Solid Waste Management Country Profile Republic of the Marshall Islands

BACKGROUND

The Republic of the Marshall Islands (RMI), located halfway between the Philippines and Hawaii, is composed of two chains of low coral islands and atolls. The Ratak Chain in the east comprises 15 atolls and individual islands, and the Ralik Chain to the west comprises 16 atolls and islands. The most recent census was in 2011, when the population was 53,000, but recent indications suggest a stable or falling population, largely driven by migration to the United States. There are two urban areas, Ebeye Island (in Kwajalein Atoll) and Majuro Atoll, which together account for around 75% of the population ¹.

The latest economic data, for 2018, indicates a national GDP of around USD 220 million, with a per capita GNI of about USD 4,800² and a growth rate of 2.5%³. The largest industrial economic activity is associated with fishing, conducted mainly by foreign ships under license to the Parties to the Nauru Agreement. A tuna fish-processing plant operates in Majuro, employing about 150 people, and Majuro is the largest tuna transshipment port in the Pacific, which results in large numbers of fishing boats and associated supply ships mooring in Majuro Lagoon.

INSTITUTIONAL ASPECTS

The following are the major regulations governing waste management in the RMI:

- National Environmental Protection Act 1984
- Solid Waste Regulation 1989

In Majuro Atoll and Kwajalein Atoll, highly populated areas in the RMI, waste management plans have been formulated as shown below.

- Solid Waste Management Plan for Majuro 2019-2028
- Kwajalein Atoll Solid Waste Management Plan 2019-2028

The government institution with overall responsibility for waste in the RMI is the Environmental Protection Authority (EPA). The EPA was set up under the National Environmental Protection Act of 1984, and under this act, the EPA has basic regulations covering solid waste and landfill operations.

Household waste collections take place on Majuro, and on Ebeye Island in Kwajalein Atoll. On Majuro, the Majuro Atoll Waste Company (MAWC), a state-owned enterprise, collects household and commercial waste; on Ebeye, collection is by the Kwajalein Atoll Local Government (KAL-GOV). In 2016, the Styrofoam Cups and Plates and Plastic Products Prohibition and Container Deposit Act legislated for a Container Deposit Scheme (CDS) recycling system for beverage containers, and the Recycling Program Regulations 2018, under that act, detail the beverage containers covered by the law, and the rates of deposit and refund. The EPA administers the CDS as the designated Recycling Agent, but contracts a System Operator, MAWC, to operate the recycling system on Majuro. The deposit refund recycling system uses a Special Revenue Fund to hold deposits and pay out refunds, and this is administered by the Ministry of Finance. On the island of Ebeye, KALGOV is designated as the System Operator to manage the redemption center there.

TECHNICAL ASPECTS

Waste Generation and Composition

According to the Solid Waste Management Plan for Majuro 2019-2028 and Kwajalein Atoll Solid Waste Management Plan 2019-2028, the amount of waste generated per day by source in Majuro and Ebeye is as shown in the table below. Due to few major industries existing in either area, as much as 60% of waste is generated by households, and 40% from other sources, on Majuro, while the split is 70% to 30% on Ebeye.



Waste generated in the RMI (tons/day)

State	Waste Generated (tons/day)		
	Household waste	Other sources	Municipal waste total
Majuro	27	17	43
Ebeye	9	4	13

Source: Solid Waste Management Plan for Majuro 2019-2028, Kwajalein Atoll Solid Waste Management Plan 2019-2028

Also, the overall amount of waste generated, as well as the total amount of waste disposed of, in Mauro and Ebeye were revealed by a waste flow created through a baseline survey in line with the solid waste management plans. It should be noted that this baseline survey was conducted in 2017. prior to the launch of the CDS in Majuro in 2018. Thus, the current final disposal amount is estimated to be lower than the one mentioned below.

