GREEN BOND FRAMEWORK

LAND TRANSPORT AUTHORITY OF SINGAPORE

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Contents

ABOUT LAND TRANSPORT AUTHORITY OF SINGAPORE

The Land Transport Authority of Singapore ("LTA") spearheads land transport developments in Singapore. We plan, design, build and maintain Singapore's land transport infrastructure and systems. We aspire to strengthen Singapore's land transport connectivity and deliver a greener and more inclusive public transport system complemented by walk and cycle options. We harness technology to strengthen our rail and bus infrastructure and develop exciting options for future land transport.[1]

The Land Transport Master Plan 2040 ("LTMP 2040") charts out the long-term vision, policies and targets that shape our land transport system to 2040, and possibly beyond. LTMP 2040 describes the future of land transport for Singapore as:

1) a transport network that is convenient, well-connected and fast;
2) a transport ecosystem characterised by gracious behaviour and inclusive infrastructure; and
3) a transport environment that supports healthy lives and enables safer journeys.

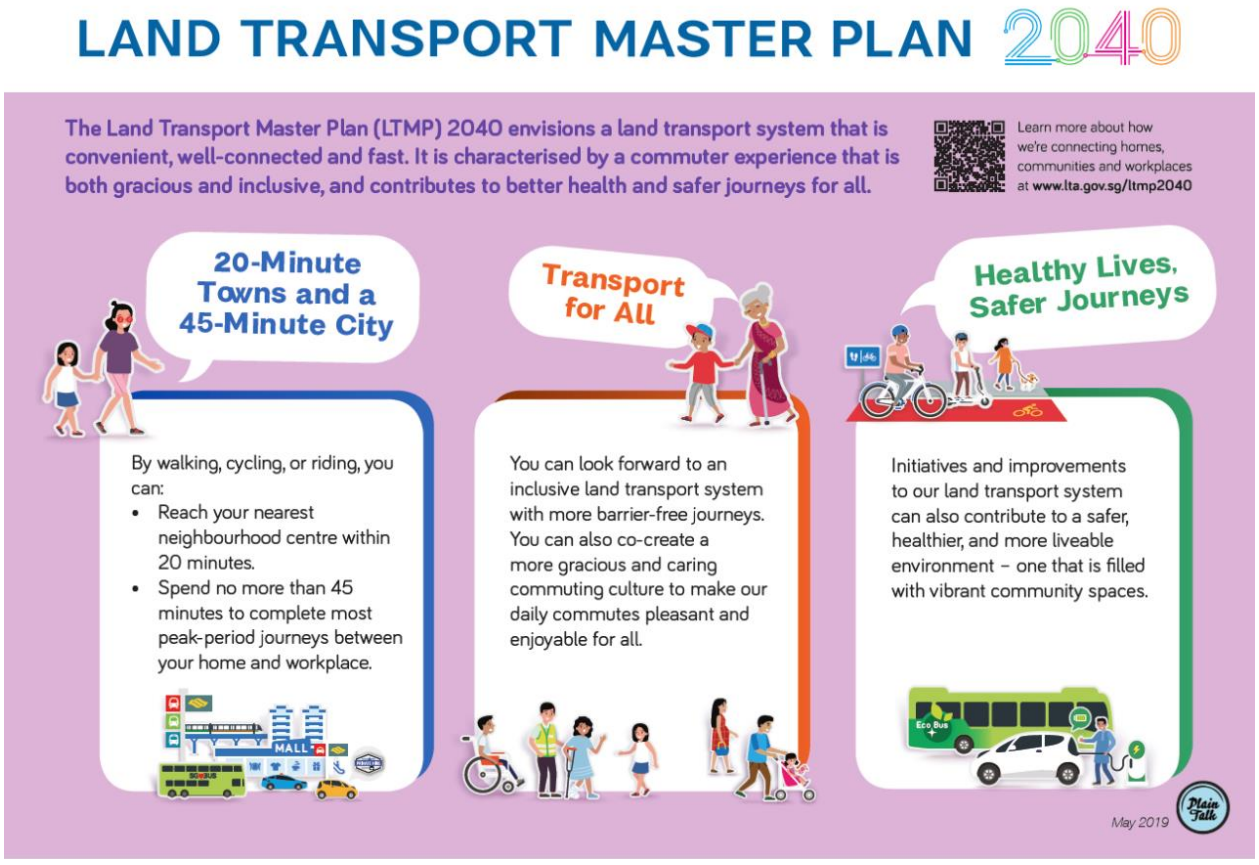

Figure 1: Land Transport Master Plan 2040

For further information on LTMP 2040, please refer to the full report here.

