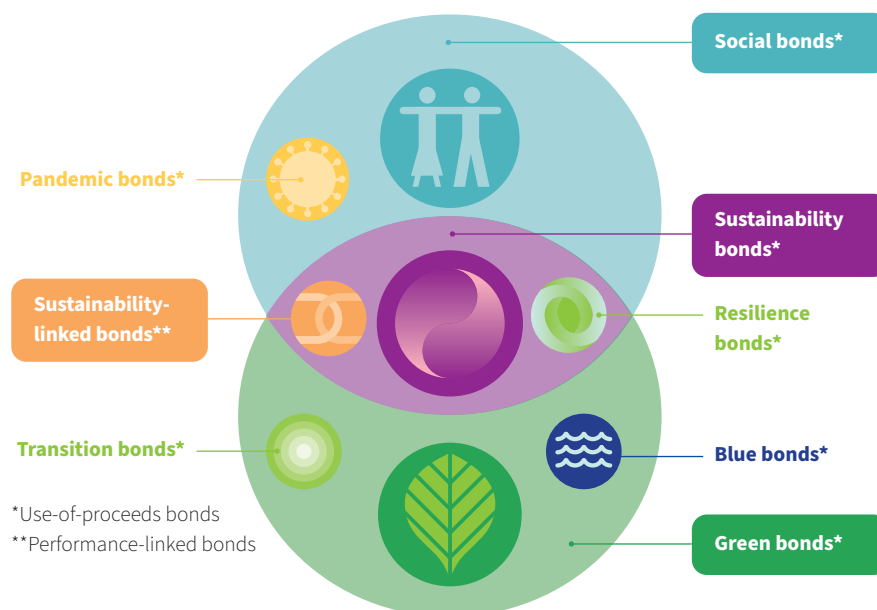
Overview of the GSS+ Debt Market

The GSS+ debt market has evolved rapidly over the last decade in terms of volume and diversity of issuers. At the same time, an increasing number of global and regional investors are seeking to incorporate climate and sustainability considerations into their investment processes and to allocate capital to green and social projects. Motivations among this growing segment of investors vary from enhancing returns and reducing long-term risks to better managing the environmental and social impacts of investments and aligning strategies with the priorities of clients and beneficiaries. GSS+ bonds seem to be preferred over the direct financing of sustainable projects and assets, as reflected in the substantial growth of the market.

By the end of 2023, Climate Bonds had recorded \$4.4 trillion worth of aligned GSS+ bonds outstanding globally across all issuer types, with green bonds representing the largest share at 63% (\$2.8 trillion) (**Box 1**) (**Figure 2**).

GSS+

Figure 1: Four Main Themes of Sustainable Bonds



*Use-of-proceeds bonds
**Performance-linked bonds

Green: use of proceeds (UOP) for pre-defined environmental project categories.

Social: UOP for pre-defined social project categories.

Sustainability: UOP for a combination of pre-defined environmental and social project categories.

Sustainability-linked bonds: UOP can either be sustainable or general, with financial rewards or penalties linked to achieving pre-defined sustainability performance targets.

Source: Climate Bonds Initiative.

Box 1: Climate Bonds Alignment

Green, social, and sustainability bonds that meet the requirements outlined in the Climate Bonds Initiative’s (Climate Bonds) screening methodology qualify for inclusion in Climate Bonds datasets and are classified as aligned. Labeled bonds for which there is not enough information to determine eligibility for database inclusion are classified as pending until sufficient disclosure is available. Labeled bonds failing to meet the requirements of Climate Bonds’ screening methodology are classified as non-aligned and are excluded from the datasets.

Sustainability-linked bonds (SLBs) are assessed according to the Climate Bonds’ SLB Database Methodology, which classifies SLBs according to four levels of alignment:¹⁸

i. Fully aligned. SLB targets cover all material sources of emissions and are aligned with the relevant pathway.

ii. Strongly aligned. SLB targets cover all material sources of emissions and will be aligned with the relevant pathway by 2030.

iii. Aligning. SLB targets cover all material sources of emissions, are aligned with the pathway on a percentage reduction basis, and the issuer has the basic tenets of a transition plan.

iv. Not aligned. SLB targets fail to meet any of the above criteria, or do not meet the other requirements detailed in the Climate Bonds’ SLB Database Methodology.

Green, Social, and Sustainability Bonds	Aligned	Pending	Excluded
Cumulative amount outstanding as of 31 December 2023	\$4.4 trillion	\$79.8 billion	\$752.1 billion

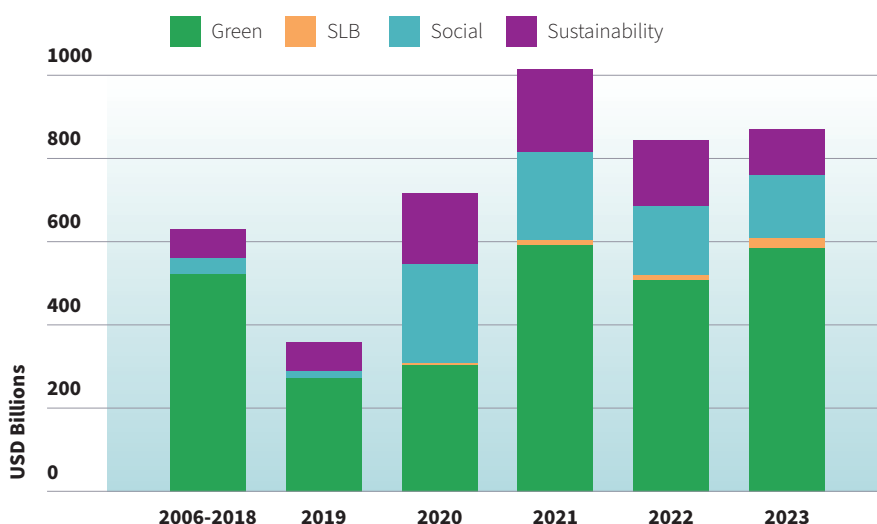
SLBs	Fully Aligned	Strongly Aligned	Aligning	Not Aligned
Cumulative amount outstanding as of 31 December 2023	\$40.3 billion	\$2.2 billion	\$4.7 billion	\$231.7 billion

Source: Climate Bonds Initiative.

In 2023, more than half (53%) of the world's aligned green bond volume (\$309.6 billion) originated from Europe, with volume from this region growing at 23% year-on-year (**Figure 3**). Asia and the Pacific was the second most prolific region in terms of green bond issuance in 2023, contributing one-third of the global aligned volume (\$189.4 billion).

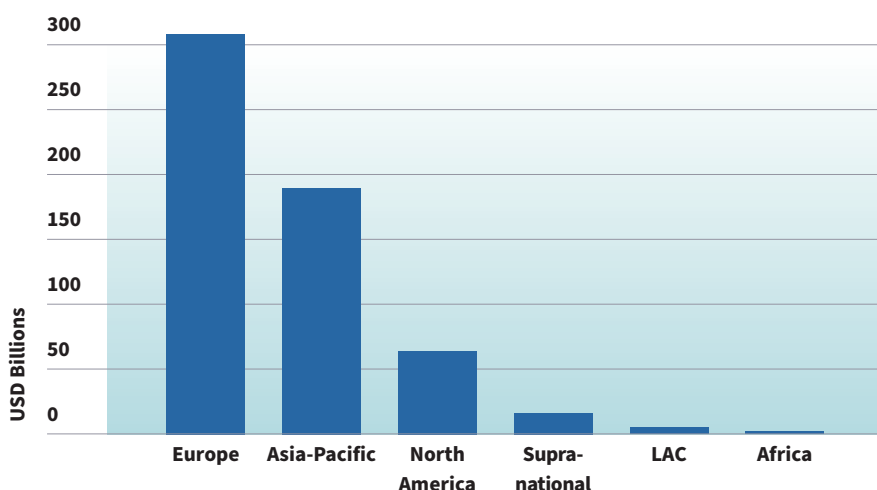
In the United States (US), the three issuers responsible for the largest number of deals in 2023 were all municipal bond issuers: (i) Federal National Mortgage Association (Fannie Mae) (83 deals with a combined volume of \$2.8 billion), (ii) New York State Environmental Facilities Corp. (69 deals with a combined volume of \$237 million), and (iii) Indiana Finance Authority (53 deals with a combined volume of \$563 million) (**Figure 4**).

Figure 2: Green Bonds Dominate the Aligned Global Sustainable Debt Market



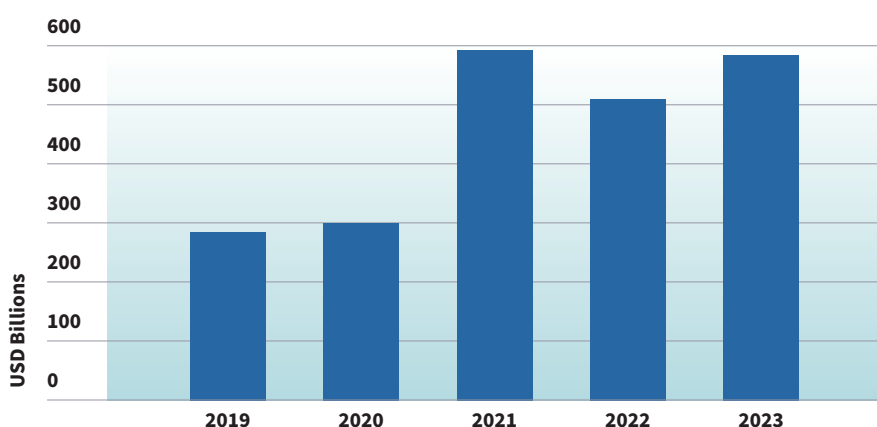
Source: Climate Bonds Initiative.

Figure 3: Europe Was the Most Prolific Source of Green Bond Volume in 2023



Source: Climate Bonds Initiative.

Figure 4: Aligned Global Green Bond Volume Grew by 15% in 2023



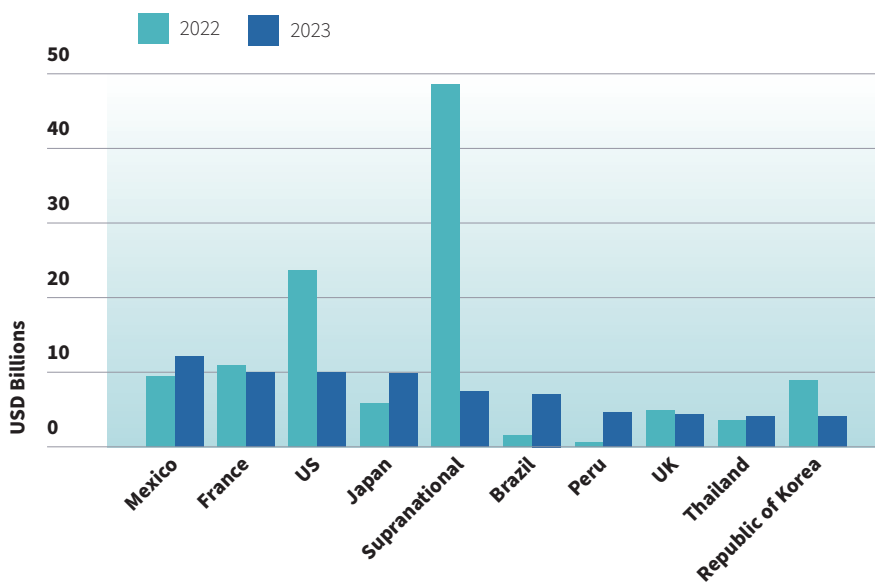
Source: Climate Bonds Initiative.

The sustainability label thrives in emerging markets. Such bonds constituted 12% of aligned GSS+ issuance volume in 2023 (\$107.8 billion), reflecting a 31% drop compared to \$156.7 billion in 2022. The sustainability label allows issuers to combine green and social project categories in a single instrument. It has proven particularly relevant for emerging market sovereign issuers, including Mexico, Peru, and Thailand (**Figure 5**). About 22% of aligned sustainability volume originated from sovereign issuers in 2023 (\$23.5 billion). Hard currencies accounted for two-thirds of sustainability issuance volume in 2023, while sustainability deals priced in local currencies (e.g., Mexican peso and Thai baht) helped to mobilize domestic capital toward responsible investment strategies.

The social theme was dominated by government-backed entities in 2023, accounting for 18% of the aligned GSS+ volume. The aligned GSS+ issuance volume totaled \$153.3 billion in 2023, a 7% decline from \$154.8 billion in 2022. Social bonds support social projects and investments, and they tend to be more local and situation-specific. For example, social bonds were deployed at scale during the coronavirus disease (COVID-19) pandemic years of 2020–2021. In 2023, Asia and the Pacific was the largest source of aligned social bonds by region, contributing 43% (\$65.5 billion) of the global total. Social bonds offer huge untapped potential to promote social advancement in developing countries by financing public healthcare, education, affordable housing, and access to basic infrastructure while being supported by a well-developed local currency bond market. The most prolific issuer type was government-backed entities, contributing \$91 billion, or 59% of the 2023 aligned social bond volume. The largest issuers in this space were the Korean Housing Finance Corp.,* which priced a total of \$30.6 billion spread over 276 social deals, and the French social security agency Caisse d'Amortissement de la Dette Sociale (CADES) with \$23.9 billion over six bonds.

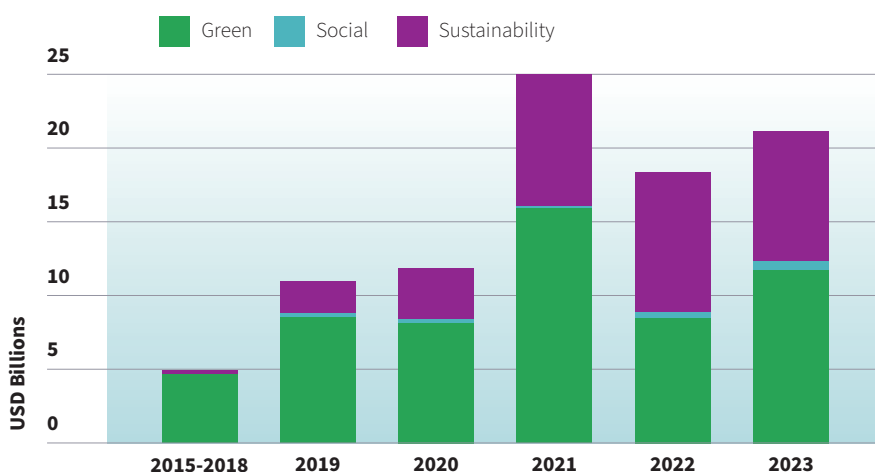
GSS+ issuance volume from Southeast Asia strongly rebounded in 2023. GSS+ issuance from the region had declined in 2022, but rebounded in 2023 to reach USD21.4 billion, reflecting a 15% increase compared to only 3% growth globally (**Figure 6**). Cumulative GSS+ volume originating from Southeast Asia had reached \$93 billion by the end of 2023.

Figure 5. Mexico Led Aligned Sustainability Volume in 2023



Source: Climate Bonds Initiative.

Figure 6. Aligned Sustainable Debt from Southeast Asia Increased 15% Year-on-Year in 2023



Source: Climate Bonds Initiative.

Aligned volume from non-financial corporate issuers increased by 800% in 2023 to \$8.1 billion, while other Southeast Asian issuer types exhibited a decline or modest increase. The number of issuers in this category increased from 9 to 37, and 5 of those issuers priced more than \$500 million each.

The largest sovereign issuers in Southeast Asia in 2023 were Thailand (\$3.9 billion), Indonesia (\$2.1 billion), Singapore (\$2.0 billion), the Philippines (\$1.3 billion), and Malaysia (\$1.2 billion).

