

Review of e-waste Related Activities in the Pacific Islands

March 2018

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Acronyms

ARF	Advance Recycling Fee
CDL	Container Deposit Legislation
CFL	Compact Fluorescent Lamps
CRT	Cathode Ray Tube
DEPC	Department of Environmental Protection and Conservation
DoE	Department of Environment (Fiji)
ECD	Environment and Conservations Division (Kiribati and Solomons)
EPR	Extended Producer Responsibility
FCL	Full Container Load
FSM	Federated States of Micronesia
ICI	Ministry of Infrastructure Cook Islands
LOA	Letter of Agreement
MRF	Materials Recovery Facility
NES	National Environment Service
PCBs	Printed Circuit Boards
PICs	Pacific Island Countries
PS	Product Stewardship
RCIL	Recycle Cook Islands Ltd.
RMI	Republic of the Marshall Islands
SAICM	Strategic Action on International Chemical Management
SPREP	Secretariat of the Pacific Regional Environment Programme
StEP	Solution to the E-waste Problem
SWM	Solid Waste Management
TA	Technical Assistance
TEU	Twenty Foot Equivalent (shipping container)
UDP	Urban Development Programme
ULAB	Used Lead Acid Batteries
UNEP	United Nations Environment Programme
WEEE	Waste Electronics and Electrical Equipment

Introduction

The problem of e-waste is an emerging one, in that electronic materials imported and used take some years to feed into the waste stream. With the Pacific Islands typically lagging somewhat in the technical revolution of the last two decades, the issue has only really reached the agenda of waste management agencies in the last five years or so.

This Pacific Islands Regional e-waste Review has been conducted as a component of a GEFPAS consultancy on the situation concerning used oil use and stockpiles in the Pacific Islands. This review is purely a desktop review, and pulls together available information for each of fourteen countries. The bulk of the review data and information comes from work conducted with funding from the SAICM 2013 - 2014 Capacity Building and Institutional Strengthening of Pacific Island Management and Disposal of E-Waste project programme and more recently the 2014 - 2017 PacWaste project, implemented by SPREP¹. PacWaste covered various aspects of hazardous waste in Pacific Island Countries (PICs), and included an e-waste Thematic Component which conducted e-waste related projects in the Cook Islands, Tonga, Kiribati, Vanuatu, Solomon Islands and Palau.

This review has taken a narrower definition of e-waste, confining itself largely to Waste Electronic and Electrical Equipment (WEEE) that would be considered 'electronic' rather than the wider definition which would include anything with a power cord or a battery. The definition used here effectively excludes the larger 'bulky waste' of whiteware (fridges, freezers, washing machines, cooking stoves), air conditioners, and other larger household electrical appliances. These items tend to be dealt with reasonably effectively through existing scrap metal recyclers. The electronic waste is more problematic, and is typically seen as having no - or very low - value by recycling companies. The challenge is to turn this e-waste into something of commercial value - largely through dismantling into commercially recognised categories - as well as to work out viable ways to collect the e-waste in the first place.

The report contains a list of relevant contacts at Appendix 1, and a Bibliography of materials researched at Appendix II, so as to provide something of a resource for future efforts on this subject. Appendix III provides the model e-waste regulations that could be used to introduce e-waste recovery and recycling using the principals of Extended Producer Responsibility (EPR) which is likely the most viable way to tackle the problem in PICs.

The report commences with a brief history of efforts to deal with the problem of e-waste in the region, thus providing some context for the subsequent country sections, which form the body of the report. A set of brief recommendations for each country is included at the end of each section. All relevant focal points were contacted and requested to supply information for the purpose of compiling this report. Not all responded.

History of Regional Support to e-Waste Policy and Projects

There have been two projects at SPREP that have put significant effort into looking at the e-waste problem: these were the 2013 - 2014 Capacity Building and Institutional Strengthening of Pacific Island Management and Disposal of E-Waste project, which

¹ The author was the PacWaste e-waste Technical Assistance consultant from February 2016 to December 2016, and also conducted the PacWaste e-waste Baseline studies of 2014. He also conducted the country visits under the 2013 SAICM work.

was funded under the Quick Start Programme of the Strategic Action on International Chemical Management (SAICM), under the United Nations system. The funding submission requested \$US 249,900 to fund a two year e-waste management focused project commencing in January 2012. The project involved Kiribati, Samoa and the Cook Islands, along with SPREP as the coordinating entity, and completed two key pieces of work. The first was a practical look at e-waste in those countries², how e-waste was being dealt with in Australia and New Zealand as a commercial proposition, the realities of processing e-waste into commercial e-scrap, and where e-scrap markets might lie. The second main piece of work developed models for a regulation and a policy document that would be useful for any PIC developing legislation and policy on e-waste. In addition, the SAICM project hired e-waste project officers in Kiribati, Samoa and the Cook Islands; it also produced guides on e-waste for both journalists and students.

The country visits produced the outline of the practical side of an Advance Recycling Fee (ARF) system for e-waste in small Pacific Islands. All three countries had made tentative efforts to collect some e-waste, but rapidly found that the often bulky materials collected had a negative value for recycling, and the path forward was very unclear. The SAICM work identified how e-waste was being dealt with commercially in Australia and New Zealand, and laid out the practical aspects of disassembly required to turn e-waste into e-scrap, that is, something with a commercial value. This dismantling and processing work came at a cost, and the costs were amplified by the high export shipping costs from PICs, and the low volumes of e-scrap that could be expected. It became very apparent that money would need to be found to be directed to the recyclers in order to conduct the processing and export effort. The burning question was then: how might this be done?

After the country-based groundwork of SAICM, a legislative and policy component developed a model policy and regulation based on what would be acceptable under existing waste management legislation in the Cook Is. and Samoa. Kiribati already had Container Deposit Legislation (CDL) that had been drafted with sufficient forethought to allow for the inclusion of other materials in the future, using regulations. The model legislation was developed under SAICM in early 2014 and is provided at Appendix III. SPREP was the executing agency for the SAICM work, and coordinated the three countries involved, and the consultancies required to complete the outputs agreed with UNEP.

The work of SAICM in 2013 - 14 guided the EU funded PacWaste project, which then ran from 2014 - 2017, implemented by SPREP. PacWaste was a regional project to improve hazardous waste management in PICs, with four Thematic Components: medical waste (primarily high temperature incinerators for hospitals); asbestos (where asbestos remained in the region and measure to address this legacy); Atoll Integrated Waste Management (focused on a set of measures to assist Majuro Atoll in the Marshall Islands); and e-waste.

PacWaste conducted a set of e-waste baseline studies for Vanuatu, Solomon Islands, Palau, Marshall Islands and Fiji in the second quarter of 2014³; these studies looked to collate and analyse any data available, and propose potential interventions for PacWaste to execute. In addition to the five countries covered by the PacWaste missions, the four countries looked at in 2013 - under SAICM - were included in this

² A side trip to Tonga was included as Tonga - through E-Waste Tonga and GIO recycling - had already started collecting e-waste.

³ E-waste Country Assessments: E-waste generation and Recycling, and the Potential for Interventions by PacWaste; SPREP June 2014.

assessment, and a total of nine potential interventions were proposed, in outline. These proposals were submitted to a Technical Assistance Panel for PacWaste e-waste Thematic Area in Brisbane in June 2014; however, it took until February 2016 for Technical Assistance to be hired to return to the countries and develop the proposals. By this time - the second quarter of 2016 - PacWaste had only one year left to run - of an initial four years - and all contracts with counterparts needed to be in place and signed by early May. As conditions had changed in some places since the 2013 and 2014 missions, and given that the 2014 proposals were predicated on three years of project - not one - the resulting interventions were less than envisaged in 2014.

The longer-term aim of the PacWaste pilot projects was to develop the model of an Advance Recycling Fee (ARF) system that might be applicable to PICs, along the general lines of the Container Deposit Legislation (CDL) beverage container recycling systems that are becoming more common across the region. In this way, PacWaste was directly building on the work of the SAICM project. The effort of PacWaste was directed at gaining practical experience of dealing with e-waste in PICs, and the projects were designed very much with that approach in mind. PacWaste had, as a fundamental objective of the project, the remit to collect and export e-waste from PICs. Significant resources were allocated in the project design and budgeting to the collection, storage and export of e-waste, and the interventions were designed with this very much in mind.

A key focus of the PacWaste e-waste work was to build relationships with private sector recyclers, as these are the people who will ultimately process and export any e-waste collected. However, most recycling businesses in PICs have little experience in getting any value from e-waste, and know very little about how to extract value, and where the markets might lie. PacWaste directed funding towards these recyclers in the form of Handling Fees in order to build their capacity in the market for e-waste, and in so doing started to replicate the conditions that might exist with an ARF system where funds collected at import would be directed to the recyclers to pay for processing and export, similar to the CDL systems that make PET bottles recyclable in places where they would not normally be so. The information that can be gained by encouraging these businesses to get involved in the business of recycling e-waste is essential to the development of any Advance Recycling Fee approaches to dealing with e-waste. It is almost certain that throughout the Pacific, an ARF approach is likely to give the best chance of success to build a long-term sustainable system to accept e-waste flows.