[1] Extracted from LTA Corporate website: LTA | Who We Are

Background

Singapore's Commitment to a Low Carbon Future

Internationally

On 31 March 2020, Singapore submitted its enhanced Nationally Determined Contribution ("NDC") and Long-Term Low-Emission Development Strategy ("LEDS") document to the United Nations Framework Convention on Climate Change ("UNFCCC"). Singapore's enhanced NDC now states an absolute emissions target to peak emission at 65 million tonnes of carbon dioxide equivalent ("$MtCO_2e$") around 2030. Singapore's LEDS builds on the enhanced NDC by aspiring to halve emissions from its peak to 33 $MtCO_2e$ by 2050, with a view to achieving net-zero emissions as soon as viable in the second half of the century.

On 18 February 2022, Singapore announced that it will raise its ambition to achieve net zero emission by or around mid-century.[2] The government consulted closely with industry and citizen stakeholders before finalising plans for a formal revision. In October 2022, Singapore raised its national climate target to achieve net zero emissions target by 2050 as part of LEDS. It will also reduce emissions to around 60 $MtCO_2e$ in 2030 after peaking emissions earlier.

Domestically

In February 2021, the Government of Singapore launched the Singapore Green Plan 2030 as a whole-of-nation movement to advance Singapore's national agenda on sustainable development and climate action. The transport-related targets to be achieved by the 2030s announced under the Singapore Green Plan 2030 include[3]:

- Achieve 75% mass public transport (i.e. rail and bus) peak-period modal share
- Expand rail network to about 360km
- Expand cycling path network to around 1,300km
- All new car and taxi registrations to be of cleaner-energy models
- Deploy 60,000 electric vehicle ("EV") charging points nationwide
- All HDB towns to be EV-ready with chargers at all HDB carparks by 2025

[2] Extracted from the National Climate Change Secretariat's website, Singapore's Pledge to Reduce Emissions: Singapore And International Efforts (nccs.gov.sg)
[3] Extracted from: Singapore Green Plan 2030 Charts Ambitious Targets for Next 10 Years to Catalyse National Sustainability Movement

LTA's Sustainability Vision

As of 2021, emissions from land transport are the third largest contributor of Singapore's emissions, after power and industry[4].

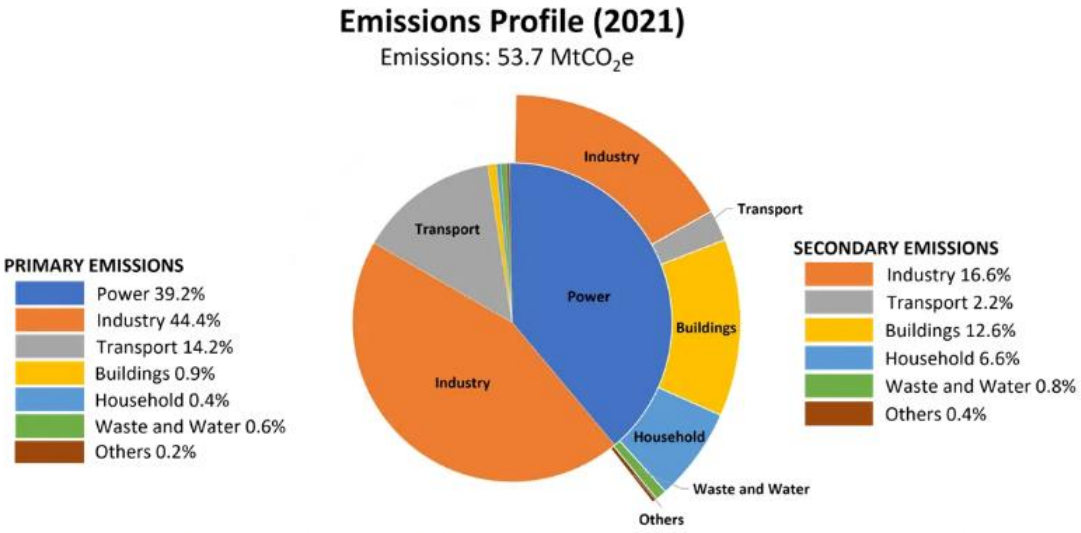

Figure 2: Emissions Profile (2021)

