Treasury Corporation of Victoria

TCV Annual Green Bond Report

December 2018

For further information please contact:

Treasury Corporation of Victoria
Telephone: +61 3 9651 4800
e-mail: tcv@tcv.vic.gov.au

Address

Level 12
1 Collins Street
Melbourne VIC 3000
Australia

Treasury Corporation of Victoria

Contents

1.0 Introduction

The purpose of the TCV Annual Green Bond Report is to provide investors with ongoing update of the TCV Green Bond activities, use of proceeds, impact reporting and updates on projects currently underway.

This report also includes an annual assurance on Climate Bond Initiative's Climate Bond Standards (Version 2.1) completed by DNV GL Business Assurance ('DNV GL') and an assurance by TCV's auditors EY, that the use of proceeds for the TCV Green Bond have been applied in accordance with the TCV Green Bond Framework. Refer to Section 4 and respectively Appendix 1 and 2 for more details.

2.0 TCV Green Bond Overview

In July 2016, TCV launched its inaugural TCV Green Bond issuance with a $300 million, 5 year maturity bond to a pool of diversified sustainable mandate investors in the Australian and International financial markets.

Key characteristics are as follows:

- TCV Green Bonds are currently rated AAA (stable)/Aaa (stable), and are senior, unsecured obligations of TCV, guaranteed by the State of Victoria and issued off TCV's Domestic Benchmark Bond programme
- TCV Green Bonds are issued in accordance with TCV's Green Bond Framework
- TCV Green Bonds have been certified in compliance with the Climate Bonds Standard (Version 2.1) and will be in alignment with the Green Bond Principles (2016)
- DNV GL have been appointed as TCV's independent Verification Agent
- EY have been appointed to conduct an assurance on TCV's Use of Proceed Statement
- National Australia Bank ('NAB') were appointed as Sole Arranger, Green Bond Structuring Agent and Lead Manager for the July 2016 transaction.

TCV Green Bonds are employed for financing, and re-financing, of projects and assets across Victoria, which are funded through TCV 'Participating Authorities' (within the meaning of the *Treasury Corporation of Victoria Act 1992*), Victorian Government Departments and State related entities, and are consistent with delivering a low carbon and climate resilient economy. Specifically, this includes projects/assets that directly contribute to:

- climate change mitigation by developing low carbon assets, technologies and practices that reduce or avoid greenhouse gas emissions by reducing energy demand, improving energy efficiency and utilising low carbon energy sources
- climate change adaptation by addressing existing/future impacts of and developing resilience to climate change.

The Climate Bonds Standard prescribes different requirements for different types of Climate Bonds, including 'Use of Proceeds Bonds' which are defined as 'a standard recourse-to-the-issuer debt obligation for which the proceeds shall be credited to a sub-account, moved to a sub-portfolio or otherwise tracked by the issuer and attested to by a formal internal process that will be linked to the issuer's lending and investment operations for Eligible Projects & Assets'.

TCV Green Bonds meet this definition for Use of Proceeds Bonds, and the requirements for certification as Climate Bonds under the Climate Bonds Standard (v 2.1). http://www.climatebonds.net/standards

Since the July 2016 issuance there have been no proposed changes to the TCV Green Bond Framework or additional assets or categories of projects proposed to the TCV Green Bond Asset Pool. Further detail of Asset Pool and asset reporting has been updated to 30 June 2018 in Section 6.

For reference to the TCV framework for selection of eligible projects and management of proceeds there have been no changes since the publication of the 2017-18 TCV Green Bond Annual Report. For further details see https://www.tcv.vic.gov.au/page/Market_Activity/TCV_Green_Bond/

2.1 TCV Green Bond Issue

Key terms of the July 2016 TCV Green Bond Issue are shown in Table 1 below.

Table 1 Key Terms

Coupon and Maturity	1.75%, 27 July 2021
Size	$300 million
Pricing Date	19 Jul 2016
Re-offer Spread	3yr EFP + 33 bps | ACGB 5.25% May 2021 + 19.75 bps
Currency	Australian Dollar
Listing	ASX
Project Categories	Energy Efficiency, Renewable Energy, Low Carbon Transport
Domestic / Foreign Investors	87% / 13%
Arrangers / Lead Managers	NAB

3.0 Reporting

The following table summarises each eligible project reporting by Category of Investment. Where available environmental metrics have been updated since the 2016-17 TCV Annual Green Bond Report