Details of these projects can be found in the body of the report, and an attempt has been made to bring together all that is known into one place, as the relevant details are typically spread across several reports. Much detail is in PacWaste TA mission reports and the relevant country Implementation Plans, and these are included in the bibliography. The work of PacWaste on these pilot projects around e-waste was not really completed by the time PacWaste closed at the end of 2017. To gain the full benefit of the efforts of PacWaste and the in-country partners, follow up work needs to be done, and this is looked at in the recommendations sections. In particular, where PacWaste has agreed to finance the shipment of e-waste by recyclers - and in so doing help local recyclers see the value in e-waste, and build commercial relationships and experience - should be followed through as a priority. If the projects had started earlier, as envisaged in 2014, then shipments would have been made before the end of the project. The 'deal' was that PacWaste would support shipment financially, but that the recyclers would provide all information about shipping costs, the value of the shipment, what it contained, and what was involved in selling it, and

to whom. Shipping also provides an opportunity to work with local Basel Competent Authorities to approve shipments.

This information would feed into the practical details of any ARF systems, in particular to help determine the degree of levy required at import in order to finance the recovery, but keeping the levies to a level that would be politically acceptable to business and the public, and thus have more chance of being implemented.

Regional Overview

Overall, the approach to e-waste management is in line with the United Nations Solutions to the E-waste Problem (StEP) in that the materials collected need to be broken up into commercial categories of e-scrap, which can then be shipped and processed in clearly defined ways. Some fractions of e-scrap require Basel permits to be shipped, but this can vary: for example, shipping a modern printed circuit board that conforms to EU RoHS standards would not require a Basel permit by Germany, but would when shipped - or received by - New Zealand. Actual processing of e-scrap (i.e. not dismantling, but shredding and chemical processing) will take place outside of the Pacific Islands region, and PacWaste focused on building commercial relationships into Singapore, where a modern e-scrap processing industry exists complimenting the local electronics industry. The StEP program has such has not directly participated in any projects in PICs, but the method promoted by StEP has been that adopted in the region.

The determination of particular shipment needs in terms of Basel permit requirements is something that in many cases can only be determined by the relevant exporting and importing countries. E-scrap is being shipped already in small quantities mixed in with non-ferrous scrap, and the difficulties, and lack of clarity, around Basel permitting does little to encourage compliance with rules that are unclear in many cases. In addition, the lengthy time delays in gaining Basel permits are a significant constraint where recyclers may be seeking to respond to market demand for e-scrap and ship stockpiles at favourable prices.

With the above in mind, the PacWaste project developed some pilot activities in several countries, experimenting with different ways of collecting e-waste, and how collection and processing might be paid for. With shipping costs being high from PICs, and volumes low, e-waste can generally be considered to have a negative value (i.e. a cost to collection and processing that is greater than its sale value) on arrival at a recycler. In New Zealand this problem is usually tackled by charging people to bring in e-waste for recycling, with a tariff specific to the item. This approach was that tried in the Cook Islands, primarily as they were already - successfully - experimenting with this method to collect whiteware bulky wastes. The population is typically familiar with 'the way things are done' in New Zealand, which helped. PacWaste paid these up-front costs as 'Handling Fees', paid direct to the recycler, and the approach has resulted in a significant quantity of e-waste being collected. Around US\$25,000 was spent on handling fees, but even so calculations indicate that this was a unit cost of only 60% of that of an e-Day that the Cooks held in 2010. The materials collected have been largely dismantled and packed for export, but not yet exported, and the value of the shipment would lower the unit cost per item if that was discounted against the handling fees. This is an example of the work that needs to be completed: to follow through and see how the handling fee schedule used actually stacks up, and how the payment schedule might be revised to more accurately reflect true costs, but still ensure that the local recycler can make a profit and so participate in the system.

For Tonga, PacWaste tried a similar approach, but this time using weight as a metric to determine Handling Fees paid to the recycler. This collection recovered 8.8 tonnes of e-waste, with the recycler paying the public about US\$10 per kg. The recycler received a Handling Fee of US\$1/kg for collection and dismantling of the e-waste. Again the materials have not yet been exported, but much is dismantled and packed ready to do so. There are also outstanding Handling Fees due to the recycler that are unpaid by the SPREP PacWaste programme, and the reason for this is not clear. A Handling Fee based on weight would provide a simple, universal metric, but the analysis needs doing to see at what level per kg a realistic Handling Fee might be set. In Tonga, the local counterparts are a NGO and a recycler, both previously involved and experienced in e-waste collections, but still nothing significant has been exported.

Kiribati has had an e-waste collection point for several years based in the Materials Recovery Facility (MRF) in Betio that is the heart of the local CDL recycling system. E-waste collections have been erratic through the years since starting in 2013, but the MRF has a dedicated e-waste collection point that can accept and process e-waste into e-scrap (commercially sellable fractions of e-waste), and there is most of a Full Container Load (FCL) of packed e-scrap awaiting shipment. This work was funded by the NZAID programme on solid waste in Tarawa that ran from 2011 - 2015, and PacWaste took over in 2016 and funded the next 18 months, a good example of one project building on another and so maximising efficiency. Kiribati legislation can easily accommodate an ARF, *if* a suitable system can be worked out that is realistic to implement in a remote place such as Kiribati. Working out the details of such an ARF model is exactly the work of multilateral partners such as SPREP.

Palau received funding under PacWaste to build an e-waste collection point at the entrance to their M Dock landfill in Koror, but up to date information has been hard to gain, and some feedback would be invaluable to learn how useful the project activities actually were in promoting e-waste collections in Palau.

Vanuatu was hoping to implement a programme of e-waste collections targeting mobile phones (cell phones) as these are so ubiquitous in Vanuatu, as they also provide a line of direct communication to the target audience. A proposal to pay for old phones bought in by giving mobile phone credit to the 'customer' unfortunately did not eventuate due to time constraints around contract deadlines, although the local counterparts were all willing in principal to do so. A fallback proposal was put in place, where e-waste stockpiles from government offices were targeted. Vanuatu has three FCL of e-waste to ship, largely from existing stockpiles, but some from recent collections, and support for the export of this would be explicitly in line with the aims and objectives of the PacWaste project document.

For the Solomon Islands, PacWaste had a similar proposal as Vanuatu; but again, contracting time constraints - largely caused by late in-country mobilisation by PacWaste⁴ - lead to the project working on collection of Used Lead Acid Batteries (ULAB) from remote Solar Home Systems (SHS). Around one and a half FCL of ULAB are reported to have been collected as of the date of writing.

⁴ PacWaste baseline studies for e-waste were completed by May 2014, and agreed at the PacWaste Technical Assistance Panel in Brisbane in June 2014, but actual on the ground work on e-waste only started in early 2016 (18 months later) and all contracts had to be in place by 10 May 2016 to meet EU D + 3 rules. This had a very significant constraining effect on what could be achieved in the time available.

For the other half of the countries in the region, most are in a situation that little baseline information exists; any work with these other countries will benefit from the experience so far gained with the PacWaste partners detailed above.

Overall Recommendations

There are three clear classes of recommendations: support to those who have collected e-waste and now have shipment ready for export, as envisaged under their respective PacWaste agreements; some who need support to set up collection and processing systems, but which enough is known about the general state of affairs, and third, a set of Pacific Island countries still need to have baseline study work conducted, on the ground, to determine what is the state of affairs with regard to e-waste in their country, including potential quantities, who are the institutional and commercial counterparts, where markets might lie, etc. The PacWaste baseline study of 2014 can provide a template for such studies.

The Cook Islands, Tonga, Vanuatu and Kiribati could all usefully use financial support to export e-waste that has been dismantled into e-scrap, and in return provide the information that would help complete the work that PacWaste started. Each place could usefully use a careful analysis of what PacWaste did - and did not do - and draw out the important lessons that are there to be learned as to how to move forward with tackling the e-waste problem. This report goes some small way down this road, but without on the ground, face to face interviews and clear inspection of shipments, methods, and what has been done, it is hard to get the real picture. GIO in Tonga is leading the way by going out and visiting Singapore to find a market for their e-waste as they must export what they have. Vanuatu (RecycleCorp) would like to export their e-waste but is challenged by the cost of sending it to an acceptable market as Vanuatu is not a member of the Basel Convention, and this may well restrict the market to Australia, with attendant low values for the product. In the Cook Islands, RCIL is also keen to export an FCL of e-waste, partly as yard space is so limited. Their likely market will be NZ, where prices are very low as the materials will be re-exported. All these commercial operators had agreements with PacWaste to support exports, and these should be honoured by the PacWaste plus project if that is at all possible, whilst in return getting the data that will be so useful elsewhere.