These were also the only issuers in Southeast Asia to break the \$1.0 billion issuance threshold.

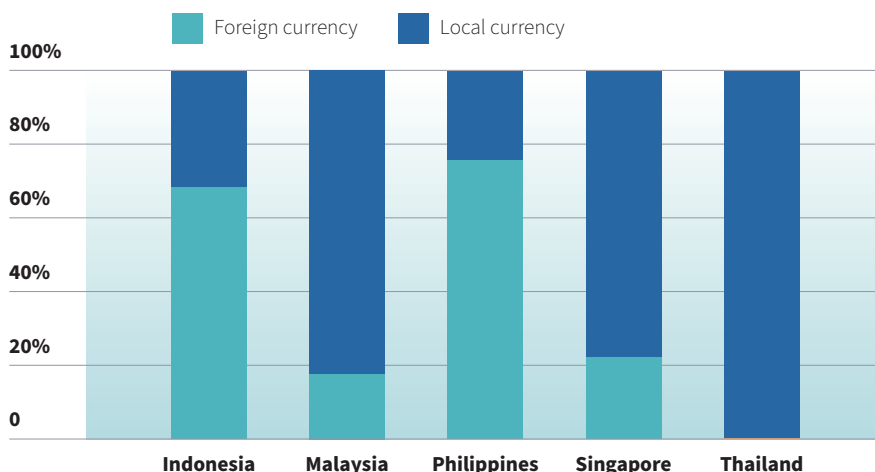
In 2023, aligned issuance volume originating from Southeast Asia was dominated by the green and sustainability themes at 55% and 42%, respectively. Social issuance represented a much smaller share (3%) during the year, while there have been yet to be any sustainability-linked bond (SLB) deals from the region considered in alignment with the Climate Bonds SLB Database Methodology.

*See note page i.

The local currency bond markets of Southeast Asia played a critical role in fostering sustainable bond market development, as almost 70% of sustainable bonds issued in 2023 were denominated in local currencies. According to *AsianBondsOnline*, Thailand is leading Southeast Asia in local currency sustainable bond issuance, with more than 99% of sustainable bonds issued domestically in Thai baht, followed by Malaysia at 82% and Singapore at 78% (**Figure 7**).

ASEAN-5 issuers prefer longer tenors. By the end of June 2024, more than 65% of sustainable bonds outstanding in ASEAN-5 member states (Indonesia, Malaysia, the Philippines, Singapore, and Thailand) carried a tenor of more than 5 years compared to only 21% in non-ASEAN economies (**Figure 8**). Consequently, the size-weighted average tenor in ASEAN-5 economies was 11.2 years, compared with only 3.7 years among selected non-ASEAN economies. The dominance of longer tenors in ASEAN-5 markets is attributed to the active participation of the public sector in sustainable bond issuance, which is driven by larger public deficits and higher investment requirements versus non-ASEAN economies.

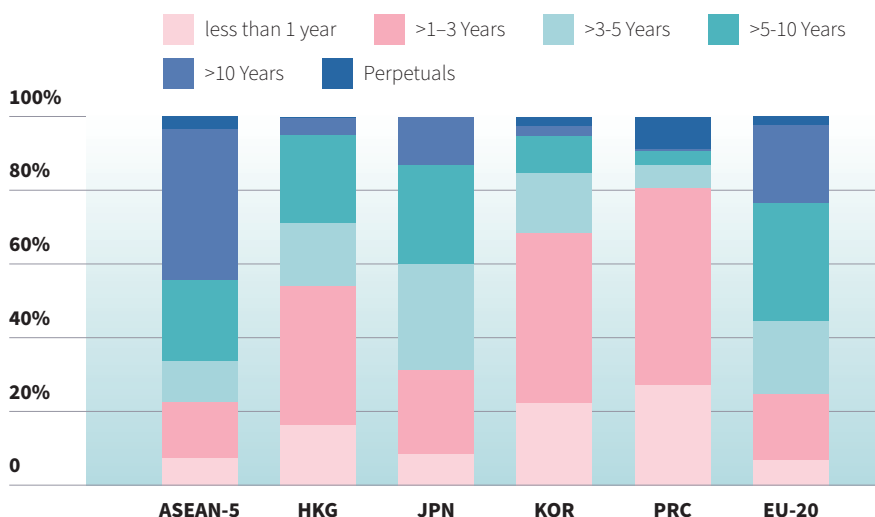
Figure 7: Consolidated Sustainable Bonds Outstanding (by Currency)



Note: Data as of 30 June 2024.

Source: AsianBondsOnline.

Figure 8: Maturity Profiles of Sustainable Bonds Outstanding at the End of June 2024



ASEAN = Association of Southeast Asian Nations; EU-20 = European Union 20; HKG = Hong Kong, China; JPN = Japan; KOR = Republic of Korea; PRC = People's Republic of China

Notes:

1. ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

2. EU-20 includes EU member markets Austria, Belgium, Croatia, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

3. Data include both local currency and foreign currency issues.

Source: AsianBondsOnline calculations based on Bloomberg LP data.

Despite recent remarkable developments, more concerted efforts from all relevant stakeholders are required to address the financing gap and reduce the Southeast Asia's vulnerability to climate-related risks. The proportion of sustainable bonds to the total bond market ranges from 2% to 7% in ASEAN-5 economies (Figure 9). In the EU-20, the corresponding share is 7.8%. As a subregion, ASEAN-5 only contributes to 1.7% of sustainable bonds outstanding globally (Figure 10).

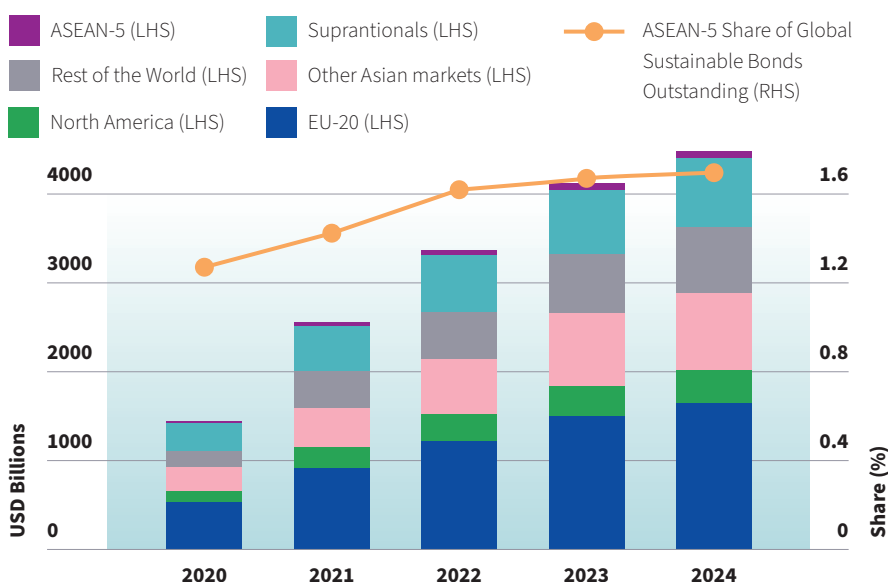
Municipalities can increase the investible opportunity set in Southeast Asia. Most sustainable bonds issued in ASEAN originate from either governments or financial issuers. However, transitioning to a climate-resilient and environmentally sustainable pathway also requires substantial investment at the city and municipality levels. Municipalities are key to the climate transition because of the dual impacts of climate change on one hand and rapid population growth and urbanization on the other. Given their granular knowledge of the local requirements and solution paths, municipalities can take the lead on sustainable solutions and infrastructure development in their communities.

Figure 9: Sustainable Bonds Outstanding and Share of the Total Bond Market



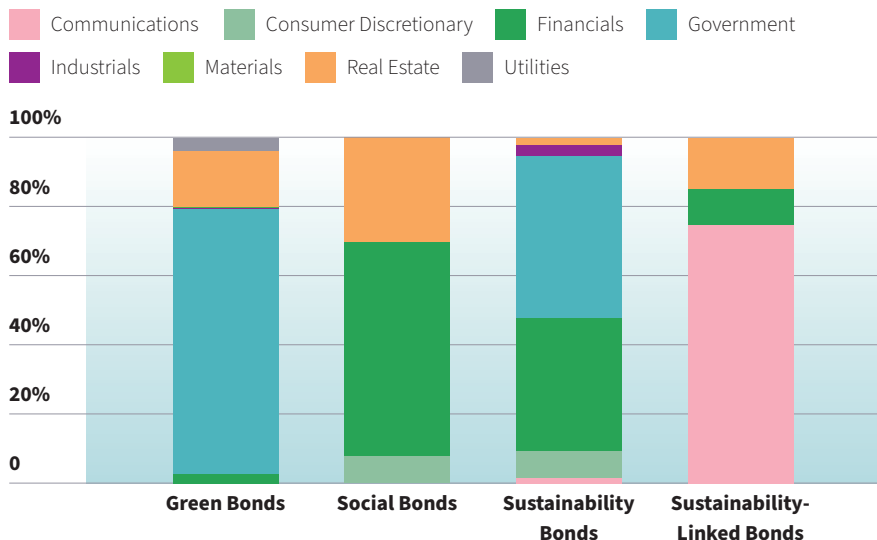
Note: Data includes both local currency and foreign currency issues.
Source: AsianBondsOnline calculations based on Bloomberg LP data.

Figure 10: Global Sustainable Bonds Outstanding



1. ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand.
2. Data includes both local currency and foreign currency issues.
Source: AsianBondsOnline calculations based on Bloomberg LP data.

Figure 11: Sustainable Bond Issuance in ASEAN-5 by Sector in H1 2024



Source: AsianBondsOnline.

Overview of Sustainable Debt for Municipalities

Municipal green bonds are bonds issued by municipalities with use of proceeds (UOP) earmarked for green projects or activities.

In 2023, local governments around the world issued the largest number of deals ever at 2,562, a 21% increase from 2022. Climate Bonds recorded \$160 billion in aligned municipal green bond volumes from 22 governments, the largest of which was the US (**Appendix 1**).

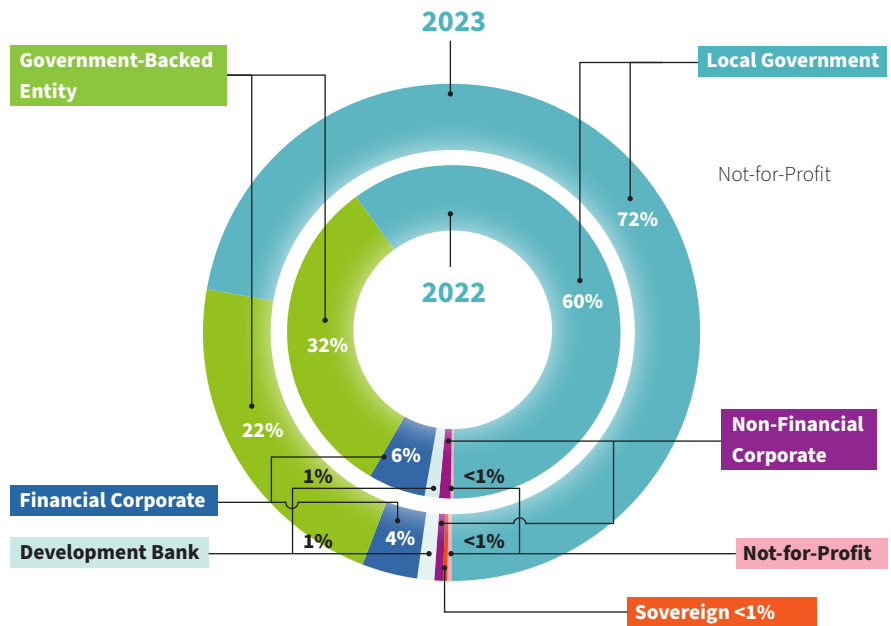
United States

The US municipal bond market is the world's largest. It has funded large-scale, long-term, capital-intensive projects in municipalities, as well as their operational expenses, since the beginning of the 1900s (**Figure 13**).¹⁹

At the end of 2023, Climate Bonds had recorded total outstanding municipal green bonds originating from the US at \$105 billion. The largest issuers include transport authorities, housing authorities, and public utilities (**Figure 14**). Such issuers have revenue streams that can be used to meet the coupon payments and repay the capital. In many cases, municipal issuers already provide social goods and infrastructure such as public transportation, housing, or water and sewage treatment, thereby making green, social, and sustainable bond issuances a natural fit for their core mission.

Investor types range from retail investors to mutual funds. The tax-exempt nature of most US municipal bonds makes these investments especially attractive to US taxpayers, particularly

Figure 12. Share of Social Bond Volume by Issuer Type 2022–2023



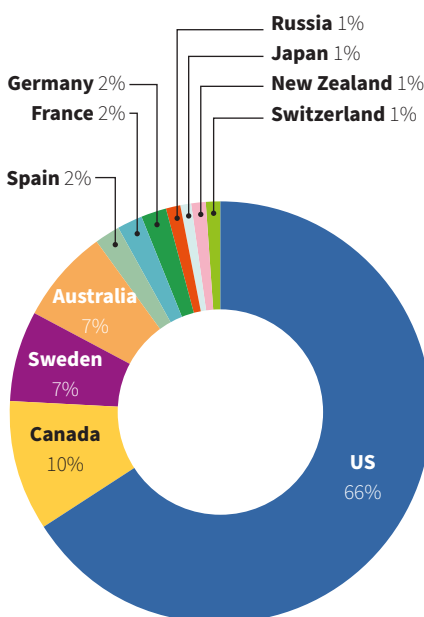
Source: Climate Bonds Initiative.

in high-tax states such as California and New York, and has supported huge growth in this market. Tax incentives extend to the state and local level, while US Treasuries are taxable. Consequently, investors are willing to accept approximately one-third less interest, which enables local governments to borrow money at a lower cost.

The tax advantages of most US municipal bonds are more relevant for domestic investors compared to foreign investors, leading to a significant yield gap between these two groups. This results in a

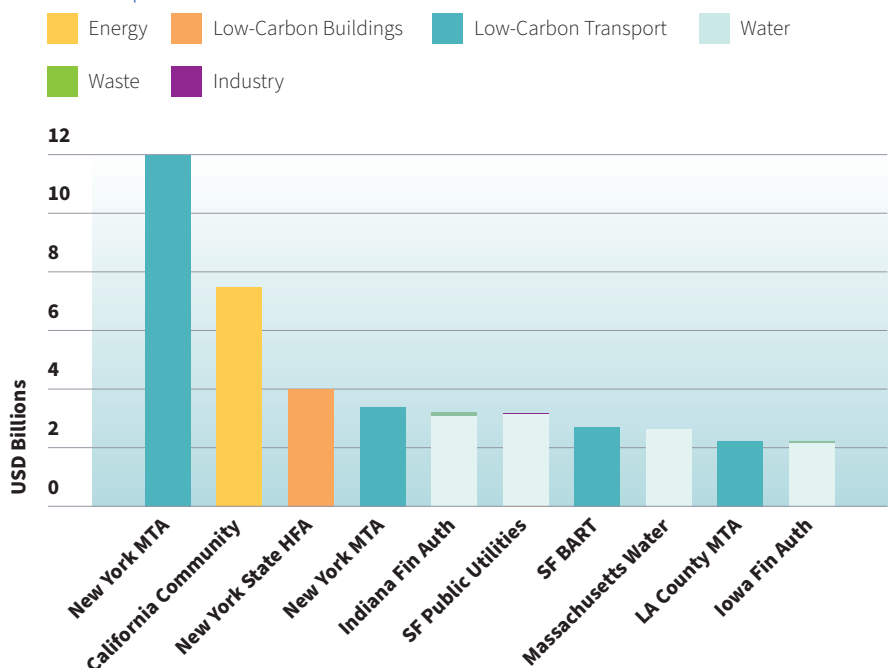
market dominated by domestic retail investors, with foreign institutional investors traditionally comprising only a small percentage—around 3% or less—of the investor base.²⁰ However, this dynamic shifts in the case of municipal bond offerings that are taxable, such as the Build America Bonds series issued in 2009 and, more recently, taxable advanced refunding bonds. Since these bonds do not offer the same tax benefits, they appeal to a broader range of investors, including foreign buyers, leading to higher foreign participation compared to tax-exempt municipal bonds.