Table 2 Environmental Performance Data

Project name	GREEN BOND ELIGIBLE USE OF PROCEEDS CATEGORY (Renewable Energy, Low Carbon Transport, Low Carbon Buildings, Energy Efficiency, Climate Change Adaptation and Resilience, Water)	Mitigation (M) or Adaptation (A)	RE (renewable energy) or EE (energy efficiency)	Annual Energy Savings (MWh)	Annual Energy Produced (MWh)	Renewable Energy Capacity Added (MW)	Annual GHG Emissions Avoided (tonnes CO2 eq.)	Target Results
Greener Government Buildings Program								
Traffic lights (statewide) replacement with LED lamps Lighting upgrade (incandescent to LED). Reduced maintenance from every 3 months to every 8 years.	Energy Efficiency	M	EE	15,271	n/a	n/a	18,174	70% GHG reduction (22,512 tonnes)
Federation Square Lighting, HVAC, cogeneration, bio-energy system, energy generating pavers, rainwater harvesting, solar PV	Energy Efficiency	M	EE	6,279 (Electricity) 23,510 GJ (Gas)	1,767	25kw	6,169	54% GHG Reduction (7,302 tonnes)
Holmesglen TAFE (all campuses) Lighting upgrade, HVAC upgrade, demand based ventilation, building automation system upgrade, cogeneration, window solar film, VSDs	Energy Efficiency	M	EE	Not Yet Completed	n/a	n/a	Not Yet Completed	36% GHG Reduction (7,452 tonnes)
East Gippsland Water Solar aerators, lighting upgrades, pump uprades, solar PV	Energy Efficiency	M	EE	585	247	80.5kw	696	41% GHG Reduction (1,853 tonnes)
Museum Victoria (all facilities, including Melb Museum, REB, Scienceworks, storage) HVAC upgrade, building controls and optmisation, lighting upgrade	Energy Efficiency	M	EE	Not Yet Completed	n/a	n/a	Not Yet Completed	66% GHG Reduction (17,811 tonnes)
Public Housing (28 high-rise towers) Lighting upgrade, HVAC upgrade, building controls and optmisation, solar PV	Energy Efficiency	M	EE	Not Yet Completed	n/a	70kw	Not Yet Completed	57% GHG Reduction (10,137 tonnes)
Melbourne Polytechnic (all campuses) HVAC upgrade, lighting upgrade, voltage reduction system, buildilng tuning and optimisation	Energy Efficiency	M	EE	1,285	n/a	n/a	1,529	40% GHG Reduction (1,438 tonnes)
Total Greener Government Buildings Program								
Melbourne Water Assets								
Mini Hydroelectric Power Stations - T3 Investigation, design and construction of up to 9 mini hydroelectric power stations - Tranche 3	Renewable Energy	M	RE	Zero, because all electricity generated is exported	Not yet constructed	5	Zero. REC goes with the electricity exported	10,900 MWh/pa.
Tranche 2 Mini Hydros Design and construct commercialy viable mini hydros.	Renewable Energy	M	RE	Zero, because all electricity generated is exported	5377.9 (2017-18)	2.5	Zero. REC goes with the electricity exported	5,450 MWh/pa.
Eastern Treatment Plant (ETP) Solids Handling - Stage 2 Provision of additional ETP Sludge Digestion treatment capacity to cater for growth	Other	M	n/a	Not Yet Completed	n/a	n/a	n/a	
ETP Solids Handling - Stage 1A WAS Thickening Process optimisation & provisions of additional treatment capacity to cater for load growth	Other	M	n/a	Not Yet Completed	n/a	n/a	n/a	
ETP Solids Handling - Stage 1B Modifications to the existing primary sludge thickening system to 1) address the impact of systemic problems/trips on plant availability, & 2) facilitate maximisation of treatment asset capacity	Other	M	n/a	Not Yet Completed	n/a	n/a	n/a	
Expansion of Power Station at Western Treatment Plant (WTP) Increased electricity generation from biogas utilising increased biogas following the replacement of the 55E lagoon cover	Renewable Energy	M	RE	Not Yet Completed	Under construction	6.0	Not Yet Completed	45,000 MWh/pa. 4,000 tonnes CO2/pa.
WTP 55E ASP Upgrade / Renewal Refurbishment of the 55E activated sludge plant to improve the occupational health and safety aspects of maintenance, renewals and overall improvement to whole of life cost efficiency	Renewable Energy	M	RE	Not Yet Completed	n/a	n/a	n/a	
Buy out residual balloon value of AGL power plant at WTP Buy AGL power plant at WTP, which is a renewable energy plant	Renewable Energy	M	RE	Not Yet Completed	n/a	9.9	n/a	
WTP 25W Biogas Cover Upgrade WTP 25W Biogas Lagoon Cover Replacement & Extension of Bio Gas Recovery Main	Renewable Energy	M	RE	Zero, because all electricity generated is exported	4,380 (2017 -18)	2.0	Zero. REC goes with the electricity exported	
Large scale renewable energy power station at ETP Key project to meet environmental targets to lower energy costs and GHG emission liabilities	Renewable Energy	M	RE	Not Yet Completed	Not yet constructed	14.0	Not Yet Completed	30,580 MWh/pa. 27,500 CO2 tonnes pa.
Total Melbourne Water								

Transport Assets (Electrified Rail)								
5 X'Trapolis Train Sets Manufacture and Delivery of 5 (6-carriage) X'trapolis train sets	Low Carbon Transport	M	n/a	n/a	n/a	n/a	n/a	Each Passenger Train equates to 525 cars off the road 40% less CO2 emmissions than road travel per Passenger Kilometre
Melbourne Metro Tunnel (expenditure to 30/6/17 excluding PPP funding) $11 billion Metro Tunnel with twin nine-kilometre underground tunnels and five new underground stations - Green Bond allocation is project expenditure to 30 June 2017	Low Carbon Transport	M	n/a	n/a	n/a	n/a	74 kilo tonnes CO2 pa at 2046 (remove 281.8 million Vehicle Kilometres Travalled (VKT) of Cars and 4.4 million VKT of trucks) (1)	• Net reduction of 1.2 grams of CO2 equiv. emissions per Passenger Kilometres Travelled after 20 years of operation, compared to 'without Metro Tunnel' scenario • 20% renewable energy for infrastructure lifecycle • Reduction in scope 1 and scope 2 GHG emissions 20% below BAU • 15% reduction in materials lifecycle GHG impact below base case
Mernda Rail Extension Eight kilometres of new rail line and three state-of-the-art stations at Marymede, Mernda and Hawkstowe extending the South Morang Railway Line to Mernda	Low Carbon Transport	M	n/a	n/a	n/a	n/a	not currently available	8,000 commuters per day 4 star rating or greater for all Station Buildings
Total Transport Assets (Electrified Rail)								
Total Green Bond Expenditure								