Over the decades, LTA has taken significant steps to build an efficient and sustainable land transport system. Policies to reduce car ownership and usage had been progressively introduced, alongside heavy investments in public transport and active mobility to promote Walk Cycle Ride ("WCR"). As a result of these moves and efforts to shift towards lower carbon emission car models, land transport emissions peaked in 2016.

Aligned with Singapore's national ambition to achieve net zero emissions by 2050, LTA aims to reduce land transport emissions significantly in absolute terms. To achieve this, we have identified six strategies for a greener and more sustainable land transport ecosystem.

[4] Based on latest available data (2021) from: Singapore's Emissions Profile (nccs.gov.sg)

Figure 3: LTA's Six Key Green Strategies

- **Green Commutes**: With public transport and active mobility as the cleanest transport modes, LTA will continue to nudge commuters towards green commutes by expanding supporting Walk-Cycle-Ride infrastructure.

- **Green Vehicles**: Internal Combustion Engine ("ICE") vehicles are the main contributors to land transport emissions. Based on the current national Grid Emission Factor, an electric car emits approximately half the CO_2 amount of an equivalent ICE car, and if all light vehicles ran on electricity, we would reduce carbon emissions by 1.5 to 2 $MtCO_2e$.

- **Green Infrastructure**: Buildings and assets generate both embodied and operational carbon. As an asset owner, LTA is committed to a greener and more sustainable approach in how they are designed and built. We also strive to influence our contractors, suppliers and stakeholders through greener procurement practices.

- **Green Operations**: LTA is aligned with the GreenGov.SG requirements for greener, cleaner operations, and targets for reducing utilities consumption and waste.

- **Green Opportunities**: LTA cultivates an open innovation ecosystem with our industry partners and adopts green financing.

- **Green Communities**: LTA actively engages the community through a range of outreach programmes to involve stakeholders in the development and promotion of a greener land transport.

Under the “Green Opportunities” strategy, LTA aims to support the Singapore’s Whole-of-Government green financing efforts. LTA has supported MOF in the development of the Singapore Green Bond Framework, which lays the foundation for the issuance of Green Singapore Government Securities (“SGS”) (Infrastructure). The Green SGS (Infrastructure) will be used to finance major, long-term infrastructure in Singapore that qualifies under the Singapore Green Bond Framework, such as the upcoming Cross Island and Jurong Region lines. LTA has developed this Green Bond Framework with the intention to issue green bonds to fund other sustainable land transport infrastructure, while also building on the Government’s efforts to develop green financing solutions and markets, by deepening market liquidity for green bonds, attracting green issuers, capital and investors and anchoring Singapore as a green finance hub in Asia.

GREEN BOND FRAMEWORK

Purpose

The green bond framework ("Framework") serves to demonstrate how LTA will issue bonds to fund new and existing projects with environmental benefits in alignment with the Green Bond Principles ("GBP") 2021 (with Jun 2022 Appendix 1) issued by International Capital Market Association ("ICMA").

Scope

The Framework applies to LTA and any applicable subsidiaries.

Use of Proceeds

The table below outlines the categories of Eligible Green Expenditures ("Green Categories") and provides descriptions of sub-categories and a non-exhaustive list of examples of expenditures within these categories. The categories are also mapped to the Singapore Green Plan Pillars and UN Sustainable Development Goals ("SDGs").

For the eligibility criteria, the Framework also took reference from existing market standards and principles, such as the ICMA Green Bond Principles (2021 with Jun 2022 Appendix 1), Singapore-Asia Taxonomy, the CBI Taxonomy (2021) and Sector Criteria and the ASEAN Green Bond Standards (2018) wherever relevant and feasible.