Kiribati, Tonga and the Cook Islands are all potentially well placed through existing legislation, where modified, to introduce an ARF management approach, and effort and focus on these three countries will likely produce the best benefits in the short and medium term. Exporting existing FCL of e-scrap that are awaiting shipment in each country would be an immediate useful step that would generate significant and valuable information (and incentive) towards the development of a functional ARF model that can be potentially adapted around the Pacific.

A summary is provided below in the table on the next page.

Summary of Recommendations for Action on e-waste Resulting from the Review

Country	e-waste collection	Shipment status	Action required
Cook Is	YES (Rarotonga) Handling Fee Schedule in place based on per item	FCL to ship by mid 2018	Financial support for e-waste shipment Analyse data from Handling Fees to determine ARF rate
Fiji	Maybe commercial	Unknown	Support to Nasinu WTS e-waste Collection Point Join Basel Conv.
FSM	NO	None	Baseline study
Kiribati	YES (Tarawa)	FCL to ship by mid 2018	Financial support for e-waste shipment
Marshall Islands	NO	None	Support to MAWC e-waste Collection Point
Nauru	NO	None	Baseline study
Niue	NO	None	Baseline study Find links to NZ recycler
Palau	Maybe	Unknown	Determine status of Collection Point
Papua New Guinea	Maybe commercial	informal	Baseline study
Samoa	Maybe commercial	informal	Baseline Study Request for practical Technical Assistance
Solomon Islands	NO	None	Target Mobile Phones for collection
Tonga	YES	FCL to ship	Financial support for e-waste shipment; Complete Handling Fee payments; Analyse Handling Fee cost data
Tuvalu	NO	none	Baseline study
Vanuatu	YES	FCL to ship	Financial support for e-waste shipment Analyse Handling Fee cost; Target Mobile Phones

1. Cook Islands

1.1 Overview

The Cook Islands has been the most proactive Pacific Island Country on tackling e-waste, conducting an e-Day collection back in 2010, and running a successful e-waste collection operation based on a Handling Fee tariff, funded by PacWaste. The Cook Islands Government has previously supported a similar Handling Fee based system to collect whiteware, and also allocates budget for government departments to pay handling fees to dispose of their e-waste.

As a result of the e-Day project, and then the PacWaste work, the Cook Islands have gained significant experience and data for dealing with e-waste. The e-Day model was adopted from New Zealand, following the e-Days used there in the early 2000s, but analysis indicated a high unit cost for each item of e-waste handled, and also a very significant logistical challenge that required large volunteer input, something that is undesirable for an ongoing, sustainable approach. With the advent of the PacWaste programme of e-waste collections, the existing whiteware collection model was used for e-waste. This approach involves specified Handling Fees for each type of e-waste item, and the Handling Fees are paid direct to the recycler for taking and processing the e-waste. PacWaste paid the Handling Fees for households sending e-waste for recycling, but for commercial and government derived e-waste, the Handling Fee was paid by the business or government department concerned.

The aim of this model was to see how unit costs would stack up compared to the e-Day model, and a reduction was achieved of around 40% from \$15.33 to \$9.17 per item. Whereas with the e-Day, there was no income from sale of e-scrap, with the PacWaste model, the income from selling the e-scrap would be deducted from the cost; except that the PacWaste activities unfortunately did not manage to export any e-waste, although this was part of the plan. E-waste collected by the recycler, Recycle Cook Islands Ltd. (RCIL) was dismantled and the resulting commercial e-scrap fractions were packed ready for shipping. About a single Full Container Load (FCL) is in Rarotonga which could be shipped; PacWaste funding was budgeted for this, but the project has now closed.

Of significant interest during the PacWaste collections was that government and business were prepared to pay the Handling Fees to dispose of their waste. The Handling Fees proposed were rather arbitrary, but were based on figures used by recyclers in New Zealand where charges are often made to accept e-waste. What is now needed is to do two things: first, export the collected e-waste in order to determine the real cost of export, who might buy it, and the value of the materials; and second, conduct a full analysis of the collection in its entirety in order to determine what the Handling Fees for a new round of collections might look like to still make it commercially viable.

That situation should be improved by two factors: as the residual, bulky, CRT TVs disappear from the waste stream (expensive to deal with and low value for e-scrap) the unit cost might come down; and as electronic equipment tends towards smaller and more dense devices (smart phones, tablets etc.) the manual processing required decreases, and the value as e-scrap goes up. It is important to build an e-waste system for the future, not the past, and with modern WEEE it may well be easier to build an Advance Recycling Fee (ARF) system where a payment is made at import that can effectively subsidize the recycling, by paying the ARF to the recycler in a similar way that PacWaste paid the Handling Fees to RCIL.

1.2 Data on Selected Electronics Imports / WEEE Materials Flows

There has not been any systematic analysis of import data as to the level of electronic imports into the Cook Islands. However, the National Environment Service (NES) did conduct a survey of whiteware and e-waste in homes and government in 2015 to try and determine some level of the scale of the problem. 6% of households, on Rarotonga only, were surveyed for whiteware and e-waste; Rarotonga has three quarters of the population and a general higher standard of living than the rest of the country. Scaling the results up to all households on Rarotonga on a simple multiplication basis would give figures - in round numbers - of e-waste along the lines of those in table 1:

Table 1: e-waste survey results extrapolated to all of Rarotonga Island

Large CRT TV	Small CRT TV	Large Flatscreen TV	Small Flatscreen TV	DVD VCR	Desktop computer	Monitor	laptop	Printer	Stereo	Total
1,700	2,000	600	160	1,300	1,500	1,300	400	1,000	600	10,500

Note that these figures from the survey represent what is considered 'waste' in peoples households, not a total of how many of such items they might have, including functional items.

1.3 e-waste Collection Activities to date

The Cook Islands held a single e-Day for collecting e-waste, which took place on December 8th 2010. The e-Day concentrated on computer equipment, but included phones and digital cameras. Televisions were not accepted, nor white-ware. A total of 5,154 recorded items that were placed into seven 20 ft shipping containers, all exported to New Zealand. Packing was completed onto pallets and into containers within two days of collection. 70 volunteers participated in the day, which was a weekday. The total cost of the operation at completion after all shipping and paying for the acceptance of the materials in New Zealand gave a total cost per unit collected of NZ\$15.33 each piece. 90% of the funding was provided by e-Day NZ Trust, which received funding from the New Zealand government for the purpose. A detailed economic analysis of the Cook Islands e-Day was conducted in 2013 as part of a SAICM project undertaken by SPREP⁵; this is believed to be the only extant example of an e-Day in a PIC that has been comprehensively documented.

It had been intended to conduct another e-Day, but appraisal of the situation steered the National Environment Service (NES) towards developing a more sustainable approach to e-waste collections, and this resulted in the development of a proposal by NES for the Cook Islands Government to fund a collection, with a view to developing an Advance Recycling Fee (ARF), whereby money would be collected at import that would be directed to recovery of items and export of recyclable fractions. A whiteware collection was initiated in 2015 with financial support from the government, using a specified handling fee per item (e.g. washing machine \$20) and a dedicated contractor, Recycling Cook Islands Ltd (RCIL). Whiteware items were only partially dismantled, and sent to a New Zealand scrap processor for further processing; the system dismantled 1,243 items to fill seventeen TEU from over six months to February 2016.

This model was then adapted by the PacWaste project to collect WEEE, and an agreement drawn up with RCIL and NES that provided for RCIL to charge a Handling Fee, based on an agreed tariff, billable to PacWaste for any items that came from

⁵ Review of Regional E-waste Recycling, Alice Leney, SPREP / SAICM 2013

households. Commercial and Government e-waste would require the entity dropping off the materials to pay the Handling Fees themselves. The Cook Islands Government instituted a budget for paying Handling Fees to dispose of its own e-waste, an excellent initiative.

Materials collected and dismantled to commercial e-scrap now constitutes over three quarters of a twenty foot equivalent (TEU) shipping container⁶; the initial Handling Fee allowance of NZ\$17,000 was exhausted over the four months June to October 2016. A new round of funding was recommended after the PacWaste TA visited in October 2016, and an additional NZ\$17,000 was provided by PacWaste. Data as to the first round collections was collated by PacWaste in 2016, but the second round data is still in a paper form on the original dockets. Data from the first round is provided below at Table 2.