Notes

1. Source: Metrol Tunnel Environmental Effects Statement (Chapter 22 Greenhouse)

Table 2 **Use of Proceeds Statement**

Project name	GREEN BOND ELIGIBLE USE OF PROCEEDS CATEGORY (Renewable Energy, Low Carbon Transport, Low Carbon Buildings, Energy Efficiency, Climate Change Adaptation and Resilience, Water)	Borrower	COMMITTED AMOUNT to 30 June 2018 (Millions)	Amount Expended to 30 June 2018 (Millions)	TCV Debt Outstanding (Millions)	Amount of Green Bond Proceeds Allocated (Millions)
Greener Government Buildings Program						
Traffic lights (statewide) replacement with LED lamps Lighting upgrade (incandescent to LED). Reduced maintenance from every 3 months to every 8 years.	Energy Efficiency	DTF	$ 25.0	$ 25.0	$ 22,239.7	$ 4.8
Federation Square Lighting, HVAC, cogeneration, bio-energy system, energy generating pavers, rainwater harvesting, solar PV	Energy Efficiency	DTF	$ 6.8	$ 6.8	$ 22,239.7	$ 1.3
Holmesglen TAFE (all campuses) Lighting upgrade, HVAC upgrade, demand based ventilation, building automation system upgrade, cogeneration, window solar film, VSDs	Energy Efficiency	DTF	$ 5.7	$ 5.5	$ 22,239.7	$ 1.1
East Gippsland Water Solar aerators, lighting upgrades, pump uprades, solar PV	Energy Efficiency	DTF	$ 1.2	$ 1.2	$ 22,239.7	$ 0.2
Museum Victoria (all facilities, including Melb Museum, REB, Scienceworks, storage) HVAC upgrade, building controls and optmisation, lighting upgrade	Energy Efficiency	DTF	$ 11.3	$ 6.7	$ 22,239.7	$ 1.3
Public Housing (28 high-rise towers) Lighting upgrade, HVAC upgrade, building controls and optmisation, solar PV	Energy Efficiency	DTF	$ 13.4	$ 4.3	$ 22,239.7	$ 0.8
Melbourne Polytechnic (all campuses) HVAC upgrade, lighting upgrade, voltage reduction system, buildilng tuning and optimisation	Energy Efficiency	DTF	$ 1.9	$ 1.9	$ 22,239.7	$ 0.4
Total Greener Government Buildings Program			**$ 65.4**	**$ 51.5**		**$ 9.9**
Melbourne Water Assets						
Mini Hydroelectric Power Stations - T3 * Investigation, design and construction of up to 9 mini hydroelectric power stations - Tranche 3	Renewable Energy	Melbourne Water	$ 15.3	$ 0.2	$ 3,991.1	$ 0.0
Tranche 2 Mini Hydros * Design and construct commercialy viable mini hydros.	Renewable Energy	Melbourne Water	$ 7.4	$ 8.6	$ 3,991.1	$ 1.7
Eastern Treatment Plant (ETP) Solids Handling - Stage 2 ** Provision of additional ETP Sludge Digestion treatment capacity to cater for growth	Other	Melbourne Water	$ 43.7	$ -	$ 3,991.1	$ -
ETP Solids Handling - Stage 1A ** WAS Thickening Process optimisation & provisions of additional treatment capacity to cater for load growth	Other	Melbourne Water	$ 7.7	$ 0.1	$ 3,991.1	$ 0.0
ETP Solids Handling - Stage 1B ** Modifications to the existing primary sludge thickening system to 1) address the impact of systemic problems/trips on plant availability, & 2) facilitate maximisation of treatment asset capacity	Other	Melbourne Water	$ 8.0	$ 0.5	$ 3,991.1	$ 0.1
Expansion of Power Station at Western Treatment Plant (WTP) ** Increased electricity generation from biogas utilising increased biogas following the replacement of the 55E lagoon cover	Renewable Energy	Melbourne Water	$ 11.4	$ 1.1	$ 3,991.1	$ 0.2
WTP 55E ASP Upgrade / Renewal Refurbishment of the 55E activated sludge plant to improve the occupational health and safety aspects of maintenance, renewals and overall improvement to whole of life cost efficiency	Renewable Energy	Melbourne Water	$ 111.9	$ 0.7	$ 3,991.1	$ 0.1
Buy out residual balloon value of AGL power plant at WTP ** Buy AGL power plant at WTP, which is a renewable energy plant	Renewable Energy	Melbourne Water	$ 3.5	$ -	$ 3,991.1	$ -
WTP 25W Biogas Cover Upgrade ** WTP 25W Biogas Lagoon Cover Replacement & Extension of Bio Gas Recovery Main	Renewable Energy	Melbourne Water	$ 42.2	$ 36.3	$ 3,991.1	$ 7.0
Large scale renewable energy power station at ETP Key project to meet environmental targets to lower energy costs and GHG emission liabilities	Renewable Energy	Melbourne Water	$ 55.0	$ 0.5	$ 3,991.1	$ 0.1
Total Melbourne Water			**$ 305.9**	**$ 48.0**		**$ 9.3**
Total Melbourne Water excluding Hydopower and Biogas			**$ 166.9**	**$ 1.2**		**$ 0.2**
* Not yet formally included in Asset Pool as CBI Criteria not finalised for Hydropower						
** Not yet formally included in Asset Pool as CBI Criteria not finalised for Biogas (as at 30 June 2018)						

Project name (Continued)	GREEN BOND ELIGIBLE USE OF PROCEEDS CATEGORY (Renewable Energy, Low Carbon Transport, Low Carbon Buildings, Energy Efficiency, Climate Change Adaptation and Resilience, Water)	Borrower	COMMITTED AMOUNT to 30 June 2018 (Millions)	Amount Expended to 30 June 2018 (Millions)	TCV Debt Outstanding (Millions)	Amount of Green Bond Proceeds Allocated (Millions)
Transport Assets (Electrified Rail)						
5 X'Trapolis Train Sets Manufacture and Delivery of 5 (6-carriage) X'trapolis train sets	Low Carbon Transport	DTF	$ 97.9	$ 86.8	$ 22,239.7	$ 16.7
Melbourne Metro Tunnel (expenditure to 30/6/17 excluding PPP funding) $11 billion Metro Tunnel with twin nine-kilometre underground tunnels and five new underground stations - Green Bond allocation is project expenditure to 30 June 2017	Low Carbon Transport	DTF	$ 1,026.5	$ 915.9	$ 22,239.7	$ 176.7
Mernda Rail Extension Eight kilometres of new rail line and three state-of-the-art stations at Marymede, Mernda and Hawkstowe extending the South Morang Railway Line to Mernda	Low Carbon Transport	DTF	$ 587.7	$ 452.6	$ 22,239.7	$ 87.3
Total Transport Assets (Electrified Rail)			**$ 1,712.1**	**$ 1,455.3**		**$ 280.8**
Total Green Bond Expenditure			**$ 2,083.4**	**$ 1,554.7**		**$ 300.0**
Total Green Bond Expenditure excluding Hydropower and Biogas			**$ 1,944.4**	**$ 1,508.0**		**$ 300.0**

4.0 Assurance

TCV Green Bonds are certified as Climate Bonds under the Climate Bonds Standard by the Climate Bond Standards Board of the Climate Bonds Initiative. Before a bond can be certified, the compliance of that bond with the Climate Bonds Standard must be verified by a third party verification agent.

TCV has retained DNV GL Business Assurance Australia Pty Ltd ('DNV GL'), as the independent verification agent for the TCV Green Bonds.