Figure 13. US is the Largest Source of Municipal Green Bonds



Source: Climate Bonds Initiative.

Figure 14: Cumulative Use of Proceeds of the 10 Largest US Municipal Green Bond Issuers



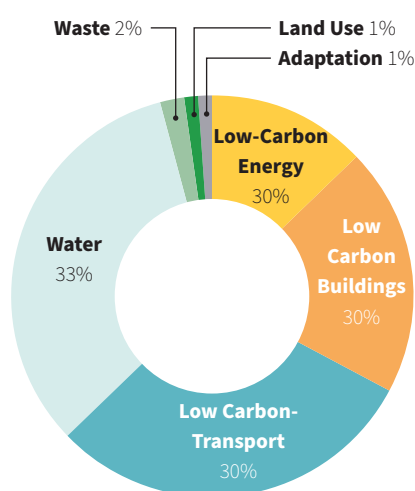
Source: Climate Bonds Initiative.

Outside of the US municipal bond market, the UOP for municipal green bonds mainly focuses on low-carbon transport and buildings, similar to the broader sustainable bond market. US municipal green bonds tend to earmark a larger percentage of the UOP to water, low-carbon transport, and green (public) buildings. As a result of the wide variety of projects with environmental and social benefits available to municipal issuers, public sector green municipal bonds tend to have smaller allocations to renewable energy than private sector green bonds (**Figure 15**).

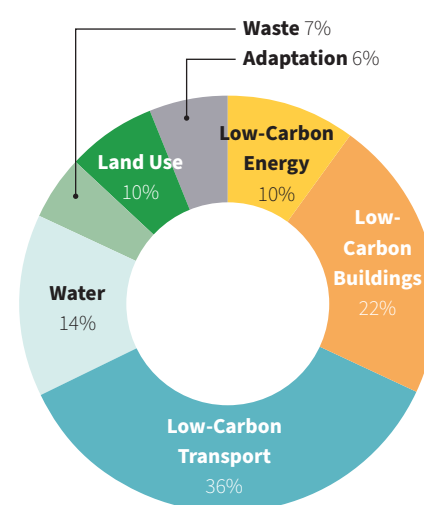
The US municipal bond market is composed primarily of green bonds, followed by social and sustainability bonds (**Box 2**). Between 2013 and 2021, green bonds largely funded water (36%) and green transport (30%) projects. However, the shift from green transport to green building (33%) projects was evident in 2021. From 2018 to 2021, social bonds focused on affordable housing (70%) and education (20%). Sustainability bonds issued from 2013 to 2021 were evenly split between water projects and affordable housing, each accounting for 24% of the total.

Figure 15: Use of Proceeds for Cumulative Municipal Bond Issuance, United States Versus Rest of the World

Water tops UOP categories for all US green municipal bonds



Low-Carbon transport comprises the highest UOP share among non-US green municipal bonds



Source: Climate Bonds Initiative.

Box 2: Municipal Sustainability-linked Bond Case Study

The Arizona Industrial Development Authority

issued the first US municipal sustainability-linked bond (SLB) in February 2022 in the form of a revenue bond for NewLife Forest Restoration LLC (NewLife). The bond proceeds were loaned to NewLife to expand its lumber processing facilities, with the expectation that the resulting revenue generated from these operations would be used to finance the bond's debt service.

The company's business model responds to the issue of catastrophic wildfires in Arizona in large part caused by small-scale natural wildfires—which are good for the ecosystem—being extinguished by local communities that view them as a threat to their livelihoods. The unfortunate consequence is that the undergrowth in these forests then over-grows, creating a source of fuel for catastrophic forest fires. This abundance of undergrowth is dangerous because it is conducive to create crown fires through a phenomenon known as the ladder effect, which makes large-scale forest fires more difficult to control.

NewLife has been contracted by the US Forest Service to thin the forest to remove dangerous levels of undergrowth, making the forests more resilient against naturally occurring fires, and generating low-grade wood fiber and biomass, which is then used for commercial production.



The underlying loan from this SLB should help NewLife continue the delivery of its manufacturing solution—helping it more efficiently produce forest products and increasing its margins, which will help finance the less economical parts of its operations, including its forest undergrowth-thinning operations.

The two key performance indicators (KPIs) used for this SLB tie the interest rate of this bond to

the successful achievements of NewLife in its two main business operation:

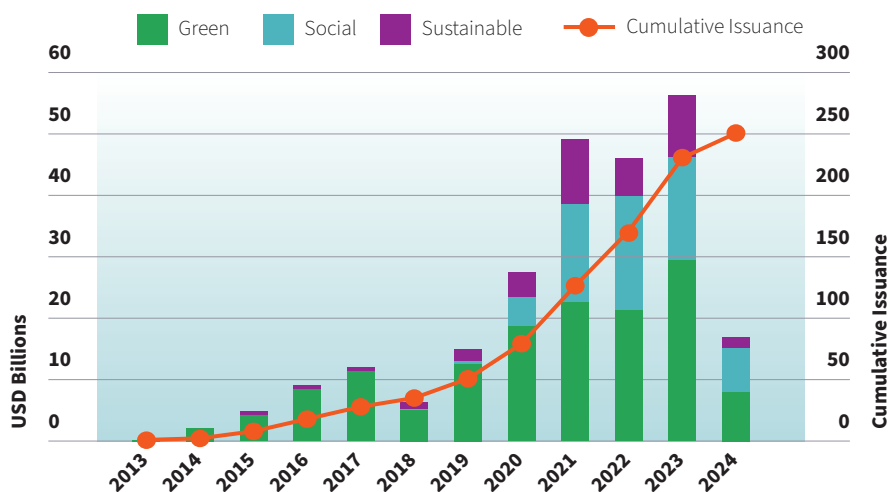
- (i) the restoration of forestland and
- (ii) the use of said products in its commercial operations. If NewLife fails to achieve both targets, a step-up of 100 basis point for KPI No. 1 and 50 basis points for KPI No. 2 would apply to the existing 9% and 11% bond interest rates, respectively.

Issuer name	Arizona Industrial Development Authority	Amount issued	Two tranches \$112.9 million \$86.8 million
Country of risk	United States	Issuer type	Municipality
Issue date	24 Feb 2022	Maturity date	1 Jan 2028 1 Jan 2047
SLB framework	Link (page 491)	Second Party Opinion	Kestrel Verifiers (page 477)
Key Performance Indicator (KPI) No. 1	Forestland restored	# of acres restored	
Sustainability Performance Target (SPT)	36,000 acres	Observation date	31 December 2024
Key Performance Indicator (KPI) No. 2	Percentage of logs processed are restoration logs	Measured in %	
Sustainability Performance Target (SPT)	80%	Observation date	31 December 2024

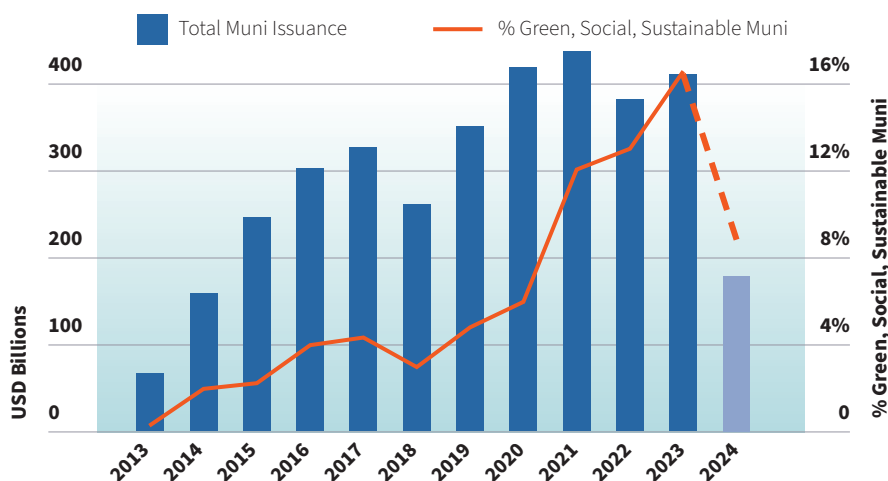
Source: Climate Bonds Initiative.

Figure 16: GSS+ Labeled Municipal Bond Market in the US
by Type and UOP Category

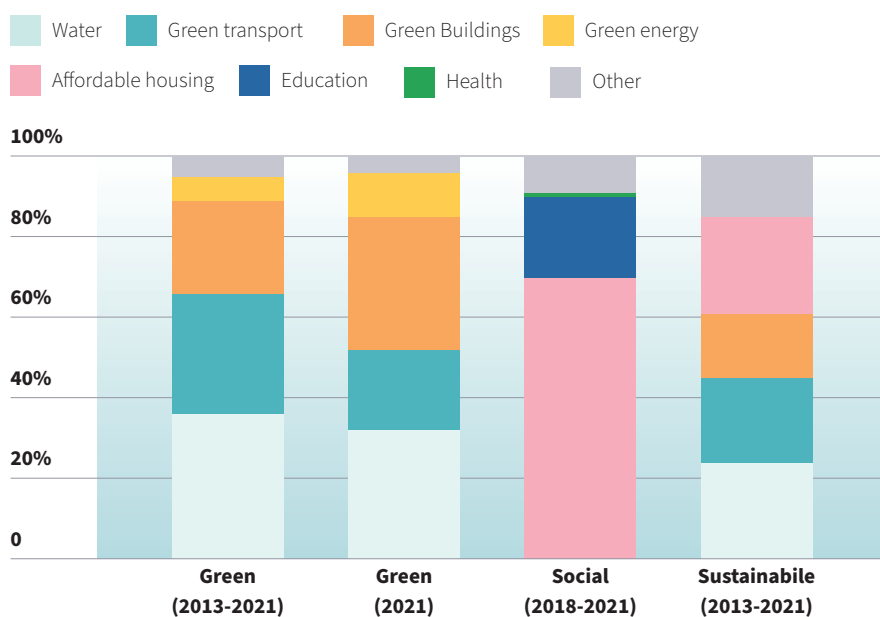
USA Municipal GSS Annual Issuance



USA Total Municipal Issuance and GSS Market Share



US GSS Muni Issuance by ICMA Project Category



Sources: SP Global Research, Bloomberg data, Nomura Asset Management calculations.

The People's Republic of China

In Asia, the People's Republic of China (PRC) has seen rapid growth as the second largest source of green bonds, including at the local level. Debt instruments are increasingly recognized in the PRC as an important tool for the low-carbon transition of economic entities and society at large. The government plays a central role in mobilizing capital in areas including climate change mitigation, resilience, and social development, with a more diverse set of debt instruments. Accordingly, in a 2024 report, the PRC's central government reaffirmed that government-backed bonds, including sovereign and municipal bonds, will serve as effective instruments to stimulate market demand and accelerate the pace of industry transition. Further policy guidance, however, is still required for the formal launch of the labeled sovereign bond and municipal bond markets.²¹

Recent municipal deals from the PRC have observed best practices. For example, in 2023, the Province of Hainan in the PRC issued a CNY3 billion (\$411.2 million) sustainability bond, the country's second-largest sustainability deal (**Figure 17**). Proceeds were earmarked for education, healthcare, social adaptation, and resilience, among other projects.

Southeast Asia

In Southeast Asia, by contrast, the municipal bond market is still at an early stage of development. Viet Nam is currently the only Southeast Asian economy where municipalities have priced green bonds. Ho Chi Minh City and Ba Ria Vung Tau province both issued green bonds in 2016 (**Table 1**).

As a 2023 Principles for Responsible Investment report on municipal bonds notes, only 64% of green municipal issuers in the US obtained an external review in 2021.²² This figure was even lower for US social municipal bonds (52%) and sustainability municipal bonds (30%), indicating that many such bonds are self-labeled with no independent review of their integrity. While municipalities may lack the financial resources to obtain these external reviews, many dedicated green bond investors regard such checks as a basic eligibility requirement. External reviewers can play a consultative role and suggest improvements to an issuer's sustainable financing framework. As such, policy makers and market regulators may consider subsidizing second-party opinion fees for municipal bond issuers to reduce the cost of issuance and enhance the integrity of the sustainable municipal market.

The Government of Indonesia has also supported the development of the municipal bond market, recognizing that subnational governments are key drivers of regional development. In addition to Law Number 1

Figure 17: Sustainability Bond Best Practice Example of 2023–Hainan Province

As per the figures quoted in the *People's Republic of China Green Bond Market 2020 Report*, deals from local government financing vehicles reached \$17 billion in 2020, representing 38% of the PRC's total 2020 issuance volume. These were seen at all four

levels of administration in the PRC: provincial, prefectural, county, and township. This reflected the ambition and commitment of local governments as well as the central government, based on the policies and incentives initiated, to encourage green finance.

Sustainability bond best practice examples of 2023

Issuer	Province of Hainan PRC
Issue Date	20/09/2023
Maturity Date	27/03/2023
Amount Issued	CNY 3 billion (\$411.2 million)
UoP (Social)	Healthcare, Employment, Education, Affordable Infrastructure, Social A&R, Affordable Housing
UoP (Green)	Water, Waste, Land, Buildings, Transportation, Energy, Biodiversity
SDG Mapping	SDG1: No poverty, SDG3: Good health and well-being, SDG4: Quality education, SDG6: Clean water and sanitation, SDG7: Affordable and clean energy, SDG8: Decent work and economic growth, SDG9: Industry, innovation, and infrastructure, SDG11: Sustainable cities and communities, SDG12: Responsible consumption and production, SDG13: Climate action, SDG14: Life below water, SDG15: Life on land.
Project evaluation and regular reporting	Department of Finance of Hainan discloses the allocation of proceeds and the environmental or social impacts of the funded eligible projects on an annual basis on its official website. External reviewer(s) engaged to confirm the alignment of the debt instruments with the relevant ICMA principles and guidelines as well as the UN principles.

Source: Climate Bonds Initiative.

Table 1: Examples of Green Municipal Bonds Issued in Viet Nam

	Ho Chi Minh City	Ba Ria Vung Tao
Issuer type	Government-backed entity	Government-backed entity
Sustainability theme	Green	Green
Tenor	15 years	5 years
Amount issued	D523.5 billion (\$24 million)	D80 billion (\$3.7 million)
Eligible UOP categories	Adaptation and Resilience (Water)	Water
Stock exchange listing	Hanoi Stock Exchange	Hanoi Stock Exchange
Aligned with the Climate Bonds Green Bond Database Methodology	Yes	Yes

Source: Climate Bonds Initiative.

of 2022 concerning the Financial Relations between the Central and Subnational Governments introduced by the government, the Financial Services Authority of Indonesia (OJK) released OJK Rule Number 10 of 2024 in relation to the Issuance and Reporting of Municipal Bonds and Sukuk (OJK Rule 10/2024) as one of the implementing regulations. OJK Rule 10/2024 is expected to spur the

development of a municipal bond and the *sukuk* (Islamic bond) market in Indonesia, thus offering local authorities a conduit to raise funds autonomously for local development initiatives.

