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FOGO and Energy from Waste in WA

Snapshot Report

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1 Introduction

NSW EPA requested that Talis provide a snapshot of the status of Mechanical Biological Treatment (MBT) facilities in states other than NSW, including issues impacting the generation of Municipal Waste Organic Outputs (MWOO). Some key factors influencing the future of MBTs, and therefore the generation of MWOO, include a move towards a three bin system for recovery of food organics and garden organics (FOGO), and the recovery of energy from waste (EfW).

There are three operating MBTs in states other than NSW, two in WA and one in Queensland. This snapshot report focuses on those three facilities, and the waste policy environment in WA. A brief overview of the policies and facilities in other states is also included.

2 Mechanical Biological Treatment in WA

2.1 Background

Twenty six of the thirty local government authorities (LGAs) in the Perth metropolitan area, operated a 2 bin system until 2017. The exceptions were the Cities of Bayswater, Nedlands and Stirling and the Towns of Cambridge and Cottesloe. The other LGAs utilised a general waste 240L mobile garbage bin (MGB) collected weekly and a recycling 240L MGB collected fortnightly. This is primarily as a result of cost benefit analyses undertaken in the late 1990's which determined that a two bin system with a MBT facility for recovering recyclable and organic materials from general waste was the most beneficial option. This resulted in the majority of LGAs working collaboratively through regional councils to generate sufficient waste supply tonnage to support investment in MBT facilities. This differs from the Sydney Metropolitan Area context where the NSW Government mandated through the Waste & Sustainability Improvement Payment in 2008/09 that councils implement a 3 bin system meaning the feedstock for MBT's in NSW was mostly from residual bins with minimal garden organics.

The Perth region is divided into five regional councils with twenty four LGAs participating as members of those regional councils. Twenty two of the LGAs are from within the metropolitan region and two (the City of Mandurah and the Shire of Murray) are non-metropolitan LGAs.

Two regional councils, Southern Metropolitan Regional Council (SMRC) and Mindarie Regional Council (MRC) committed to MBT facilities which commenced operation in 2003 and 2009 respectively. Western Metropolitan Regional Council (WMRC) committed to an anaerobic/aerobic digester facility, which commenced commissioning in 2012 but has never operated at capacity, or as intended.

Two other regional councils, Rivers Regional Council (RRC) and Eastern Metropolitan Regional Council (EMRC) did not reach an agreement on a preferred solution for processing household waste until recently. Those two groups of councils have committed residual waste tonnages to EfW at two different facilities.

Details of the waste processing commitments of the regional councils are summarised in Table 2-1.

Table 2-1 Summary of WA Regional Group of Councils AWT commitments

Facility	Regional Group – Councils committed
MBT - WCF – Canning Vale	SMRC – 5 member councils participating
MBT - Neerabup RRF	MRC – 7 member councils participating
EfW - Avertas Energy EfW	RRC – 6 member councils, + 2 other councils participating. One RRC Member – Shire of Murray – has an agreement to delay commencement of waste delivery.
EfW - East Rockingham RRF Project Co Pty Ltd	EMRC – 4 of the 6 member councils + 1 other council participating

The contractual commitments by the LGAs through the regional councils and individually for processing household waste set the context for the recent WA State Government direction on food and garden organics (FOGO) collection and EfW, which impacts the generation MWOO.

2.2 Details of the existing MBTs in WA

The dominant method for reprocessing organic waste materials in WA is open air composting in windrows however the waste industry in WA has a range of organics treatment technologies, including two MBT facilities processing mixed waste.

2.2.1 SMRC – Canning Vale Waste Composting Facility

The SMRC is located in the southern part of metropolitan Perth and its member councils are the Town of East Fremantle and the Cities of Fremantle, Cockburn, Kwinana and Melville. The SMRC owns and operates the Regional Resource Recovery Centre (RRRC) located in Canning Vale on behalf of some of its members. The facility includes an MBT known as the Waste Composting Facility (WCF). The WCF uses Bedminster enclosed rotating drums, mechanical separation and internal maturation floors to produce a compost material. The RRRC is licenced to accept a maximum of 109,200 tonnes annually to process general Municipal Solid Waste (MSW).