Eligible Green Expenditures are expenditures that fall under the eligible Green Categories as defined in the section below. Eligible Green Expenditures may include:

• Infrastructure capital expenditures;
• Operational and maintenance expenditures of the infrastructure;
• Associated ancillary activities necessary for the construction, operation or maintenance of the infrastructure;
• Intangible assets (research and innovation, human capital and organisation);
• Subsidies and rebates; and
• Capital transfers to public or private entities.

LTA will use the net proceeds from each green bond issued to finance and/or refinance (with 2-year lookback period for refinance), in whole or part, new or existing projects that meet the eligibility criteria described in
Table 1. All these projects that meet the eligibility criteria will be known as "Eligible Green Project".

Table 1: Eligible Criteria

Green Category: Clean Transportation	
Environmental Objectives Climate change mitigation Pollution prevention and control	**Sub-categories** • Land transport infrastructure and mobility solutions with zero direct tailpipe CO_2 emissions:

<table>
<tr><th colspan="2">Green Category: Clean Transportation</th></tr>
<tr><td>Singapore Green Plan Pillar
Sustainable Living
Energy Reset</td><td rowspan="2">

Electrified railway infrastructure, including rolling stock and other related assets and expenditures
Electric Bus infrastructure, buses and other related assets and expenditures
Electric vehicle (“EV”) charging infrastructure and solutions (e.g. charging points and swap stations, cabinets, etc.) and related assets including:

Electricity grid connection upgrades necessary to support the deployment and operation of infrastructure for charging EVs; and
All other solutions related to optimising and/or providing the necessary electrical capacity to support the deployment and operation of EV charging solutions

Personal mobility and cycling infrastructure and solutions (e.g. cycling tracks, pedestrian zones, parking provisions for active mobility modes, electrical charging and hydrogen refuelling installations for personal mobility devices)
Other relevant infrastructure or assets that help to increase accessibility and connectivity of public transport networks, which support zero direct emission mobility solutions, to increase its usage and ultimately reduce reliance on private vehicle transportation and greenhouse gas emissions

Research and development (“R&D”) for zero emission transportation technologies, capped at 10% on a portfolio basis

Example Eligible Expenditure[5]:

Rail Expansion
Our target by 2030s is to expand the rail network to about 360km. This means connecting eight in 10 households to within 10 minutes of a train station. With 360km of rail network, Singapore will have a total rail length that is longer than major cities such as Tokyo or Hong Kong today, and be on par with London and New York City. Some of the rail expansion projects that will bring a train station

</td></tr>
<tr><td>SDGs mapping
 
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</table>

[5] Examples in Table 1 are intended to provide more context about the Green Categories. LTA does not necessarily finance/ refinance the projects included as examples with green bonds. All financing/ refinancing activities using green bonds will be executed in accordance with this Green Bond Framework.

Green Category: Clean Transportation	
	closer to commuters includes Circle Line 6, Cross Island Line, Downtown Line 3 Extension, Jurong Region Line, North East Line Extension and Thomson-East Coast Line. We are also building the Johor Bahru – Singapore Rapid Transit System to Johor Bahru. • ***Electric Vehicle ("EV") Infrastructure*** *LTA is accelerating the nationwide provision of EV charging infrastructure to drive the adoption of EVs in Singapore. All HDB towns will be EV-ready by the 2025. LTA is targeting to deploy a total of 60,000 EV charging points across Singapore by 2030, with 40,000 charging points in public carparks and 20,000 in private premises. In addition, LTA will organise systematic upgrade of supporting electrical infrastructure in carparks and buildings to ensure sufficient capacity for charging a fully electrified vehicle fleet. These steps help support our nation's pivot towards greener private transportation, moving us closer to achieve our vision of 100% cleaner energy vehicles by 2040.* • ***Islandwide Cycling Network ("ICN") Programme*** *LTA will accelerate the building of cycling path networks and active mobility infrastructure across Singapore under the ICN Programme. The programme will bring greater convenience and enhanced connectivity to active mobility device users, and improve safety for all path users, including pedestrian. Under the ICN Programme:* o *By 2030, Singapore's cycling path network will be expanded to around 1,300km which will provide comprehensive connectivity for all active mobility users.* • ***Electric Buses*** *To reduce carbon footprint of public transport, LTA has committed to a 100% cleaner energy public bus fleet by 2040 and for all new public bus purchases to be cleaner energy bus models since March 2020. A total of 60 electric buses have been progressively deployed for passenger service since November 2020. LTA will be progressively rolling out 360 more electric buses from December 2024 onwards. By 2030, half of our public bus fleet will be electric.*