Sustainable Finance Policies and Initiatives in Southeast Asia

Although Southeast Asian capital markets are at various stages of development with diverse legal and policy frameworks, ASEAN member states are collaborating closely to develop sustainable finance markets as a top priority.



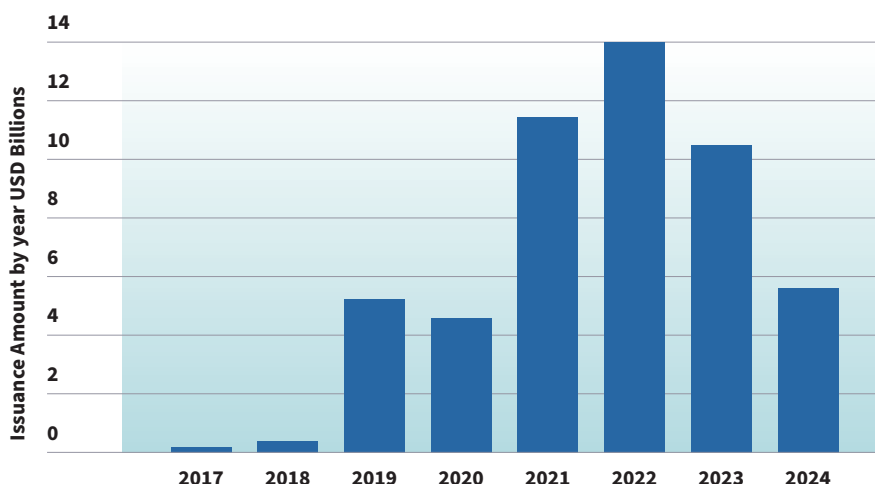
The ASEAN Capital Markets Forum (ACMF), which comprises capital market regulators from across Southeast Asia, introduced the ASEAN Green Bond Standards in 2017; the ASEAN Social and Sustainability Bond Standards in 2018; as well as the ASEAN Sustainability-Linked Bond Standards in 2022. Collectively referred to as the ASEAN Sustainability Bond Suite, it was further complemented by the introduction of the ASEAN Sustainable and Responsible Fund Standards, also in 2022, as a measure to expand the sustainable asset class within ASEAN. Several members of the ACMF have subsequently adopted these standards into their respective national regulations. In 2023, the ACMF issued the Handbook for Cross-Border Offerings of ASEAN Sustainable and Responsible Funds under the ASEAN Collective Investment Schemes Framework.

Cumulatively, over \$50 billion worth of sustainable bonds have been issued under these standards, most of which bear the sustainability label (**Figure 18**). Thailand is leading in terms of issuance, with about 40% of the bonds issued and labeled using the ASEAN Sustainability Bond Suite, followed by Malaysia and the Philippines (**Figure 19**).

In partnership with ADB, the ACMF also published the *Roadmap for ASEAN Sustainable Capital Markets* in 2020, which aims to create an open and vibrant ASEAN capital market ecosystem that facilitates and mobilizes the private sector in the financing of sustainable projects.²³ As highlighted in the roadmap, key priorities include strengthening the foundations of sustainability reporting and transparency, identifying ways to systematically embed sustainable finance practices into capital markets, building capacities, and strengthening partnerships and networks. In the same year, the ASEAN Working Committee on Capital Market Development also released the *Report on Promoting Sustainable Finance in ASEAN*. The roadmap and the report complement each other. In April 2022, the working committee released the Sustainable Finance First for Sustainable Projects' Conversation Pack, which aims to assist policymakers in promoting sustainable financing for infrastructure investments in the region.

The *ASEAN Taxonomy for Sustainable Finance (ASEAN Taxonomy Version 1)* was released in November 2021 by the ASEAN Taxonomy Board

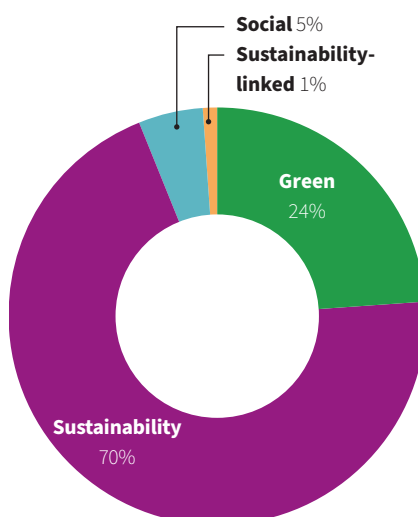
Figure 18: Sustainable Bond Issuance under ASEAN Standards by Year



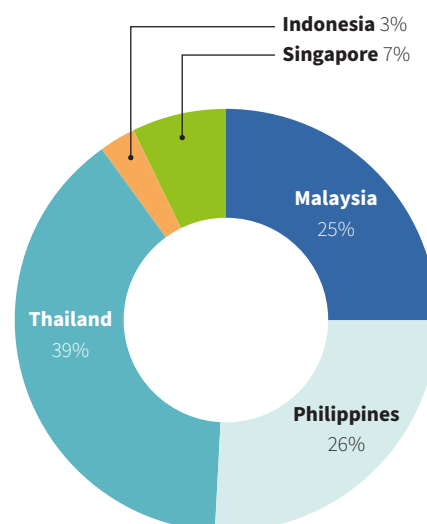
Source: ASEAN Capital Markets Forum.

Figure 19: Outstanding Labeled Green, Social, Sustainability, and Sustainability-Linked Bonds Originating from ASEAN

Issuance of labelled ASEAN Green, Social, Sustainability and Sustainability-linked bonds



Issuance of labelled ASEAN Green, Social, Sustainability bonds by country



Note: Data as of 15 August 2024 and include issuances originating in Cambodia, Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

Source: ASEAN Capital Market Forum.

(ATB). The ATB is overseen by the ASEAN Finance Ministers and Central Bank Governors' Meeting. The *ASEAN Taxonomy Version 1* was designed to be inclusive by considering the different starting points of ASEAN Member States and by encapsulating the key components of a sustainable finance taxonomy to meet the needs of all member states in a credible manner.²⁴ Given the varying stages of development across the region, technical thresholds and quantitative screening criteria were not included in this first iteration of the taxonomy. Instead, it provides the key concepts of the taxonomy as a basis for consultation, discussion, and collaboration as the ATB develops the taxonomy further. The *ASEAN Taxonomy Version 1* focused on setting out the conceptual framework for economic activity assessment using either of these frames:

Foundation framework. A principles-based framework in which the classification of activities is qualitative. A decision tree classifies activities as either green, amber (transition), or red (excluded).

Plus standard. This standard uses quantitative and qualitative screening criteria to classify economic activities into three tiers—green, amber 2, and amber 3—where the amber tiers are transition tiers.

The *ASEAN Taxonomy Version 1* conceptualized how the Plus Standard can have up to three thresholds for each activity. The need for flexibility was necessary to ensure inclusivity across all participating economies in a complex region. The ATB's stakeholder consultations have shown that with the importance of transition

coming to the fore, stakeholders have responded well to this concept. The *ASEAN Taxonomy Version 1* recognizes that the complexity created by including multiple tiers may require additional efforts for users to understand and apply. Nevertheless, the advantage of this system is that it considers the different starting points of AMS in their decarbonization journeys.

The *ASEAN Taxonomy Version 2* and *Version 3* were subsequently published in 2023 and 2024, respectively, to provide technical screening criteria for the energy, transportation, and construction sectors.

Furthermore, recognizing the need to guide ASEAN-based entities to embark on their transition journey, the ACMF released the *ASEAN Transition Finance Guidance* in 2023, which outlines how entities in the region can assess or demonstrate a credible transition to obtain financing from capital markets.

On the banking side, the ASEAN Senior Level Committee on Financial Integration published the *Report on the Roles of ASEAN Central Banks in Managing Climate and Environment-Related Risks* in 2020, which outlined a series of recommendations on how central banks could strengthen their role in managing the risks associated with climate and environmental change. It also endorsed the ASEAN Sustainable Banking Principles as a guide for future policies to promote sustainable banking across the region. Further, the ASEAN Central Banks Governors Meeting in 2021 endorsed the establishment of the Senior Level Committee Task Force on Sustainable Finance to advance the recommendations in the committee's report as well as other sustainable banking initiatives.

The ASEAN is in the process of finalizing the ASEAN Green Map, which will articulate its vision for a comprehensive sustainable finance ecosystem and identify the essential building blocks for such an ecosystem. The ASEAN Green Map is intended to enhance synergy across the various ASEAN bodies that support the development of the banking and insurance sectors, capital markets, and all relevant ancillary service sectors. **Table 2** summarizes the major sustainable finance initiatives of the ASEAN.

Municipalities are encouraged to reference green taxonomies or sector criteria when allocating their budgets to ensure that projects with environmental benefits are identified and prioritized. This can make it easier to select and feature projects, assets, and expenditures suitable for inclusion in green bonds (i.e., green tagging), addressing a common challenge to developing sufficient green project pipelines.

The ASEAN Infrastructure Fund launched the ASEAN Catalytic Green Finance Facility (ACGF) in April 2019, which leverages resources from

Table 2: Major Sustainable Finance Initiatives of the ASEAN

Year	Initiative
2017	Association of Southeast Asian Nations (ASEAN) Green Bond Standards launched by the ASEAN Capital Markets Forum (ACMF)
2018	ASEAN Social and Sustainability Bond Standards launched by the ACMF
2019	Establishment of the ASEAN Catalytic Green Finance Facility (ACGF) by the ASEAN Infrastructure Fund
2020	Roadmap for ASEAN Sustainable Capital Markets published by the ACMF
2020	Report on Promoting Sustainable Finance in ASEAN published by the Working Committee on Capital Market Development (WC-CMD)
2020	Report on the Roles of ASEAN Central Banks in Managing Climate and Environment-Related Risks published by a group of ASEAN central banks and monetary authorities
2021	ASEAN Green Recovery Platform established under the ACGF
2021	ASEAN Taxonomy for Sustainable Finance (Version 1) launched by the ASEAN Taxonomy Board
2022	Sustainable Finance First for Sustainable Projects' Conversation Pack published by the WC-CMD
2022	Green, Social, Sustainable, and Other Labeled (GSS+) Bonds Initiative for Southeast Asia launched by the ACGF and the ASEAN+3 Asian Bond Markets Initiative
2023	ASEAN Taxonomy for Sustainable Finance (Version 2) launched by the ASEAN Taxonomy Board
2023	ASEAN Transition Finance Guidance published by the ACMF
2024	ASEAN Taxonomy for Sustainable Finance (Version 3) launched by the ASEAN Taxonomy Board

Source: Asian Development Bank.

Box 3: Green, Social, Sustainable, and Other Labeled Bonds Initiative for Southeast Asia

In September 2022, the ASEAN Catalytic Green Finance Facility launched the Green, Social, Sustainable, and Other Labeled (GSS+) Bonds Initiative for Southeast Asia. The GSS+ Initiative seeks to deepen and accelerate the development of sustainable capital markets, catalyze signature GSS+ deals, and create enabling environments for growth. It aims to catalyze at least \$1.0 billion in GSS+ issuance by 2025. The program is being implemented jointly with the ASEAN+3 Asian Bond Markets Initiative, which was designed to support corporate sustainable bond deals and develop an efficient sustainable finance ecosystem across the region.

By the end of August 2024, over \$2.7 billion in sustainable bonds had been brought to market by the program, with over \$12.0 billion in subsequent volume between January 2020 and August 2024. Seven transactions supported by the program were internationally awarded as the best sustainable bonds in different categories.

More information can be found at Asian Development Bank. 2024. *Mobilizing Capital Markets for a Climate-Responsive and Inclusive Southeast Asia*. <https://www.adb.org/sites/default/files/publication/958556/gss-flyer-2024.pdf>.

Source: Asian Development Bank.

the fund itself, ADB, and other development partners to accelerate the development of green infrastructure in Southeast Asia and bridge bankability gaps (**Box 3**).

ADB, as administrator of the ASEAN Infrastructure Fund, has also developed a set of Investment Principles and Eligibility Criteria for the ACGF that provides green eligibility criteria for the financing of green projects. Finally, the ACGF has

helped incubate and grow GSS+ Initiative to help ASEAN-based issuers bring landmark issuances of sustainable bonds to market (**Appendix 2**).²⁵

Opportunities and Challenges for Developing a Sustainable Municipal Bond Market in Southeast Asia

While the municipal bond market in Southeast Asia is still at an early stage of development, it offers considerable untapped potential for cities and subnationals in Southeast Asia to attract new sources of financing from investors and obtain competitively priced capital for low-carbon and climate-resilient infrastructure investments.

This section aims to assess the existing challenges and explores opportunities for accelerating the growth of sustainable municipal bond markets in ASEAN (**Table 3**), highlighting practical approaches and presenting case studies that governments in the region may find useful.

The uniqueness of municipal GSS+ bonds lies in their proximity to a pool of assets and projects that lend themselves to green and sustainable impacts such as utilities, buildings, transport, and waste management. Ensuring that the UOP are allocated to the right assets and projects, and transparently reported accordingly, strengthens the integrity and green credentials of an issuer's bonds, instilling confidence in investors with dedicated pools of capital to deploy. Sustainable bond issuance and associated impact reporting can also enhance issuers' ability to tell their sustainability story and build deeper engagement and trust with the investment community.

Credibility is one of the most important elements in a successful green bond deal. Issuers should design their green bond financing frameworks in line with the Green Bond Principles of the International Capital Market Association (ICMA) and the ASEAN Green Bonds Standards, which recommend the inclusion of four elements:²⁶

- i. UOP,
- ii. process for project evaluation and selection,
- iii. management of proceeds, and
- iv. reporting.

Most issuers choose to highlight their UOP's contribution to the UN Sustainable Development Goals (SDGs) while referencing the bond's alignment to market standards, typically the ICMA's, and, in many cases, a relevant internationally recognized green taxonomy. As of mid-2023, there were around 40 taxonomies (either published or in development) and other standards, including the Climate Bonds Standards and Certification Scheme.

Several multilateral development banks have programs to support municipalities and cities to design and develop sustainable financing frameworks. As previously mentioned, ADB, through the ACGF, has launched the GSS+ Bonds Initiative to provide advisory support

Box 4: Municipalities' Borrowing Limits in Malaysia and Thailand

The level of autonomy given to subnational entities and local governments and municipalities around funding channels and decision-making remains low. A study published in 2012 found that 56% of countries worldwide forbid any kind of borrowing by local governments (including the issuance of municipal bonds), and that only 16% of countries grant any taxation powers to local entities.^a

Fiscal capacity decisions in Malaysia have historically been concentrated at the central level, with states only allowed to borrow long term from the federal government.^b In certain circumstances, state governments may access short-term financing from approved financial institutions, subject to the approval of the central bank.^c

In Thailand, all types of municipalities rely heavily on central government budgets. Although regulations permit municipalities to borrow from alternative sources, such as financial institutions or capital markets, the limit is set at only 10% of the 3-year average revenue for investment, debt restructuring, and working capital for pawn shops. Such borrowing must be approved by the provincial governor. However, any borrowing exceeding this limit can be proposed for approval by the minister of interior, a process that requires additional time and steps.

a. M. Ivanya and A. Shah. 2012. How Close Is Your Government to Its People? Worldwide Indicators on Localization and Decentralization. World Bank Policy Research Papers No. 6138. <https://documents1.worldbank.org/curated/en/534401468340175192/pdf/WPS6138.pdf>.

b. International Monetary Fund. 2022. How to Manage Fiscal Risks from Subnational Governments. <https://www.elibrary.imf.org/view/journals/061/2022/003/article-A001-en.xml>.

c. Asian Development Bank. 2023. Multi-Level Governance and Subnational Finance in Asia and the Pacific. <https://www.adb.org/>.