Volume of waste managed by waste management services in the RMI (tons/day)

	Generated	Discharged	Disposed
Majuro	43	35	34
Ebeye	13	11	11

Source: Solid Waste Management Plan for Majuro 2019-2028, Kwajalein Atoll Solid Waste Management Plan 2019-2028

According to the result of the waste composition survey at the final disposal site presented in the Solid Waste Management Plan for Majuro (2019-2028), the biggest component was green waste, which accounted for 31% of waste. Second was paper, accounting for 21%, then plastics at 16%. In fourth place, surprisingly, were disposable diapers at 9.5%. Accordingly, the biggest issue to be solved in order to use the current landfill site longer is reducing the amount of green waste. Note that this survey was carried out at the landfill site, and not at the sources of waste, so the figures represent the composition of waste from all sources.





In addition, we cannot ignore some difficult-to-manage types of waste, which are not captured by the waste composition survey. Majuro has a significant problem with end-of-life vehicles, old tires, and dumping of waste on seashores in an effort to build more land, the waste being used as informal landfill. Disused ships and boats are also common, while discarded heavy equipment is often dumped on reef flats. The Marshalls Energy Company (MEC) usually has over 2 million liters of waste oil stockpiled, and the Ebeye power-plant has over 200,000 liters.

Waste Collection

The two urban centers, Majuro and Ebeye, have regular waste collections. On Majuro, MAWC operates compactor trucks that handle wheelie bins and dumpsters. Wheelie bins are used by two thirds of households in the urban area of Majuro Atoll, which runs from east of the airport along to Rita at the end of the road, and these are emptied once a week by MAWC. In addition, MAWC operates a dumpster service for commercial waste from large-scale retailers and offices, and this is a pay-for-service operation that empties the dumpster on demand. Some businesses haul their own waste to the disposal site, and nominal gate charges are collected depending on vehicle size, not volume of waste. The wheelie bins are large 360-liter units and were supplied through Government of Japan funding in 2012. Collection of waste from the airport to Laura, the rural area of the atoll, is weekly, and based on a blue garbage bag that can be purchased from MAWC. This bag was part of a program initiated by SPREP and PacWaste in 2017.

There is intermittent collection of green waste, and some of this is transported to a facility operated by MAWC at Laura, where a pilot program is in place to make compost. Collection of green waste is mainly conducted on Saturday, when collection services for households and businesses are not provided.

Waste oil can be taken to MEC for disposal, for a charge of USD 1 per liter. Scrap vehicles are not collected, although some smaller scrap metals, such as old roofing, whitegoods, and household items are removed from incoming waste and placed on a scrap metal pile at the disposal site.

For Ebeye, KALGOV waste collectors circle the island every two days, emptying wheelie bins and collecting waste, and one day per week go up the causeway to collect from the inhabitants along the way, and at Gugeegue Island, at the end of the road where there is a school and housing.

SWM Country Profile



Local government household waste collection is also noted in the 2011 census for Jabwor Island, Jaluit Atoll, and Kili Island, but what this comprises and where the waste is disposed of is not known.



Waste collection in Ebeye (2017)

Waste Disposal

Majuro has a disposal site at Batkan, which is about halfway between the sea port at Delap and the airport. The site is a controlled disposal site, with a gate and a fence along the adjacent main road. The site is flanked by residential properties. As a result of waste disposal for many years, waste is piled up into a "mountain"—known locally as "Mt. Trashmore"—which at 17 m is the highest point in the country. The waste is tipped from collection vehicles onto a concrete pad, from where it is piled up onto the heap using a tracked excavator of about 12 tons. No compaction takes place due to lack of heavy machinery.



Majuro disposal site (2020)

A small extension to the existing Batkan disposal site is being built across the road from the Batkan site on the lagoon-side: this extension is piloting a new technique to build lagoon-side landfill using methods developed and successfully used in South Tarawa, Kiribati, with thick concrete walls containing coral sand that acts as a leachate filter. However, the extension of the existing site is merely an interim solution, and construction of a new disposal site for Majuro is urgently required.