Table 2: Collection data for all E-waste collected under PacWaste

Description	HH QTY	C&G QTY	Total QTY	Total paid
Computers				
Desktop computers	100	189	289	\$2,890
CRT monitors & Laptops	94	213	307	\$1,535
Servers/ Shuttles	4	94	98	\$980
Flat LCD computer monitors	20	58	78	\$1,560
Transformers	11	5	16	\$240
Hubs, routers, modems	30	66	96	\$480
cables, etc.	187	828	1,015	\$5,070
UPS / battery packs	30	61	91	\$455
Printers, Copiers, scanners				
printers, scanners, faxes	82	158	240	\$2,400
Office Photocopiers medium	16	101	117	\$4,680
Office Photocopiers large	2	30	32	\$2,340
copier toner drums	31	563	594	\$1,782
Toner laser Cartridges	9	765	774	\$2,322
Consumer Electronics				
CRT TVs	227	63	290	N/A*
Flat screen TVs / Projectors	65	35	100	N/A*
DVD players, CD players, VCRs	143	64	207	\$1,035
Stereo system	80	27	107	\$1,070
Gaming Consoles	12	0	12	\$120
Cellphones	0	6	6	\$12
Totals	1143	3325	4469	\$41,011

- *but included in total value of column, as these items have two tariffs - large and small - for these lines (without checking each entry).
- HH is Household
- C&G is Commercial and Government sourced e-waste.

These 4,500 items provided enough e-waste to fill at least one half a FCL TEU; it is worth noting that the cables etc. line is around one quarter of all items, and may

⁶ Pers Comm Jessie Sword, RCIL February 2018

include a number of small items such as cell phone chargers. Average Handling Fee cost per item is \$9.17, which is around half the cost per item for the e-day project. Data from the second round would be very useful as the number of Cathode Ray Tube TVs and monitors might have decreased as existing stockpiles are run down, and this might drive down overall Handling Fee per item cost as these are expensive units to recycle.

1.4 e-waste Exports to date

There were e-waste exports in 2011 which comprised seven 20 ft FCL of whole e-waste (that is, not dismantled) which was collected as part of the e-Day. This export was fully funded under the e-Day project at the time. Since then there have been no specific shipments of only e-waste. There is nearly another full container ready to go if funding and a buyer is found: this was to be financed under the PacWaste project, and support to encourage RCIL to export will help them to understand the economics of the e-waste recycling business.

1.5 Relevant Legislation

A Solid and Hazardous Waste Bill 2018 is currently before Parliament and expected to pass during 2018; the legislation defines e-waste as hazardous waste, and includes provisions and the potential for regulations covering the handling and treatment of hazardous waste. Under the legislation, e-waste could also be defined as recyclable waste if so desired. The only current piece of legislation that might prove relevant to the e-waste issue is the Environment Act 2003.

The Environment Act has provision⁷ to operate an Environment Protection Fund (EPF), which could be used as a separate account to hold deposits and pay out funds for recycling as part of any ARF scheme. The Act also provides for powers to regulate the EPF⁸; a regulation could be made for the EPF to collect and hold any ARF, to be used to assist the shipping of e-waste out of the Cook Islands. The regulation would need to define who pays the ARF, for what, when and how much, and then how money would be disbursed from the Fund. Whilst there is an existing regulation covering operation of the EPF⁹, the EPF itself is currently moribund and not operational. If the existing regulation were repealed, a legal framework could be easily put in place to operate a deposit/refund recycling system.

1.6 Key Counterparts In-Country

The Cook Islands activities involved two local partners, Recycling Cook Islands Ltd. (RCIL) and the National Environment Service (NES). E-waste from government and business was also collected, but did not attract a Handling Fee subsidy payment under the PacWaste project with these fees being charged directly to the entity in question. NES conducted the publicity programme for the e-waste collection, and verified RCIL Handling Fee invoices before payment by PacWaste. NES and RCIL have a good relationship with a long record of cooperation.

Te Ipukerea Society (TIS) is a local environment NGO, established in 1996. TIS set up the first recycling centre in Rarotonga in 1996, and ran the first Cook Islands 'Clean Up The World' campaign. In 2016 TIS staff made a series of four short videos - around two minutes each - to promote awareness of the e-waste problem. These

⁷ **61. Environment Protection Fund** - (1) The monies held in the Environment Protection Fund shall be expended on the...protection from pollution of (and removal of pollution from) land, sea and air, ...

⁸ **70. Regulations** (n) regulating the operation of the Environment Protection Fund;

(s) prohibiting or regulating the importation or disposal of recyclable or non-recyclable products;

⁹ Environment Act (Environmental Protection Fund) Regulations 2005

were shown on local TV and also put up on YouTube. They have a history of co-operating closely with NES on conservation and environmental projects.

The Ministry of Infrastructure Cook Islands (ICI) is responsible for oversight of the contractor collecting household waste. The landfill has a recycling centre at its gateway which bales PET bottles & aluminium cans, and also has a lamp compactor machine for crushing old CFL and fluorescent tube lamps. ICI is also responsible for development of SWM policy, and has set aside an area of the landfill for low-level hazardous waste.

The local electronics import & retail businesses are generally very supportive of efforts to create a system of e-waste collection for the Cook Islands.

1.7 Specific e-waste Project Involvement

PacWaste took on the successful whiteware collection model to support e-waste collections in 2016 and 2017. Two collection rounds were completed: the first round used up the initial NZ\$17,000 in three months, and so a second round of the same amount was agreed between RCIL, NES and PacWaste. The model was that RCIL would collect and then invoice monthly for the Handling Fees based on an agreed schedule as follows:

Table 3: Handling Fee schedule used for Cook Islands e-waste collections

Description	Handling Fee
Computers	
Desktop computers (including PC and Mac)	\$10
CRT computer monitors & Laptops	\$5
Servers/ Shuttles	\$10
Flat LCD computer monitors	\$20
Transformers	\$15
Hubs, routers, modems*	\$5
cables, Memory Boards, keyboards, mouse*	\$5
UPS / battery packs	\$5
Printers, Copiers, scanners	
printers, scanners, faxes	\$10
Office Photocopiers (small, medium)	\$40
Office Photocopiers (large)	\$70
copier toner drums	\$3
Toner laser Cartridges	\$3
Consumer Electronics	
CRT TVs >25 inch	\$25
CRT TVs <25 inch	\$50
Flatscreen TVs / Projectors > 25 inch	\$10
Flatscreen TVs / Projectors < 25 inch	\$25
DVD players, CD players, VCRs	\$5
Stereo system (inc two speakers/ Amps/ CD players)	\$10
Gaming Consoles	\$10
Cellphones	\$2

However, the financial management at the PacWaste was erratic: after clearing all the RCIL invoices for the first round (which were checked by NES before going to PacWaste for payment after issues) PacWaste then sent RCIL a lump sum for the second round, in early 2017, unlike the first round which was done on a monthly

invoice basis based on what was collected. However, in October 2017, the PacWaste Manager emailed the NES Director and asked for the money back, saying that they had not agreed to fund a second round. By this time the money had been all expended in handling fees for the second round. NES forwarded an email to PacWaste that clearly stated that the PacWaste Manager had in fact agreed to fund a second round, and the matter there rested.

Under the agreement with PacWaste, the project was required to pay for the export of a shipping container of e-waste, but the project finished without this happening. There is currently (February 2018) about three quarters of an FCL dismantled and packed, and RCIL reports that e-waste collections have been halted as the recycling yard is undergoing some re-arrangement, but that there is still demand from the public, except that now any Handling Fees are charged to whoever brings things in. It is hoped to re-commence collections, where everyone will pay the Handling Fee, in April 2018. Past experience would suggest that this arrangement will tend to result in significant quantities of e-waste going to landfill or being dumped informally.

In 2013 the Strategic Action on International Chemical Management (SAICM), under the coordination of SPREP, undertook a study in the Cook Islands¹⁰ as part of a Pacific Islands regional effort to develop a model of a Product Stewardship system that might be applicable for managing e-waste in PICs. The Cook Islands are a potential 'early adopter' of any system and/or legislation that might be developed to collect and export e-waste in a commercially viable manner in the Pacific Islands.

The ADB supported a project around 2012 - 2014 that collected and crushed CFL lamps into a special drum equipped with a lamp crushing machine. This was part of a wider scheme to collect old whiteware, mainly aimed at replacing inefficient electric stoves and fridges on Rarotonga as an energy efficiency measure to cut fuel import costs. The model of Handling Fees developed for that project was adapted for the PacWaste e-waste collections as it was proven to work well and acceptable to the Cook Islands Government.

1.8 Recommendations for Future Action

There are two clear courses of action that emerge from the above:

- Follow through with the commitments made under PacWaste and export the FCL that is currently in RCIL yard, whether it is completely full or not. This exercise will require coordination with an international e-waste buyer, and the work required to gain a Basel Permit for the export. This process will gain essential information to allow a full analysis of the project.
- Analyse in detail the information gained from the PacWaste intervention, particularly with regard to what was collected, what effort it took to dismantle it, how much shipping space was required for the resulting dismantled e-waste fractions, what is the cost of shipping, and the value of the export to the seller. This should allow some development of a Handling Fee schedule for future use in the Cooks, and help other countries develop a system based on a Handling Fee per item. Determination of realistic Handling Fees will then allow development of a suitable Product Stewardship model where an Advance Recycling Fee is added to the price of a product at import to fund collection and export.