Source: Asian Development Bank.

Box 5: Creating Investable Cities in a Post-COVID19 Asia and the Pacific—Enhancing Competitiveness and Resilience Through Quality Infrastructure

Climate change and coronavirus disease (COVID-19) impacts urgently require a resilient recovery and effective resource mobilization that accelerates sustainable infrastructure development and social inclusivity. To address this need, the Asian Development Bank launched the Creating Investable Cities Initiative in 2020 to help cities in its developing member countries increase their technical, financial, and managerial capacity in developing quality municipal infrastructure. This will improve the competitiveness and resilience against external shocks of cities and countries in Asia and the Pacific.

The initiative offers subnational-focused advisory upstream (country level) and downstream (project level) support. At the country level, support is provided to create a subnational-infrastructure-financing environment. At the city level, technical assistance and a smart-solution tool (City Resource and Finance Tool) are offered to assess and improve a city's financial health and creditworthiness. The initiative's support also extends to policy and pipeline advisory services as well as the project screening process.

Source: Asian Development Bank.

to sovereign, municipality, and state-owned enterprise (SOE) issuers. Meanwhile, the ASEAN+3 Asian Bond Markets Initiative focuses on supporting corporate issuers to catalyze signature GSS+ bond issuances and create enabling environments for growth and development of the overall market.

Despite policy restrictions for how some municipalities can borrow (**Box 4**), many supporting programs and initiatives have been

introduced for the development of municipal bonds at both national and regional levels. In addition to the GSS+ Bonds Initiative, ADB launched the Creating Investable Cities Initiative to improve competitiveness and resilience against external shocks of cities in Asia (**Box 5**). More examples of similar initiatives are available for green municipal bonds in Japan (**Box 6**), municipal finance facility in Finland (**Box 7**), and the Nordic Model of the Scandinavian region (**Box 8**).

Table 3: Challenges and Opportunities in the Sustainable Municipal Bond Market in Southeast Asia

Challenge	Opportunity
Insufficient green project pipelines. One of the main challenges for sustainable bond issuers is identifying and classifying a sufficient pipeline of eligible green use of proceeds such as projects, assets, or activities. This constraint applies to all types of issuers, including sovereign, municipals, state-owned enterprises, and corporates. It is especially challenging for public entities that do not build or operate large-scale, capital-intensive green assets and infrastructure, such as renewable energy, transportation, water treatment, climate-resilient infrastructure and green public buildings.	Internationally recognized and official national taxonomies. The development of international green taxonomies such as the Climate Bonds Taxonomy and respective national taxonomies across Southeast Asia can guide potential issuers in selecting eligible green projects that align with national climate priorities. Some governments are also implementing the green and Sustainable Development Goal (SDG) budget tagging system to help measure SDG financing flows and accelerate their SDG achievement.^a Officially recognized taxonomies, transition pathways, and green budget tagging can aid issuer efforts to identify and grow the pipeline of green projects through standardization.
Small-scale projects, infrequent issuance needs, and borrowing limits. Green bond issuance is sometimes considered impractical for municipalities compared to central governments. This is because municipalities typically oversee small-scale investment projects, while large infrastructure projects are handled by the federal or central government. Local government issuance needs may be irregular or “lumpy,” making it difficult to consistently come to market and establish a presence with investors. Together with strict borrowing limits (to maintain debt sustainability), the financing requirements of municipalities are often too small or irregular to justify bond issuance programs, which can incur additional costs.	Development of pooled borrowing facilities. A pooled facility can be established jointly by local governments with relatively small individual green borrowing needs or who are constrained by borrowing limits to issue their own green bonds. A pooled facility aggregates smaller environmental projects into a larger portfolio so that bonds can be issued regularly and in sufficient size for institutional investors. The bond proceeds are used for financing the pool of smaller projects developed by different municipalities or cities jointly. Larger, more regular bond issuance increases the visibility and familiarity of the issuer in the market, which makes capital-raising and book-building smoother and generally less costly. Pooling resources for issuance and investor relations can also save costs through operational efficiency gains. Finally, a credit enhancement or de-risking mechanism can be considered to increase the credit rating of joint entity’s bond to reduce borrowing costs, thus increasing project bankability. As an alternative, community-based municipal crowdfunding may be considered, similar to the model introduced by Abundance Investment in the United Kingdom.^b Not only do these bonds promote the involvement of residents and local stakeholders, they also foster collaboration between environmental and finance departments, and build partnerships with various cities and municipalities.
Additional impact reporting requirements. Municipal issuers may lack capacities and expertise, or be hesitant from a reputational standpoint, to commit to additional financial and post-issuance impact reporting obligations. Municipalities often lack the financial resources to contract with external reviewers or impact data providers, or they are restricted by regulations in their ability to engage and pay for these commercial services.	Capacity development for local governments. Successful implementation of allocation and impact reporting is generally a prerequisite for effectively capitalizing on the opportunity presented by municipal green or sustainable bonds. For example, the International Capital Market Associations’ Green Bond Principles highly recommend that issuers report on the allocation and management of proceeds as well as on impacts as a core expectation for the market.^c Consistent alignment of issuers with these principles is crucial for promoting trust and integrity of the overall labeled sustainable bond market. To support this, the Asian Development Bank, through the ASEAN Catalytic Green Finance Facility, has launched the Green, Social, Sustainable, and Other Labeled Bonds Initiative, providing advisory support to sovereign, municipal, and state-owned enterprise issuers.
State-owned financial institutions already provide loans to municipalities.^d Local governments heavily rely on loans from government-owned financial institutions due to the lower cost of funds and strong relationships with the local government sector. Therefore, the immediate financial benefits to issuing sustainable bonds may not be apparent to municipal issuers.	State-owned financial institutions can support municipal bond market development. These institutions can retain their role in municipal lending while deepening the market in two ways: (i) restricting their participation to a proportion of an approved municipal infrastructure financing, allowing private banks or debt capital markets to satisfy the remaining financing requirements; and (ii) securitizing their loan portfolios to the bond market, introducing investors to a mix of municipal credits without requiring investors to take on individual municipal issuer credit risk.
The cost of and benefits from green and sustainable debt may not be immediately apparent to issuers. While sometimes apparent in primary market pricing, the reduction in financing costs (“greenium”) for green and sustainable labeled debt, is not guaranteed for issuers. Finance controllers may be challenged to approve the additional effort and costs required for a labeled sustainable bond issuance, without a clear expected net benefit.	Issuers may consider the benefits of green and sustainable bond issuance from a long-term perspective. The Climate Bonds Initiative’ Green Bond Treasurer Survey 2020 summarized conversations with over 80 green bond issuers, who broadly agreed that post-issuance, any pricing benefits were regarded as ancillary. Advantages obtained from green bond issuance included but were not limited to their contribution to transition, risk management, and future proofing of the business, broadening the investor base and introducing new engagement opportunities, better standards to benefit all, enhanced reputation and visibility, and stronger internal collaboration on sustainability goals.^e Issuers asserted that the benefits of issuing green bonds more than compensated for any additional efforts required.

a. United Nations Development Programme. 2024. *SDG Budget Tagging: A Proposal to Measure SDG Financing*. New York.

b. Abundance Investment is an entity based in the United Kingdom that offers individuals the ability to contribute to the cost of specific projects that local authorities want to fund. Some of the investments are eligible to be held in a tax-free investment savings account wrapper, which means returns are tax free on an annual investment ceiling of £20,000.

c. International Capital Market Association. 2021. [Green Bond Principles](#).

d. Asian Development Bank. 2023. *Mobilizing Resources through Municipal Bonds*. ADB Working Paper Series No. 88. [sdwp-088-mobilizing-resources-municipal-bonds.pdf](#).

e. Climate Bonds. 2020. [Green Bond Treasurer Survey 2020](#).

Source: Climate Bonds Initiative.

Box 6: Examples of Green Municipal Finance in Japan

With one of the world's largest and most developed domestic bond markets, Japan has drawn on international examples of municipal-finance-raising structures while developing its own approach reflecting local circumstances. Like many economies in Southeast Asia, Japan has a large capital city and widely dispersed regional areas, and a traditionally bank-intermediated financing system with a debt capital market largely focused on central government debt.

Japan also faces a variety of socioeconomic challenges such as the need to address aging societies, build disaster- and climate-resilient infrastructure, and address central versus regional economic disparities against the backdrop of high central government debt levels. As policymakers in Asia increasingly grapple with similar issues, Japan's approach to building a sustainable municipal bond market can serve as an example for developing Southeast Asian markets.

Japan has developed a wide variety of financing solutions and specialized entities for originating green and sustainable municipal debt to channel capital from central government debt markets to local issuers. The general model of local government financing in Japan is that larger prefectures (regional administrative jurisdictions similar to states or provinces) and major cities mainly raise funds in the public market directly or through special purpose entities for joint local bond issuance, while smaller cities, towns, and villages receive loans from centralized municipal finance organizations or directly from the central government. Within Japan's local government finance market, all of these entities issue green and sustainable bonds, which can be tailored to meet specific local needs. Employing this variety of approaches supports the financing needs of various local governments across the spectrum of size, capacity, and investor bases.

Tokyo Metropolitan Government's Green and Social Bond Framework

A capital city leveraging size and market presence to catalyze growth in the local green municipal bond market

Metropolitan Tokyo is a major sub-sovereign issuer in the Japanese debt capital markets. As the national capital and largest city in Japan, Tokyo is the source of 20% of national gross domestic product and a global financial center. The city has developed a stand-alone borrowing program with prominent status among domestic and foreign investors, active in Japanese yen and foreign currencies. As the largest municipal bond issuer in Japan, the Tokyo Metropolitan Government (TMG) issued

the first municipal green bond in Japan in 2017 and has since established a green and social bond program with over 10 deals as of 2023. The main use of proceeds from the TMG's sustainable finance program has been applied to physical infrastructure and spending initiatives for urban disaster resilience; energy and water resource conservation; coastal and riverine flooding countermeasures; and upgrades to aging social infrastructure for education, childcare, and facilities for older people. The TMG's Green and Social Bond Framework carries an external review (second-party opinion) from ISS ESG.

The motivation for the TMG's Green and Social Bond Framework arose from the increased funding needed to meet the city's 2050 net zero commitments and growing demand for disaster-resilient infrastructure and social-related programs, as well as a desire to diversify funding sources to include the growing international and domestic green, social, sustainable, and other labeled bonds (GSS+) investor base. The TMG also wanted to set a precedent for other local government issuers in Japan at a time when it had not yet established a sovereign green bond issuance program. Finally, the TMG credits supportive policies from the Bank of Japan and government pension funds, which raised local investor awareness and interest in green debt instruments.^a

Capital cities often have the ideal mix of financing needs with revenue sources, environmental and social infrastructure use-of-proceeds pipelines, and financial market human capital and institutions for kick-starting the growth of green and sustainable municipal bond markets.

Japan Joint Local Government Bonds (Green Bonds)

A novel structure for participating local governments to pool eligible green projects and achieve scale and regularity

In Japan, over 36 local government entities, including over 26 prefectures and 10 major cities outside of Tokyo, collaborate to issue Joint Local Government Bonds (JLGBs). These instruments enable benchmark sized deals, which help to obtain liquidity and lower financing costs.

The legal basis for this approach is based on Article 5-7 of the Local Financing Act and Article 432 of Japan's Civil Law, whereby multiple local governments can agree to joint and severable issuance of bonds based on collective responsibility for principal and interest payments. Creditworthiness is enhanced because each joint debt issuer agrees to bear responsibility for the repayment obligation of all the pooled entities debt. This allows regional governments to pool their funding needs into regular and larger-sized benchmark JLGBs, which now represent around

25% of the total outstanding municipal and local government bond market in Japan.

This structure also lends itself well to green municipal bond issuance; the first green JLGB was issued in 2023 with additional subsequent issuance in 2024.^b Each participating local government entity can choose to participate in each green JLGB issue by entering its own local green projects into the funding pool. Thus, many small-scale local green projects with infrequent or irregularly timing and financing needs can be aggregated into consistently large, benchmark-sized green municipal bond issuances that also benefit from lower organizational overhead costs and efficient use of the limited pool of local sustainable finance expertise. The green JLGB use of proceeds range from local renewable energy and resource conservation projects to climate change adaptation measures and resilient infrastructure for preventing damage from disasters triggered by natural hazards, such as earthquakes, flooding, typhoons, and tsunamis. The issuer's framework is aligned with the International Capital Market Association's 2021 Green Bond Principles and the Japan Ministry of the Environment's 2022 Green Bond Guidelines, with second-party opinions from local rating agencies.

Regulatory and policy reforms can be instrumental in unlocking potential for green municipal bond market development through innovative approaches.

a. L. Kihari. 2021. [Japan to Promote Green Finance with Common Platform, Scenario Analyses](#). Reuters. 1 September.

b. [グリーン共同発行団体連絡協議会. Joint Local Government Green](#). [green-kyodohakko.jp](#).

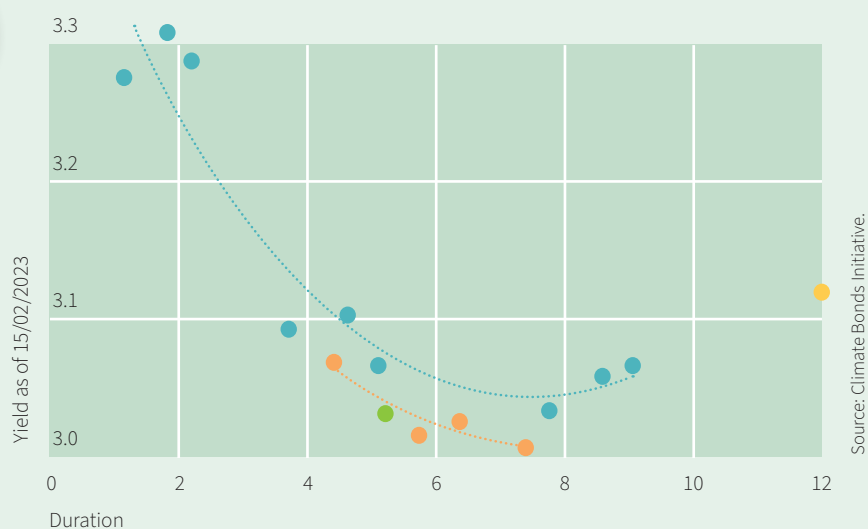
Source: Asian Development Bank.

Box 7: Case Study–Kuntarahoitus Oyj 2028 Green Bond

Kuntarahoitus Oyj (Kunta), also known as Municipality Finance Plc., is a Finnish public-sector-owned institution lending to municipalities to finance sustainable development. This lending is financed in the global capital markets. Kunta's objectives are aligned with those of the Government of Finland, aiming for both carbon neutrality by 2035 and the protection of biodiversity, while financed emissions are calculated and monitored. Kunta updated its Green Bond Framework in August 2022, referencing both the European Union Taxonomy and the European Union Green Bond Standard. Eligible project categories for Kunta's green bonds are low-carbon buildings, low-carbon transport, low-carbon energy, and water and waste.