Extension to the lagoon-side (2021)

On Ebeye, which is only 36 ha, a controlled disposal site is located at the north end of the island alongside the causeway to Gugeegue, and is fenced on the land-facing sides. This disposal site is largely flat, and some compaction takes place through heavy machinery working the site. Bulky metal waste is put to one side and kept away from the main tipping areas, to facilitate compaction. Ebeye has historically grown in land area through land-filling with waste: the previous disposal site is directly adjacent to the current one, and is now a residential area. There is scope to build a new disposal site on the north side of the existing disposal site, along the causeway, using existing methodology. The current disposal site can be expected to accept waste for another few years. On outer islands, the last census (2011) records the predominate methods of garbage disposal as burying and burning.

Recycling

MAWC is the only permanent recycling operator in the RMI. In 2017, recycling efforts received a major boost when the Japanese government financed a recycling shed through a grassroots grant from the Embassy of Japan. This recycling shed, complete with large baling equipment, has made the introduction of the new CDS recycling system possible. Beverage containers made of aluminum, PET, and



glass are recovered under the CDS system; details are provided below. In addition, MAWC built a composting facility for recycling green waste.

Used lead-acid batteries (ULABs) from vehicles and solar power generation systems are also collected and exported. MEC owns a large number of small Solar Home Systems on outer islands, installed under various donor programs over the last two decades. These yield a number of ULABs, and MEC has exported perhaps 60 tons of the batteries in the last three years. MAWC collects vehicle batteries from the public, buying them at around 30 cents per kilogram, and selling them on to MEC, which fills containers with them for export and sale to Korean buyers under a Basel Permit. Scrap metal is collected in a pile at both the Majuro and Ebeye disposal sites, but there is no export of scrap currently. Foreign scrap metal dealers do business from time to time when global prices rise, but high shipping costs are a significant impediment. Some low-level purchase of non-ferrous metals may be ongoing by local agents acting for overseas buyers, usually Korean. A SPREP project did subsidize the export of some scrap from the Batkan site in 2016/17. However, a large barge of scrap metal has been moored in Majuro for the past year, awaiting export - an indication that current scrap prices are far too low to make export economic.

Container Deposit Scheme Recycling

The Marshall Islands has a beverage container recycling scheme that accepts aluminum cans, PET bottles, and glass bottles, all under 1 liter. In 2019 this scheme handled 15 million cans and bottles. The scheme is mandated under container deposit legislation contained in the Styrofoam Cups and Plates and Plastic Products Prohibition and Container Deposit Act of 2016. A 6-cent deposit is paid by the importer for each prescribed beverage when import-





ed, or sold locally in the case of the single local water bottler. The deposits are collected by the Ministry of Finance, or by Customs at the time of import entry, and placed into the Recycling Special Revenue Fund. Once the drink has been consumed, members of the public can redeem their cans and bottles by taking them to the redemption center, where they receive a 5-cent refund (but there is a minimum requirement of 20 units to keep payments to whole dollar amounts). The refund, and the processing of the cans and bottles, is conducted by MAWC as the System Operator contracted by the EPA to run the recycling system. MAWC claims back the entire 6-cent deposit from the Recycling Special Revenue Fund, and by so doing earns itself a 1-cent "handling fee" for each item refunded. Currently, there is only one redemption center, at the Batkan disposal site. Between October 2018 and September 2019, as many as 15,700,000 beverage containers were collected under the CDS. Of the containers collected, aluminum cans accounted for 59% and PET bottles accounted for 40%. The remainder were glass bottles. It is reported that the number of beverage containers littering the streets has decreased significantly, which contributes to improving the level of environmental hygiene.



Collection of beverage containers at the redemption center

PET bottles are baled, but there is no export market for PET currently, due in part to the previous market in China collapsing, and current low oil prices. A protocol has been developed by EPA to use PET bales as "clean fill" to replace coral sand that has to be mined from the lagoon, in suitable locations where the resulting land is not to be built upon: bales must be buried in sand. Around 300 cubic meters of baled PET are produced each year by MAWC, from around 5.5 million PET bottles. Meanwhile, glass bottles

SWM Country Profile



are smashed and used for internal road treatment in the landfill, as numbers are small at around 150,000 units per annum, and the amount of glass produced is very small once crushed. Glass is of far too low a value to consider for export. However, aluminum cans are crushed in a large baler and sold for around USD 1,000 per ton, depending on global prices. The recycling system exports around 130 tons per year.