On an annual basis, TCV has retained DNV GL to independently verify the annual TCV Green Bond Report, and provide assurance that each outstanding TCV Green Bond is in compliance the requirements of the Climate Bond Standards.

Refer to Appendix 1 for the TCV Green Bond DNV GL Periodic Assurance Statement. Note that the inclusion of Hydro and Biogas Projects in the Green Bond Pool is provisional and subject to finalisation of the CBI Standards for Water and Biogas Projects.

In addition, TCV has provided this Annual Green Bond Report and related financial information to its auditors EY to provide an assurance that the use of proceeds for the TCV Green Bond have been applied in accordance with the TCV Green Bond Framework.

Refer to Appendix 2 for TCV Green Bond Financial Assurance prepared by EY.

5.0 Project Updates

5.1 Greener Government Buildings

Overview

Greener Government Buildings (GGB) is a program that improves the energy efficiency of existing government buildings to reduce operating costs and greenhouse gas (GHG) emissions. Energy is saved through a combination of:

- lighting upgrades (e.g. LED)
- heating, ventilation and cooling upgrades (HVAC)
- solar panels
- building automation and controls.

Project Status

Project Name	Status	Solutions
Traffic lights (state-wide) replacement with LED lamps	Completed 2012	Lighting upgrade (incandescent to LED). Reduced maintenance from every 3 months to every 8 years.
Federation Square	Completed 2012	Lighting, HVAC, cogeneration, bio-energy system, energy generating pavers, rainwater harvesting.
Holmesglen TAFE (all campuses)	Installing	Lighting upgrade, HVAC upgrade, demand based ventilation, building automation system upgrade, cogeneration, window solar film, VSDs
East Gippsland Water	Completed 2016	Solar aerators, lighting upgrades, pump upgrades, solar PV
Museum Victoria (all facilities, including Melbourne Museum, REB, Scienceworks, storage)	Installing	HVAC upgrade, building controls and optmisation, lighting upgrade, solar PV
Public Housing (28 high-rise towers)	Installing	Lighting upgrade, HVAC upgrade, building controls and optmisation, solar PV
Melbourne Polytechnic (all campuses)	Completed 2016	HVAC upgrade, lighting upgrade, voltage reduction system, building tuning and optimisation

Environmental Benefits

Project Name	Electricity Savings (kWh)	Gas Savings (GJ)	Tonnes of CO2-e
Traffic lights (statewide) replacement with LED lamps	15,271,949	-	18,174
Federation Square	457,444	-	544
Holmesglen TAFE (all campuses)	-	-	-
East Gippsland Water	333,221	-	397
Museum Victoria (all facilities, including Melb Museum, REB, Scienceworks, storage)	-	-	-
Public Housing (28 high-rise towers)	-	-	-
Melbourne Polytechnic (all campuses)	1,284,873	-	1,529

Image: Melbourne Polytechnic

5.2 Melbourne Water Projects

Eastern Treatment Plant – Large Scale Renewable Energy Power Station (Solar)

Overview

The Project is to design, install, commission and maintain for up to 2 years a Large Scale Solar Photovoltaic power station generating approximately 30 GWh/year. The facility is to be located at the Eastern Treatment Plant, south of Thompsons Road on Melbourne Water owned land, covering an area of up to 37 hectares.

Project Status

- Preliminary Business Case was approved by the Melbourne Water Board in late May 2018
- project is now in Functional Design phase
- GHD were awarded Functional Design contact in mid July 2018
- various external project approvals are being prepared.
- DTF approval process in progress with expected positive outcome due approximately mid-September 2018
- early civil works planned to start late 2018
- Main Solar Contract Expression of Interest due to go to open market mid October 2018
- Main Solar Contract due to be awarded late March 2019
- completion due for late 2020.

Estimated Environmental Benefits

- reduction of Melbourne Water Greenhouse Gas Emissions of 20,443 Tonnes of CO2 per annum by 2025
- expected to generate 30,000 MWh per year of renewable energy for use in the operation of the Eastern Treatment Plant reducing the need for imported grid electricity at the site
- help meet Victorian Government Carbon emissions reductions pledge.

Western Treatment Plant Biogas Power Generation Expansion

Overview

The Western Treatment Plant (WTP) at Werribee treats more than 50% of Melbourne's sewage. All sewage flows through two covered anaerobic lagoons where solids are captured and methane (biogas) is produced for renewable energy production, thereby reducing the need to import electricity.

Following commissioning of the 25W Cover Replacement project the volume of biogas produced at the WTP has increased, exceeding the capacity of the existing 9.9MW biogas power generation facility. MWC will increase the generation capacity by installing a new power generation facility that will have 6MW of biogas generation equipment, with provision for future expansion up to 9MW.

Project Status

- detailed design of the new biogas power generation facility commenced in June 2018
- order placement for the new biogas generators has been made, with design and manufacture of these generators commencing shortly
- site mobilisation and construction is expected to commence in January 2019
- an extensive performance trial will commence in approximately August 2019 to prove the operation of the facility and optimise its performance
- the new biogas power generation facility will enter the operational phase in late November 2019.

Estimated Environmental Benefits

- full utilisation of the captured biogas will be possible, with the biogas being used to generate additional electricity, ensuring the WTP can meet 100% of its energy demand
- based on current estimates, the generated electricity that is used within the WTP site will contribute to an avoided GHG emission of approximately 4,130 tonnes CO2-e/annum
- the new generators (compared to existing units at WTP) have a larger electrical capacity and will operate at a higher efficiency (meaning that more electricity is generated from the same amount of biogas when compared to existing site engines).

Western Treatment Plant 25W Biogas Cover Upgrade

Overview

The Western Treatment Plant (WTP) at Werribee treats more than 50% of Melbourne's sewage. All sewage flows through two covered anaerobic lagoons (25W and 55E respectively) where solids are captured and methane (biogas) is produced for renewable energy production thereby reducing the need to import electricity.

The 25W Cover Replacement project commenced in 2014 and built upon the floating cover design from the 55E anaerobic lagoon. Like the 55E, the improved 25W cover was designed with a series of removable segments to allow for maintenance whilst keeping the majority of the cover online, minimising future lost biogas.