¹⁰ Review of Regional e-waste Recycling: Including a Model Product Stewardship Approach for Pacific Island Nations; SPREP/SAICM 2013

2. Fiji Islands

2.1 Overview

Fiji has had a reasonably well developed recycling industry for some twenty years, but in the last few years it has come under exceptional pressure from issues over stealing of property for sale as scrap metal, which led to strong government controls on recyclers. There is a very significant quantity of e-waste generated in Fiji annually, but there has not been a systematic attempt to deal with it. Some has been collected by recyclers, but a potential impediment to export exists in that Fiji is not a Party to the Basel Convention, and so typically non-ferrous fractions are recovered and the rest dumped.

There is little up-to-date information, as the last study by SPREP was part of the e-waste baseline study of selected countries for PacWaste in 2014.

2.2 Data on Selected Electronics Imports / WEEE Materials Flows

PacWaste looked at import data from Fiji Bureau of Statistics for the years 2008 – 2013 for several categories of potential e-waste: Air conditioners, fridges & freezers, washing machines, computers, lead-acid batteries, telephones, TV sets & computer monitors and solar PV modules; this was part of the 2014 baseline study.

Cell phone use in Fiji has escalated rapidly over the last decade: the telecoms regulator TAF produced a report in 2013¹¹ that gives a figure of 106.4 subscribers per 100 head of population¹². If the current (2013) population of Fiji is taken to be around 860,000 then that would amount to some 915,000 phones. Mobile broadband connections were noted at that time at 89.8 per 100 people, so if those phones are very largely smart phones, then that would indicate around 700,000 smart phones. Import data obtained from FBOS regarding cell phone imports 2008 – 2013 is provided at table 4.

Table 4: Cell Phone Imports to Fiji, 2008 - 2013

Year	2008	2009	2010	2011	2012	2013
Cell phone Qty	177317kg	54284kg	157,174	177,267	253,544	304,949
Cell phone value (FJ\$ million)	\$43.7	\$14.2	\$12.7	\$15.1	\$18.6	\$27.6
total value all phones (FJ\$ million)	\$46.6	\$15.1	\$13.9	\$16.6	\$20.6	\$29.4
Average Value cell phone (FJ\$)	\$246/kg	\$252/kg	\$80/ea	\$85/ea	\$73/ea	\$90/ea

If it is assumed that a cell phone has an average life of around 3 years, and the TAP data indicates that there are around 800,000 units in actual use¹³, then something like one million cell phones may have become waste in Fiji over the last few years. At 110g each on average, then they would comprise 110 tonnes of e-waste, or enough for four or five TEU. Add to this at least 300,000 units (and probably over 400,000) prior to 2008¹⁴, and it can be easily seen that the quantity of just cell phone e-waste

¹¹ Telecommunications Authority Fiji, Country Report, Baseline September 2013

<http://www.taf.org.fj/getattachment/Monitoring/Country-Report/Baseline-Report.pdf.aspx>

¹² It is not clear if this is the total number of SIM cards issued, or only those active.

¹³ Many SIM cards will of course be transferred from old to new phones, to keep the number.

¹⁴ 360,000 subscribers reported for 2007.

is likely to be significant. Much of this will have already gone to landfill / dumpsite, but a significant amount is probably sitting in drawers and cupboards in residential homes, with flat batteries, cracked screens, and dodgy buttons - or just simply as a result of 'upgrading'. For computers, import data for 2008 – 2013 is provided in Table 5 provides details. Quantity in the import data is only by weight; hence the conversion factors of value and kg were calculated to assist general estimates.

Table 5: Imports of Computer Equipment into Fiji, 2008 – 2013

Year	2008	2009	2010	2011	2012	2013
Portables value (FJ\$ million)	\$5.9	\$6.8	\$10.3	\$13.3	\$19.4	\$26.9
Portables Qty	N/A	N/A	11,483	14,012	31,759	59,592
All P C value¹⁵ (FJ\$ million)	\$10.3	\$13.3	\$15.3	\$17.8	\$23.8	\$32.8
Computers Qty	N/A	N/A	22,400	22,717	44,637	100,828 ¹⁶
All 8471 value(FJ\$ million)	\$20.4	\$24.3	\$24.8	\$25.9	\$35.9	\$41.8
Average unit value of portables	\$114/kg	\$81/kg	\$898/ea	\$947/ea	\$609/ea	\$451/ea

Of note is that in the early years of the table, personal devices comprise only about half of the value of all imports in 8471, and portable devices are only one half again of that amount (a quarter of the total for 8471); but by the end of the series – 2013 – it can be seen that portable devices are a far larger portion of the personal computers quantity. This trend will be increasing today with the move to smaller, denser devices. JICA estimated in 2012¹⁷ 105,000 computers 'owned' in Fiji, so if a 20,000 per year historical rate of import was assumed (based on 2010-2011 figures) then that would give an average lifetime of 5 years per unit.

Televisions and computer monitor import numbers are showing steady increase, ranging from nearly 28,000 in 2010 to 38,000 in 2013, with an average of 36,500 across the period; value is increasing faster than number however - indicating that the unit cost is increasing - and this is likely a reflection of increased average screen size for TVs.

Table 6: Imports of Televisions and Computer Monitors into Fiji 2008 – 2013

Year	2008	2009	2010	2011	2012	2013
CRT Qty	24,500kg	23,500kg	1,769	1,834	1,067	2,227
Total Qty	504,400k g	448,800k g	27,725	35,433	44,905	38,170
Total Value (FJ\$ millions)	\$9.3	\$7.1	\$11.1	\$10.7	\$12.6	\$16.9
CRT Value (FJ\$)	\$343,817	\$295,684	\$492,617	\$423,514	\$271,944	\$937,334

However, whilst the CRT imports trend was that of a general decline in both value and numbers, 2013 shows a significant jump in CRT imports, with a value three times that of the year before, and a doubling of quantity. Whether this is a longer term trend

¹⁵ Laptops and desktops, not larger servers

¹⁶ This figure must be treated with caution

¹⁷ JICA EI JR13025 Data Collection Survey On Reverse Logistics In The Pacific Region, 2012, p 17

or an aberration is not clear. If the information from census data is used to evaluate TV numbers, in 2011 it was estimated that there was an 80% rate of use of TVs in households across Fiji, with some 152,000 units owned¹⁸: the information is provided in Table 7, reproduced from the JICA Reverse Logistics report. If around 36,000 items are coming in per year currently, and they were only replacing existing units, that would give a lifetime per unit of around 4.2 years based on these figures. As there can be expected to be a degree of growth involved in Fiji, especially when mapped against the increase in growth of average urban household income since the start of the century and the tendency for wealthy households to have more than one TV set, a probable average lifetime of around 5 – 7 years per unit might be a reasonable estimate.

Table 7: Estimations of the Quantity of Selected Electrical Equipment Present in Fiji Based on Census Data (Reproduced from JICA Reverse Logistics Report 2012).

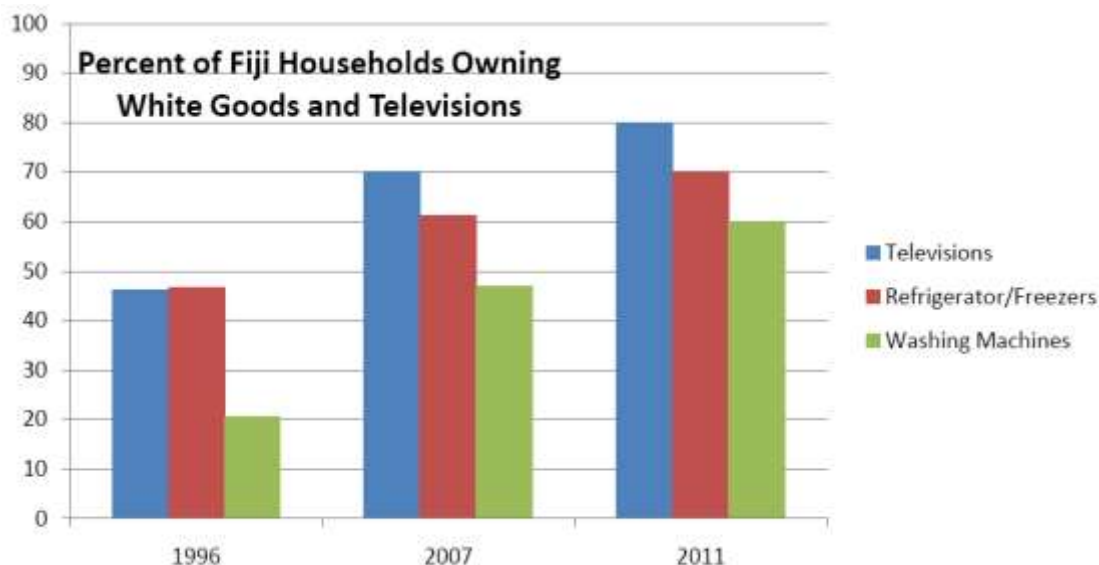
Year	1996 ⁽¹⁾		2007 ⁽¹⁾		2011 ⁽²⁾		
No. of Households	144,239		174,423		177,933		
Items	Household Ownership rate	Owned units	Household Ownership rate	Owned units	Household Ownership rate	Units owned by businesses and offices	Owned units
Televisions	46.1%	66,431	70.1%	122,353	80.0%	+5%	151,985
Refrigerator, Freezers	46.6%	67,144	61.1%	106,619	70.0%	+5%	132,987
Washing machines	20.6%	29,688	47.0%	82,027	60.0%	+5%	113,989
Microwaves	--	--	--	--	40.0%	+5%	75,993
Air conditioners	--	--	3.7%	6,536	40.0%	+5%	75,993
Computers	--	--	17.0%	29,682	30.0%	+50,714 units ⁽³⁾	105,025