Kunta initiated its green bond program in 2016 and has priced eight aligned deals to date. The most recent of these was the Kunta 2028 Euro-denominated bond priced in February 2023. The €1.0 billion (\$1.1 billion) bond covered its book twice compared to its vanilla basket, which managed 1.2 times. Both the Kunta 2028 and its vanilla basket tightened

Kunta 2028 Green Bond Obtained a Greenium



● Vanilla bonds ● Seasoned green bonds ● New issue green bond ● Social

by 2 basis points (bps) during book building, and the Kunta 2028 priced inside its secondary market yield curve. The order book was well-diversified geographically and by investor type, and 80% of the deal was allocated to investors describing themselves as green. The deal priced

at mid-swaps –3.0 bps, but secondary market performance was impacted by the collapse of SVB and associated market turmoil, and the spread moved in a range of between –8.9 bps and 3.4 bps. However, by the end of June, the bond was at mid swaps –2.8bps.

Source: Climate Bonds Initiative. [Green Bond Pricing in the Primary Market, H1 2023](#).

Box 8: The Nordic Model for Regional Financing Needs

Pooled financing models are particularly common in the Scandinavian region where local government funding agencies have applied this concept in all major Nordic countries. Pooling enables a deal to reach the size and, therefore, trading liquidity that attracts a broader range of large institutional and global investors. This can lower the cost of capital for borrowers, and even more so when the green label is applied, given that investor preference for sustainability is high and well-established in Scandinavian markets. Furthermore, consolidating financing at the state, regional, or national levels can maximize the expertise of a limited pool of public finance specialists, thereby mitigating the issue of limited capacity at the local level.

The Nordic countries are unique in many ways. The so-called Nordic Model—as it has evolved in Denmark, Finland, and Sweden—is based on decentralization and cooperation between regions and municipalities to deliver an extremely wide range of services to the people they serve. This implies that fiscal responsibility rests with local and regional governments, who have taxation powers and the ability to raise debt. Many services—including health care, education, housing, energy generation, and heating—are managed by local governments, but may be delivered indirectly through municipal-owned companies.

In Norway, there is greater state involvement because the Government of Norway retains local taxation powers. In general, state-owned enterprises play a larger role in Norway and Finland where state ownership is higher. This model puts relatively more assets and financing decisions in the hands of municipalities. The municipal sector also plays a key role in the region's climate change mitigation and adaptation efforts. This has led to greater regional cooperation at the local level. Examples include the (i) Nordic Sustainable Cities, one of six flagship projects under the Nordic Solutions to Global Challenges initiative, coordinated by the Nordic Council of Ministers; and (ii) 6Aika, a case of six Finnish cities joining forces to promote innovation and smart solutions to improve cities.

Another aspect is the increasingly stringent requirements imposed on asset owners. For instance, Norway introduced new regulations for impact assessments within the Planning & Building Act, 2017. The new energy efficiency requirements for new builds and renovations are higher across all property types relative to the 2010 code. These features make Nordic municipalities, cities, regions, and the companies they own very desirable borrowers. The strong credit quality has facilitated direct access to the local bond markets, and in some cases to international bonds markets, for municipal issuers. While market dynamics vary country by country, there are issuers that have accessed the bond market, but have not issued green bonds yet, which represents untapped potential.

Nordic green bond issuance has recorded many global and European firsts. With their 2010 debut green bond, state-owned municipality financing bank KBN Kommunalbanken and the Nordic Investment Bank were some of the first to market green bond issuers globally. The City of Gothenburg made history in 2013 when it became the first city to issue green bonds, and it is a prominent member of the C40 cities engaged in sustainable urban development.^a

Collectively, the Nordic region accounts for 5.5% of the world's cumulative aligned green bond issuance, notably higher than its share of global gross domestic product or outstanding public debt. At the end of 2023, Sweden was the 10th-largest source of green bonds globally, with \$84 billion in cumulative aligned issuance including deals from 16 local government issuers amounting to \$11 billion. Norway was 13th with \$54 billion, of which \$219 million came from two local governments. Denmark was 15th with \$40.5 billion, while \$24.4 billion originated from Finland. Iceland entered the green bond market in 2018, accumulating \$2.2 billion of aligned green bonds by the end of 2023. Iceland's seven issuers included the City of Reykjavik (\$63.3 million) and Municipality Credit Iceland (\$8.7 million). These examples show how commitment to sustainability and strategic use of financing for GSS+ bond markets can support municipalities financing needs and climate action ambitions.

a. Climate Bonds Initiative. 2018. *Nordic and Baltic Public Green Sector Bonds*. https://www.climatebonds.net/files/files/Nordic_Muni_Final-01%281%29.pdf.

Table B8: Local Government Funding Agencies in the Nordic Countries—LGFAs Enjoy Dominant Position as Lender to Local Government

	Municipality Finance	Kommune-Kredit	Kommuninvest	Kommunal banken	Municipality Credit
Country	Finland	Denmark	Sweden	Norway	Iceland
Established	1989 / 1993	1899	1986	1926	1967
Owner	51% municipal 31% Keva 18% state	Member municipalities	Member municipalities	100% state	Member municipalities
Guarantee structure	Municipalities on a joint basis via Municipal Guarantee Board	Joint and several liability from local and regional governments	Joint and several liability from local and regional governments	100% state-owned since 2009. Letter of support from owner	Municipalities and State Treasury for MOC & SOE loans
S&P / MDY rating*	AA+ / Aa1	AAA / Aaa	AAA / Aaa	AAA / Aaa	NR / NR
Market share**	About 60%	98% (prev. 95%)	48% (prev. 46%)	45% (prev. 50%)	25% in 2012

Source: S&P Ratings Direct, Municipality Finance PLC, December 2016; * Most recent credit reports from Moody's and S&P;

**Company annual accounts 2016, except for MuniFin (S&P report) and MCI (corporate website)

Source: Climate Bonds Initiative.

Innovative Financing and De-risking Approaches

A vibrant municipal green bond market requires a deep and developed underlying bond market, with some degree of capacity for sub-sovereign and local public financing. Most ASEAN member states' bond markets are still at an early stage of development compared to those with mature municipal markets such as in the US or the Nordic countries, which have a track record of over a century in local financing through bond issuance.

Targeted interventions and solutions are required to attract the necessary investment and catalyze the municipal green bond market in Southeast Asia.

Blended finance is one of the tools that multilateral development banks and development finance institutions can use in cooperation with donors and other development partners to increase the impact of private sector operations, mobilize private capital, and help achieve the UN SDGs. It is a process of lowering the risk (de-risking) of investments to enable a broader range of private investors to participate. It can be effective where the profitability or risk profile of the underlying green project does not match the risk–return requirements of private investors. In such a scenario, a development finance institution might commit to absorb the first losses on a project, thus improving its appeal to commercial investors. This process of de-risking may also enhance the credit quality and rating of the deal, making it an eligible investment opportunity for a broader range of institutional investors who may not be permitted to invest in sub-investment grade debt (**Figure 21**).

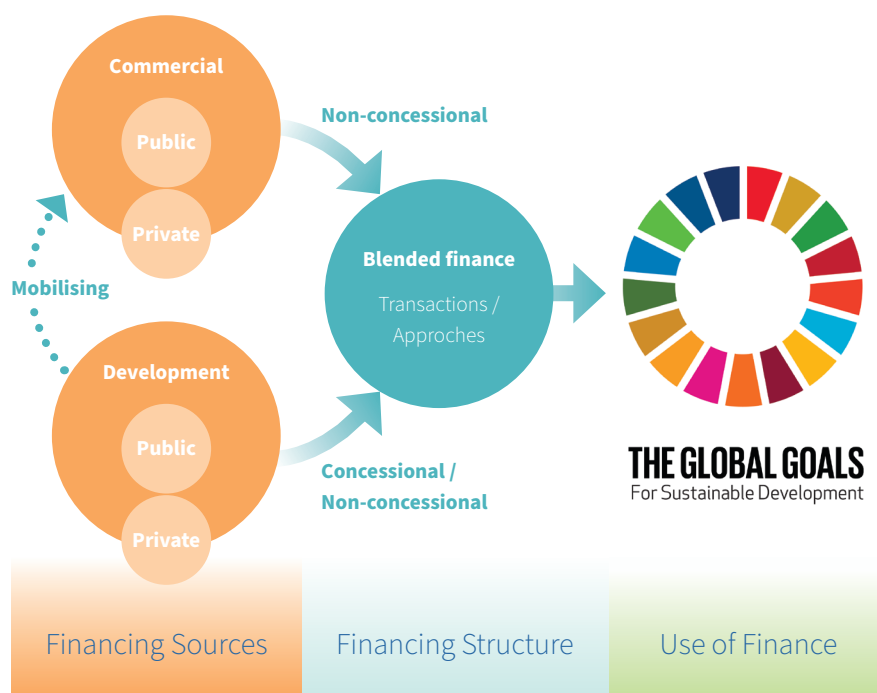
A survey conducted by the Organisation for Economic Co-operation and Development (OECD) to assess the leveraging effect of development assistance and blended finance instruments found that \$205.1 billion was mobilized from the private sector via official development finance interventions from 2012 to 2018, and that 39% of this total took the form of guarantees or equivalent products.²⁷

A key finding of this work was that the private sector is eager to participate with guarantees, even when project allocation amounts are small. The study found that guarantees were the largest contributor to mobilizing private capital during the observation period, attracting more than twice the next largest categories: syndicated loans and credit lines.

Land Value Capture

Land value capture (LVC) assumes that access to infrastructure leads to an appreciation in land value. The public sector can capture a part of this appreciation through investment in social and environmental projects, which contributes to making them more attractive and livable, leading

Figure 21: Blended Finance Mechanisms Can Contribute to the Achievement of the United Nations Sustainable Development Goals



Source: Organisation for Economic Co-operation and Development.

to higher appraisal values.²⁸ In the context of municipal green bonds, LVC can be used to develop a dedicated revenue stream to service the debt, which increases the attractiveness and investability of these bonds for investors. LVC financing can be an avenue of fundraising for municipalities by making cash flows more financeable.

However, LVC involves its own set of challenges and requires a thorough understanding of multiple factors such as the maturity of land markets, land use regulations, investment policies, enabling legal frameworks, fiscal and governance structures, local context, and traditions regarding land rights (**Box 9**).²⁹

Box 9: The Mass Transit Railway Corporation in Hong Kong, China

One example of a successful model for LVC is the Mass Transit Railway Corporation (MTRC) in Hong Kong, China, which operates without government subsidy and is a highly profitable infrastructure developer with high-profile development projects overseas.^a The MTRC's revenues are derived from profit-sharing with private developers (mostly of residential projects) in real estate sales, and from renting and managing MTRC-owned properties for commercial use. Besides providing a stable source of income, developing property along the railway benefits the MTRC by attracting residents to amenities and housing near the stations, which in turn contributes to railway ridership and associated commercial patronage.

At the planning stage, the MTRC collaborates with the government to assess the cost of construction and then prepares a master plan to identify property development sites along the railway. It then prepares a public tender for allocating these property development rights to private developers, who pay all the development



costs including a land premium. Profit-sharing mechanisms are included in the agreements with the private developers, and the MTRC enforces requirements for interfacing between its railway premises and the property development.

This rail-plus-property model not only helps the MTRC finance new railway lines profitably and sustainably, but also satisfies the government's intention to stimulate the growth of local communities along the railway and encourage sustainable urban transport options.^b

MTRC published its first Green Finance Framework in 2016, and the document was updated in 2018 and 2020. By the end of 2023, the Climate Bonds Initiative had recorded cumulative aligned green bond volumes of \$3.2 billion. Low-carbon transport was the most frequently stated beneficiary, but use of proceeds has also been earmarked for low-carbon energy, water, waste, low-carbon buildings, land use, and adaptation and resilience.

a. MTRC. London Crossrail. <https://www.mtr.com.hk/en/corporate/consultancy/crossrail.html>.

b. UNESCAP. 2014. *Case Study: Public-Private Partnerships*. Bangkok. Source: Climate Bonds Initiative.

Public-Private Partnerships for Capital Raising

Some municipalities can contract a private sector entity, which in turn will raise capital (based on its own creditworthiness and contractual link to the municipality) to build and operate projects on behalf of the municipal entity. The private sector entity may also be authorized to collect certain revenue streams. This sort of public-private partnership is often used to finance municipal water and waste projects.

There are examples of pooled finance vehicles where several municipalities or local entities jointly create a stand-alone or partnership entity with private sector firms, which in turn issues a bond based on the underlying projects of the entity (**Box 10**). The Development Bank of Southern Africa, for example, uses its balance sheet to support seven project categories, including local governments. By February 2023, the bank had 20 vanilla deals outstanding with a combined volume of R3.8 trillion (\$2.9 billion). Project categories were prioritized against a green taxonomy to identify eligibility for green bond financing.

Risk-Sharing and Risk-Transfer Mechanisms for Enhancing Returns

A risk-sharing component embedded within municipal green bonds can mobilize greater capital flows from private and commercial sources. An example could be an environmental impact bond structure, in which the return on the investment were dependent on the success of a project, thus allowing both the issuer and investors to share the risks and rewards of undertaking a project.³⁰

Such risk-sharing and risk-transfer mechanisms can extend to the provision of first-loss capital, securitization or synthetic green capital notes, loan loss reserves, and credit default swaps. Combining these mechanisms with technical assistance can address both the capacity and capability issues in catalyzing new markets.

A broad range of tools can be used to provide credit enhancement and/or risk transfer at the entity, instrument, or project level. Developing a customized, targeted product for cities and municipalities would be a key enabler for growing green municipal bond issuance in Southeast Asia. A sample of generic options are outlined below. Some are context-specific, but the schematic and examples in **Table 4** detail potential applications and real-life examples.

Box 10: The Green Municipal Fund of Canada

Created in 2000, the Green Municipal Fund is a Can\$1.65 billion (\$1.2 billion) program funded by the Government of Canada and administered by the Federation of Canadian Municipalities. The fund's mission is to support municipal efforts to tackle climate challenges and reach net zero emission commitments through funding and capacity building.



The fund supports partnerships and leveraging of public and private sector funding for initiatives that demonstrate an innovative solution or approach to a municipal environmental issue (e.g., air, water, soil quality, climate protection); offer manifold environmental benefits, a strong business case, or social advantages; are complemented by local policies and measurement systems; or can generate new lessons and models for other municipalities and regions of Canada.

The fund provides support for plans, feasibility studies, pilot projects, and capital projects across various sectors, including energy, transport, wastewater treatment, and water supply. The support package includes both grant money and low-interest loans. Grants are capped at a maximum of 50% of the costs for plans and feasibility studies. Loan amounts may be increased for particularly innovative projects. While the financial support package is attractive for pursuing green projects, its broader assistance structure makes the Green Municipal Fund an effective mechanism.

Interested parties can access the peer network of the fund and connect with other municipalities, informing their project designs

with the latest good practices, and use tools for capacity building and practical training in green infrastructure. Clear forms, templates, and sample letters provide guidance through the application process where applicants use a project scorecard to check if their proposal aligns with the fund's eligibility criteria. They receive feedback from an independent reviewer, upon which they can revise their applications before submission to reflect and incorporate the fund's feedback to project design.

As of mid-2023, the Green Municipal Fund had approved 1,931 sustainability projects and supported projects worth Can\$1.28 billion (\$930 million).

The United Kingdom's Public Works Loan Board

The Public Works Loan Board (PWLB) in the United Kingdom is a government body that issues loans to local authorities for public infrastructure projects.³² The PWLB operates under the United Kingdom's Debt Management Office, offering loans at rates generally lower than those available from commercial lenders, due to government backing. This arrangement helps local authorities access capital quickly and undertake necessary development projects with more favorable financing terms. The PWLB avoids crowding out private lenders by focusing on funding essential public infrastructure projects that are less attractive to the private sector, thereby complementing rather than competing with private financing.

a. United Kingdom Debt Management Office. Public Works Loan Board. <https://www.dmo.gov.uk/responsibilities/local-authority-lending/about-pwlb-lending/>.