Project Status

- lagoon desludging, design and construction of the new cover was successfully delivered by Melbourne Water with the John Holland- KBR and GTI joint venture in April 2017
- commissioning including biogas extraction commenced April 2017
- at the end of December 2017, the project was completed
- additional biogas will be captured from 25W lagoon after the cover is successfully installed and commissioned. The increased amount of biogas can be utilised to generate additional electricity, ensuring the WTP can meet 100% of its energy demand. MW is in the process of expanding its biogas power station under a separate capital project
- utilising anaerobic treatment up-front continues to maximise carbon converted to energy, subsequently reducing the energy demand from downstream aerated processes
- for the 2017-2018 reporting year the avoided GHG emission from the two covered anaerobic lagoons was 317,018 tCO2-e.

5.3 Electrified Rail Transport Projects

5.3.1 Mernda Rail Extension

Project Status
The contract to design and construct the Mernda Rail extension was awarded to John Holland in November 2016. Major construction works commenced in April 2017, with construction of the three new stations, 8km of rail line and associated infrastructure now substantially complete.

The Mernda Rail Extension project is in service and commenced passenger services in August 2018.

5.3.2 X'Trapolis Metro Trains

Overview
X'Trapolis metro trains are manufactured by Alstom in Ballarat, Victoria with 43 per cent local content. The Victorian Government invested $103.5 million in the 2018-19 Budget for an additional five, six-car X'Trapolis trains for the Melbourne metropolitan rail network.

The X'Trapolis Trains operate on Melbourne's Mernda, Hurstbridge, Belgrave, Lilydale, Alamein, Glen Waverley, and Frankston lines. There are currently 99 X'Trapolis trains in service.

Project Status
The Alstom facility in Ballarat has been building X'Trapolis trains since 2002. The five trains ordered as part of the 2016-17 Budget are delivered, with the final train entering service in December 2017. The State committed to an additional nine X'Trapolis trains in September 2016, which are being delivered progressively from February 2018, with the final train expected to enter service in December 2018. The five trains ordered as part of the 2018-19 Budget are due to be delivered progressively from September 2019, with the final train expected to enter service in February 2020.

5.3.3 Melbourne Metro Tunnel

Overview
The AUD$11 billion Metro Tunnel Project will transform the way people move around Melbourne, with 'turn up and go' rail services and improved access to key landmarks. The Project will free up space in the City Loop to run from trains to and from the suburbs, by taking our busiest train lines through a new tunnel under the city. This means more trains more often across Melbourne, with a less crowded and more reliable train network.

The Metro Tunnel will deliver twin nine-kilometre rail tunnels from the north west of the city to the south-east as part of a new railway line. New underground stations will be built at North Melbourne near Arden Street and Parkville in Melbourne's inner north, at Domain under St Kilda Road in Melbourne's inner south, and under Swanston Street in Melbourne CBD (State Library and Town Hall). The two new CBD stations will connect directly with the existing Flinders Street and Melbourne Central stations.

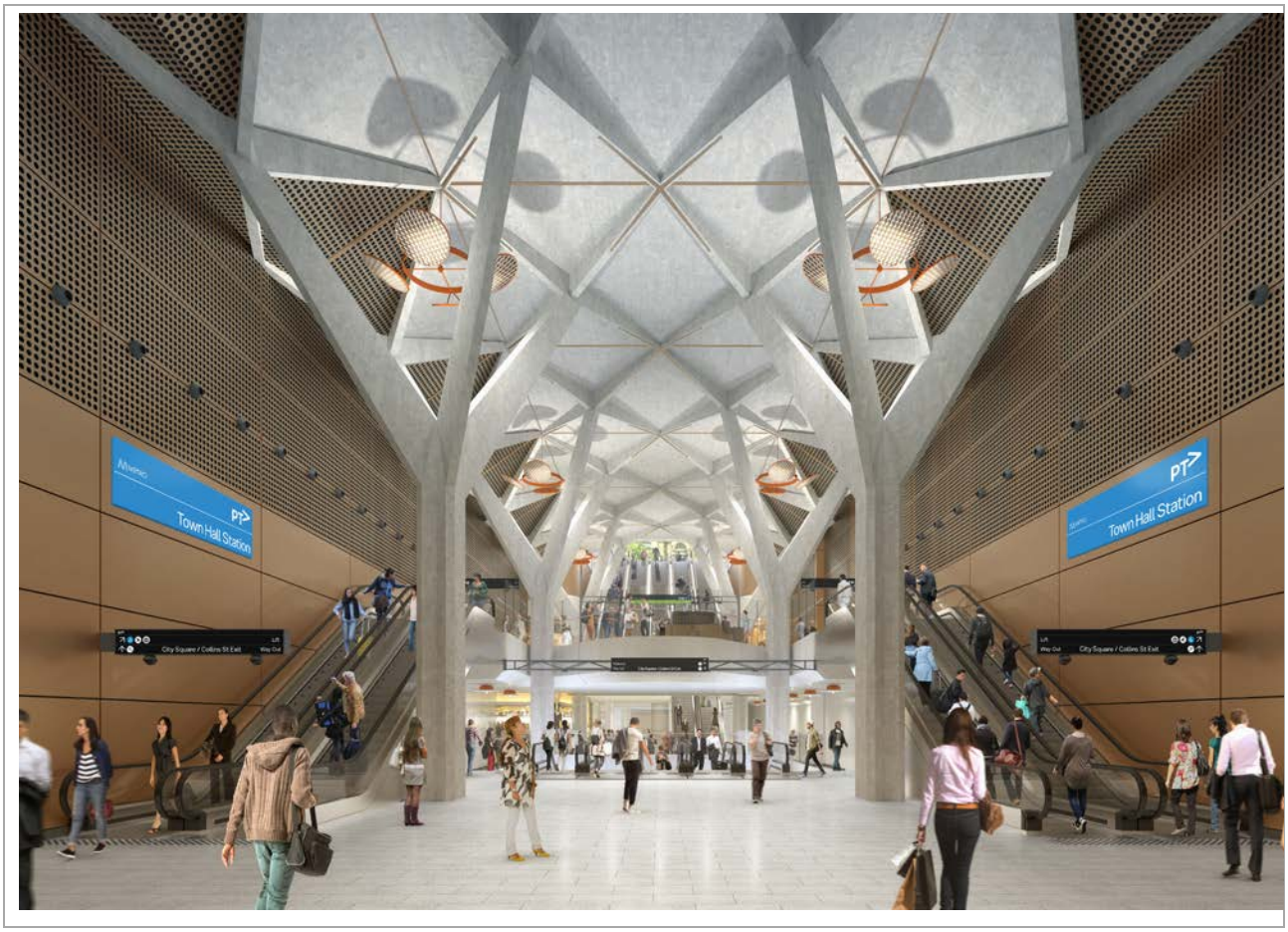
The Metro Tunnel will also deliver high capacity signalling to maximise the efficiency of a new fleet of High Capacity Metro Trains. The Metro Tunnel is the key to the future expansion of Victoria's rail network, enabling Melbourne's transport system to grow as Melbourne does.