Source: (1) Census 1996 and 2007, (2) JICA Study Team estimates, (3) Based on estimates of total numbers of professionals, officials, technical staffs and clerks using PCs

Figure 1: Whitegoods and TV use in Fijian Households: 1996-2011¹⁹

¹⁸ JICA EI JR13025 Data Collection Survey On Reverse Logistics In The Pacific Region, 2012, p 17

¹⁹Source: Ibid.



2.3 e-waste Collection Activities to Date

Suva City Council conducts a twice yearly bulky waste collection: usually this goes straight to landfill, but in June 2013 they tried to pilot the recycling of some materials – such as whitegoods - by having the trucks being specific about what was collected and diverting the recyclables collection to Nanuku scrap buyers in Walu Bay. This company stripped out recyclable materials, and then SCC came and took away what remained. Data was collected for each truck during the period, and this shows two truck-loads were recorded as being e-waste, with twenty truckloads of whitegoods recorded from a total of fifty loads; the entire two-week collection sent 37.3 tonnes of waste to landfill.

2.4 e-waste Exports to Date

There are several companies engaged in recycling scrap in Fiji, but due to the regulatory constraints, the recycling industry appears to be in very significant decline. Three recyclers were found to have some e-waste in a 2014 survey for PacWaste, but only one – Waste Recyclers Fiji – appears to have made any effort to systematically target electronics. They have taken e-waste from clients, but they charge for it (their main customers all pay to have the recyclables collected). These e-wastes were shipped - without being dismantled - as part of non-ferrous metal shipments to Australia, and understood to go on to Asian destinations. The company has done leaflet drops to try and source more e-waste but with minimal success²⁰.

2.5 Relevant Legislation

The following are the various pieces of law and policy considered to have a bearing on the issue of e-waste in Fiji. The Environment Management Act 2005 is the key piece of environmental legislation in Fiji, and largely formalises the role and functions of the Department of Environment (DoE), and provided DoE with various powers to regulate and create general policy objectives. The Act does have a definition of hazardous waste²¹ as something potentially hazardous to human health, but the words only appear again in the Act as part of a definition of 'pollutant'. The

²⁰ Pers. Comm. Peter Bray, Director Waste Recyclers Fiji, May 2014.

²¹ EMA 2005 Interpretation 2. "hazardous waste" means toxic, inflammable, corrosive, reactive, infective or explosive waste, and includes waste which is potentially hazardous to human health or the environment;

Environment Management (Waste Disposal and Recycling) Regulations 2007 are a large set of regulations promulgated under the EMA, and some parts do cover areas that are of relevance, being hazardous waste, burning wires to remove insulation, and lead-acid batteries.

There are detailed regulations covering lead-acid batteries²², requiring battery handling permits for those who import, manufacture or sell batteries, and a requirement to have a battery buy-back system in place in order to hold a handling permit. The general aim of most of the conditions on battery handling permits is to recover more batteries for recycling. Holders of permits should be maintaining battery collection centres for the public²³, and supplying semi-annual returns to the DoE detailing batteries made and/or imported²⁴ or recycled²⁵. Clause 25 of the regulations details that anyone holding a permit must set up a scheme to recover batteries – the clause is titled *buy-back of batteries* - and that scheme must recover 80% of batteries sold after two years and thereafter. No one can import a battery without a battery handling permit if the regulations are strictly applied, and so no importer can operate unless they have a buy-back or similar recovery system in place²⁶. Pacific Batteries is reported to be the only Battery Permit holder²⁷, and Pacific Batteries has created a very effective collection and recycling system. This Regulation is in effect a form of ARF.

The Scrap Metal Trade Decree 2011²⁸ covers all scrap metals²⁹ except aluminium used beverage containers, scrap metal being defined as a '*recyclable object that has a metallic content*' and would thus technically include e-waste items.

Fiji is a Party to the Waigani Convention, and is active in fulfilling its obligations under Waigani. DoE is the Competent Authority for Waigani.

2.6 Key Counterparts In-Country

The Department of Environment (DoE) is part of the Ministry of Local Government, Urban Development, Housing and Environment.

The Department has a Waste and Pollution Control (WPC) Unit which had 3 full time staff and two volunteers currently attached to it (2014). The DoE also has an office in the Western Division, with three staff based in Lautoka, covering the area from Sigatoka in the south west to Raki Raki in the north of Viti Levu. A northern office is based in Labasa with two staff.

The Suva Conurbation comprises the Suva City Council and three Town Councils: Lami to the west of Suva, along with Nasinu and Nausori to the east. All waste goes to the Naboro Landfill to the west of Suva. Nasinu Town Council (NTC) covers the central area of the conurbation, and has the largest residential population of the three councils³⁰. They also conduct a twice yearly bulky waste collection, when WEEE is

²² Ibid: Part 6 Lead Acid Batteries.

²³ Ibid: 24 (1) (e)

²⁴ Ibid: 24 (1) (f)

²⁵ Ibid 24 (2)

²⁶ It is not clear exactly how much of this is in place in reality, except in the case of Pacific Batteries, which is detailed below.

²⁷ Pers. comm DoE staff May 2014

²⁸ Scrap Metal Trade Decree 2011, Decree No. 22 of 2011, May 16 2011

²⁹ Ibid: '*scrap metal*' means any recyclable object that has a metallic content and has a resale value, but excludes aluminium beverage containers Part 1 2. Interpretation

³⁰ FBOS Key Statistics 2013 table 1.4 p 5.

collected, but it is largely whitegoods and old furniture, etc. Lami and Nausori Town Councils comprise the other two urban councils, and both conduct occasional bulky waste collections.

Lautoka City and Nadi Town Councils cover the two large urban areas in the west of Viti Levu. Both have worked with JICA over the past five years to get a residential kerbside recycling system going, the recycling collections of which are fortnightly.³¹. Materials collected go to Waste Recyclers Fiji, who pack and export what is recoverable. The Senior Health Inspector (Mr Shalend Singh) and his team are a committed group, and are aware of the potential to set up a collection point at the landfill weighbridge, to intercept WEEE before they were dumped. Nadi waste also goes to the Lautoka Landfill.

Labasa dumpsite has undergone remediation effort with assistance from SPREP; the town itself is very tidy and the local DoE office and the Council Health Dept. clearly work well together, and the local waste collections work well.

The Telecommunications Authority of Fiji (TAF) is the regulator of telecoms in Fiji; TAF collects data on telecoms use, and also requires anyone selling cell phones in Fiji to have a permit for the particular model: that requires demonstrated ability to provide service to the equipment, including repair.

2.7 Specific Project Involvement

Whilst J-PRISM has been active in the Western Division on SWM, there does not appear to have been any specific project involvement to date on the subject of e-waste in Fiji aside from studies generating data.

The PacWaste baseline study of 2014 found significant pent-up demand from the electronics retail and repair sector, as well as observing e-waste going to landfill.

PacWaste had a general intention to support the development of the Nasinu Waste Transfer Station (WTS), which has a site already allocated. PacWaste would have supported the development of an e-waste collection point if the WTS had been developed sufficiently during the life of the project.

2.8 Recommendations for Future Action

A significant problem for Fiji is likely to be that Fiji is not a Party to Basel, and so these will likely push any e-scrap exports into the non-ferrous waste stream as the real market for this material is into Asia where big processing plants exist, partly to service the electronics manufacturing industry in Asia. Fiji joining the Basel Convention is an essential step to dealing with e-waste in the long-term.

There is no doubt that a significant demand exists to collect and process e-waste in Fiji, the question is how to support such a collection, and where to start if such a collection is to be made. Following up from the J-PRISM work with Nadi and Lautoka may well be a good place to start, as Waste Recyclers Fiji is based in Lautoka, and the large tourism industry has an incentive to recycle its e-waste, as many of its customers would appreciate this.

³¹ Pers. com. Shalend Singh, Senior Health Inspector, 15-5-14. He puts the decline down to insufficient public campaign effort.

