

# **GREEN BOND REPORT**

For the Financial Year 2023



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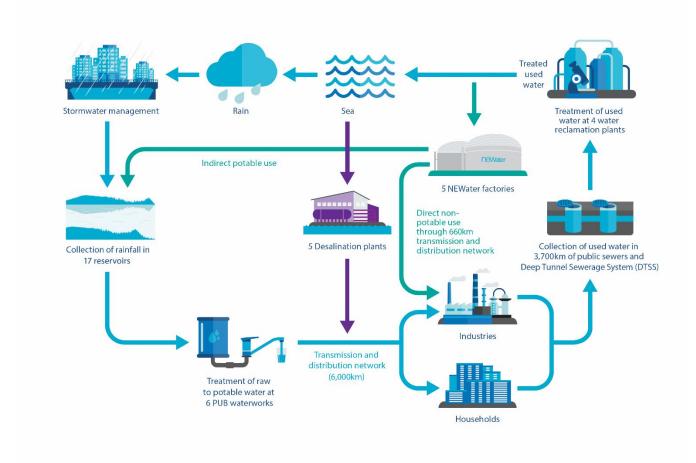
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# 1. Background

### 1.1 About PUB

PUB, Singapore's National Water Agency, is a statutory board under the Ministry of Sustainability and the Environment (MSE). PUB manages Singapore's water supply, water catchment and used water in an integrated way. PUB is also the national agency with the overall responsibility of protecting Singapore's coastline against sea level rise.

PUB ensures a diversified and sustainable supply of water for Singapore with the Four National Taps (local catchment water, imported water, NEWater and desalinated water).



### 1.2 Management's Message

### **Green Financing for a Sustainable Water System**

The impact of climate change presents a major long-term challenge for Singapore and is a key focus of the work at PUB. Results from the Third National Climate Change Study showed that Singapore will experience more wet and dry extremes, which can impact the sustainability and resilience of our water supply. We will increasingly rely on weather-resilient sources of water to meet growing demand especially from industry needs. Faced with increasing constraints on land, carbon, manpower and budget, PUB must invest in new, innovative and sustainable infrastructure to meet future demands and deliver a sustainable water system for all. PUB also needs to respond to the long-term issue of sea-level rise, which will entail significant infrastructure build-up across Singapore's coastline.

PUB established a Green Financing Framework in 2022, aligned to the ICMA Green Bond Principles 2021 and ASEAN Green Bond Standards 2018. PUB has also issued our inaugural tranche of S\$800 million of green bonds in August 2022, which have been earmarked for allocation to Tuas Water Reclamation Plant (WRP) and Tuas NEWater Factory 1 (TNF 1). These projects incorporate advanced physical, biological and chemical treatment processes which, coupled with PUB's renewable solar energy deployments, enable us to use less non-renewable energy in our operations.

PUB will continue to issue green bonds to finance upcoming infrastructure in sustainable water and wastewater management. This infrastructure will deliver various environmental benefits, such as reduced emissions and waste generation and increased water recycling. Through sustained investment in green infrastructure, PUB aims to transit to a low carbon and resource efficient future.

To understand better PUB's sustainability goals and strategies, we encourage you to read this progress report in conjunction with PUB's Annual and Sustainability Report 2024, which shares our vision for a sustainable and resilient water future for Singapore.

Ong Tze-Ch'in Chief Executive, PUB

### 1.3 PUB Green Financing Framework

Eligible project categories and qualifying criteria under PUB's Green Financing Framework<sup>1</sup> are detailed in <u>Table 1</u>. Please refer to PUB's Green Financing Framework on PUB's website for more details on the framework for use of proceeds, governance structure, process for project evaluation and selection and management of proceeds.

