

Sustainable Finance Report 2021



Introduction

MTR established a Green Bond Framework in 2016 to guide its green bond issuance and a Green Finance Framework in 2018 expand its green financing instruments to include green loans and other credit facilities. In 2020 a Sustainable Finance Framework was established to cover a wider range of financing transactions where the proceeds are used for furthering the development of sustainable urban infrastructure in support of the United Nations Sustainable Development Goals.

Sustainalytics is of the opinion that the Sustainable Finance Framework conforms to the Green Bond Principles 2018, Social Bond Principles 2020, Sustainability Bond Guidelines 2018 and Green Loan Principles 2020.

As a corporation whose main business is to provide low carbon transportation to keep cities moving in a sustainable manner, MTR continues to utilize sustainable financing to fund new projects and refinance existing ones. In 2021, a total of six green bonds and one bilateral sustainable loan were arranged.

Sustainable Finance Portfolio

At the end of 2021, MTR's sustainable finance portfolio consisted of 15 bonds in four different currencies, in addition to three HKD and one EUR loans. The bonds were issued by either MTR or its issuance vehicle MTR Corporation (C.I.) Limited ("MTR CI") with the guarantee of MTR.

In 2021 six bonds in the portfolio (three in HKD, two in CNY and one in USD, totaling HK\$ 2.2 billion equivalent) matured. Six new bonds and one new loan totaling HK\$ 4.8 billion equivalent were arranged in the same year to replace matured financings and fund new projects. The outstanding sustainable finance of the Group reached HK\$ 26.1 billion equivalent, with sustainable bonds totalling HK\$21.8 billion equivalent which represented more than half the outstanding debt securities of the Group.

The following table lists out the sustainable financings that were outstanding as of 31 December 2021.

Outstanding Green Bonds

Year Issued	Identifier/ISIN	Issuer	Currency	Coupon (p.a.)	Maturity Date	Principal Amount
2016	MTRCIGB_USD_261102XS1509084775	MTR CI	USD	2.500%	2 Nov 2026	USD 600,000,000
2017	MTRCIGB_AUD_270628XS1637858546	MTR CI	AUD	3.300%	28 Jun 2027	AUD 171,000,000
2017	MTRCIGB_HKD_320920HK0000365228	MTR CI	HKD	2.460%	20 Sep 2032	HKD 722,000,000
2017	MTRGB_HKD_470717HK0000352432	MTR	HKD	2.980%	17 Jul 2047	HKD 338,000,000
2017	MTRCIGB_HKD_470906HK0000362761	MTR CI	HKD	2.830%	06 Sep 2047	HKD 315,000,000
2017	MTRGB_USD_470927XS1690683211	MTR	USD	3.375%	27 Sep 2047	USD 100,000,000
2018	MTRCIGB_HKD_480328HK0000409455	MTR CI	HKD	3.150%	28 Mar 2048	HKD 230,000,000
2020	MTRGB_USD_300819XS2213668085	MTR	USD	1.625%	19 Aug 2030	USD 1,200,000,000
2020	MTRGB_HKD_550624HK0000612025	MTR	HKD	2.550%	24 Jun 2055	HKD 500,000,000
2021	MTRGB_CNY_220318HK0000707312	MTR	CNY	2.900%	18 Mar 2022	CNY 1,150,000,000
2021	MTRGB_CNY_220419HK0000722279	MTR	CNY	2.860%	19 Apr 2022	CNY 200,000,000
2021	MTRGB_HKD_220715HK0000684792	MTR	HKD	3-month HKD HIBOR + 0.03%	15 July 2022	HKD 418,000,000
2021	MTRGB_CNY_230408HK0000722089	MTR	CNY	2.850%	8 Apr 2023	CNY 350,000,000
2021	MTRGB_CNY_240324HK0000707460	MTR	CNY	2.900%	24 Mar 2024	CNY 1,000,000,000
2021	MTRGB_CNY_240325HK0000707445	MTR	CNY	2.800%	25 Mar 2024	CNY 250,000,000

Outstanding Green Loans/Sustainable Loans/Credit Facilities

Year Executed	Identifier	Currency	Maturity Date	Loan Amount
2018	MTRGL_HKD_230626	HKD	26 Jun 2023	HKD 1,200,000,000
2020	MTRGL_HKD_230626B	HKD	26 Jun 2023	HKD 700,000,000
2020	MTRGL_HKD_250618	HKD	18 Jun 2025	HKD 1,500,000,000
2021	MTRGL_EUR_260111	EUR	11 Jan 2026	EUR 100,000,000

Project Portfolio

A large proportion of the financings raised in 2021 were used for refinancing completed rail projects which have a long asset lifespan.