If the Nasinu Waste Transfer Station is implemented as planned, then support to Fiji to create a dedicated e-waste Collection Point as part of the Nasinu facility would be an excellent step to showing the way forward for other Fiji municipal councils.

3. Federated States of Micronesia

3.1 Overview

The Federated States of Micronesia (FSM) comprise the four states of Kosrae, Pohnpei, Chuuk and Yap. Each state is responsible for its own waste management. None of the four states are known to have any active programmes to collect e-waste. Kosrae and Yap have CDL systems that cover several items of beverage containers, and the Kosrae system includes Used Lead-Acid Batteries (ULAB). Pohnpei has a CDL system that only covers aluminium cans. Chuuk is actively looking at passing a CDL law, and introducing a recycling Materials Recovery Facility (MRF) on Weno Island in Chuuk lagoon. Yap and Chuuk have significant remote, outer island, populations, where e-waste will be present but in low quantities, and recovery would be expensive. However, significant solar PV systems exist in outer islands, and some e-waste recovery tied to PV management is feasible.

3.2 Data on Selected Electronics Imports / WEEE Materials Flows

The FSM provided a Country Report on e-Waste to SPREP in 2009 as part of a regional pilot project on e-waste³². The report does provide some data extracted from customs import data, and does make an attempt to estimate e-waste flows by making predictions based on a five year lifespan for computers, four years for TVs, and 2.5 years for mobile phones and music equipment. The import data is initially provided by each state, and an aggregated table is provided at Table 8 below. Inspection of the data does lead to the impression that there may be some unreliable numbers, for example for digital cameras and copiers. It would be advisable to repeat the exercise to get some more recent data.

Table 8: FSM Totals - Selected potential e-waste imports 2004 - 2007³³

Description	2004	2005	2006	2007
Appliances – Ovens	627	142	1,104	162
Appliances - Washing Machines	6,789	6,611	6,088	1,274
Batteries – Cells	8,284	7,198	5,941	6,821
Cameras - Digital & Video	3	13	6	4
Communications - Line Telephony and Apparatus	561	472	614	58
Communications - Radio and Apparatus	215	450	186	12
Computing - Calculating Machines, all types	628	1,217	1,152	19
Computing - Cash Registers	58	49	53	1
Computing - Data Processing Machines	1,099	1,250	1,800	1,889
Computing - Electric/Automatic Typewriters	3	24	18	0
Copiers - Duplicating Machines	2	6	14	0
Entertainment - Amplifier Sets	2	0	0	0
Entertainment - Sounds Recording Apparatus	228	328	299	46
Entertainment – Televisions	823	829	746	986
Entertainment - Video Monitors/Projectors	76	328	246	5
Refrigeration - Air conditioning machines, all types	818	134	962	2,467
Refrigeration – Freezers	479	375	270	298
Refrigeration – Refrigerators	1,151	385	544	266

³² Cover letter to SPREP accompanying the report, February 5th, 2009.

³³ Extracted from: "The E-waste Situation in FSM: Country Report" p 11, February 2009

3.3 e-waste Collection Activities to Date

There have been no specific e-waste collections to date that have been notified to the author. There have been sporadic scrap metal recycling operators collecting in Chuuk, Pohnpei and Kosrae³⁴, and more consistently, in Yap, where Island Paradise Metal Company is reported to have collected some computers and whiteware.

3.4 e-waste Exports to Date

None reported.

3.5 Relevant Legislation

There is not known to be any specific legislation covering e-waste in any of the states. The FSM nationally is a member of the Basel Convention.

3.6 Key Counterparts In-Country

Nationally, the Office of Environment and Emergency Management is the SPREP focal point and Basel Focal Point. On a state basis the following apply: Kosrae Island Resource Management Authority manages waste and overall policy in Kosrae; Pohnpei Environmental Protection Authority is the key entity in Pohnpei State, with Pohnpei Waste Management Services operating the Kolonia landfill under contract to the government; Chuuk Environmental Protection Authority manages waste and overall policy in Chuuk; and in Yap, The Environmental Protection Authority is the key counterpart.

3.7 Specific Project Involvement

No specific recent project involvement for e-waste is recorded: the FSM did not participate in the e-waste projects run under PacWaste. Island Paradise Metal Company staff have had training in e-waste dismantling from JICA in the past on a trip to Japan. The report above from 2009 as part of a pilot project for SPREP is the only known project involvement. The JICA J-PRISM II project will be conducting SWM work in FSM during 2018 - 2021, but it is not clear at this stage if that will address e-waste specifically.

3.8 Recommendations for Future Action

The first requirement for the FSM is to get some idea of the scale of the problem, and conduct a baseline study of estimated flows of WEEE, key stakeholders in government, private sector and NGOs, and develop some ideas for activities. This is what PacWaste did with its baseline studies for some other PICs in 2014. Perhaps J-PRISM II could include this as part of their work in FSM.

³⁴ Pohnpei and Kosrae recycle aluminium cans under CDL systems but not scrap metals currently

4. Kiribati

4.1 Overview

Kiribati has one large 'urban' area of South Tarawa where about half the population live, and where much of any WEEE will be generated. The Environment and Conservation Division (ECD) of the Ministry of Environment has taken an interest in the issue of e-waste since around 2007, when they commissioned a report on the problem from a local consultant. Kiribati has had a well-functioning, commercially viable deposit/refund recycling system for PET bottles, aluminium cans and ULABs since 2005, and the system legislation would potentially allow the inclusion of some WEEE through additional regulation, and the government is actively looking at this possibility.

Kiribati has had a functional Collection Point for e-waste for the last few years at the Materials Recovery Facility (MRF) in Betio, Tarawa. Whilst the Collection Point has had periods of chaos, it has managed to collect much of a full container load of broken down e-scrap during its period of operation. The model has been that e-waste arrives at the Collection Point, either from the public, dropped off, or from collections organised by the Environment and Conservation Division (ECD), and the e-waste is stored in a shipping container on site. Periodically, a local Youth NGO - who has had some training from SPREP - comes and dismantles the stockpiled e-waste into e-scrap categories that can be exported and sold commercially. The excess metal parts - such as desktop computer cases - go onto the scrap metal pile in the MRF, and waste plastic components go to landfill. Record keeping has not been precise, but the facility has absorbed a large quantity of e-waste since 2013 to the point where around three quarters of an FCL of e-scrap is packed and ready for shipment by the time of writing.

4.2 Data on Selected Electronics Imports / WEEE Materials Flows

There has been only one report that attempted to quantify the amount of e-waste in Kiribati, and that was one from ECD in 2008³⁵. This did look at selected import data derived from Kiribati Customs Service import information, from 1999 to 2007. Numbers were converted to kilograms: the estimate was of the order of a cumulative 85,000kg by the end of 2007. Imports of electronic equipment in the last ten years will be significantly larger as Kiribati was late to move into the electronics revolution.

A better indication is provided by materials collected from 2013 to 2017 by the ECD e-waste collection point at the Materials Recovery Facility (MRF) in Tarawa. There is about three quarters of a full container load of e-scrap (dismantled WEEE which has been sorted by category) which is in wooolsacks. This might represent five to ten FCL of original electrical imports. There were a large number of CRTs coming in to Kiribati in the past, but these have now largely stopped, and most of these units are no longer working, Kiribati being a very hard environment for electronic equipment, contributing to short equipment life-spans. Kiribati does have had a small market in second-hand goods which has included some old CRT TVs; these mainly come from NZ as part of shipments of second-hand household goods. But the cost of new flat screens has come right down, and the local second-hand market has largely fallen away it seems, these old CRTs being very bulky and awkward to ship.

³⁵ Electrical and Electronic Waste (e-waste) Baseline Study, Kiribati, 2008; Environment and Conservation Division of the Ministry of Environment, Kiribati.

4.3 e-waste Collection Activities to Date

Where Kiribati has done much better is in e-waste collection, although this is entirely in South Tarawa, where half the population lives.

Under the NZAID-funded Urban Development Programme (UDP) to improve SWM in South Tarawa (2011- 2015), an e-waste collection point was set up in the Betio (Tarawa) MRF. Many CRTs were collected under this program: attempts to find a market proved futile, and the only potential avenue was to Australia where there would have been a significant price per Kilo charge on top of all shipping costs - this would assume that a Basel Permit to import to Australia could have been achieved. As a result, it was decided to set aside a hazardous waste area in the Nanikai Landfill and bury CRTs whole in that. This approach was encouraged by information that showed that the calcium carbonate coral sand would act as an effective treatment medium for acids and any heavy metals that might possible leach out, but where burying CRTs whole could be achieved, leaching should be minimal³⁶. CRTs were stripped out of their casings, and all recyclable parts recovered, prior to burying in the landfill. The UDP collections organised by ECD actively collected 1400 items of e-waste from villages on South Tarawa, aside from a much larger amount of material that was dropped off at the MRF e-waste Collection Point. UPD also funded the construction of three small e-waste collection points - like small garden sheds - at each of the three South Tarawa landfills - technically, controlled dumpsites - which ECD empty periodically and take the e-waste to the MRF. This part of the collection could work better if the landfill watchman took a more active role in intervening in e-waste dumped, and ECD cleared the collection points more regularly.