Table 1 - List of Eligible Project Categories and Green Financing Criteria

<b>Project Category</b>	Project Sub-category	Criteria
Sustainable water and wastewater management	Water monitoring (e.g. water quality monitoring systems, used water monitoring systems)	<ul> <li>Net-zero or reduction in greenhouse gas ("GHG") emissions relative to business as usual ("BAU") baseline</li> <li>Enables early detection and prompt intervention to prevent         <ul> <li>a) pollution of water sources</li> <li>b) water losses in system</li> </ul> </li> </ul>
Sustainable water and wastewater management	Water collection, storage and distribution (e.g. stormwater management systems, water distribution systems)	Net-zero or reduction in GHG emissions relative to BAU baseline     Prevent water losses
Sustainable water and wastewater management	Water treatment (e.g. water recycling systems, wastewater treatment systems)	<ul> <li>Net-zero or reduction in GHG emissions relative to BAU baseline</li> <li>Prevent pollution of water sources</li> <li>Conservation of resources through water recycling</li> <li>Reduced waste generation</li> </ul>
Renewable energy	Renewable energy (e.g. solar PV systems, biogas generators)	Net-zero or reduction in GHG emissions relative to BAU baseline

### 1.4 PUB Green Bond Summary

PUB raised S\$800 million through the issuance of its inaugural green bond on 31 August 2022. The S\$800 million Fixed Rate green bond carries a coupon of 3.433% per annum, payable semi-annually. The bond received strong interest from investors and was about two times subscribed.

Table 2: Details of PUB's Green Bond Issued

ISIN	Issue Date	Maturity Date	Tenor	Principal Amount	Coupon
SGXF59503676	31 Aug 2022	30 Aug 2052	30 years	S\$800,000,000	3.433%

<sup>&</sup>lt;sup>1</sup> PUB's Green Financing Framework is available at https://www.pub.gov.sg/sustainability/green-financing-framework.

### 2 Allocation of Proceeds

In accordance with PUB's Green Financing Framework, proceeds from PUB green bonds will be used to finance and refinance eligible sustainable water and wastewater management, and renewable energy projects, with a two-year look-back period for refinancing projects.

The Management-level Sustainability Committee, co-chaired by PUB's two Deputy Chief Executives, with Department Directors as committee members, has overall responsibility for implementing PUB's Green Financing Framework. The main responsibilities with respect to green financing include reviewing nominated Eligible Green Projects, updating the process to align the purpose of the Framework relevant to PUB business activities, amending the scope of financial instruments covered by the Framework, and determining the eligibility for use of proceeds. All Eligible Green Projects will be reviewed by the Sustainability Committee and approved by the Chief Executive.

PUB's first tranche of green bond proceeds (S\$800 million) is fully earmarked for allocation to the Tuas WRP and TNF 1 projects, which are Eligible Green Projects under the sub-category of water treatment. As of 31 March 2024, **86% of these green bond proceeds (or \$684.6 million) have been allocated** to finance and refinance these Eligible Green Projects in <u>Table 3</u> below.

Table 3: Allocation of Proceeds to Eligible Green Projects as of 31 March 2024

Project Category	Project Sub- Category	Project Name	Amount
Sustainable water	Water treatment	Tuas Water Reclamation Plant	S\$642,511,191
and wastewater management	water treatment	Tuas NEWater Factory 1	S\$42,128,400
		Total	S\$684,639,591

The green bond proceeds have been allocated to finance and refinance the Eligible Green Projects' expenditure from April 2022 to March 2024. 31% of the allocated green bond proceeds were applied to refinancing the Eligible Green Projects from April 2022 to February 2023<sup>2</sup>.

The unallocated green bond proceeds were deployed in the interim at PUB's own discretion in cash instruments in accordance with PUB's approved cash investment policy, as outlined in PUB's Green Financing Framework. These unallocated green bond proceeds are expected to be fully allocated to Tuas WRP and TNF 1 projects in Financial Year (FY) 2024.