Low Carbon Transportation Projects normally take many years to construct/implement. Tail end project payments for Kwun Tong Line Extension (A) and South Island Line (East) (B) continued into 2021. Our asset replacement projects like the M-Train purchase (C) and the Rail Power Line replacement (D) are ongoing and investment amount for these projects will continue to grow.

Details of the projects are available in later part of this report.

#	Name of Project	Classification	Total Project Amount	Cost Incurred up to Dec 2021	Amount Financed by Sustainable Finance Proceeds
Train Lines and Infrastructure					
A	Kwun Tong Line Extension	Low Carbon Transportation	HK\$ 6,900 million	HK\$ 6,500 million*	HK\$ 5,725 million
B	South Island Line (East)	Low Carbon Transportation	HK\$ 17,200 million	HK\$ 17,000 million*	HK\$ 15,426 million
C	Replacement of 1 st Generation M-Trains	Low Carbon Transportation	HK\$ 7,100 million	HK\$ 1,280 million	HK\$ 1,200 million
D	Replacement of Rail Power Line	Low Carbon Transportation	HK\$ 4,900 million	HK\$ 194 million	HK\$ 194 million
E	Battery Locomotives Acquisition	Low Carbon Transportation	HK\$ 265 million	HK\$ 21 million	HK\$ 21 million
Energy Efficiency Improvement					
F	Replacement of Chillers at Stations/Depot Facilities	Energy Efficiency	HK\$ 1,100 million	HK\$ 840 million	HK\$ 840 million
G	Trackside Energy Storage (pilot)	Energy Efficiency	HK\$ 21 million	HK\$ 21 million	HK\$ 21 million
H	Smart Intelligent Power Module (R-IPM)	Energy Efficiency	HK\$ 98 million	HK\$ 90 million	HK\$ 90 million
I	Regenerative Station Energy Saving Inverter System	Energy Efficiency	HK\$ 8 million	HK\$ 5 million	HK\$ 5 million
Sustainable Stations and Buildings					
J	Maritime Square Extension	Sustainable Real Estate	HK\$ 2,600 million	HK\$ 2,525 million	HK\$ 2,525 million
K	Carbon Neutral Station Design	Sustainable Transit Station	HK\$ 5 million	HK\$5 million	HK\$ 4 million
Biodiversity Preservation					
L	Lok Ma Chau Wetland	Biodiversity and conservation	HK\$ 4~5 million per year	HK\$ 24 million (from 2017)	HK\$ 24 million
Total:			HK\$ 40,220 million	HK\$ 28,505 million	HK\$ 26,075 million

* There were typographical errors in the presentation for the 2020 Sustainable Finance Report on these two figures. The errors did not affect the CO2 attribution computation.

Use of Proceeds

The following table lists out how the financing proceeds were allocated to different projects, and the corresponding aggregate Greenhouse Gas (GHG) emission avoided.

Year Raised	Description/ Identifier/ISIN	Principal Amount (HKD million equivalent)	Current Allocation in Projects (HKD million)												Total CO ₂ e avoidance for bond/loan/earlier portfolio (tonnes)
			A	B	C	D	E	F	G	H	I	J	K	L	
Previous financings and allocation aggregated															
2016-2020	Nine green bonds and three green loan*	21,264	4,535	13,344	110	117	5	546	19	65	1	2,500	4	18	39,590
Allocation for financings raised in 2021															
2021	MTRGB_CNY_220318 HK0000707312	1,369	100	644	500		16	109							4,600
2021	MTRGB_CNY_220419 HK0000722279	237	100	129					2					6	460
2021	MTRGB_HKD_220715 HK0000684792	418	100	314							4				840
2021	MTRGB_CNY_230408 HK0000722089	414	90	114				185		25					3,220
2021	MTRGB_CNY_240324 HK0000707460	1,192	200	402	590										3,650
2021	MTRGB_CNY_240325 HK0000707445	299	200	22		77									970
2021	MTRGL_EUR_260111	882	400	457								25			1,780
Total:		26,075	5,725	15,426	1,200	194	21	840	21	90	5	2,525	4	24	
Total CO ₂ e avoidance for each project (tonnes)			17,590	18,500	5,190	840	80	9,990	-	2,200	190	530	-	-	55,110
GHG emission avoidance per HKD million investment			3.07	1.20	4.33	4.33	3.68	11.90	-	24.49	39.75	0.21	-	-	

* Please refer to the 2016-2020 reports for the allocation of the financing proceeds raised in previous years.

MTR Green Bond, Green Finance and Sustainable Finance Frameworks

MTR set up a **Green Bond Framework** ("GBF") in October 2016. **Sustainalytics** opined that the Framework was in alignment with the four pillars of the Green Bond Principles (2016) of the International Capital Market Association. Expanding upon the foundation of the GBF, MTR established a **Green Finance Framework** in June 2018 to include the coverage of green loan financing, taking into account the recommendation of the Green Loan Principles issued by the Asia Pacific Loan Market Association.