Source: Climate Bonds Initiative.

Globally, there are many examples of institutions specifically chartered to provide credit enhancements to advance public policy priorities. In the US, the Small Business Administration operates a program that guarantees up to 85% of commercial loans made to small businesses. Fannie Mae and Freddie Mac are government-sponsored entities in the US that aim to reduce the cost and enhance the availability of home ownership for low- and middle-income Americans by providing credit enhancements to home mortgages to reduce the risk of capital losses to investors.

Market-making institutions can also engage in credit enhancement by underwriting specific pooled bond issues and providing subordinated debt to a pool of projects for raising bond finance. For instance, the Development Bank of Southern Africa plays this market-making role using instruments such as credit guarantees.³¹ Some regional examples from Southeast Asia are included in **Appendix 3**.

Table 4: Credit Enhancement Mechanisms

Mechanism	Definition	Example
Full or partial credit guarantee (PCG)	A credit guarantee or PCG is created to absorb part or all the debt service default risk of an infrastructure project, irrespective of the cause of default. PCGs can be used for any commercial debt instrument (e.g., loans, bonds) from a private lender. A PCG suggests that the guaranteeing entity expects the project to be successful, which can help to attract new lenders.	Energy company AP Renewables (Philippines) issued a ₱10.7 billion (\$226 million) 10-year certified climate bond to finance the Tiwi-MakBan geothermal power plants, which have a combined capacity of 390 megawatts. ADB provided a partial credit guarantee covering up to 75% of scheduled principal repayments and interest payments. In addition, ADB also provided a limited recourse direct senior secured loan of ₱1.8 billion.
Political risk guarantee (PRG)	PRGs cover private lenders and investors for certain risks of lending to sovereign or sub-sovereign borrowers. A PRG needs to include private participation in the project. A PRG can cover several sovereign or sub-sovereign risks such as currency inconvertibility; repatriation; expropriation; and political force majeure such as war, regulatory risk, and government payment obligations (e.g., tariffs).	PRGs are often used in renewable energy and energy efficiency projects. ^a They are especially meaningful to investors where the deal or project economics, such as renewable energy pricing and offtake agreements, are contingent on continuing and predictable public policy support.
Partial risk swap guarantees	Partial swap guarantees cover investors against the risks arising from currency swaps in cross-border transactions or where the debt service cash flow is in a different currency from the deal cash flows, which would require the issuer to hedge the currency.	Brazil-based private sector bank Unibanco issued ¥25 billion 10-year amortizing notes, backed by its United States dollar-denominated offshore remittance flows—but investors required hedging of the currency mismatch. To reduce the credit exposure for the institution providing the currency swap, the deal obtained a PSG from the IFC.
First-loss provisions	First-loss provisions refer to any device designed to protect investors from a loss of capital. These could be debt, equity, or derivatives instruments including mezzanine finance, cash facilities or guarantees. They could also take the form of insurance or debt security providers who are liable to pay compensation to the investors, irrespective of the cause of the loss.	The Green Cornerstone Bond Fund, created by the IFC and Amundi and launched in March 2018, is the world's largest green bond fund specifically focused on investment in green bonds issued by emerging market financial institutions. The IFC provides a first-loss absorption through a junior tranche to lower risk and leverage public investment to attract private sector capital.
Contingent loans	Contingent loans are often used in project finance to backstop the main debt by providing a payment option for specific case scenarios, which allows the issuer or borrower to meet financing requirements following a shortfall in resources due to adverse economic events. The contingent loans help ensure that investors are paid.	There have been no green projects using contingent loans to date.
Concessional loans	Concessional loans are granted on substantially more generous terms than market rate loans. This is achieved through below-market interest rates, longer than market-available repayment terms, or a combination of both.	The Seychelles issued the world's first blue bond worth \$15 million in October 2018 to finance sustainable marine and fisheries projects. The Global Environmental Facility provided a \$5 million concessional loan to partially cover the bond's interest payments. The deal was also supported by a \$5 million partial guarantee from the World Bank.
Viability gap funding	Viability gap funding is used specifically in infrastructure to cover the heavy upfront funding required to kick start a project. An analysis of the viability of a proposed project points out the weak areas that prevent large-scale funding from being obtained.	The Government of India launched its Viability Gap Funding scheme for public-private partnerships infrastructure projects in 2004.
A/B loans or grants	A/B loans or grants are where a multilateral development bank (MDB) offers the "A" portion of the loan while also attracting other lenders to join in a second (or "B") tranche. The MDB will be the lender-of-record, lead lender, and administrative agent in the transaction. This reduces part of the risks of the operations, by also being covered by the umbrella of the MDBs that include a preferred creditor status and de jure immunity from taxation.	Italian transmissions system operator Terna priced a \$81 million green A/B loan in project finance format in July 2017. The Inter-American Development Bank offered the \$56 million A loan and BBVA subscribed a B loan for \$25 million. The deal financed the design and construction of a 213-kilometer transmission line of 500 kilovolts in the northeastern region of Uruguay.

a. Climate Bonds Initiative. 2019. *ASEAN Green Finance State of the Market, 2019*. London.

Source: Climate Bonds Initiative.

Outlook

Sustainable growth and development require that society has access to clean energy, water and basic sanitation, climate-resilient infrastructure and transportation, health care, and education—all of which are often directly provided by city councils, local authorities, and municipalities. While much progress has been achieved in mobilizing climate-oriented investments, particularly for renewable energy, the need for a sustainable growth model and the required financing for achieving the UN SDGs and the objectives of the Paris Climate Agreement are still insufficient, especially at the local level.



City administrations, local governments, and municipalities can play a much larger role, given their granular knowledge of on-the-ground requirements and solutions. Channeling the necessary financing and capacity-building support to these entities directly is therefore key for the next chapter of sustainable finance in Southeast Asia. Specifically, green and sustainability-linked municipal bonds, enabled by the development of a liquid and robust local debt market, can be leveraged to address these needs.

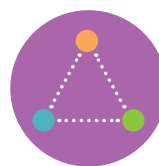
There is already evidence of success in municipal green bond markets in developed countries for attracting institutional and international investment at scale. Aside from the UOP format, sovereign and sub-sovereign SLB markets offer an additional path for local sustainable fundraising, although this market is still early in its development. Fostering and building the GSS+ municipal bond market will require the granting of more independent borrowing and revenue-generation capacity to local issuers, facilitation through pooled financing or de-risking mechanisms, as well as innovative solutions that can channel private capital to these projects at scale.

With the combination of regulatory and legal autonomy, financial innovation, and inspiration from proven successful models internationally, coupled with growth of the project and infrastructure pipeline at the municipal and local levels, Southeast Asian municipal issuers can leverage green bonds and SLBs for greater access to local and global capital markets, potentially at a lower cost of capital, while also benefiting from more diversified funding sources.

The following are five recommendations for moving the market forward:

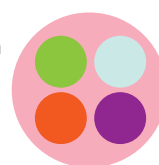
i. Prioritize the development of local debt markets

The more developed the local debt market is, the easier it is for issuers to mobilize sustainable capital and harness investor appetite for green and sustainable bonds. Within Southeast Asia, this process is already advanced in Malaysia, Singapore, and Thailand. However, an active municipal bond market, green or otherwise, requires decentralized borrowing capacity and the credit quality to borrow in the capital markets. While these conditions have not yet been satisfied in all ASEAN member states, local markets can continue to develop with the support and capacity building efforts of development finance institutions.



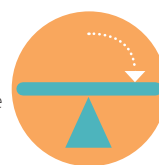
ii. Encourage pooling platforms for aggregation

Pooled financing is a proven solution that has supported market development in other regions and could be replicated in Southeast Asia. In this approach, a government entity—usually at the regional or national level—aggregates the borrowing needs of individual municipalities. Consequently, larger bonds can be issued to reduce market fragmentation and increase liquidity, while often lowering borrowing costs for issuers and improving governance and transparency for investors. This method also allows for more efficient use of the limited pool of public finance experts, thereby addressing local-level capacity constraints.



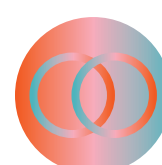
iii. Leverage sovereign borrowing

Southeast Asian sovereigns are active borrowers in the debt capital markets. Indonesia, Malaysia, the Philippines, Singapore, and Thailand have each priced at least one aligned GSS+ instrument. Since the sovereign will likely have the strongest credit rating in its own country, it could offer green or sustainable loans to municipalities and finance the lending through a green or sustainability bond. In some cases, sovereign GSS+ issuance has also shown the ability to catalyze increased GSS+ issuance by other public and private sector borrowers, while raising market awareness of sustainable investment.



iv. Standardize blended finance solutions

To attract the broadest possible investor base, standardization is necessary to increase the availability and speed of blended finance options. The de-risking of such solutions and development of such markets requires private capital to catalyze needed investments. This will require targeted credit enhancement mechanisms to support long-term infrastructure investments in Southeast Asian municipalities seeking to become emerging market issuers and nascent players.



v. Grow the pipeline of eligible projects

Green development must be prioritized to ensure a continuous flow of high-quality, eligible use-of-proceeds options for green bond financing. Regional or national taxonomies and standards can be deployed to help cities and municipalities identify and prioritize appropriate mitigation and adaptation projects, even with limited local expertise and funding. This action should be supported by policies including green public procurement and green expenditure tagging. Municipalities can overcome capacity constraints by establishing formal connections with project preparation facilities from ADB or other development finance institutions.³³ These facilities usually offer support at no or limited cost.



Appendix 1: Examples of Municipal Green Deals

Table A1: Examples of Municipal Green Bonds

Region or Country	City, State, or Municipality	Year of Issue	Issue Size	Use of Proceeds
Latin America				
Mexico	Mexico City	2016 2018	MX\$1.0 billion MX\$1.1 billion	Energy-efficient lighting, upgrades to public transport and water infrastructure.
Argentina	City of Cordoba	2022	ARS2 billion	LED and solar panels for buildings, along with optimization of city's sewage network
	Godoy Cruz	2023	ARS300 million	Solar energy park, bicycle/cycling lanes, and LED light installations
	Province of Jujuy	2017	\$210 million	Renewable energy
	Province of La Rioja	2017	\$300 million	Construction, installation, commissioning, operation and maintenance of PSF Arauco I, a photovoltaic plant.
		2022	\$18 million	
		2023	\$55 million	
Europe				
Belgium	Region Wallone	2023	€700 million	Green buildings and retrofits, clean transportation, land use (agriculture, biodiversity, and conservation)
France	Ile de France	2014 2015	€600 million €500 million	Green buildings, eco corridors, sustainable transport, energy efficiency, renewable energy, water resources, Corporate Social Responsibility in Small and Medium Enterprises initiatives
	City of Paris	2015	€300 million	Eligible projects include public transport cycling plan, electric vehicles ; energy efficiency in buildings, public lighting and signals, heating systems; renewable energy (geothermal, solar, energy recovery, heating network); and adaptation (new green areas, tree planting).
	Department de L'essonne	2014	€40 million	Low-carbon transport projects (rail and bus), energy efficiency projects for the local council building, and green buildings (for a school and a nursing homes).
	Hauts-de-France	2012	€80 million	Low-carbon transport such as highway lanes dedicated to public transit vehicles, eco-materials for buildings and energy efficiency projects for buildings and biodiversity projects (including forest management).
	Provence-Alpes-Cote	2012	€120 million	
	Region of Pays de la Loire	2018	€75 million	
Germany	State of Baden-Württemberg	2022 2023	€350 million €600 million	Clean transportation, A&R , energy efficiency, land use (including biodiversity), green buildings, waste, renewable energy and water management, renewable energy (wind, solar, hydro, geothermal, bio, storage and transmission infrastructure), broadband networks, green buildings and retrofits, A&R, clean transportation (zero emissions vehicles and supporting infrastructure), land use (including biodiversity), water management, waste management, and circular economy solutions.
	State of Hessen	2021 2023	€600 million €1 billion	Renewable energy (wind, solar, hydro, geothermal, bio, storage and transmission infrastructure), broadband networks, green buildings and retrofits, A&R, clean transportation (zero-emissions vehicles and supporting infrastructure), land use (including biodiversity), water management, waste management, and circular economy solutions.
Iceland	City of Reykjavik	2018 2020	ISK3.8 billion ISK4.1 billion	Low-carbon transport, waste A&R and land use.

Table A1: Examples of Municipal Green Bonds

Region or Country	City, State, or Municipality	Year of Issue	Issue Size	Use of Proceeds
Europe				
Sweden	Gothenburg Green Bond	2013 – 2022	SKr20.6 billion	Renewable energy, green buildings, energy efficiency, clean transportation, waste and water management, sustainable land use, and climate change adaptation.
	City of Lund	2017–2023	SKr3.75 billion	Renewable energy, green buildings and energy efficiency improvement, low-carbon transport, water management, waste management, and A&R.
	City of Malmo	2017–2022	SKr5.25 billion	The new green bond will finance a representative and broad pool of green projects and assets.
	City of Vasteras	2016	SKr750 million	
	Municipality of Linköping	2021	SKr500 million	Green and resilient buildings, clean transport, land use.
	Nacka Kommun	2018	SKr500 million	Renewable energy (wind, solar, bioenergy, geothermal), clean transport, replacing fossil fuel materials, buildings, waste, water, adaptation.
	Norrköping	2016–2022	SKr2.4 billion	Renewable energy, biogas from waste, energy efficiency: non-residential buildings, water, A&R.
	Orebro Kommun	2014–2023	SKr7.45 billion	Renewable energy (and energy efficiency improvement), green buildings and energy efficiency improvement, waste, water, A&R, and clean transportation infrastructure.
	Ostersund Municipality	2017–2021	SKr2.8 billion	Renewable energy project and energy efficiency in commercial and residential buildings.
	Region Skane	2016–2023	SKr9.9 billion	Green buildings, renewable energy (solar, wind and geothermal heat pumps connected to buildings), A&R, and waste.
	Region Stockholm	2022	SKr625 billion	Green buildings and energy efficiency improvement, clean transportation, and renewable energy.
	Rikshem AB	2014–2022	SKr9.5 billion	Renewable energy, low carbon transport, and green buildings. Green buildings (Building Research Establishment Environmental Assessment Methodology–BREEAM good; Miljöbyggnad “Silver”), clean transportation (hydrogen and electric), energy efficiency of buildings (20%), waste, RE (solar and geothermal).
	SIBS AB	2020	SKr400 billion	Energy efficiency, buildings.
	Stockholms Lans Landsting	2014–2021	SKr18.7 billion	Low-carbon transport (rail, BRT, and trams), green buildings, waste management (recycling and biogas capture) and water management.
	Vastra Gotanlandsregionen	2018	SKr1 trillion	
	Vellinge Municipality	2018 2019 2021	SKr350 billion SKr200 million SKr300 million	
Switzerland	Canton of Geneva	2017 2019	SwF620 million SwF 660 million	Green buildings in the health and medical research sectors including a university medical center, a general hospital, and a maternity hospital.
	Canton of Basel	2018 2019 2022	SwF 230,000 SwF 300 million SwF 130 million	Green bond allows funding for six sustainable construction projects. Use of proceeds toward eligible green buildings.
	City of Zurich	2023	SwF 300 million	Green buildings and retrofits.