Green Category: Renewable Energy	
Environmental Objective Climate change mitigation	Renewable energy systems, including solar (photovoltaic), at MRT stations, bus station roofs, and other related facilities and infrastructure **Example Eligible Expenditure:**
Singapore Green Plan Pillar Energy Reset Green Economy	• ***Harnessing Solar Power in Public Transport Infrastructure*** *To reduce carbon emissions and lower energy costs, LTA will install solar panels on the roofs of new or recently upgraded land transport infrastructure such as rail and bus depots, offices and facility buildings. This will support LTA's existing plans to achieve the solar energy deployment targets of 16 megawatt-peak ("MWp") by 2025 and 25 MWp by 2030.*
SDGs mapping 	

Green Category: Energy Efficiency	
Environmental Objective Climate change mitigation	**Sub-categories** • Energy efficient infrastructure and other related assets, such as energy-efficient lighting system • Energy storage dedicated to integrating the deployment of low carbon energy sources, transmission & distribution system comprised of energy-efficient equipment • R&D for new energy efficiency technologies, capped at 10% on a portfolio basis
Singapore Green Plan Pillar Energy Reset Green Economy	**Example Eligible Expenditure:** • ***Energy-Efficient Lighting System*** *Since 2017, streetlights have been progressively fitted with energy-efficient LEDs which consume more than 25% less energy than the traditional High-Pressure Sodium streetlights. To date, LTA has achieved annual energy savings of more than*

SDGs mapping 	*30 million kWh by converting all streetlights to LED streetlighting. LTA also has plans to progressively replace the current tunnel lighting system with LED.*

Green Category: Green Buildings	
Environmental Objective Climate change mitigation	Buildings that meet regional, national or internationally recognised standards or certifications for environmental performance such as BCA Green Mark [6] certification of Gold^{Plus} or above, or other equivalent and recognised green building standards or certifications (e.g. Leadership in Energy and Environmental Design ("LEED") Gold and above). **Example Eligible Expenditure:** • ***Singapore Rail Test Centre ("SRTC")*** *The SRTC is fully equipped to conduct rigorous testing and commissioning of trains and other core railways systems for both new and existing rail lines. It is designed to BCA's Green Mark Platinum certification, with energy saving equipment incorporated into its design and operations. These include features such as LED lightings, solar panels and a hybrid cooling system. To promote sustainable mobility within the facility and to encourage walking and cycling, bicycle parking lots and sheltered linkways will also be provided.*
Singapore Green Plan Pillar Energy Reset	
SDGs mapping 	

Green Category: Climate Change Adaptation	
Environmental Objectives Climate change adaptation	Design, construction, maintenance and upgrades of infrastructure for adapting to extreme weather events, such as: • Climate change resilient infrastructure, flood prevention, flood protection and other risk mitigation programmes **Example Eligible Expenditure:** • ***Flood Mitigation Systems*** *To safeguard against rising flood risks, flood*
Singapore Green Plan Pillar Sustainable Living	

[6] https://www1.bca.gov.sg/buildsg/sustainability/green-mark-certification-scheme/green-mark-2021

SDGs mapping 	*mitigation systems (e.g. flood barriers) will be developed to protect the underground transport infrastructures which includes underground MRT stations.*

Exclusion

For the avoidance of doubt, expenditures incurred for the Green Categories that are already financed via dedicated funding sources, such as green bonds issuances under the Singapore Green Bond Framework, will not be eligible under this Framework to avoid any double counting.