In August 2020, a **Sustainable Finance Framework** ("SFF") was established so that the scope of eligible investments was further broadened to include projects in the development of sustainable urban infrastructure in support of the United Nations Sustainable Development Goals. A second-party **opinion** was provided by Sustainalytics on the SFF.

The Frameworks set out how the Corporation uses sustainable finance proceeds to fund or refinance eligible projects and initiatives that enhance long-term service levels and propel ESG (Environmental, Social and Governance) targets, as well as the reporting thereon, thereby integrating ESG elements into its financing and corporate decision-making process.

Summary of the Frameworks are as follows:

MTR Frameworks:

- MTR Green Bond Framework established in October 2016
- MTR Green Finance Framework established in June 2018
- MTR Sustainable Finance Framework established in August 2020
- Proceeds of sustainable financings will be used to fund or refinance, in whole or in part, Eligible Investments
- Proceeds of sustainable financings may be used to repay borrowings under MTR's general credit facilities pending allocation to Eligible Investments
- Eligible Green Investments include projects in the following sectors:
 - Renewable Energy
 - Low Carbon Transportation
 - Energy Efficiency
 - Sustainable Transit Stations and Real Estate Properties
 - Adaptation to Climate Change
 - Biodiversity and Conservation
 - Water Management
 - Waste Management
 - Pollution Prevention
- Eligible Social Investments include projects in the following sectors:
 - Relief measures and programmes for employment generation and unemployment prevention for populations adversely affected by unexpected economic disruptions caused by natural disasters or pandemics. Relief measures may include, but are not limited to, rent moratorium for tenants
 - Affordable basic infrastructure, including initiatives, subsidy or investments in:
 - » Projects that support passengers affected by socioeconomic situation including but not limited to relief measures such as fare discount
 - » Sanitation and infection preventative services and equipment at transit stations, trains, buildings, real estates properties, facilities and infrastructure
 - » Projects for the design, construction, maintenance and upgrade of station facilities, services and train environment including but not limited to baby care and breast-feeding rooms for women, accessibility and barrier-free infrastructure and facilities for elderly and special need groups, among others

Sustainable investment descriptions and environmental benefits

As there has not been any material changes in Project #G, Project #K and Project #L, descriptions of the projects are not repeated here but can be obtained from earlier [reports](#).

Name of Investment		(#A) Kwun Tong Line Extension
Total Investment Amount	HK\$ 6,900 million	
Investment Amount Funded by Sustainable Finance	HK\$ 5,725 million	
Category of Eligible Investment	Low Carbon Transportation	
Description of Investment	<p>In May 2011, the Company entered into project agreements with the Hong Kong SAR Government to design, construct and operate the Kwun Tong Line Extension ("KTL") and the South Island Line (East) ("SIL").</p> <p>KTL extends the existing Kwun Tong Line from Yau Ma Tei station by 2.6km, with two new stations at Ho Man Tin and Whampoa. KTL commenced operation in October 2016.</p>	
Benefits of Project	The project provides low carbon transportation services to densely populated areas and helps reduce road traffic congestions experienced by the residents.	
Passenger Trips for 2021	45,721,000 (33,087,000 in 2020)	
Equivalent Carbon Offset (GHG Emission Avoided in tonnes CO ₂ e)	21,200 tonnes of CO₂ equivalent[^] at total investment amount.	
Carbon Offset per Million Investment (HK\$)	3.07 tonnes	
Other Benefits	<ul style="list-style-type: none"> Reduction of road traffic and congestion around the new stations as fewer cars are needed to transport passengers from the area. Energy conservation measures such as regenerative braking systems, full platform screen doors and efficient chiller equipment were implemented. 	

[^] Please see Appendix I for the method of estimating the GHG emission avoided for projects #A, #B, #C and #D.