Table A1: Examples of Municipal Green Bonds

Region or Country	City, State, or Municipality	Year of Issue	Issue Size	Use of Proceeds
Europe				
Norway	City of Oslo	2015	NKr1.5 billion	Energy efficiency and sustainable housing projects; water management and water cleaning facilities; environmental transportation services; and environmental projects (including reducing the amount of vehicles in the city center).
	Vestland Fylkeskommune	2023	NKr457 million	Green buildings
Russia	City of Moscow	2021	₽70 billion	Public transport: electric buses and metro projects.
Spain	Community of Madrid	2020	€700 million	Clean transportation, waste management, and A&R.
		2021	€500 million	
		2022	€500 million	
		2023	€600 million	
UK	West Berkshire Council	2020		Installation of solar panels on roof tops.
Africa				
South Africa	Cape Town	2017	R1 billion	A mix of adaptation and mitigation initiatives including electric buses; energy efficiency in buildings; water management initiatives, including water meter installations and replacements, water pressure management, upgrades to reservoirs, sewage effluent treatment, and rehabilitation and protection of coastal structures.
	Johannesburg	2014	R.46 billion	Projects across a range of sectors including 150 new dual fuel buses and converting 30 buses to biogas.
Asia and the Pacific				
Australia	NSW State Treasury	2018 2020 2023	A\$1.3 billion A\$1.5 billion A\$3.0 billion	Infrastructure including the Newcastle Light Rail, Sydney Metro Northwest project, and the Lower South Creek Treatment Program.
	Queensland Treasury Corp	2017 2019	A\$750 million A\$1.25 billion	Renewable energy – solar; low-carbon transport – electrified rail infrastructure and cycle ways. Low-carbon transport.
People's Republic of China	Jiangxi Province	2019	CNY300 million	Proceeds will be used for two underground pipeline corridor projects, one of which has gas pipeline as one of the five pipes.
	Municipality of Shenzhen	2021 2022	CNY3.9 billion CNY2.6 billion	Water treatment, sponge cities, and clean transportation.
	The People's Government of Fujian			Water.
	The People's Government of Zhejiang Province			Water treatment projects.
Japan	Tokyo Metropolitan Government	2017	¥5 billion	Energy efficiency improvement of buildings, solar, water management, A&R, and clean transportation.
		2018	¥10 billion	
		2019	¥10 billion	
		2020	¥20 billion	
		2021	A\$122 million	
		2022	¥30 billion	
	City of Fukuoka	2023	¥20 billion	Green building (ZEB and building retrofit), solar power generation, forestry management, A&R measures, and marine conservation (biodiversity).
	City of Kawasaki	2021	¥5 billion	Waste to energy; green buildings; Adaption and Resilience .
	Kanagawa Prefecture	2020	¥5 billion	Proceeds will be allocated to finance new projects related to rivers, coasts, and erosion control under the “Kanagawa Prefecture Flood Disaster Prevention Strategy”.
		2021	¥10 billion	
		2022	¥11 billion	

Table A1: Examples of Municipal Green Bonds

Region or Country	City, State, or Municipality	Year of Issue	Issue Size	Use of Proceeds
Asia and the Pacific				
Japan	Kochi Prefecture	2023	¥5 billion	Solar energy, building retrofits, electric vehicle charging points, land use, and A&R.
	Nagano Prefecture	2020		
	Osaka Prefecture	2022 2023	¥5 trillion ¥5 trillion	CASBEE A building, sewer, passenger railway, and A&R measures.
India	Indore Municipal Corporation	TBA	₹5 billion	The Indore Municipality has proposed a green bond toward a 120-megawatt solar power plant project for captive consumption.
	Nagar Nigam Ghaziabad	2021	₹1.5 billion	The corporation has proposed to take up a project for setting up a tertiary sewage treatment plant to further treat secondary treated sewage water.
New Zealand	Auckland Council	2018 2019 2020 2021 2022	NZ\$200 million NZ\$150 million NZ\$500 million NZ\$300 million €500 million SwF 100 million	Low-carbon transport, renewable energy, green buildings, waste management, land use, A&R, water management.
Viet Nam	Ho Chi Minh City	2016	\$23 million	Water and adaptation.
	People's Committee of Ba Ria Vung Tau Province	2016	\$4 million	Water.
North America				
United States		2006–2023	\$33 trillion	
Canada	City of Ottawa	2017 2018 2019	Can\$102 million Can\$200 million Can\$300 million	Proceeds of the deal will be used to finance light rail transit capital work that meets the requirements of the city's Green Bond Framework.
	City of Toronto	2018–2022	Can\$1 billion	1. Renewable Energy. 2. Energy Efficiency. 3. Pollution Prevention and Control. 4. Sustainable Clean Transportation. 5. Sustainable Water and Wastewater Management. 6. Climate Change Adaptation and Resilience. 7. Eco-Efficient and/or Circular Economy Principles Integration. 8. Green Buildings.
	Province of Ontario	2014–2022	Can\$13.5 billion	Clean transport; energy efficiency or conservation; clean energy; forestry, agriculture, land management; Adaptation & Resilience.
	Province of Quebec	2017–2022	Can\$5.1 billion	Clean transportation, green buildings, sustainable water and wastewater management, climate change adaptation.

Table A2: Examples of Sustainability-Linked Bonds from Municipalities

Issuer	Original amount sold (bn)	Currency	USD equivalent(bn)	Year of issue	Country	KPI 1	KPI 2
Jiangsu Province Credit Re-Guarantee Group Co.,Ltd	1.00	CNY	0.14	2023	China	Increase inclusive finance	0
Fujian Investment Development Group Co Ltd	0.50	CNY	0.07	2023	China	Renewable energy capacity	0
Jianxi Provincial Investment Group Co. Ltd.	1.00	CNY	0.14	2023	China	Renewable installed capacity	0
City of Vasteras/Sweden	0.50	SEK	0.05	2023	Sweden	GHG emissions intensity	0
Uppsala Kommun	0.20	SEK	0.02	2023	Sweden	GHG emissions	Solar energy installed capacity
Uppsala Kommun	0.40	SEK	0.04	2023	Sweden	GHG emissions	Solar energy installed capacity
City of Vasteras/Sweden	0.30	SEK	0.03	2023	Sweden	GHG emissions intensity	0
City of Vasteras/Sweden	0.40	SEK	0.04	2023	Sweden	GHG emissions intensity	0
City of Vasteras/Sweden	0.20	SEK	0.02	2023	Sweden	GHG emissions intensity	0
Shiga Prefecture	5.00	JPY	0.04	2022	Japan	GHG emissions	0
City of Helsingborg Sweden	0.50	SEK	0.05	2022	Sweden	GHG emissions	0
Arizona Industrial Development Authority	0.11	USD	0.11	2022	United States	Restore forestland	Percentage of logs harvested from restored forestland
Arizona Industrial Development Authority	0.09	USD	0.09	2022	United States	Restore forestland	Percentage of logs harvested from restored forestland
City of Helsingborg Sweden	0.50	SEK	0.06	2022	Sweden	GHG emissions	0

Source: Climate Bonds Initiative.

Appendix 2: Assurance Ecosystem for Green Bonds

In 2014, the International Capital Markets Association (ICMA) created the Green Bond Principles (GBP). The GBP are voluntary process guidelines promoting transparency and disclosure and are intended for issuers, investors, and underwriters alike.

The guidelines are based on four pillars:

- i. use of proceeds,
- ii. process for project evaluation and selection,
- iii. management of proceeds, and
- iv. reporting.

In 2021, the ICMA published *Green Project Mapping*, which lists 10 eligible project categories:³⁴

- i. renewable energy;
- ii. energy efficiency;
- iii. pollution prevention and control;
- iv. environmentally sustainable management of living natural resources and land use;
- v. terrestrial and aquatic biodiversity conservation projects;
- vi. clean transportation;
- vii. sustainable water and waste management;
- viii. climate change adaptation;
- ix. eco-efficient and/or circular economy-adapted products, production technologies, and processes; and
- x. green buildings.

However, as the GBP aims to represent market best practices rather than provide definitions or standards, it allows for a broad interpretation of these project categories. The GBP recommends that issuers should obtain an external review to confirm the credibility of their sustainable financing framework. The external review may involve consultant review, such as second opinions; verification, such as auditors; or certification where a green bond framework is evaluated against a set external standard.

For Southeast Asia, as the administrator of the Association of Southeast Asian Nations (ASEAN) Infrastructure Fund, the Asian Development Bank (ADB) has developed a set of Investment Principles and Eligibility Criteria for its ASEAN Catalytic Green Finance (ACGF) that provides a set of green eligibility criteria for providing finance for green projects detailed below.

Table A3: Key Elements of the ACGF Investment Principles and Eligibility Criteria

Eligible project types	Sovereign and sovereign-backed infrastructure projects.
Eligible countries	ADB members in Southeast Asia: Cambodia, Indonesia, Lao People's Democratic Republic, Myanmar, ³⁵ Malaysia, Philippines, Thailand, and Viet Nam.
Mandatory co-financing	First loss provision to green bond issuances will be subject to co-financing from ADB of not less than 30%.
Preferential co-financing	Preference will be given where co-financing or structuring involves ACGF financing partners.
Green impact	All projects must qualify as green infrastructure projects as identified in the ACGF Investment Principles and Eligibility Criteria.
Bankability	Projects should demonstrate a contribution to financial viability and sustainability, and bankability, ideally measured using financial criteria (debt service coverage ratio/internal rate of return) .
Leverage and catalysis	Projects should have the potential to catalyze further resources, including private, commercial, and institutional sources.

Source: *Green Municipal Bonds Playbook*; Green City Bond Coalition.

Table A4: Use of Proceeds Categories and Project Examples

Use of Proceeds Category	Project Example
Renewable Energy	- Solar and wind energy generation. - Solar and wind energy equipment manufacturing. - Grid connections to renewable energy generation. Hydro-electricity generation (run of river or existing dams). - Geothermal energy (subject to limits on greenhouse gas emissions). - Biomass energy generation. - Tidal energy generation and other emerging renewable energy technologies. - Energy storage.
Green Building and Green Infrastructure	- LEED -certified buildings (gold and above recommended). - Energy efficiency and conservation projects in buildings (such as LED lighting installation). - Rehabilitation of transmission facilities to reduce greenhouse gas emissions. - Public housing built to high energy efficiency standards.
Agriculture, Bioenergy, and Forestry	- Sustainable agriculture, forestry, and land use. - Biofuels production using agricultural waste or non-food crops. - Agriculture produces supply chain improvements to reduce waste.
Clean Water and Utilities, Storm Adaptation	- Clean water and drinking water. - Resilience, adaptation, and green infrastructure. - River revitalization and habitat preservation and restoration, flood mitigation and drought impact.
Industrial Efficiency	- Cement production: substantial reductions in greenhouse gas emissions. - Waste heat recovery systems. - Energy-efficient motors.
Clean Transportation	- Mass transit: subways, light rail. - Rolling stock for railways. - Rail track capital expenditure. - Electric vehicle infrastructure, vehicle fleets, consumer loans. - Bus rapid transit systems (minimum ITDP bronze rated). - Zero- and low-emission vehicle fleets.
Waste Management, Methane Reduction	- Sewage treatment facilities with methane capture. - Low-emission garbage trucks and related infrastructure. - Recycling plants. - Qualifying waste-to-energy generation.

Source: *Green Municipal Bonds Playbook*; Green City Bond Coalition.

Appendix 3: Examples of Credit Enhancement Mechanisms from Southeast Asia

Indonesia Infrastructure Guarantee Fund (IIGF)

On 30 December 2009, the Government of Indonesia established PT Penjaminan Infrastruktur Indonesia (Persero), or the Indonesia Infrastructure Guarantee Fund (IIGF) as a state-owned enterprise (SOE) through a State Capital Injection of Rp1 trillion as paid-up capital.

IIGF ensures accelerated fulfillment of sustainable infrastructure development by providing assurance and added value for infrastructure development by providing investment comfort and certainty of payment on claims of loss. Their objectives include:

- improving the creditworthiness and quality of public-private partnerships in infrastructure projects by establishing a clear and consistent appraisal and claim framework for guarantees;
- improving the governance and transparency of guarantee provision;
- facilitating the deal flow for contracting agencies (e.g., ministries, SOEs, regional governments) by providing guarantees to well-structured public-private partnerships; and
- ring-fencing the government's contingent liabilities and minimizing sudden shocks to the state budget.

Source: www.iigf.co.id/en/.

Danajamin Nasional Berhad: Financial Guarantor in Malaysia

Danajamin Nasional Berhad (Danajamin) in Malaysia was established in May 2009 to be a financial guarantor and a catalyst to stimulate and further develop the Malaysian bond and *sukuk* (Islamic bond) market. It provides financial guarantee insurance for bond and *sukuk* issuances to viable Malaysian companies to enable access to the corporate bond market. It is jointly owned by the Minister of Finance Incorporated (50%) and Credit Guarantee Corporation Malaysia Berhad (50%). Danajamin is rated AAA by both domestic rating agencies of Malaysia: RAM Rating Services Bhd. and Malaysia Rating Corporation.

Danajamin provides financial guarantee, a form of credit enhancement, to bonds and *sukuk*. With Danajamin's guarantee, the bonds and *sukuk* will be automatically upgraded to AAA (fg), the highest rating accorded to bonds and *sukuk*. With the improved rating, issuers will be more assured of a successful bond and *sukuk* issuance. To date, Danajamin has issued guarantees worth more than \$3.75 billion.

Source: Danajamin Nasional Berhad. <https://www.danajamin.com/>.

Credit Guarantee and Investment Facility

The Credit Guarantee and Investment Facility (CGIF) was established by the 10 members of the Association of Southeast Asian Nations (ASEAN) together with the People's Republic of China, Japan, and the Republic of Korea (ASEAN+3), and the Asian Development Bank in 2010.

CGIF is a key component of the Asian Bond Markets Initiative under ASEAN+3 cooperation. It has been established to promote economic development, stability, and the resilience of financial markets in the region. The main function of CGIF is to provide credit guarantees for local-currency-denominated bonds issued by investment-grade companies in ASEAN+3 countries.

Source: Asia Bond Markets Initiative. Credit Guarantee and Investment Facility. <http://www.cgif-abmi.org/>.

GuarantCo

GuarantCo is supported by the governments of the United Kingdom, the Netherlands, Switzerland, Australia, and Sweden. Set up in 2005, it is part of the Private Infrastructure Development Group, and it is rated AA- by Fitch Ratings and A1 by Moody's Rating Services. GuarantCo primarily provides guarantees to projects and companies seeking to raise debt financing to develop infrastructure in lower-income countries in Africa and Asia. GuarantCo, through GuarantCo Management Company, manages its activities through its fund manager, the Cardano Development Group, under an exclusive long-term contract.

It has a variety of products like partial credit guarantees, first loss guarantees, liquidity guarantees, Engineering, Procurement, and Construction (EPC) contractor guarantees, and related products. To date, they have provided guarantees to companies in 17 countries.

Source: GuarantCo. <https://guarantco.com/>.

Endnotes

1. This report defines a municipality as a town or district that has a local government. The term municipal bond is used throughout to refer to a bond issued by any town, city, or entity.
2. This total does not include the People's Republic of China. Bonds meeting the requirements outlined in the Climate Bonds Initiative's screening methodology qualify for inclusion in the databases and are classified as aligned (**Box 1**).
3. PT SMI is a national entity serving as a catalyst for accelerating national infrastructure development and contributing to sustainable development and climate resilience in Indonesia through innovative, unique, and flexible financing products. An example of blended finance is the Asian Development Bank's SDG Indonesia One: Green Finance Facility, managed by PT SMI, which aims to mobilize public and private funds for green and bankable infrastructure projects that are critical for sustainable economic recovery.
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