The original agreement for the MBT, based on the expected life of the composting drums, was for 20 years, expiring in 2023. The City of Canning was a foundation member of the SMRC but withdrew from membership in 2009. The City of Canning subsequently entered into an agreement with the Rivers Regional Council to participate in its waste supply agreement with WTE Project Co Pty Ltd EfW facility in Kwinana.

The City of Cockburn has recently withdrawn from the SMRC and is introducing a 3 bin waste collection system (with a green organics collection service). It has also recently entered into a waste supply agreement with the East Rockingham RRF Project Co Pty Ltd EfW facility in East Rockingham.

As a result of various changes to the waste markets and waste policy context in WA, SMRC has looked into a number of options for the future of the RRRC to provide the same or better performance at lower costs. SMRC recently invited tenders for a divestment opportunity to take over operation of some or all of the RRRC under a sub-lease agreement. SMRC is currently in the process of negotiating with Remondis as its preferred tenderer.

SMRC had considered the possibility of decommissioning the drum technology and is currently operating an additional pre-sorting shed (upgrades shown in Amended Licence)¹ and screening process to assist with the processing of FOGO material collected from a trial area in City of Melville. Each of the remaining member councils have committed to introduce FOGO commencing between July - September 2019. The SMRC is also currently inviting tenders for a waste supply agreement for processing the kerbside collection refuse stream through an EfW facility. Table 2-2 provides a summary of the SMRC WCF facility.

Table 2-2 Summary of the SMRC Waste Composting Facility

Feature	Details
Plant commissioned	2003 – 20 year agreement between SMRC and its participating member councils.
Licence No	L7799/2001/8. Contains no specific requirements for compost testing
Description	<p>The WCF is based on the Bedminster Bioconversion rotary digester technology and processes mixed MSW material. The facility has 4 Eweson three compartment rotary digesters. Bulky contaminants and any observed hazardous wastes are removed from the mixed MSW prior to batch feeding material into the rotary digester. Liquid waste² (including leachate) or water is also fed into the first compartment if required. Temperatures are maintained at an average of 50°C. The material is then rotated through in batches to the second compartment on day 2 and third compartment on day 3.</p> <p>After 3 days the raw compost is unloaded onto a conveyer belt where a magnet removes metals and a primary trommel (40mm) screens out plastics and other oversized contaminants. The remaining material (<40mm) is then transferred to an enclosed composting hall with aerated floor for secondary composting and maturation for 28-30 days. The compost is regularly turned and watered to speed up decomposition.</p> <p>The material is then passed through a 15mm trommel. Material over 15mm is disposed of to landfill. The material then passes through a 4.76mm oscillating deck screen. This results in two grades of product; soil conditioner (5mm-15mm) and compost (<5mm). The majority of contaminants are removed through the screening process.</p> <p>SMRC’s website states that each batch of compost from the RRRRC undergoes testing for a large number of contaminants prior to leaving the facility.</p>
Throughput	75,000tpa with licence capacity of 109,200tpa
Residence time	5-7 weeks
Saleable outputs	<p>Compost (<5mm) & soil conditioner (<5-15mm) – MSW derived. Processed by Nutrarich in Brookton (~125km from Canning Vale). The material generally applied to agricultural land and is blended with other organic materials as required to suit the market.</p> <p>SMRC’s website states that the final product, which is blended with other soil conditioners, is suitable for unrestricted use in farms, parks and gardens. There is no published</p>

¹ https://www.der.wa.gov.au/images/documents/our-work/licences-and-works-approvals/Amendment_notices/L7799-2001-8a2.pdf SMRC Amendment Notice 2

² Biosolids, if delivered to the facility, were permitted as a WCF input material until 2015. Biosolids are longer accepted as one of a number of mitigation strategies to manage odour complaints (SMRC, SWMP, 2016).