Sustainable investment descriptions and environmental benefits

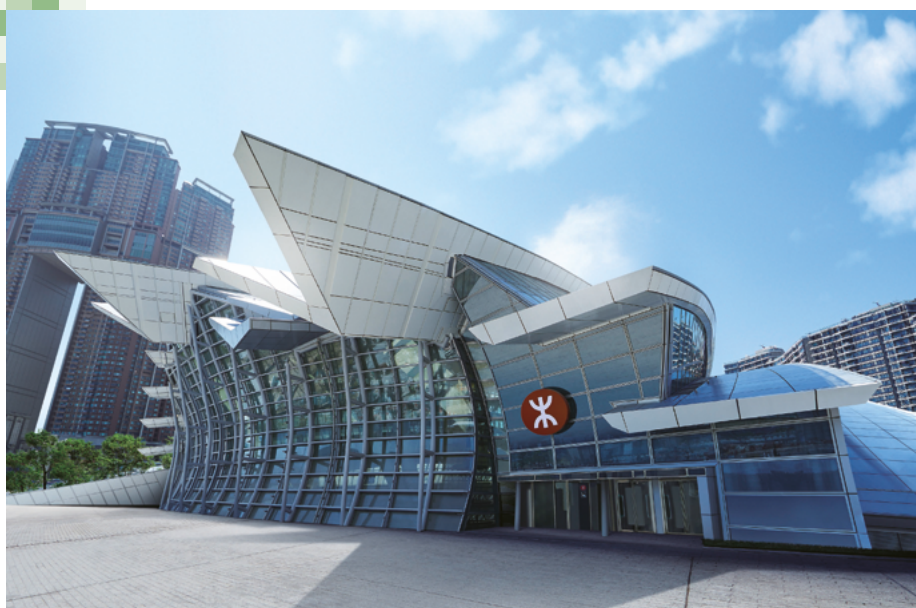
Name of Investment		(#B) South Island Line (East)
Total Investment Amount	HK\$ 17,200 million	
Investment Amount Funded by Sustainable Finance	HK\$ 15,426 million	
Category of Eligible Investment	Low Carbon Transportation	
Description of Investment	<p>In May 2011, the Company entered into project agreements with the Hong Kong SAR Government to design, construct and operate the Kwun Tong Line Extension ("KTL") and the South Island Line (East) ("SIL").</p> <p>SIL is a 7km medium capacity metro line connecting the existing Admiralty station to the Southern District of Hong Kong, with four new stations at Ocean Park, Wong Chuk Hang, Lei Tung and South Horizons. SIL commenced operation in December 2016.</p>	
Benefits of Project	<p>The project provides low carbon transportation services to densely populated areas and helps reduce road traffic congestions experienced by the residents. SIL was also designed with environmentally friendly features like regenerative braking and trackside energy storage systems, extended noise barriers and green roofs.</p>	
Passenger Trips for 2021	44,611,000 (33,070,000 in 2020)	
Equivalent Carbon Offset (GHG Emission Avoided in tonnes CO ₂ e)	20,700 tonnes of CO₂ equivalent[^] at total investment amount.	
Carbon Offset per Million Investment (HK\$)	1.20 tonnes	
Other Benefits	<ul style="list-style-type: none"> • Estimated 600 kWh of electricity saved annually with the regenerative braking and trackside energy storage systems. • Reduction of road traffic and congestion especially at the Aberdeen Tunnel. 	

[^] Please see Appendix I for the method of estimating the GHG emission avoided for projects #A, #B, #C and #D.

Sustainable investment descriptions and environmental benefits

Name of Investment		(#C) Replacement of First-Generation Metro Cammell EMU Trains ("M-Trains")
Total Investment Amount	HK\$ 7,100 million	
Investment Amount Funded by Sustainable Finance	HK\$ 1,200 million	
Category of Eligible Investment	Low Carbon Transportation	
Description of Investment	<p>As part of MTR's long-term asset renewal strategy, 93 eight-car trains were procured to replace some of the first-generation M-trains, which have been in service for decades on Tsuen Wan Line, Kwun Tong Line, Island Line and Tseung Kwan O Line.</p> <p>13 out of 93 trains have been received and they are undergoing stringent testing and commissioning procedures before being put into service.</p>	
Benefits of Project	Some of the first-generation M-trains have reached an age where asset replacement must be carried out to ensure continuity of reliable services and smooth operations.	
Equivalent Carbon Offset (GHG Emission Avoided in tonnes CO ₂ e)	30,700 tonnes of CO₂ equivalent[^] at total investment amount.	
Carbon Offset per Million Investment (HK\$)	4.33 tonnes	

[^] Please see Appendix I for the method of estimating the GHG emission avoided for projects #A, #B, #C and #D.



Sustainable investment descriptions and environmental benefits

Name of Investment		(#D) Replacement of Rail Power Line
Total Investment Amount		HK\$ 4,900 million
Investment Amount Funded by Sustainable Finance		HK\$ 194 million
Category of Eligible Investment		Low Carbon Transportation
Description of Investment		Replacement of High Voltage and Low Voltage rail power line systems for Kwun Tong Line, Tsuen Wan Line and Island Line to maintain the reliability of the power supply system. The replacement also improves energy efficiency by adding Power Convertors to recycle traction power back into the network.
Benefits of Project		The replacement is to ensure the reliability of the transport infrastructure over the long term, avoiding break down due to aging of the systems. Enhancements to the existing power system have been added in conjunction with the asset replacement program, including: <ul style="list-style-type: none"> • Installation of five power converters for power recycling • Higher efficiency transformers to reduce power losses
Equivalent Carbon Offset (GHG Emission Avoided in tonnes CO ₂ e)		21,200 tonnes of CO₂ equivalent[^] at total investment amount.
Carbon Offset per Million Investment (HK\$)		4.33 tonnes
Other Benefits		The new power converters and higher efficiency transformers provide the following expected benefits. Power Converter savings: 1.7GWh / year Transformer savings: 1.6GWh / year Applying average emission factors of 0.55kgCO ₂ e/kWh for CLP ¹ and HK Electric ² , works out to be around 1,800 tonnes of CO ₂ e when completed. This would further improve the carbon offset but was not included in the calculation of the carbon offset numbers above.