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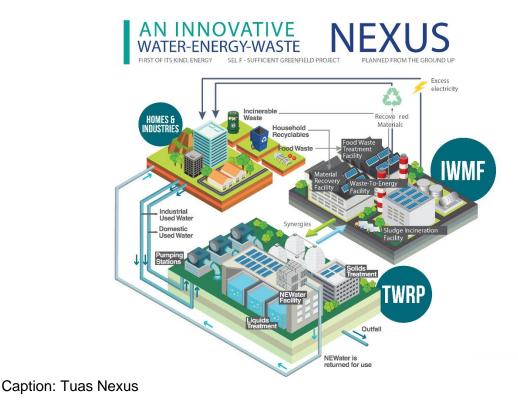
<sup>&</sup>lt;sup>2</sup> In accordance with PUB's Green Financing Framework, the identified projects were approved as Eligible Green Projects in March 2023

# 3 Tuas Water Reclamation Plant and NEWater Factory

The Deep Tunnel Sewerage System (DTSS) is an underground superhighway, designed to meet Singapore's long-term needs for used water collection, treatment, reclamation, and discharge in a sustainable manner. Expected to be completed in 2027, DTSS Phase 2 will extend the existing DTSS network to cover the Western half of Singapore and includes the upcoming Tuas Water Reclamation Plant (WRP) and Tuas NEWater Factory 1 (TNF 1). Tunneling works for DTSS Phase 2 concluded in August 2023, which will allow used water to be conveyed via gravity to Tuas Water Reclamation Plant.

Tuas WRP can receive up to 800 Million Litres per Day (MLD) of domestic and industrial used water. Besides incorporating advanced physical, biological and chemical treatment systems, Tuas WRP will also house the largest membrane bioreactor facility in the world. This enables the plant to be more energy efficient, occupy less space compared to existing WRPs, and produce high quality NEWater feedstock for TNF 1. Through the use of flow reversal technologies, TNF 1 will be able to achieve greater recovery rates of up to 85% NEWater from domestic used water and close the water loop.

The co-location of Tuas WRP with NEA's Integrated Waste Management Facility (IWMF) at Tuas Nexus integrates used water and solid waste treatment processes. This allows both facilities to harness synergies of the water-energy-waste nexus. For example, the co-digestion of used water sludge and food waste at Tuas WRP increases the production of biogas, which is subsequently processed in high efficiency superheaters at IWMF to generate more renewable energy. This maximises energy generation and resource recovery for a more sustainable water system.



# 4 Impact Report – Tuas Water Reclamation Plant



# Harnessing Nexus synergies and new used water treatment technologies for improved energy efficiencies

Metric	Estimated Project-Level	Bond-Level Impact <sup>3</sup>
	Impact	·
Operational GHG Emissions	0.07 kg CO <sub>2</sub> /m <sup>3</sup> avoided from	0.016 kgCO <sub>2</sub> /m <sup>3</sup> avoided
Avoided (kgCO <sub>2</sub> /m <sup>3</sup> ).	baseline	from baseline4
Prevent Pollution of Water	800 Million Litres Per Day	182.4 Million Litres per Day
Sources.	(MLD) of Used Water	(MLD) of Used Water
	Treatment Capacity.	Treatment Capacity.
Conservation of Resources	N/A <sup>5</sup>	
through Water Recycling.		
Reduced Waste Generation	0.01 kg/m <sup>3</sup> reduction from	0.002 kg/m <sup>3</sup> reduction from
(kg/m <sup>3</sup> ).	baseline.	baseline <sup>4</sup> .

We have taken reference from the International Capital Market Association's (ICMA) Harmonised Framework for Impact Reporting (June 2022) handbook to assess the impact of Eligible Green Projects.

The project achieves 0.20 kWh/m³ specific energy consumption, excluding Deep Tunnel Sewerage System pumping and renewable energy consumption.

<sup>&</sup>lt;sup>3</sup> The described impact is derived by pro-rating the estimated total project impact based on the share of green bond financing (i.e. green bonds allocated as a proportion of total project costs). This would increase in future years as the share of green bonds allocated to the project increases over time. The described impact includes abatement from renewable energy consumption (e.g. biogas and PUB's solar deployments), and is subjected to change based on final design, biogas offtake volumes and thermal efficiencies, actual commissioning results, plant output and onsite / offsite solar energy deployments. The midpoint of the bond's term to maturity is assumed to be the representative year for which the annual financed emissions avoided is calculated. For the tranche of Green bonds issued in FY2022 with a tenor of 30 years, the representative year is assumed to be 2037.