Feature	Details
	information identified by Talis that states the testing regime or that the material reaches Australian Standards, however anecdotally the final product meets AS4454. There have been some issues with suitability of application of the product to non-agricultural land due to the plastic content ³ .
Diversion Rate	54% ~ 25,000tpa organic output (remainder is moisture loss)
Footprint	3ha
Experience to date	Odour complaints from residents occurred in the past. The issue was resolved with investment in odour control, input tonnage and operations management. Two of the original participant councils have withdrawn from the project since its inception. Talis understands that the gate fee is high compared to alternatives.
Current status of plant	Due to the 3 bin system being introduced by the remaining member councils within the SMRC region the WCF is likely to be converted to process FOGO only. SMRC is currently in negotiations with Remondis to operate the facility. It is not yet public what the proposed FOGO processing method will be. SMRC is also in the process of finalising a tender for the processing of residual waste from the red-lid bin, which is likely to go to EfW once a facility is operating in WA.
Additional information	This webpage includes a link to a video with a virtual tour of the facility https://smrc.com.au/virtual-tours/

2.2.2 MRC - Neerabup Resource Recovery Facility

MRC includes seven member councils mainly located in the northern corridor of the metropolitan area including the Cities of Joondalup, Perth, Stirling, Vincent and Wanneroo and the Towns of Cambridge and Victoria Park. In 2018 MRC member councils delivered 105,531 tonnes of mixed general waste from their two bin collection systems to the Neerabup Resource Recovery Facility (RRF) for processing into composting products. The RRF is owned and operated by BioVision 2020 Pty Ltd under a public private partnership with the MRC. MRC has recently trialled the processing of FOGO through the Neerabup RRF, and in cooperation with the facility owners, is considering whether to convert the facility to FOGO processing only. Table 2-3 provides a summary of the RRF.

Table 2-3 Summary of the MRC Neerabup RRF

Feature	Description
Contract	BioVision 2020 Pty Ltd has contracted with the MRC and its member councils to build own and operate a mechanical biological treatment facility with a capacity of 100,000 tonne per annum of mixed MSW, for a period of 20 years.
Plant commissioned	2009
Licence No	L8336/2009/2. Contains no specific requirements for compost testing

³ SMRC, Strategic Waste Management Plan, 2016

Feature	Description
Description	<p>Large contaminants are removed prior to loading the mixed general waste onto the conveyor belts to feed into the composting drums. The RRF is a two-stage composting system. The first uses the Conporec rotating drum for the initial mechanical breakdown of the waste and rapid decomposition of organics over 3 days. The mechanical breakdown occurs through the rotating action of the drums. The crude compost that exits the digester drum is screened, with particles less than 30mm sent to the maturation hall for the second stage composting. Magnets remove metals for recycling. Materials greater than 30mm are sent to landfill for disposal.</p> <p>The organics (<30mm) are loaded into composting bays within an enclosed maturation hall with an aerated floor. The material is turned every 1- 3 days for 28 days.</p> <p>After 28 days the compost is further refined including a vibrating screen to remove oversize material which is disposed of. The remaining fine materials are crushed using a granulator and a pulveriser reducing any glass to a sand-like consistency.</p>
Throughput	100,000tpa.
Residence time	72 hours in digester then up to four weeks' active composting on the aeration floor.
Saleable outputs	40,000tpa is taken and marketed by C-Wise as Organic Soil Conditioner, an AS4454 compliant product ⁴ . There is a testing regime and acceptable compost standard outlined in the Resource Recovery Agreement which is not publicly available. The members' information report published every 2 months indicates that the compost standards were amended in 2013. And that there have only been three quality breaches in the past 12 months (1 in July 2019 and 2 in March 2019).
Capital costs	\$70 million.
Diversion Rate	55%
Footprint	3ha
Experience to date	One member of the initial tendering consortium withdrew during the contract negotiations. SITA (now Suez) bought into BioVision 2020 as both an owner and operator of the facility and the contract was finalised on this basis. Early in the operating life of the facility there were issues with the drums which were taken out of commission and repaired. While the regional council is satisfied that the facility is operating in accordance with expectations, Talis understands that the gate fee is high compared to alternatives.
Current status of the plant	MRC has a continuing contract with BioVision 2020 to own and operate the facility. MRC, in cooperation with BioVision 2020, is currently determining the options and implications of converting the RRF to process FOGO only.