1. CLP emission factors for 2021 : 0.39kgCO₂e/kWh

2. HKE emission factors for 2021 : 0.71kgCO₂e/kWh

[^] Please see Appendix I for the method of estimating the GHG emission avoided for projects #A, #B, #C and #D.

Sustainable investment descriptions and environmental benefits

Name of Investment		#E Battery Locomotives Acquisition	
Total Investment Amount		HK\$ 265 million	
Investment Amount Funded by Sustainable Finance		HK\$ 21 million	
Category of Eligible Investment		Low Carbon Transportation	
Description of Investment		Procurement of 13 battery operated locomotives to replace eight diesel and five old battery locomotives.	
Beneficial Environmental Impact Estimate		<p>The operating efficiency and performance of the new electric-battery locomotives will be an improvement over the existing diesel and battery locomotives.</p> <p>On average, each locomotive is active 8 hours / day</p> <p>For diesel locomotive, approximately 51 litres of diesel is consumed each hour.</p> <p>Diesel consumption per day: $8 \times 51L = 408L$</p> <p>Total CO₂e emission per year⁺ $= 2.61 * 365 * 408 = 388.7 \text{ tonnes}$</p> <p>For electric-battery locomotive, CO₂e emission is calculated based on average emission factor of the power companies^{1,2}.</p> <p>Electric-Battery Locomotive (old)</p> <p>electricity consumption $= 1,408 \text{ kWh / day}$</p> <p>Total CO₂e emission per year $= 365 * 1,408 * 0.55 = 282.7 \text{ tonnes}$</p> <p>Electric-Battery Locomotive (new)</p> <p>electricity consumption $= 1,360 \text{ kWh / day}$</p> <p>Total CO₂e emission per year $= 365 * 1,360 * 0.55 = 273.0 \text{ tonnes}$</p> <p>Total CO₂e emission reduction per year for 13 locomotive replacements</p> <p>$= 8 * (388.7 - 273.0) + 5 * (282.7 - 273.0)$</p> <p>$= 974.1 \text{ tonnes}$</p>	
Equivalent Carbon Offset (GHG Emission Avoided in tonnes CO ₂ e)		975 tonnes of CO₂ equivalent based on the average CO ₂ e emission factors of 0.55kgCO ₂ e/kWh for CLP ¹ and HK Electric ² at total investment amount.	
Carbon Offset per Million Investment (HK\$)		3.68 tonnes	

1. CLP emission factors for 2021 : 0.39kgCO₂e/kWh

2. HKE emission factors for 2021 : 0.71kgCO₂e/kWh

⁺ Emission of CO₂e for usage of diesel can be obtained [here](#) (report by the Environmental Protection Department and the Electrical and Mechanical Services Department).

Sustainable investment descriptions and environmental benefits

Name of Investment		(#F) Replacement of Chillers at Stations/Depot Facilities
Total Investment Amount	HK\$ 1,100 million	
Investment Amount Funded by Sustainable Finance	HK\$ 840 million	
Category of Eligible Investment	Energy Efficiency	
Description of Investment	<p>A total of 154 chillers at 38 MTR stations and four railway depots will be replaced with more advanced and environmentally friendly systems by 2023.</p> <p>The new station chillers will provide a more comfortable station environment for passengers, with enhanced energy efficiency using variable-frequency drive inverter technology that could adjust the power output based on the actual temperature detected.</p>	
Beneficial Environmental Impact Estimate	<p>The operating efficiency and performance of the new chillers will be an improvement over the existing chillers. Total number of chillers needed is reduced to 133 chillers. Total energy consumption is expected to be reduced by 30.4 GWh when completed:</p> <p>Estimation of benefit</p> <p>Old chillers total energy consumption per annum: 92.1 GWh</p> <p>New chillers total energy consumption per annum: 61.7 GWh</p> <p>Estimated energy conserved per annum: 30.4 GWh</p>	
Progress of Investment and Measured Benefits	<p>As of December 2021, a total of 121 chillers have been replaced.</p> <p>Computation of savings in energy based on specification numbers is at approximately 23.9 GWh per year (121/154 * 30.4GWh)</p>	
Equivalent Carbon Offset (GHG Emission Avoided in tonnes CO ₂ e)	<p>13,100 tonnes of CO₂ equivalent based on the average CO₂e emission factors of 0.55kgCO₂e/kWh for CLP¹ and HK Electric² at total investment amount.</p>	
Carbon Offset per Million Investment (HK\$)	11.90 tonnes	