Project Status
The Metro Tunnel is a complex infrastructure project scheduled for completion in 2025 and is being delivered by Rail Projects Victoria. Significant milestones have already been achieved, including:

- key environmental and planning processes are complete, with the Metro Tunnel Environmental Management Framework approved and in place
- key procurement processes have been completed, with the Cross Yarra Partnerships led by Lendlease, John Holland, Bouygues Construction and Capella Capital awarded the $6 billion contract to build the Metro Tunnel and five new underground stations

- CPB Contractors and Bombardier Transportation have been awarded the contract to deliver high capacity signalling and communications systems for the Metro Tunnel's Rail Systems Alliance
- the procurement process is underway for the Rail Infrastructure Alliance which will link the Metro Tunnel to Melbourne's existing rail network
- early works have commenced, with tram diversion works complete and major utility service relocations complete or underway, and
- major works, including piling, building and demolition, are underway at the future locations of the five new underground stations.

Image: Town Hall Concourse Citysquare



6.0 Appendix One - Assurance Report on Climate Bond Initiative Criteria

DNV·GL

TREASURY CORPORATION OF VICTORIA GREEN BOND

DNV GL PERIODIC ASSURANCE STATEMENT

Scope and objectives

On 19 July 2016, Treasury Corporation Victoria ("TCV" or "Issuer") issued a $300 million bond in AUD with ISIN: AU0000XVGHK0 (henceforth referred to as "BOND") and has achieved Certification against the Climate Bond Standard (CBS).

TCV has used the proceeds of the BOND to finance the nominated projects and assets falling under the following categories:

- Renewable Energy – Solar and Wind
- Low Carbon Buildings – Energy Efficiency Improvements
- Low Carbon Transport – Electrified Rail Infrastructure
- Water – Wastewater Processing
- Hydropower (Sector Criteria Pending Release)

DNV GL Business Assurance Australia Pty Ltd (henceforth referred to as "DNV GL") has been commissioned by TCV to provide the initial and periodic verification of the BOND as an independent and approved verifier under the Climate Bond Standard. Our criteria and information covered to achieve this is described under 'Work Undertaken' below. The Periodic Verification was conducted on the information provided by TCV dated 30 June 2018.

No assurance is provided regarding the financial performance of the BOND, the value of any investments in the BONDS, or the long term environmental benefits of the transaction. Our objective has been to provide an assessment that the BOND has met the criteria of the Climate Bond Standard and the associated Technical Criteria on the basis set out below.

The scope of this DNV GL opinion is limited to the Climate Bonds Standard Version 2.1 and the following associated Sector Technical Criteria:

- Solar
- Wind
- Low Carbon Transport
- Low Carbon Buildings
- Water

DNV GL notes that the TCV Green Bond pool of nominated projects and assets includes Biogas and Hydropower projects. These projects did not have Climate Bonds Standard Sector Technical criteria approved at the time of verification and have not been considered for compliance with the Climate Bonds

DNV GL Business Assurance Australia Pty. Ltd. Level 7, 124 Walker Street, North Sydney, NSW Australia, 2060. Ph: +61 (2) 9922 1966 https://www.dnvgl.com/assurance/

Standard. These projects, however are noted in the Bond Pool for future inclusion once applicable Sector Technical Criteria for Hydropower and Biogas (Biofuel) Projects is available.

Responsibilities of the Management of TCV and DNV GL

The management of TCV has provided the information and data used by DNV GL during the delivery of this review. Our statement represents an independent opinion and is intended to inform TCV management and other interested stakeholders in the BOND as to whether the established criteria have been met, based on the information provided to us. In our work we have relied on the information and the facts presented to us by TCV. DNV GL is not responsible for any aspect of the nominated assets referred to in this opinion and cannot be held liable if estimates, findings, opinions, or conclusions are incorrect. Thus, DNV GL shall not be held liable if any of the information or data provided by TCV's management and used as a basis for this assessment were not correct or complete.

Basis of DNV GL's opinion

DNV GL has conducted the verification against the CBS v2.1 and associated Sector Technical Criteria through the creation and execution of a verification protocol addressing each requirement of the CBS v2.1 and the associated Sector Technical Criteria. The detail of areas covered in the DNV GL verification is summarised in Schedule 2 below.

Work undertaken

Our work constituted a high level review of the available information, based on the understanding that this information was provided to us by TCV in good faith. We have not performed an audit or other tests to check the veracity of the information provided to us. The work undertaken to form our opinion included:

Initial Verification

- Creation and execution of a Climate Bond Standard Protocol, adapted to include the relevant Sector Technical Criteria for the BOND nominated projects and assets, as described above and in Schedule 2 to this Assessment;
- Assessment of documentary evidence provided by TCV on the BOND and supplemented by a high-level desktop research, onsite visit for documentation review and interviews with key personnel from the issuer TCV. These checks refer to current assessment best practices and standards methodology;
- Discussions with TCV management, and review of relevant documentation;
- Documentation of findings against each element of the criteria.

Periodic Verification

- Assessment of documentary evidence provided by TCV on the BOND and supplemented by a high-level desktop research, documentation review and interviews with key personnel from the issuer TCV. These checks refer to current assessment best practices and standards methodology;
- Discussions with TCV management, and review of relevant documentation;
- Review of the nominated projects and assets as described in Schedule 2 as at the time of Periodic Verification;
- Review and testing where possible Reporting Data;

- Documentation of findings for Periodic Verification as detailed in this document. Our opinion as detailed below is a summary of these findings.

Findings and DNV GL's opinion

DNV GL has performed the Periodic Verification of the TCV Climate Bond. It is DNV GL's responsibility to provide an independent verification statement on the compliance of the TCV Climate Bonds with the Climate Bond Standard.