⁴ <https://www.cwise.com.au/news/waste-management/63-turning-waste-into-gold.html>

3 Food and Garden Organics Collections and Policy in WA

The WA Waste Authority released the *Waste Avoidance and Resource Recovery Strategy 2030* (Waste Strategy) in February 2019. The Waste Strategy sets targets including increasing MSW material recovery in Perth to 65% by 2020, 67% by 2025 and 70% by 2030.

One of the headline strategies is the introduction of *'A consistent three bin kerbside collection system, which includes separation of FOGO from other waste, to be provided by all local governments in the Perth and Peel Region'⁵ by 2025 and supported by State Government through the application of financial mechanisms.'*

In addition to the strategies related to FOGO, the Waste Strategy requires that energy is only recovered from residual waste. Residual waste in WA is defined as *'waste that remains after the application of a better practice source separation process and recycling system, consistent with the waste hierarchy'*.

For municipal waste the Waste Authority in WA considers Better Practice to be a three bin FOGO system. The challenge for LGAs in Perth is that many had begun to introduce a three bin garden organics collection system, as recommended by the Waste Authority's *Better Bin Kerbside Collection Program Guidelines* (2016), and/or have existing contractual commitments to AWT's. Only the following councils, all in regional WA, **City of Bunbury and Shires of Capel, Collie and Donnybrook-Balingup**, had introduced a FOGO system in WA prior to the state government's proposal to possibly mandate its introduction. When the Waste Strategy was released City of Melville was conducting a FOGO trial to assist in determining whether it and the remaining SMRC member councils would introduce FOGO.

There are financial ramifications for changing the inputs to the existing facilities (landfill, MBT and EfW) where capital and operating costs still need to be covered. Both existing MBT facilities are assessing the option of being converted to process FOGO. The EFW contracts have mechanisms to address changes in the quantities of waste delivered due to the introduction of changes to the waste collection systems. Landfill operations have more flexibility to changes to waste deliveries however they will be affected by an overall reduction in waste received, in line with the policy objectives.

Under the *Waste Avoidance and Resource Recovery Act 2007* (Part 4) the State Government can require LGAs to *'develop a Waste Plan outlining how waste services provided by the local government will be managed to achieve consistency with the waste strategy'*. If the State Government is not satisfied that the waste plan complies with the requirements of the waste strategy then the local government can be directed to modify the document to have it comply or the State Government may prepare or modify the waste plan on behalf of the local government.

The State Government has recently released a template waste plan which is aligned with the Waste Strategy and is currently out for consultation with LGAs. It is not known whether the State Government

⁵ This covers 79% of WA's population and 24% of WA Councils (34 of 139)

will enforce its powers under the Act to require LGAs to comply with the strategies related to FOGO and EfW.

Because of the Government's policy for FOGO separation and collection to be provided by all local governments in the Perth and Peel Region, it is anticipated that a number of these local governments will transition to FOGO based 3 bin collection services over the next few years.

4 Energy from Waste in WA

There are no EfW facilities currently operating in Australia on mixed residual waste streams. However, in the context of the two MBTs in WA operating at high cost compared to landfill and the absence of a policy direction requiring a 3 bin kerbside collection system from the State Government, some regional councils opted to tender for EfW solutions through waste supply agreements. The Waste Authority released its Waste to Energy position paper for WA in 2013, just prior to the first EfW waste supply agreement by local governments being finalised. The position paper acknowledged that if EfW were to be introduced in accordance with international best practice, using proven technologies, it would be an acceptable part of the waste hierarchy.