<sup>&</sup>lt;sup>4</sup> The baseline is a standalone water reclamation plant without Nexus synergies or enhanced biogas recovery.

<sup>&</sup>lt;sup>5</sup> The recycling of used water into NEWater is discussed in the impact report for Tuas NEWater Factory 1. In Tuas WRP, water recycling is achieved by utilising membrane filtrate water for internal usage (e.g. chillers, cooling, washdown, flush and spray systems).

# 5 Impact Report – Tuas NEWater Factory 1



# **Maximising NEWater Recovery with New Technologies**

Metric	Estimated Project-Level Impact	Bond-Level Impact <sup>6</sup>
Operational GHG Emissions Avoided (kgCO <sub>2</sub> /m³).	0.25 kgCO <sub>2</sub> /m <sup>3</sup> avoided from baseline	0.071 kgCO <sub>2</sub> /m <sup>3</sup> avoided from baseline <sup>7</sup>
Prevent Pollution of Water Sources.	N/A	
Conservation of Resources through Water Recycling.	25 million gallons per day (MGD) of NEWater production capacity.	7.23 million gallons per day (MGD) of NEWater production capacity.
Reduced Waste Generation (%).	16 percentage points decrease in NEWater reject produced from baseline.	4.62 percentage points decrease in NEWater reject produced from baseline <sup>7</sup> .

We have taken reference from ICMA's Harmonised Framework for Impact Reporting (June 2022) handbook to assess the impact of Eligible Green Projects.

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<sup>&</sup>lt;sup>6</sup> The described impact is derived by pro-rating the estimated total project impact based on the share of green bond financing (i.e. green bonds allocated as a proportion of total project costs). This would increase in future years as the share of green bonds allocated to the project increases over time. The described impact includes abatement from renewable energy consumption (e.g. PUB's solar deployments), and is subjected to change based on final design, actual commissioning results, plant output and onsite / offsite solar energy deployments. The midpoint of the bond's term to maturity is assumed to be the representative year for which the annual financed emissions avoided is calculated. For the tranche of Green bonds issued in FY2022 with a tenor of 30 years, the representative year is assumed to be 2037.

<sup>&</sup>lt;sup>7</sup> The baseline is the average performance of PUB's operational NEWater factories.

### 6 Looking Forward

# **Transition to Singapore-Asia Taxonomy**

PUB's green bond report sets out the allocation of green proceeds and expected performance of PUB's eligible green projects as we transition towards a low carbon and resource efficient future. PUB intends to update PUB's Green Financing Framework to align with the Singapore-Asia Taxonomy.

The Singapore-Asia Taxonomy sets science-based and robust technical screening criteria, based on market best practice. PUB's projects will need to meet stringent criteria in metrics such as specific energy consumption to qualify for green financing in line with the Singapore-Asia Taxonomy. This will not be easy because of our unique operating context where land scarcity in Singapore means more compact water treatment facilities, resulting in higher energy intensity.

Nonetheless, PUB remains committed to decarbonisation and resource efficiency. We trust you will continue to partner us on our green financing journey.

For queries or feedback about this report, please email <u>TIN\_Jing\_Jie@pub.gov.sg</u> or <u>TAN\_Chee\_Wei@pub.gov.sg</u>

### 7 External Reviewer's Report

Sustainalytics Pte. Ltd. ("Sustainalytics") was engaged as an independent external reviewer to assess whether the allocation of the green bond proceeds and the impact reporting of the allocated Eligible Green Projects for FY2023 were done in accordance with the use of proceeds criteria and reporting commitments in PUB's Green Financing Framework.

Based on the limited assurance review, nothing has come to Sustainalytics' attention that causes Sustainalytics to believe that, in all material respects, the reviewed projects do not conform with the use of proceeds criteria and reporting commitments in the PUB Green Financing Framework. A copy of Sustainalytics' report is appended to PUB's Green Bond Report for FY2023 in Appendix.