Ebeye is in the final stage of setting up a similar CDS operation base at the Ebeye disposal site, with KALGOV as the System Operator contracted to EPA.

FINANCIAL ASPECTS

Under the Compact of Free Association with the United States, the RMI government receives grant funding for various elements of the national budget. For example, in FY2018 this amounted to USD 81.4 million. In addition, that year the government received USD 15.6 million in other US Federal Government grants, and at least USD 23 million from other multilateral donors. Under a Compact Capital Fund Sector Grant, MAWC was allocated USD 1.5 million in the FY2018 appropriations bill for capital improvements; MAWC was also allocated USD 180,000 that year under a Compact Environmental Sector Grant. In addition, MAWC operations are subsidized to a significant degree by the central government of the RMI. In 2018 for example, MAWC received a USD 518,000 contribution from the government for operational expenditures, and a capital grant of USD 457,000; total operational expense for MAWC that year was USD 1.06 million.

The CDS provides income to MAWC through the 1-cent "handling fee" component of the deposit (the difference between the deposit and the refund). This 1 cent provided MAWC with USD 157,000 in 2019, the first full year of operation of the system, and the sale of 9.5 million cans, around 136 tons of aluminum, generated an additional revenue of over USD 100,000. The cans are sold to an Australian company. The CDS recycling operation generates a surplus to MAWC of around USD 100,000 per year, and this is used to support other waste services that MAWC provides to the community of Majuro, and may help relieve pressure on government support payments. MAWC does charge nominal gate fees at the Batkan disposal site, and also charges for commercial dumpster waste collections: these fees brought in an income of USD 112,000 in FY2018. For Kwajalein, where the waste collections and disposal site are operated by the local government, KALGOV, FY2018 expenditure on SWM was around USD 300,000, of which USD 108,000 was a subsidy from the RMI government.

On Ebeye, no income has been raised from waste management services since the redemption center has not been operated yet under the CDS, and neither collection fees nor disposal fees for waste have been collected.

CONCLUSIONS

The situation with regard to waste management is a mix of some very good developments, with regard to recycling, and some critical needs, such as the landfill situation on Majuro.

Proper final disposal

Appropriate final disposal is an extremely important factor in waste management, but Majuro has many challenges at this final disposal stage. Currently, extension work is underway on the lagoon side of the existing disposal site. This new pilot-scale disposal site will not have much capacity, but it may well show the way forward to a new approach for finding potential landfill sites. If incoming waste can be diverted from the existing landfill site, rehabilitation can then take place that will flatten and compact the site, and so allow more space for recycling and waste diversion operations in the future, as the recycling shed and associated administrative infrastructure are located there. However, due to the limited capacity of the pilot-scale disposal site, further extension works on the ocean side is just initiated, as an interim measure. At the same time as appropriating budget for this interim measure, it is also necessary to start considering a long-term measure, i.e., construction of a new disposal site.

Further efforts for recycling

The RMI is considering extension of the legislated recycling system to other materials that are usually difficult to deal with, such as used cars and tires, etc. Whether the deposit system is appropriate for these items in the first place will need to be examined from a technical perspective. Even if it is decided to include such items in the deposit system, careful consideration will need to be given to such issues as where they should be collected and what to do with the collected items. It is ex-

SWM Country Profile



pected that the RMI will continue to play a pioneering role in this regard, while seriously considering technical aspects.

Financial sustainability

As it is unclear whether the United States will continue to provide financial support to the central government based on the Compact of Free Association, financial sustainability will be required in the field of waste management, as in other areas. The existing arrangements whereby waste collections are free for residents may need to be changed as MAWC and KALGOV shift to a model that makes the better-off, who make more waste as they buy more, pay for the collection service. It must be remembered that this will only be possible if the regulations regarding uncontrolled dumping onto beaches and coasts are improved and enforced at the same time.

REFERENCES

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*3 Asian Development Bank, 2018

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^{*1} Republic of the Marshall Islands 2011 Census Report

^{*2} World Bank, 2018