In addition, in April 2013 (prior to the release of the Waste Authority's Position Statement on Waste to Energy), the Environmental Protection Authority and the Waste Authority provided joint advice to the then Environment Minister on the environmental and health performance of waste to energy technologies internationally which made 21 recommendations, based on 6 principles:

- Only proven technology components should be accepted for commercially operating waste to energy plants;
- The expected waste input should be the main consideration for the technology and processes selected;
- Proposals must demonstrate best practice that, at a minimum, meet the European Union's Waste Incineration Directive standards for emissions at all times;
- The waste sourced as input must target genuine residual waste that cannot feasibly be reused or recycled;
- Continuous emissions monitoring must occur where feasible, and non-continuous emissions monitoring must be required for all other emissions of concern; and
- Residual by-products must be properly treated and disposed of to an appropriate landfill, except where it is demonstrated that they can be safely used elsewhere with acceptable impacts to the environment or human health.

Both the Waste Authority Position Statement and the joint EPA/ Waste Authority advice on Waste to Energy indicated efforts to source waste as a feedstock to waste to energy facilities should target genuine residual waste that cannot feasibly be reused or recycled.

Table 4-1 shows a brief overview of the two proposed WA facilities.

Table 4-1 Mixed MSW Energy from Waste Facilities in WA

Company	Proposed Location	Cost	Waste Feedstock (type/tpa)	Energy Outputs (MW)	Technology Type	Implementation
Avertas Energy (WTE Project Co Pty Ltd)	Kwinana (WA)	\$680 million	Residual MSW & commercial/ 400,000	36	Moving grate combustion (Keppel Seghers)	Construction of the facility has commenced and the facility is expected to be operational in 2021.
East Rockingham RRF Project Co Pty Ltd	East Rockingham (WA)	\$400 million	Residual MSW & commercial/ 300,000	28	Moving grate combustion (HZI)	Still to reach financial close, expected to be operational in 2023

Source: Tribe HZI New Energy media release 14 March 2018; Macquarie Group statement 18 October 2018

4.1 Avertas Energy

Avertas Energy is a co-development investor that owns the Phoenix Energy EfW project. Macquarie Group is the other co-developer. The project was supported by a 20-year waste supply agreement with RRC on behalf of its six members (Cities of Armadale, Gosnells, Mandurah and South Perth and the Shires of Murray and Serpentine-Jarrahdale) along with the City of Canning, and a separate agreement with City of Kwinana. The Shire of Murray has an option to delay commencement of waste delivery.

Under these agreements the eight participating councils will supply kerbside collected general waste to the plant. Some of the councils will also provide other waste including bulk waste collections, public place waste, council operations waste and waste dropped off at transfer stations. Some of these councils have indicated their preference to retain a 2 bin system. It is not known whether the state government will force the participating councils to comply with the 3 bin FOGO collection system.

The RRC agreement was signed in 2014. This agreement outlines annual Committed Tonnes, a minimum combined total amount of waste to be supplied annually by the RRC participating councils once the facility is operating. Committed Tonnes need to be met by the RRC as a whole rather than on a council by council basis⁶.

4.2 East Rockingham RRF Project

The East Rockingham RRF Project Company Pty Ltd is being jointly developed by New Energy Corporation, Hitachi Zosen INOVA and Tribe Infrastructure Group. The project is also supported by a 20 year waste supply agreement between the Eastern Metropolitan Regional Council (EMRC) and four of its member councils, Cities of Belmont, Mundaring, Kalamunda and Swan. Town of Bassendean and City of Bayswater chose not to enter into the agreement.