# **PUB**

Type of Engagement: Annual Review

**Date:** 01 August 2024 **Engagement Team:** 

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#### Introduction

In August 2022, PUB, Singapore's National Water Agency ("PUB"), issued a green bond (the "2022 Green Bond") to finance and refinance eligible sustainable water and wastewater treatment projects. In 2024, PUB engaged Sustainalytics to review the projects funded through the 2022 Green Bond (the "Nominated Expenditures") and provide an assessment as to whether the projects meet the use of proceeds criteria and the reporting commitments outlined in the PUB Green Financing Framework (the "Framework"). Sustainalytics provided a Second-Party Opinion on the Framework in March 2022. This is Sustainalytics' second annual review of allocation and reporting of the instruments issued under the Framework, following a previous review in October 2023.

#### **Evaluation Criteria**

Sustainalytics evaluated the Nominated Expenditures and PUB's reporting based on whether they:

- Meet the use of proceeds and eligibility criteria defined in the Framework; and
- Reported on at least one key performance indicator (KPI) for each use of proceeds category defined in the Framework.

Table 1: Use of Proceeds Categories, Eligibility Criteria and Associated KPIs

Use of Proceeds Category	Eligibility	Criteria	Impac	t Indicators
Sustainable Water and Wastewater Management	systems a	atment, including water recycling and wastewater treatment systems, the following criteria:  Net zero or reduction in GHG emissions relative to a business-as-usual baseline Prevent pollution of water sources Conservation of resources through water recycling Reduced waste generation	i. ii. iii. iv.	GHG emissions avoided Amount of wastewater treated Recovery rate of wastewater recycling process Amount of waste avoided or reduced

<sup>&</sup>lt;sup>1</sup> PUB, "Green Financing Framework", (2022), at: <a href="https://www.pub.gov.sg/-/media/PUB/PDF/PUB-Green-Financing-Framework-document.pdf">https://www.pub.gov.sg/-/media/PUB/PDF/PUB-Green-Financing-Framework-document.pdf</a>

<sup>&</sup>lt;sup>2</sup> Sustainalytics, "Second-Party Opinion: PUB Green Financing Framework", (2022), at: <a href="https://mstar-sustops-cdn-mainwebsite-s3.s3.amazonaws.com/docs/default-source/spos/pub-green-financing-framework-second-party-opinion0e2d0366-2f64-484d-83e2-185dff554379.pdf?sfvrsn=834c9b60\_1</a>

<sup>&</sup>lt;sup>3</sup> Sustainalytics, "Annual Review: PUB", (2023), at: <a href="https://mstar-sustops-cdn-mainwebsite-s3.s3.amazonaws.com/docs/default-source/spos/pub-2023-green-bond-annual-review.pdf?sfvrsn=8d1489f2\_1">https://mstar-sustops-cdn-mainwebsite-s3.s3.amazonaws.com/docs/default-source/spos/pub-2023-green-bond-annual-review.pdf?sfvrsn=8d1489f2\_1</a>

### Issuer's Responsibility

PUB is responsible for providing accurate information and documentation relating to the details of the projects, including descriptions of projects, amounts allocated and projects' impact.

### **Independence and Quality Control**

Sustainalytics, a leading provider of ESG research and ratings, conducted the verification of the use of proceeds from PUB's 2022 Green Bond. The work undertaken as part of this engagement included collection of documentation from PUB and review of said documentation to assess conformance with the Framework.

Sustainalytics relied on the information and the facts presented by PUB. Sustainalytics is not responsible nor shall it be held liable for any inaccuracies in the opinions, findings or conclusions herein due to incorrect or incomplete data provided by PUB.

Sustainalytics made all efforts to ensure the highest quality and rigor during its assessment process and enlisted its Sustainability Bonds Review Committee to provide oversight of the review.