DNV GL conducted the verification in accordance with the Climate Bond Standard Version 2.1 and with International Standard on Assurance Engagements *3000 Assurance Engagements other than Audits or Reviews of Historical Information*. The verification included i) checking whether the provisions of the Climate Bond Standard were consistently and appropriately applied and ii) the collection of evidence supporting the verification.

DNV GL's verification approach draws on an understanding of the risks associated with conforming to the Climate Bond Standard and the controls in place to mitigate these. DNV GL planned and performed the verification by obtaining evidence and other information and explanations that DNV GL considers necessary to give limited assurance that the TCV Climate Bond continues to meet the requirements of the Climate Bond Standard.

Based on the limited assurance procedures conducted, nothing has come to our attention that causes us to believe that the TCV Climate Bond is not, in all material respects, in accordance with the requirements of the Climate Bond Standard Version 2.1 and Associated Solar, Wind, Low Carbon Transport, Low Carbon Buildings and Water Technical Criteria.

for DNV GL Business Assurance Australia Pty Ltd

Sydney, 5 October 2018

Mark Robinson
Manager, Sustainability Services
DNV GL – Business Assurance

About DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organisations to advance the safety and sustainability of their business. Combining leading technical and operational expertise, risk methodology and in-depth industry knowledge, we empower our customers' decisions and actions with trust and confidence. We continuously invest in research and collaborative innovation to provide customers and society with operational and technological foresight. With our origins stretching back to 1864, our reach today is global. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping customers make the world safer, smarter and greener.

SCHEDULE 1: DESCRIPTION OF NOMINATED ASSETS

Eligible Projects & Assets Category	Sub category	Project name	Amount Funded ($)	Amount Expended to 30 June 2018
Low Carbon Buildings	Energy Efficiency	Traffic lights (statewide) replacement with LED lamps	$25,000,000.00	$25,000,000.00
Low Carbon Buildings	Energy Efficiency	Federation Square	$6,815,528.00	$6,815,528.00
Low Carbon Buildings	Energy Efficiency	Holmesglen TAFE (all campuses)	$5,703,470.00	$5,532,846.29
Low Carbon Buildings	Energy Efficiency	East Gippsland Water	$1,230,000.00	$1,230,000.00
Low Carbon Buildings	Energy Efficiency	Museum Victoria (all facilities, including Melb. Museum, REB, Scienceworks, storage)	$11,347,943.00	$6,746,897.50
Low Carbon Buildings	Energy Efficiency	Public Housing (28 high-rise towers)	$13,385,500.00	$4,255,324.38
Low Carbon Buildings	Energy Efficiency	Melbourne Polytechnic (all campuses)	$1,917,000.00	$1,917,000.00
Low Carbon Transport	Electrified Rolling Stock	5 X'Trapolis Train Sets	$97,870,000	$86,759,000
Low Carbon Transport	Supporting Infrastructure and Station &/or Platform Improvements	Melbourne Metro Tunnel State funded works, excluding PPP scope funded to June 2017	$1,026,500,000	$915,884,000
Low Carbon Transport	Supporting Infrastructure and Station &/or Platform Improvements	Mernda Rail Extension	$587,714,000	$452,630,000
Renewable Energy	Hydropower	Mini Hydroelectric Power Stations - T3	$15,250,000	$182,188
Renewable Energy	Hydropower	Tranche 2 Mini Hydros	$7,360,991	$8,599,240
Renewable Energy	Biogas	ETP Solids Handling - Stage 2	$43,715,895	$0
Renewable Energy	Biogas	ETP Solids Handling - Stage 1A	$7,658,900	$77,263
Renewable Energy	Biogas	ETP Solids Handling - Stage 1B	$8,029,875	$500,717
Renewable Energy	Biogas	Expansion of Power Station at WTP	$11,355,000	$1,096,305
Water	Greenhouse Gas Mitigation	WTP 55E ASP Upgrade / Renewal	$111,908,535	$741,354
Renewable Energy	Biogas	Buy out residual balloon value of AGL power plant at WTP	$3,500,000	$0
Renewable Energy	Biogas	WTP 25W Biogas Cover Upgrade	$42,155,956	$36,296,660
Renewable Energy	Solar or Wind	Large scale renewable energy power station at ETP	$55,000,000	$460,737
Total Excluding Hydro and Biogas Projects **Total**			**$1,944,391,976** **$2,083,418,593**	**$1,507,972,687** **$1,554,725,060**

SCHEDULE 2: VERIFICATION CRITERIA

Summary criteria for assertions of compliance with the Climate Bond Standard v2.1

The criteria against which TCV and its nominated projects and assets have been reviewed prior to inclusion in the Bond are grouped under the requirements as detailed within the Climate Bond Standard Version 2.1 including:

Part A: General Requirements

Area	Requirement
Project Nomination	The Climate Bond issued must specify the project collateral or physical assets with which it is associated
Use of Proceeds	Proceeds must be allocated to Nominated Project(s)
Non-Contamination	Issuers are permitted a grace period to allocate or re-allocate funds to Nominated Project(s)
Confidentiality	The information disclosed to the Verifier and the Climate Bond Standards Board may be subject to confidentiality arrangements
Reporting	Reporting on use of proceeds and nominated projects and assets

Part B: Low Carbon Contribution - Eligible projects and physical assets

Nominated projects and assets include financing of or investments in equipment and systems which enable the mitigation of greenhouse gasses, as detailed in Appendix B.