1. CLP emission factors for 2021 : 0.39kgCO₂e/kWh

2. HKE emission factors for 2021 : 0.71kgCO₂e/kWh

Sustainable investment descriptions and environmental benefits

Name of Investment		(#H) Smart Intelligent Power Module (R-IPM)
Total Investment Amount	HK\$ 98 million	
Investment Amount Funded by Sustainable Finance	HK\$ 90 million	
Category of Eligible Investment	Energy Efficiency	
Description of Investment	Replacement of Intelligent Power Modules ("IPM") in 48 SP trains with more advanced R-series Smart Intelligent Power Modules ("R-IPM") that improves usage rate of regenerative energy from braking.	
Beneficial Environmental Impact Estimate	<p>R-IPM installed in trains allow a train to increase the regenerative energy (electricity generated from the braking system) ratio from 36% to 41%. The regenerative energy is fed back into the power supply network for usage by the train or other trains that run on the network.</p> <p>The energy recycled back to the network that are utilized will increase to 35.7 GWh from 31.4 GWh per annum with a net savings of 4.3 GWh.</p> <p>In addition, the higher regenerative energy ratio also provides for better braking traction to assist trains to stop at the destination points.</p>	
Equivalent Carbon Offset (GHG Emission Avoided in tonnes CO ₂ e)	2,400 tonnes of CO₂ equivalent based on the average CO ₂ e emission factors of 0.55kgCO ₂ e/kWh for CLP ¹ and HK Electric ² at total investment amount.	
Carbon Offset per Million Investment (HK\$)	24.49 tonnes	

1. CLP emission factors for 2021 : 0.39kgCO₂e/kWh

2. HKE emission factors for 2021 : 0.71kgCO₂e/kWh



Sustainable investment descriptions and environmental benefits

Name of Investment		(#1) Regenerative Station Energy Saving Inverter System	
Total Investment Amount		HK\$ 8 million	
Investment Amount Funded by Sustainable Finance		HK\$ 5 million	
Category of Eligible Investment		Energy Efficiency	
Description of Investment		<p>Installation of Station Energy Saving Inverter (S-EIV) at Hong Kong University Station (HKU) and Lai King Traction Substation (LKT).</p> <p>The S-EIV converts the regenerative energy produced by the train braking system into 415V low-voltage alternative current electricity that can be consumed by the station facilities, thereby increasing the utilization of regenerative energy and reducing external electricity consumption.</p> <p>At Hong Kong University Station, the installation of the S-EIV also helps to decelerate trains more effectively and improve stopping accuracy at the West Island Line stations.</p>	
Beneficial Environmental Impact Estimate		<p>Annual savings estimated in HKU station: 170MWh</p> <p>Annual savings estimated in LKT substation: 409MWh</p> <p>Total electricity saved per annum: 579MWh</p>	
Equivalent Carbon Offset (GHG Emission Avoided in tonnes CO ₂ e)		318 tonnes of CO₂ equivalent based on the average CO ₂ e emission factors of 0.55kgCO ₂ e/kWh for CLP ¹ and HK Electric ² at total investment amount.	
Carbon Offset per Million Investment (HK\$)		39.75 tonnes	

1. CLP emission factors for 2021 : 0.39kgCO₂e/kWh

2. HKE emission factors for 2021 : 0.71kgCO₂e/kWh

Sustainable investment descriptions and environmental benefits

Name of Investment		(#J) Maritime Square Extension															
Total Investment Amount	HK\$ 2,600 million																
Investment Amount Funded by Sustainable Finance	HK\$ 2,525 million																
Category of Eligible Investment	Sustainable Real Estate Properties																
Description of Investment	<p>It is a shopping mall building with the design of a "Floating Garden" with multi-level accessible green terraces, seamlessly integrated with the interior spaces and a water covered skylight at the roof garden which brings in dynamic natural lighting to the core atrium of the mall interior.</p> <p>Implementation of energy-saving initiatives includes an energy management system, water-cooled air conditioning system with a combination of conventional and oil-free chillers, air lock lobbies and energy efficient lighting.</p>																
Benefit of Project	<p>The project has attained the Beam Plus Silver accreditation, a strong achievement for a non-office commercial building (shopping mall). The energy savings is estimated at 25.9% for the commercial portion and 21.6% for the car park respectively (average 23.8%).</p>																
Beneficial Environmental Impact Estimate	<p>The annual electricity consumption for the Maritime Square extension for 2021 was 4,451 MWh. While most of energy consumption is at the commercial portion of the mall (versus carpark), conservatively we use the average of the 2 saving rates listed above to compute the total energy saved.</p> <p>Savings of 23.8% amounted to about 1,390 MWh (for 2021), equivalent to CO₂e emission avoidance of 760 tonnes based on CLP's¹ (provider of electricity in Tsing Yi area) CO₂e emission factor.</p> <p>The following was the recorded energy consumption for 2018-2021.</p> <table border="1"> <thead> <tr> <th>Year</th><th>Electricity Consumption (MWh)</th><th>Energy savings based on average 23.8% rate (MWh)</th></tr> </thead> <tbody> <tr> <td>2018</td><td>4,564</td><td>1,425</td></tr> <tr> <td>2019</td><td>4,458</td><td>1,392</td></tr> <tr> <td>2020</td><td>4,267</td><td>1,333</td></tr> <tr> <td>2021</td><td>4,451</td><td>1,390</td></tr> </tbody> </table> <p>Energy Savings = Consumption/(1-Saving Rate) - Consumption</p>		Year	Electricity Consumption (MWh)	Energy savings based on average 23.8% rate (MWh)	2018	4,564	1,425	2019	4,458	1,392	2020	4,267	1,333	2021	4,451	1,390
Year	Electricity Consumption (MWh)	Energy savings based on average 23.8% rate (MWh)															
2018	4,564	1,425															
2019	4,458	1,392															
2020	4,267	1,333															
2021	4,451	1,390															
Equivalent Carbon Offset (GHG Emission Avoided in tonnes CO ₂ e)	540 tonnes of CO₂ equivalent at total investment amount.																
Carbon Offset per Million Investment (HK\$)	0.21 tonnes																