⁶ SMRC, *Strategic Waste Management Plan, 2016*

Under the terms of the agreements, the participating member councils will supply their waste to the facility on a 'waste arising basis' which means they will only be obliged to deliver waste that is generated and not diverted through waste reduction schemes⁷. This means there should not be any direct penalty for member councils in relation to the volume of waste they deliver to the facility.

4.3 Impact of FOGO on EfW feedstock supply

Provision has been made in the EfW supply contracts to allow for reductions in tonnes resulting from different collection systems and policy changes such as the introduction of FOGO. The contracted tonnes relate to the total amount for the region, not on a council by council basis. The participating councils at EMRC generate approximately 85,000tpa of general waste from a 2 bin system, and RRC participating councils generate approximately 110,000tpa. Councils that change from a 2 bin collection to a 3 bin FOGO system would divert approximately 40% of material to the FOGO bin.

The MSW contractual commitments from member councils in WA made up a significant amount of the surety for investors being prepared to finance the EfW projects. The mandating of FOGO collection creates a risk that a significant proportion of the waste stream will be diverted to a different facility. Therefore the EfW facilities will need to secure additional tonnages to ensure adequate feedstock supply and to compensate for gate fee losses. It is anticipated that the cost of processing residue waste at an EfW facility will be less than the cost of landfilling, given the value of the waste levy in WA. Therefore it is likely that the additional waste quantities will be obtained from other LGAs and/or from commercial and industrial waste sources.

FOGO is generally very wet and uses more heat to extract energy than drier materials such as plastic, paper, wood and other composite items that make up the general waste stream. However, food is a large proportion of the waste stream so it contributes a significant amount to the overall tonnage and calorific value of the EfW feedstock.

EfW facilities are designed to work within a broad calorific value range⁸ to maintain a consistent energy output. Typically, the calorific value of kerbside general MSW is between 9-10MJ/kg. Regardless of whether the material is from a 2 bin or a 3 bin collection system it is expected that the feedstock will fit within the acceptable calorific value range of the EfW facilities. It should be noted that a key aspect of managing feedstock into the EfW facility is to constantly mix the material in the waste receiveal bunker to help achieve a consistent calorific value of the material placed in the furnace. This process provides the opportunity to receive waste of varying characteristics from differing sources. Therefore, there would be no need to redesign or modify a facility based on the introduction of FOGO by some or all councils.

⁷ EMRC media statement – Community News 15 March 2018; City of Cockburn -Waste Management Review 7 November 2018

⁸ 7.5-14MJ/kg for the East Rockingham EfW (Source: HZI, 2017). Avertas is expected to operate in a similar range 7-13MJ/kg based on characteristics of other similar direct combustion grate systems (Source WSP, 2013)

5 Overview of EfW, FOGO and MBTs in other states

The increased media and public attention on waste and waste management has resulted in an influx of new or updated policy documents across Australia. The following table shows a summary of the states and the policies related to EfW, FOGO and waste infrastructure guidelines. Table 5-1 shows that almost all states now have adopted an EfW Policy or have a policy document out for public consultation. The documents referred to in this table are referred to in more detail in the Sources section at the end of this report.

Table 5-1 Summary of EfW, FOGO and Infrastructure Policies by State

	ACT	Qld	NSW	NT	SA	Tas	Vic	WA	National
EfW Policy	Consultation closed	Consultation draft	✓	No	Consultation draft	No	✓	✓	No
Policy related to FOGO as best practice	Yes (consultation)	No	✓	No	✓	No	✓	✓	✓
Waste infrastructure strategies that include (MBT)	No	No	✓ Draft	No	✓	No	✓	Draft	

In four states, and nationally, there are better practice collection guidelines that encourage a three bin collection system. In the ACT there is a discussion paper recommending the introduction of FOGO. None of the guidelines require FOGO, however each encourage FOGO as a better practice option. As discussed previously WA is the only state that now requires LGAs to introduce FOGO using a mechanism through the Waste Strategy and WARR Act.

