Impact Report for Bonds and Loans
BTSG Green Bond Framework

SUSTAINALYTICS
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IMPACT REPORTING ✓

Impact Summary

Sustainalytics has calculated the estimated impact achieved by the green bond issued by Bangkok Mass Transit System Public Company Limited (BTSC) in November 2021. The green bond issuance raised THB 10.2 billion, which has been fully allocated in the category Clean Transportation across projects in Thailand. For a representative year of the bond's term to maturity, Sustainalytics has calculated 1,331 tCO_2e of financed avoided emissions.

THB 10.2B
Allocated funds

1,331
Annual emissions avoided (tCO_2e)
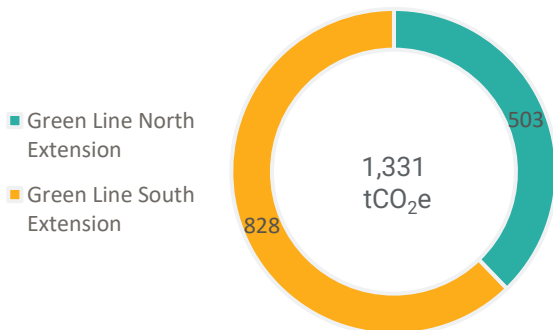
2
Projects

88K
Trees, yearly sequestration

1
Country

Avoided CO_2e emissions by Project

■ Green Line North Extension
■ Green Line South Extension

503
828

1,331
tCO_2e

Thailand
2 Projects

For inquiries, contact the Sustainalytics Corporate Solutions project team:

Michael Susan (Amsterdam)
Project Lead
michael.susan@morningstar.com

Simon Vacklen (London)
Project Manager
simon.vacklen@morningstar.com

Aditi Bhatia (Mumbai)
Client Relations
susfinance.apac@sustainalytics.com

Francesca Placa (Amsterdam)
Commercialization Manager
francesca.placa@morningstar.com

Introduction

BTS Group Holdings PCL (BTSG) is a privately owned, multi-industry conglomerate that operates across three business platforms; MOVE, MIX and MATCH. Listed on the Stock Exchange of Thailand (SET), BTSC is a subsidiary of BTSG and the group's mass transit unit, accounting for the majority of the group's revenue. BTSC operates and maintains the Sky Train system, an elevated trackwork in Bangkok. In 2021, BTSC issued a green bond and allocated the proceeds according to the BTSG Green Bond Framework. Sustainalytics provided a Second-Party Opinion on the BTSG Green Bond Framework, evaluating it as credible, impactful and aligned with the Green Bond Principles 2021 (GBP).[1]

BTSC engaged Sustainalytics to quantify the environmental benefits of the projects refinanced with the proceeds from its green bond. Using established methodologies, Sustainalytics has estimated avoided emissions from BTSC's Clean Transportation projects. This report presents the details of our findings, including a description of the methodology used to calculate the impacts.

Scope of Work and Limitations

BTSC has engaged Sustainalytics to calculate the environmental impacts of the projects refinanced through the green bond issued. For this work, Sustainalytics relied on the data provided by BTSC on the amounts allocated and the technical data on the financed projects.

Sustainalytics' impact reporting is aligned with ICMA's Harmonised Framework for Impact Reporting of June 2021.[2] The methodology used and the assumptions made for the impact calculation are outlined in the methodology section below.

As part of this engagement, Sustainalytics exchanged information with various members of BTSC's management team to understand the sustainability impact of its projects. Through these exchanges, BTSC's representatives have confirmed that:

(1) They understand it is the sole responsibility of BTSC to ensure that the information provided is complete, accurate and up to date;

(2) They have provided Sustainalytics with all relevant information;

(3) Any provided material information has been duly disclosed in a timely manner.

Sustainalytics also reviewed relevant public documents and non-public information.

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[1] The Green Bond Principles are administered by the International Capital Market Association and are available at https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/.
[2] ICMA, Handbook - Harmonised Framework for Impact Reporting (2021) at: https://www.icmagroup.org/assets/documents/Sustainable-finance/2021-updates/Handbook-Harmonised-Framework-for-Impact-Reporting-June-2021-100621.pdf

Impact Findings

For reporting, Sustainalytics follows ICMA's Harmonised Framework for Impact Reporting.[3] This framework synthesizes market expectations and outlines recommendations for impact reporting to create a standardized reporting structure and to enhance the understanding of the impact to all stakeholders, including bond investors.

Table 1 below provides a summary of the projects whose impact Sustainalytics has estimated at the portfolio level. Table 2 shows impact calculated for each project financed under this bond. A further breakdown of the avoided emissions per project can be found in the Appendix. These metrics correspond to a representative year during the bond's term to maturity.