1. CLP emission factors for 2021 : 0.39kgCO₂e/kWh

Appendix I : Methodology for estimating environmental benefits of Low Carbon Transportation

Key approach and assumptions:

The GHG emission avoidance for MTR is calculated with

- The total passenger-km number for the asset of the project.
- The GHG emission reduction versus the next best alternative (local public bus), which is a conservative assumption as passengers are also likely to use alternative means like mini-bus, private cars and taxis, all of which emit more GHG than a local bus.
- GHG Emission avoided =

$$\text{Number of Passenger-km} * (\text{Emission Factor of Average Bus} - \text{Emission Factor of MTR})$$

The emission factor for MTR trains is computed using the total GHG emission divided by the total number of passenger-km.

The total passenger-km travelled on MTR Heavy Rail system in 2021 was 14,927,416,470 (12,124,774,100 in 2020).

Total GHG emission from railway operation (including fuel consumption, refrigerants, purchased electricity and water consumption) in 2021 was 868,815,000 kgCO₂e (828,954,000 kgCO₂e in 2020).

The GHG emission MTR rounds to **0.058kg CO₂e/passenger-km** (0.068 kgCO₂e/passenger-km in 2020).

The emission factor for buses was obtained from a report published by UK Department of Business Energy & Industrial Strategy ([DEFRA](#)).

Transport Mode	Emission Factor kgCO ₂ e per Passenger-km	Reference
Buses (average local bus)	0.10227 (2020: 0.10312)	Defra conversion factor
MTR Railway	0.058 (2020: 0.068)	As computed above

Hence total GHG emission avoidance for the MTR heavy rail transport (excluding Airport Express) rounds out to be:

$$14,876,452,036 * (0.10227 - 0.058) = 658,580 \text{ tonnes CO}_2\text{e}$$

Where 14,876,452,036 is the total passenger-km travelled on MTR heavy rail network excluding Airport Express.



For projects #A and #B

Projects #A and #B are extensions to the MTR network with an ending node. For estimation of the GHG emission avoidance, we assume any usage of the lines (i.e. passengers that used any one of the stations along the lines) as an incremental usage as the train trips would not have happened without the lines. i.e. passengers would have taken additional trip on a bus/car from the previous terminal station, or passengers would have taken outright the full trip on bus/car.

The average travelling distance of each passenger was 10.5km in 2021 (10.5km for 2020). Based on the number of passengers for Kwun Tong Line Extension and South Island Line (East) in 2021, the corresponding avoidance of GHG emissions are computed as follows:

Annual GHG Emissions Avoided =

$$(\text{Emission Factor for MTRC} - \text{Emission Factor for Local Bus}) * \text{Annual Passenger number} * \text{Average Passenger Distance}$$

Projects	Annual Passenger Number ('000)	Annual GHG Emissions Avoided (tonnes CO ₂ e)
#A	45,721 (33,087 in 2020)	21,200 (12,100 in 2020)
#B	44,611 (33,070 in 2020)	20,700 (12,100 in 2020)

For projects #C and #D

Projects #C and #D are mid-life asset replacement projects that are crucial to upkeep the operation of the network.

The GHG emission avoidance number is estimated based on the amount of expenditure divided by the Total Asset Value of the MTR rail system (inclusive of KCRC rail system), multiplied by the total GHG emission avoided by the whole system.