Area	Requirement
Solar Energy Generation	Solar electricity generation facilities
Wind Energy Generation	Wind Energy generation facilities

Low Carbon Transport	All infrastructure, infrastructure upgrades, rolling stock and vehicles for electrified public transport pass this criterion, including electrified rail, trams, trolleybuses and cable cars
Low Carbon Buildings	For a 5-year bond, a 30% carbon reduction as quantified in property upgrade contracts
Water	Engineered assets to capture, treat and deliver water, and to protect against flooding.
	Under the requirements of the methodology selected, the issuer must describe • The calculations and assumptions used to arrive at the baseline • Projected emissions over the life of the project and associated estimated GHG mitigation impact • A credible, independently verifiable, method of tracking actual emissions and mitigation impact over the life of the bond

Part C: Bond structures

Area	Requirement
Project Holding	The issuer of a Corporate Climate Bond with Nominated Projects linked to a portfolio of assets must continue to hold eligible assets at least equal to the Fair Market Value at the time of issuance of the original principal
Settlement Period	Climate Bond issuing entities must demonstrate that the proceeds of a Climate Bond have been allocated to the Nominated Project(s) within 24 months after the bond is issued
Earmarking	The Issuer of the bond shall maintain the earmarking process to manage and account for funding to the Nominated Projects & Assets

7.0 Appendix Two - Assurance Report on Use of Proceeds Statement

Building a better working world

Ernst & Young
8 Exhibition Street
Melbourne VIC 3000 Australia
GPO Box 67 Melbourne VIC 3001

Tel: +61 3 9288 8000
Fax: +61 3 8650 7777
ey.com/au

Independent Reasonable Assurance Report in relation to the Use of Proceeds Statement to the Directors and Management of Treasury Corporation of Victoria ("TCV")

Assurance conclusion

Based on our reasonable assurance procedures, in our opinion:

- Specific information in the Use of Proceeds Statement is fairly stated, in all material respects, based on:
  - the information provided by TCV participating authorities, government departments and state related entities managing earmarked assets and projects within the TCV eligible portfolio
  - internal information systems and financial records of the State of Victoria; and
- TCV's systems and policies managing the TCV Green Bond proceeds and the preparation of the Use of Proceeds Statement are, in all material respects, in accordance with the TCV Green Bond Framework.

Scope

We have performed a reasonable assurance engagement for the Directors and Management of TCV in relation to specific information in the annual TCV Green Bond Use of Proceeds Statement, processes for managing the TCV Green Bond proceeds and the preparation of the Use of Proceeds Statement. The specific subject matter and associated criteria of our assurance engagement are detailed in the table below.

Subject matter	Criteria
Certain information in the Use of Proceeds Statement in Table 2 on pages 7 and 8, specifically the: • Amount expended to 30 June 2018 as listed in the column titled "Amount Expended to 30 June 2018" • Related project names (project name only; excludes description of project) • Borrowers	• Criteria described in Section 5.0 Management of Proceeds on page 7 of the 2016-17 TCV Green Bond Annual Report dated February 2018.
TCV's systems and policies managing the TCV Green Bond proceeds and the preparation of the Use of Proceeds Statement.	• Criteria described in Section 5.0 Management of Proceeds on page 7 of the 2016-17 TCV Green Bond Annual Report dated February 2018

Management Responsibility

Management of TCV ('Management') are responsible for the collection, preparation, and presentation of the subject matter in accordance with the criteria and for maintaining adequate records and internal controls that are designed to support the management of Green Bond proceeds and the preparation of the Use of Proceeds Statement.

Assurance Practitioner's Responsibility

Our responsibility is to express a reasonable assurance conclusion as to whether the subject matter is presented in accordance with the criteria, in all material respects. Our assurance engagement has been planned and performed in accordance with the Australian Standard on Assurance Engagements 3000 (revised) Assurance Engagements Other Than Audits or Reviews of Historical Financial Information ('ASAE 3000').

Level of Assurance

A reasonable assurance engagement consists of making enquiries and applying analytical, controls testing and other evidence-gathering procedures that are sufficient for us to obtain a meaningful level of assurance as the basis for a positive form of conclusion. The procedures performed depend on the assurance practitioner's judgement including the risk of material misstatement of the specific activity data, whether due to fraud or error. While we considered the effectiveness of Management's internal controls when determining the nature and extent of our procedures, our review was not designed to provide assurance on internal controls. We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Our Approach

A summary of our assurance procedures is shown in the following Table.

	Assurance item	Testing Plan
1	Processes and systems	• Mapped out the processes and systems used to manage the eligible lending through interviews with TCV personnel responsible for managing proceeds from the Green Bond • Documented and assessed controls over each significant process and system
2	Accuracy of specific quantitative information	• Agreed the amount expended to 30 June 2018 for each project with the respective TCV participating authorities, government departments and state related entities managing earmarked assets and projects within the TCV eligible portfolio and/or agreed to internal information systems and financial records of the State of Victoria
3	Green Bond issuance and register of all TCV Green Bond eligible projects	• Checked that the 2016 Green Bond had an amount equal to the net proceeds booked under an allocated position within TCV's internal systems. • Checked, on a sample basis that TCV had established a register of all TCV Green Bond eligible projects earmarked against each TCV Green Bond, updated on a quarterly basis, which identified each eligible project/asset and tracked funds invested in each of these eligible projects/assets.
4	Distribution of the net proceeds of the Green Bond	• Checked that the requirements of the TCV Green Bond Framework had been met as of 30 June 2018 by testing that the total amount expended to 30 June 2018 of $1,555 million is in excess of the TCV Green Bond proceeds of $300 million • Specifically, as required by the Climate Bond Standard, we checked that TCV as Issuer demonstrated that the net proceeds of the TCV Green Bond have been distributed and invested in eligible assets and projects within 24 months of issuance date of the TCV Green Bond. This will be validated by quarterly reporting undertaken for the TCV Green Bond.

Limitations

There are inherent limitations in performing assurance – for example, assurance engagements are based on selective testing of the information being examined – and it is possible that fraud, error, or non-compliance may occur and not be detected. 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 ASAE 3000 is subjective and will be interpreted differently by different stakeholder groups.

Our assurance was limited to the subject matter above related to TCV's 2016 Green Bond issuance and does not extend to any other information in the TCV Annual Green Bond Report. Our assurance is limited to policies and procedures in place as of 6 December 2018. We do not provide any assurance on projects'/assets' eligibility under the Climate Bonds Standard.

Use of Report

Our responsibility in performing our assurance activities is to the Directors and Management of TCV alone and in accordance with the terms of reference for our engagement as agreed with them. We do not therefore accept or assume any responsibility for any other purpose or to any other person or organisation. Any reliance any such third party may place on the Proceeds of Use Statement is entirely at its own risk. No statement is made as to whether the criteria are appropriate for any third party purpose.

Our Independence and Assurance Team

In accordance with APES 110, the firm and all professional personnel involved in this engagement have met the independence requirements of Australian or International professional ethical requirements. Our team has the required competencies and experience for this assurance engagement.

Ernst & Young

Ernst & Young

Mathew Nelson
Partner
Melbourne, Australia
6 December 2018