Table 1: Summary of Impact - Portfolio Level

Allocated Amount	Project Lifetime	Passenger-kilometres travelled	Financed Emissions Avoided
THB million	Years	pkm	tCO_2e
10,200	20	371,219,961	1,331

Table 2: Impact of Clean Transportation by Project

Project	Allocated Amount	Passenger-kilometres travelled	Financed Emissions Avoided
	THB million	pkm	tCO_2e
Green Line North Extension	5,100	205,759,522	503
Green Line South Extension	5,100	165,460,439	828

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[3] ICMA, Handbook - Harmonised Framework for Impact Reporting (2021) at https://www.icmagroup.org/assets/documents/Sustainable-finance/2021-updates/Handbook-Harmonised-Framework-for-Impact-Reporting-June-2021-100621.pdf

Methodology

Sustainalytics developed its own methodologies for quantifying GHG avoidance and other metrics, including leveraging publicly available best-in-class methodologies, protocols and frameworks that are currently industry best practice. Our estimation practices and general principles rely on the GHG Protocol.[4] Our methodologies are based on guidance provided by the International Financial Institutions[5] on calculation methodology and global emissions. In addition, we rely on the Partnership for Carbon Accounting Financials' Global Accounting Standard[6] for guidance on estimation where data is not readily available and assumptions must be made. Finally, the UN's Clean Development Mechanism[7] provides guidance and information, serving as the foundation for these and other methodologies, including those implemented in this report.

Clean Transportation

Clean transportation is assumed to displace a mix of existing and future transportation along the same travel distance. The carbon avoidance is calculated using:

a)   The emissions of the clean transportation projects based on the best available data from BTSC. To the extent available, calculations are based on fuel consumption or passenger-kilometre data. In the absence of such information, estimates are made based on mode of transportation, fuel type and average passengers per vehicle.

b)   The baseline emissions, which are the emissions associated with a basket of vehicles or modes of transport being replaced currently and in the future lifetime of the project.

Data Sources and Assumptions

- For the projects included in the report, fuel consumption and passenger-kilometre data was provided by BTSC.
- It is assumed that the Green Line extensions displace a mix of available public transportation modes in Bangkok, specifically buses, trains, boats and cars.
- To calculate the emissions avoided, Sustainalytics uses well-to-wheel emission factors to account not only for emissions directly emitted by the vehicle, but also from the production and transportation of the fuels themselves.
- Project level emissions associated with electricity consumption were calculated using a national grid emission factor sourced from IFI.[8] To account for emissions from upstream activities, such as electricity transmission losses and the extraction and refining of primary fuels, Sustainalytics applies an additional, indirect emissions factor.[9]
- Baseline emission factors for all other transport modes were sourced from publicly available sources for greenhouse gas reporting.

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[4] The Greenhouse Gas Protocol provides standards, guidance, tools and training for business and government to measure and manage climate-warming emissions. For more information: https://ghgprotocol.org/.
[5] Close to 25 institutions are currently members of the IFI Technical Working Group on Greenhouse Gas Accounting.
[6] PCAF is a group of leading international financial institutions that launched a global initiative to develop a global GHG accounting standard and make GHG accounting common practice in the financial industry https://carbonaccountingfinancials.com/.
[7] UNFCCC, CDM Methodology Booklet, at: https://cdm.unfccc.int/methodologies/documentation/index.html
[8] UNFCCC, Harmonized grid emission factor data set, at:
https://unfccc.int/sites/default/files/resource/Harmonized_Grid_Emission_factor_data_set.xlsx
[9] Government of the UK, Department for Business, Energy & Industrial strategy, "Government conversion factors for company reporting of greenhouse gas emissions", at: https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting

Appendix 1: Impacts of Clean Transportation by Project

Project Name	Country	Allocated Amount	Share of total project financing	Project Lifetime	Passenger-kilometres travelled	Project Direct Emissions[10]	Project Indirect Emissions[11]	Project Avoided Emissions	Financed Avoided Emissions
		THB million	%	Years	pkm	tCO_2e	tCO_2e	tCO_2e	tCO_2e
Green Line North Extension	Thailand	5,100	9	20	205,759,522	9,091	2,946	5,797	503
Green Line South Extension	Thailand	5,100	21	20	165,460,439	7,828	2,536	3,977	828

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[10] Emissions associated with fuel consumption of transportation bond vehicles.
[11] Emissions associated with upstream activities, such as electricity transmission and distribution, and extraction and refining of primary fuels.

Disclaimer

About Sustainalytics, a Morningstar Company

Sustainalytics, a Morningstar Company, is a leading ESG research, ratings and data firm that supports investors around the world with the development and implementation of responsible investment strategies. The firm works with hundreds of the world's leading asset managers and pension funds who incorporate ESG and corporate governance information and assessments into their investment processes. The world's foremost issuers, from multinational corporations to financial institutions to governments, also rely on Sustainalytics for credible second-party opinions on green, social and sustainable bond frameworks. In 2020, Climate Bonds Initiative named Sustainalytics the "Largest Approved Verifier for Certified Climate Bonds" for the third consecutive year. The firm was also recognized by Environmental Finance as the "Largest External Reviewer" in 2020 for the second consecutive year. For more information, visit www.sustainalytics.com or contact us contact@sustainalytics.com