- Total Asset Value of the heavy rail system:

$$\text{HKD } 99.9 \text{ billion}^1 + \text{HKD } 52.1 \text{ billion}^2$$

- GHG Emission avoided for project =

$$\text{Project Investment Amount} / \text{Total Asset Value} * \text{GHG Emission Avoidance for MTR Heavy Rail Network}$$

Projects	Current Investment Amount (Total investment amount)	Annual GHG Emissions Avoided (tonnes CO ₂ e)
#C	HK\$ 1,200 million (HK\$ 7,100 million)	5,190 (30,700 for complete project)
#D	HK\$ 194 million (HK\$ 4,900 million)	840 (21,200 for complete project)

1. Carry value of railway assets for MTRC as of end 2020 (page 268, 2020 MTRC [annual report](#))

2. Carry value of railway assets for KCRC as of end 2020 (page 53, 2020 KCRC [annual report](#))

Appendix II : Verification Statement



VERIFICATION STATEMENT

Scope of Verification

Hong Kong Quality Assurance Agency (HKQAA) has been engaged by MTR Corporation Limited ("MTR", Hong Kong stock code: 66) to undertake an independent verification for providing limited assurance on the compliance of the projects included in the green and social project portfolio and financed through the proceeds of 15 MTR Green and/or Social Bonds issued by MTR Corporation (C.I.) Limited (a subsidiary of MTR) and MTR Corporation Limited, and 4 green credit facilities (refer to annex 1 for details) under MTR Sustainable Finance Framework ("Framework"). The scope of HKQAA's verification covers the data and information for the period 1st January 2021 to 31st December 2021.

Level of Assurance and Methodology

The process applied in this verification was based on the International Standard on Assurance Engagements 3000 (Revised) – "Assurance Engagement Other Than Audits or Reviews of Historical Financial Information" issued by the International Auditing and Assurance Standards Board (ISAE 3000). Our evidence gathering process was designed to obtain a limited level of assurance as set out in ISAE 3000 for the purpose of devising the verification.

Our verification procedure performed covered reviewing of relevant documentation, interviewing responsible personnel with accountability for preparing the reporting contents and verifying the selected representative sample of project, data and information. Raw data and supporting evidence of the selected samples were also thoroughly examined during the verification process.

Independence

MTR is responsible for the collection and presentation of the information presented. HKQAA does not involve in calculating, compiling, or development of the Report. Our verification activities are independent from MTR.

Limitations

There are inherent limitations in performing assurance. Assurance engagements are based on selective testing of the information and data being examined. It is possible that fraud, error or non-compliance may occur and not be detected. The assurance did not provide assurance on information outside the defined reporting boundary and period. There are additional inherent risks associated with assurance over non-financial information including reporting against standards which require information to be assured against source data compiled using definitions and estimation methods that are developed by the reporting entity. Finally, adherence to ISAE 3000 is subjective and will be interpreted differently by different stakeholder groups.

Our assurance was limited to the MTR Sustainable Finance Framework post-issuance, and did not include statutory financial statements, financial statements and economic performance. Our assurance is limited to policies and procedures in place as of 31st December 2021.

Conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the selected information as at 31st December 2021 has not been prepared, in all material respects, in accordance with the reporting criteria.

Signed on behalf of Hong Kong Quality Assurance Agency



Connie Sham
Head of Audit
27 May 2022



Annex 1: List of Bonds and Credit Facilities

BONDS	
<u>Issuer name</u>	<u>Name of Bond</u>
MTR Corporation (C.I.) Limited	MTRCIGB_USD_261102XS1509084775
MTR Corporation (C.I.) Limited	MTRCIGB_AUD_270628XS1637858546
MTR Corporation (C.I.) Limited	MTRCIGB_HKD_320920HK0000365228
MTR Corporation Limited	MTRGB_HKD_470717HK0000352432
MTR Corporation (C.I.) Limited	MTRCIGB_HKD_470906HK0000362761
MTR Corporation Limited	MTRGB_USD_470927XS1690683211
MTR Corporation (C.I.) Limited	MTRCIGB_HKD_480328HK0000409455
MTR Corporation Limited	MTRGB_USD_300819XS2213668085
MTR Corporation Limited	MTRGB_HKD_550624HK0000612025
MTR Corporation Limited	MTRGB_CNY_220318HK0000707312
MTR Corporation Limited	MTRGB_CNY_220419HK0000722279
MTR Corporation Limited	MTRGB_HKD_220715HK0000684792
MTR Corporation Limited	MTRGB_CNY_230408HK0000722089
MTR Corporation Limited	MTRGB_CNY_240324HK0000707460
MTR Corporation Limited	MTRGB_CNY_240325HK0000707445
CREDIT FACILITIES	
<u>Year Executed</u>	<u>Identifier</u>
2018	MTRGL_HKD_230626
2020	MTRGL_HKD_230626B
2020	MTRGL_HKD_250618
2021	MTRGL_EUR_260111