Any expenditure related to the following activities will be excluded from the Green Categories:

- Fossil fuel
- Vehicles powered through fossil fuel combustion
- Non-certified sustainable palm oil
- Nuclear energy
- Lethal defence goods
- Weaponry
- Gambling
- Alcoholic beverages
- Tobacco products
- Conflict minerals
- Activities or projects associated with child labour of forced labour

It is intended that all Eligible Green Expenditures financed under this Framework shall not significantly undermine the Environmental Objectives stated in the Green Categories, and will adhere to internationally recognised principles and guidelines, as well as applicable national laws and regulations in Singapore.

Process for Evaluation and Selection of Projects

LTA has set up a Green Bond Committee ("GBC"), chaired by Chief Executive to oversee and approve key decisions related to the green bonds issued under this Framework. Its responsibilities include:

- Design and maintenance of the Framework
- Selection and evaluation of Eligible Green Expenditures
- Management of green bond proceeds
- Reporting on allocation and impact of green bonds issued.

The GBC comprises senior leadership which includes:

- Chief Executive
- Deputy Chief Executives
- Chief Financial Officer
- Chief Sustainability Officer(s)

The GBC is supported by another working level group, the Green Bond Working Group ("GBWG"). The GBWG comprises representative member from relevant functions and will compile an initial list of potential green expenditures/projects for review and approval by GBC.

On an annual basis or as needed, the GBC will evaluate the potential green expenditures/projects based on eligibility criteria set out in the Use of Proceeds and approve the expenditures/projects as Eligible Green Expenditures in accordance with the Framework.

The Board will approve the green bond issuances under the Framework.

The selection criteria are in accordance with conditions as outlined in the Use of Proceeds section and might be extended by the relevant applicable taxonomies (e.g. the Singapore-Asia Taxonomy).

LTA is committed to upholding high safety, health and environment standards in line with international best practices. Safety is integral to all our projects; we aim to achieve zero incidents and no negative health impact in all our construction projects. To minimise environmental impact, LTA has a comprehensive environmental management system used in project planning, design, and construction. Projects with significant environmental impact undergo an environmental study during the design stage to assess potential impacts and recommend mitigation measures. Further details on LTA's safety, health, and environmental policies can be found on LTA's corporate website.

Management of Proceeds

LTA will take a portfolio approach for the allocation of net proceeds from the green bonds. The net proceeds will only be allocated to Eligible Green Expenditures that occurred no earlier than 2 years prior to the date of issuance, and no later than 2 years from the date of issuance. At least 50% of the net proceeds will be allocated to current and future expenditures. However, net proceeds from the inaugural green bond issuance may be allocated to Eligible Green Expenditures incurred up to 3 years from the date of issuance as LTA may require greater flexibility for planning and preparation during the initial implementation of this Framework.

LTA may also issue green bonds to refinance maturing green bonds that were previously issued to finance past Eligible Green Expenditures. Refinancing will be necessary when the tenors of the maturing green bonds are shorter than the useful lives of green assets. In such cases, LTA will disclose this information at the time of refinancing.

LTA will maintain a green bond register ("Register") to monitor the allocation of the use of proceeds. The Register will contain information for each green bond issued, including the date of issuance, principal amount of proceeds, International Securities Identification Number ("ISIN") and date of maturity.

In the event where the portfolio of Eligible Green Expenditures is smaller than the net green bond proceeds outstanding due to unforeseen circumstances (e.g. construction delays) or where a financed Eligible Green Expenditure no longer complies with this Framework (e.g. following divestment, postponement, cancellation, non-compliance with eligibility criteria or potential ESG controversies), LTA will use its best endeavours to allocate the specific proceeds to other Eligible Green Expenditures as soon as reasonably practicable.

Where the allocation of proceeds is pending, such amounts will be managed as part of LTA's cash management process which includes short-term balances which may be held by the Accountant-General's Department ("AGD") under the Government's Centralised Liquidity

Management Framework for Statutory Boards. LTA does not plan to invest these unallocated proceeds in the exclusion activities as described in “Use of Proceeds” section.

Reporting

LTA will prepare a progress report starting one year from the first green bond issuance, on an annual basis until the full allocation (and subsequently on needs basis). The report will be made available on LTA’s website throughout the tenure of the green bond and will consist mainly information on:

(1) Allocation Reporting

- The total amount of green bonds outstanding
- Breakdown of allocation by Eligible Green Expenditure sub-categories
- List of Eligible Green Expenditures with descriptions and the amount that has been allocated
- Share of allocation of proceeds for refinancing versus financing of Eligible Green Expenditures
- The remaining balance of proceeds yet to be allocated at the end of the reporting period, with confirmation that the temporarily unallocated proceeds were managed in accordance with the treasury policy of LTA

The information may be presented in generic terms at category level in the event confidentiality limits the amount of detail that can be made available.