MBT facilities for mixed waste are accepted in the waste infrastructure plans in NSW, SA, Victoria and WA. It is also mentioned in the ACT Waste Strategy 2011-2025 however all of these infrastructure plans were released prior to the MWOO restrictions in NSW were implemented so it is not clear if the states will still consider MBTs to be a preferable option.

Table 5-2 shows a summary of EfW, MBT and FOGO implementation by state. There are a number of EfW consortia that are interested in developing facilities in Australia but they have not been considered in this table unless they have submitted a planning approval. The following sections provide further information about each state's policies and facilities.

Table 5-2 Summary of EfW and MBT Facilities and FOGO Collection by State

	ACT	Qld	NSW	NT	SA	Tas	Vic	WA
Mixed MSW EfW - approved							1 (subject to appeal)	4 (1 under construction, 1 securing finance, 2 unlikely to proceed)
Mixed MSW EfW -proposed			1					
MBT - existing		1	5					2
Councils with 3 bin FOGO	0	1	43	0	25	5	38	6 (+4 committed)

Australian Capital Territory (ACT)

The *ACT Waste Management Strategy 2011-2025* contains Strategy 2.2 to *Recover organic and residual waste resources*. This indicates there is a role for a mixed MSW MBT and EfW in the ACT.

In 2018 the ACT Government issued a *Waste to Energy Information Paper* for consultation. A final policy paper has not yet been issued. The consultation document outlines a number of policy principles including respecting the waste hierarchy and circular economy and acknowledges that the 2025 target of 90% resource recovery is unlikely to be achieved without some form of EfW. It requires that only residual waste is used in any EfW facility after all efforts to reduce, reuse and recycle have been made. There is no specific mention of 3 bin systems or FOGO.

In 2018 ACT Government also produced a *Waste Feasibility Study Roadmap and Recommendations - Discussion paper*. It contains a recommendation to implement a FOGO collection service, and the need to identify a site and establish a FOGO processing facility.

ACT introduced the option of a green waste bin in April 2019 across the Territory and does not currently have any mixed waste MBTs.

Northern Territory

There are currently no MSW FOGO collections and no MBT or EfW in the Northern Territory. The *Waste Management Strategy for the Northern Territory 2015-2022* does not contain any mention of FOGO, MBT or EfW. It does mention the need to *develop a waste infrastructure mapping database to identify locations of accessible facilities and to assist strategic planning and future requirements of the Territory*.

Queensland

On 1 July 2019 the Queensland Government released its *Waste Management and Resource Recovery Strategy*. It states that *'The options of fuel production, energy production or disposal should be reserved for residual waste that is unsuitable for higher order options'*. Government actions include to

‘develop a coherent state wide infrastructure planning framework and regional infrastructure plans’. There is no specific mention of FOGO or MBT.

Eleven Queensland LGAs (14% of all LGAs) operate a 3 bin garden organics collection system and one operates a FOGO system. There is one mixed waste MBT operating in Cairns. The details are provided in Table 5-3. Open air composting in windrows remains the dominant method for processing separately collected MSW organics.

Table 5-3 Summary of SITA Bedminster Drum, Cairns QLD

Feature	SITA Bedminster Drum, Cairns QLD
Description	Mechanical and biological treatment using a similar process to that outlined for the SMRC facility. The facility uses Bedminster drum composting and maturation to create a saleable product. It opened in 2003.
Throughput	125,000tpa.
Waste sources	Cairns and regional council household waste and C&I waste.
Residence time	72 hours in digester then up to four weeks’ active composting on the aeration floor
Saleable outputs	Ferrous materials recovered. Recycled organics sold to cane farmers. There has been significant demand for this compost since SITA took over the plant in early 2006. Cane Farmers Ag Study has shown significant (25%) increase in crop productivity over traditional fertilisers.
Diversion Rate	50% as the plant also takes in C+I waste which is not processed
Footprint	3ha
Experience to date	Plant initially suffered a number of design and operational problems, having been built on an old landfill with the substructure engineering being underspecified. In 2009 the receival hall collapsed. The plant was closed for 6- 12 months. Previous to that the plant was also closed for a period due to odour problems. Since being taken over by SITA these issues have been resolved.