#### Conclusion

Based on the limited assurance procedures conducted,<sup>4</sup> nothing has come to Sustainalytics' attention that causes us to believe that, in all material respects, the Nominated Expenditures do not conform with the use of proceeds criteria and reporting commitments in the Framework. PUB has disclosed to Sustainalytics that 86% of the proceeds from the 2022 Green Bond (SGD 684.6 million) were allocated as of 31 March 2024. The remaining 14% of the proceeds (SGD 115.4 million) are expected to be allocated by March 2025.

### **Detailed Findings**

Table 2: Detailed Findings

Framework Requirements	Procedure Performed	Factual Findings	Error or Exceptions Identified
Use of Proceeds Criteria	Verification of the Nominated Expenditures to determine alignment with the use of proceeds criteria outlined in the Framework.	The Nominated Expenditures comply with the use of proceeds criteria.	None
Reporting Criteria	Verification of the Nominated Expenditures to determine if impact was reported in line with the KPIs outlined in the Framework.	PUB reported on at least one KPI per use of proceeds category.	None

<sup>&</sup>lt;sup>4</sup> Sustainalytics' limited assurance process includes reviewing documentation relating to details of projects, as provided by the issuing entity, which is responsible for providing accurate information. These may include descriptions of projects, estimated and realized costs, and reported impact. Sustainalytics has not conducted on-site visits to projects.

# **Appendix**

### **Appendix 1: Allocation and Reported Impact**

In 2023, PUB issued the 2022 Green Bond and raised SGD 800 million, of which SGD 684.6 million were used to finance the following Nominated Expenditures.

Table 3: Allocation from the 2022 Green Bond

Use of Proceeds Category	Project Category	Project Name	Share of Green Bond Proceeds in the Project's Value (%)	Net Proceeds Allocated (SGD million)
Sustainable Water and Wastewater	Water Treatment	Tuas Water Reclamation Plant <sup>5</sup>	22.8	642.5
Management		Tuas NEWater Factory 16	28.9	42.1
Total				684.6
Unallocated Proceeds				115.4

Table 4: Reported Impact from the 2022 Green Bond

Use of Proceeds Category	Project Name	Key Performance Indicator	Reported Impact <sup>7</sup>
		Operational GHG emissions avoided from baseline <sup>8</sup> (kgCO <sub>2</sub> /m³)	0.016
	Tuas Water Reclamation Plant	Amount of wastewater treated (million litres per day of used water treatment capacity)	182.4
Sustainable Water and		Amount of reduced waste generation from baseline <sup>9</sup> (kg/m³)	0.002
Wastewater Management	Tuas NEWater Factory 1	Operational GHG emissions avoided from baseline <sup>10</sup> (kgCO <sub>2</sub> /m³)	0.071
		Recovery rate of wastewater recycled (million gallons per day of NEWater production capacity)	7.23
		Amount of reduced waste generation from baseline <sup>11</sup> (percentage points decrease in NEWater reject produced)	4.62

<sup>&</sup>lt;sup>5</sup> The upcoming Tuas Water Reclamation Plant is expected to receive up to 800 million litres per day of domestic and industrial used water. The plant is also co-located with a waste management facility in Tuas Nexus, which will allow it to capitalize on the integration of used water treatment and solid waste treatment processes to maximize energy generation and resource recovery, such as the co-digestion of used water sludge and food waste to produce biogas.

<sup>&</sup>lt;sup>6</sup> The upcoming Tuas NEWater Factory 1 will receive treated used water from the Tuas Water Reclamation Plant to produce up to 25 million gallons per day of NEWater.

<sup>&</sup>lt;sup>7</sup> The impact has been reported as per the amount allocated from the 2022 Green Bond by pro-rating the estimated total project impact based on the share of the 2022 Green Bond financing.

<sup>&</sup>lt;sup>8</sup> The baseline refers to a standalone water reclamation plant without Tuas Nexus' synergies in water, energy and waste treatment processes.

<sup>&</sup>lt;sup>9</sup> Ibid.

<sup>&</sup>lt;sup>10</sup> The baseline refers to the average performance of PUB's operational NEWater factories.

<sup>&</sup>lt;sup>11</sup> Ibid.

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