(2) Impact Reporting

LTA intends to report on the associated estimated environmental benefits and, where possible, the social co-benefits of the Eligible Green Expenditures, including any material developments or ESG controversies. For the selection of impact indicators, LTA will refer to and adopt, where possible, the guidance and impact reporting templates provided in ICMA’s ‘*Handbook – Harmonised Framework for Impact Reporting*’ (June 2023).

The impact reporting will also provide information on the methodology and assumptions used for calculation of the impact indicators. Below are examples of indicative impact indicators:

Table 2: List of indicative impact indicators corresponding to Eligible Category

Eligible Category	Examples of Indicative Impact Indicators
Clean Transportation	• Annual GHG emissions reduced/avoided in tonnes of CO_2 equivalent • Reduction of air pollutants e.g. particulate matter ("PM”), sulphur oxides (“SOx"), nitrogen oxides (“NOx”), carbon monoxide (“CO”), and non-methane volatile organic compounds (“NMVOCs”) • Passenger-kilometres and/or number of passengers • Amount of infrastructure built e.g. length of rail, walking and cycling path networks in kilometres, number of charging points for EVs in public carparks
Renewable Energy	• Annual GHG emissions reduced/avoided in tonnes of CO_2 equivalent • Annual renewable energy electricity generation in MWh

Eligible Category	Examples of Indicative Impact Indicators
Energy Efficiency	• Annual energy savings in MWh (electricity) or GJ (other energy savings) • Annual GHG emissions reduced/avoided in tonnes of CO_2 equivalent
Green Buildings	• Type of green building certification scheme, certification level and m^2 of gross building areas ("GBA") • Energy use in kWh/m^2 of GBA p.a.; and % of energy use reduced/avoided vs local baseline/building code; and, if relevant, % of renewable energy ("RE") generated on site (specifying the relevant RE form) • GHG emission in kgCO_2/m^2 of GBA p.a.; annual GHG emissions reduced/avoided in tonnes of CO_2 equivalent vs local baseline/baseline certification level; and/or % of carbon emissions reduced/avoided vs local baseline/baseline certification level
Climate Change Adaptation	• Reduction in flood damage costs • Reduction in number of operating days lost to floods

External Review

LTA has engaged an independent provider, S&P Global Ratings Singapore Pte Ltd, to provide pre-issuance second party opinion ("SPO") on the Framework. The SPO report is made available on LTA's website.

Post-issuance, LTA will engage an independent party to conduct external reviews on the alignment of the allocation and impact reporting in the progress report with the framework until full allocation of proceeds from green bonds issued. The post-issuance verification report will be made available on LTA's website throughout the tenure of the green bond.

Disclaimer

This Green Bond Framework contains certain forward-looking statements that reflect LTA's current views with respect to future events and its financial and operational performance. These forward-looking statements are based on LTA's current expectations and projections about future events. Because these forward-looking statements are subject to risks and uncertainties, actual future results or performance may differ materially from those expressed in or implied by these statements due to any number of different factors, many of which are beyond the ability of LTA to control or estimate precisely, including changes in the regulatory environment, future market developments, fluctuations in price and other risks. You are cautioned not to place undue reliance on the forward-looking statements contained herein, which are made only as of the date of this document. You are advised to conduct your own due diligence of and independent assessment as to the risks and performance of these bonds or securities. This Green Bond Framework does not constitute a recommendation regarding any securities of LTA. This Green Bond Framework is not, does not contain and may not be intended as an offer to sell or a solicitation of any offer to buy any securities issued by LTA. In particular, neither this document nor any other related material may be distributed or published in any jurisdiction in which it is unlawful to do so, except under circumstances that will result in compliance with any applicable laws or regulations. Persons into whose possession such documents may come must inform themselves about, and observe, any applicable restrictions on distribution.