Source: SMRC, *Strategic Waste Management Plan, 2016*

South Australia

The majority of LGAs in Adelaide and surrounds have a three bin waste collection system. There is no requirement in SA to introduce a FOGO system, however Zero Waste SA (now Green Industries SA) published *South Australia’s Kerbside Three Bin System Waste Report 2012-13* which outlines best practice and system performance related to FOGO and GO collections showing that FOGO systems with a kitchen caddy provide the highest diversion rates. In addition the *SA Waste Strategy 2015-20* promotes food organics collection and treatment to maximise diversion to the extent practically and economically achievable for Adelaide councils.

There are currently no mixed waste MBT facilities in SA producing MWOO. Green Industries SA’s *Waste and Resource Recovery Infrastructure Plan* indicates a potential role for 200,000 tpa of MBT capacity in the future, in addition to a role for increasing anaerobic digestion and EfW. The report indicates that the MBTs would recover material from the residual waste stream, including 100,000tpa of MSW and 100,000 C&I waste across approximately 6 facilities.

In April 2019 EPA SA released a *Thermal Energy from Waste Activities Position Statement*. It indicates that mixed MSW is an acceptable feedstock for EfW and Refuse Derived Fuel production. It states that 'EfW should support any viable options for higher order beneficial uses... In keeping with the waste management hierarchy and circular economy objectives, the combustion of waste without sufficient resource recovery is not supported'. For MSW a maximum of 40% by weight of kerbside collected material may be eligible for use in EfW from councils with a 3 bin system including collection of FOGO.

Tasmania

Tasmanian councils are divided into three waste management groups – Northern Tasmanian Waste Management Group, Cradle Coast Waste Management Group and Waste Strategy South which is a committee of the Southern Tasmanian Councils Authority. In the absence of state direction the regional groups have been proactive in developing waste strategies and local waste initiatives. Four councils have introduced FOGO collections and City of Hobart has a commitment in its Waste Strategy 2015-2030 to work with others to establish a regional organics processing plan and introduce FOGO collections.

In June 2019 the Tasmanian Government released a *Draft Waste Action Plan* for consultation. It refers to the need for a Tasmanian Waste and Resource Recovery Infrastructure Plan by 2021 which would include consideration for source separation of kerbside collected organics and EfW infrastructure. It is also proposed that an Organic Waste and Resource Recovery Strategy be developed by the end of 2020.

Victoria

In 2017 Sustainability Victoria released a guide to *Optimising Kerbside Collection Systems* to encourage greater consistency in kerbside collection. The document indicates that greater recovery rates are achieved through a 3 bin FOGO system, and that it maximises source separation preparing the residual waste for thermal treatment. A 3 bin system is encouraged however there is no requirement to introduce FOGO.

The majority of Victoria's 79 LGA's offer a 3 bin collection service, with 38 providing FOGO. There are no mixed waste MBT facilities currently operating that Talis is aware of. Sustainability Victoria's *Guide to Biological Recovery of Organics* outlines performance measures to encourage best practice (Section 8) if a mixed waste MBT was introduced in Victoria.

EPA Victoria released a *Guideline: Energy from Waste (2017)* which states that '*the EPA encourages EfW options where energy recovery provides the best practicable environmental outcome for the management of waste having regard to the economic, social and environmental considerations, and when the waste has a gross caloric value that can be recovered. It should be considered where generation of the waste cannot be avoided or the waste cannot be recovered for productive purposes through reuse and recycling*'. There is no specific reference to FOGO. It states that '*It is the responsibility of the applicant to demonstrate that EfW is the best management option for the waste*'.

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