PacWaste took over from the UDP project, and initiated another two rounds of collections from villages and offices around South Tarawa, which amounted to another 950 items. Again, the public and business continued to drop off e-wastes at the MRF in quantities that at least matched what was collected by ECD. Materials dumped at the MRF are not recorded, so this creates a mismatch with the data as to what is broken down.

Table 9: Status of e-scrap packed in Tarawa e-waste Collection Point

e-scrap item	Num of Sacks	Weight kg
Circuit Boards	19	2,100
CD ROM	1	195
Phones (landline)	1	45
cable	1	45
power supply	1	234
hard disk	1	95
aluminium heat sink	2	180
speakers	2	125
Cell batteries	1 drum	130
	28 + 1	
Totals	Drum	3,153

³⁶ Landfill Construction and Leachate Management for Atolls; paper for Asia Pacific landfill Symposium; Bali 2012: Alice Leney,

However, during the PacWaste project in 2017, the Project Officer has actively recorded all the e-scrap materials that have resulted from the dismantling of WEEE, and this is shown in Table 8. 28 Woolsacks of e-scrap, and one drum with 130 kg of small cell batteries has been collected, which amounts to 4,600 pieces and 3,150 kg; this is currently packed in a shipping container which is a fixed part of the Collection Point, and when a FCL is ready for shipment, the materials will be transferred for export into a suitable TEU bought onto the site. 'Sacks' are woolsacks, which have an approximate volume of around 1m³.

4.4 e-waste Exports to Date

There have been no exports to date of e-scrap. A buyer and a Basel permit will be required. TES-AMM from Singapore has been approached by PacWaste to be a potential buyer, but PacWaste has closed down before an export could be completed. The agreement between PacWaste and ECD would provide support for an export. The cost of shipping a twenty foot container is estimated at about A\$4,000 including the Hazardous cargo premium. The materials as packed will meet IMO DG criteria, with sealed, plastic-lined drums being used for small battery cells.

Kiribati regularly exports quantities of ULAB from the MRF, which requires a Basel Permit, so ECD is familiar with the process.

4.5 Relevant Legislation

The Environment Act (1999, plus amendments of 2007) is very general in its 'Pollution' provisions and largely makes an offence of dumping wastes, which would include e-waste. Landfill operators require licenses whereby ECD sets conditions.

Kiribati has Container Deposit Legislation³⁷ which covers PET bottles, aluminium cans, and lead-acid batteries; the centre of this operation is the government owned Materials Recovery Facility (MRF) in Betio, Tarawa. There is a secondary operation in Kritimati Island. The recycling system is operated by a designated 'System Operator' who works under contract to the government, and is a private business. Given the way the legislation is structured, with detail in associated Regulations, it should be possible to include e-waste into the system at some point in the future, but a viable system of levying deposits, and how to apportion refunds, would need to be worked out prior to developing the regulation. ECD has an active approach to developing this pathway, and has carried out consultations with electrical retailers and importers on this subject during 2017. The National Solid Waste Management Strategy (which may be still in a draft form) does identify e-wastes as a priority area, and notes the potential to include WEEE into the existing CDL recycling system.

Kiribati is a Party to the Basel Convention, and ECD (through the Ministry of Environment, Lands and Agricultural Development) is the Focal Point, whilst the Comptroller of Customs is the Competent Authority. Kiribati is not a Party to the Waigani Convention.

4.6 Key Counterparts In-Country

ECD is the primary counterpart for any e-waste work, and whilst it is quite possible to involve contractors to conduct actual dismantling and shipping of e-waste from Kiribati, these would be arranged at that time. The local electronics retailers and repairs have generally been supportive of collections and have been actively engaged over several years.

³⁷ The Special Fund (Waste Materials Recovery) Act 2004

The electrical retailers and repairers are interested in this issue and may provide useful partners in any future work to collect e-waste. There are no direct NGO partners in recent years, although FSPK, an NGO, was instrumental in setting up the CDL recycling system, known as the 'Kaoki Maange'.

4.7 Specific Project Involvement

Under the NZAID-funded program to improve SWM in South Tarawa (2012- 2015) an e-waste collection point was set up in the Betio (Tarawa) MRF using three shipping containers on concrete foundations: one for storing un-dismantled e-waste; one for storing dismantled, packed e-scrap, and one with tools and packing materials. The gap between the containers is covered to provide an outside workspace for dismantling work, using some long benches. This Collection Point included the ability to break up e-waste items into e-scrap, being a process of dismantling and sorting into commercial categories, and stored in woollsacks. Significant materials were collected, and metallic materials stripped off (such as cases) were put directly on the scrap metal pile in the MRF. The Collection Point was run by ECD.

PacWaste took over the funding of this program after a lapse of a year, and supported a Project Officer who actively promoted the collection of e-waste from larger producers such as government departments. Actual dismantling of items was largely done via a small contract to a local youth NGO; hands-on training was provided to the dismantlers on several occasions through PacWaste Technical Assistance (TA). Printed Circuit Boards (PCBs) were sorted into two categories, high and low value. Sealable oil drums were provided to hold small batteries and CFL lights, and toner cartridges.

Two project staff were hired through PacWaste (there had been one only under the NZAID program) based in ECD, and they were responsible to promote the collection of E-waste. PacWaste supplied two tranches of A\$18,000 each to ECD, with a total of A\$60,000 being potential available under the programme. The Project Officers reclaimed the site of the e-waste Collection Point as it had fallen into some disarray during the hiatus between projects, with much e-waste being dumped by the public. A watchman was hired under PacWaste who could control e-waste dumped during the hours the MRF is open; the MRF handles PET bottles, cans and ULAB under the CDL system, as well as having a large scrap metal pile.

The original 'Kaoki Maange' project, during the period funded by UNDP which kicked off the CDL recycling system, did collect some e-waste, from 2004 - 2005, but whilst the small quantity of materials collected did act as something of an occasional resource for electronic repairers, the materials collected could find no viable market and were dumped to landfill in 2006.

4.8 Recommendations for Future Action

Finishing off collecting enough materials for a single FCL of e-scrap, and making an export, is the priority activity for Kiribati. This would validate the entire e-waste Collection Point in the eyes of government, the public and business. A shipment could provide the impetus to develop a suitable ARF system using a regulation under the existing CDL. This would all be extremely useful for the region as it would provide a model directly applicable to similar countries in the region. Financial support to ECD to make the shipment is likely the only way this will occur.

5. Marshall Islands

5.1 Overview

The Republic of the Marshall Islands (RMI) is an atoll nation with around 80% of the population in two places: Majuro Atoll and Ebeye Island (which is in Kwajalein Atoll). Outside of these centres, with a few limited exceptions, there is no electricity network, and electricity is provided by small solar power Solar Home Systems (SHS). This factor limits the uptake of electrical goods, although increasingly, small portable items can be used on these SHS. Almost all commercial activity is in these two urban centres. Majuro has around 28,000 people and Ebeye around 10,000; population is stable due to out-migration to the USA, and most outer islands are slowly losing population. Customs data is still recorded using a paper-based system, so data is sparse. The highest point in the country is the landfill on Majuro. Recycling efforts are small, but the introduction of a CDL system during 2018 will improve the situation. E-waste management is still a fairly low priority; however, a ULAB recovery system is in place and slowly gaining strength, as there are many ULAB generated from SHS in the country.

PacWaste ran an Integrated Atoll Waste Management Project there 2015 - 2017 but it did not deal with e-waste.

5.2 Data on Selected Electronics Imports / WEEE Materials Flows

PacWaste made some general estimates of e-waste quantities in 2014³⁸; this study looked at available data around household ownership of electrical items from the 2011 census, and from this a crude estimate was made of the number of WEEE that might be available for recovery per annum, and this is reproduced in Table 10 (numbers rounded). Due to lack of widespread electricity networks except in Majuro and Ebeye, most of these items will be found in these two places. Much of the available data is over ten years old, and this is a significant constraint given the explosion in portable electronics in the last decade. The numbers in the table do not include government and commercial items.

Cell phone subscriber numbers have gone from 600 in 2003³⁹ to 14,900 in 2014⁴⁰, which indicates that there are around 15,000 cell phones in use, and if a typical phone lasts three to four years, then any e-scrap system recovering cell phones could easily expect to potentially recover around 3 -5,000 cell phones per year. There will be significant numbers of ipad-type tablet devices that will not show in this data.

Customs data in electronic format is only available for 2009 & 2010, although the RMI customs are planning to move to an electronic system in 2018. Only value was recorded, not quantity, and so numbers of items were estimated⁴¹ using values obtained from inspection of Palau customs data, which provides a detailed data set which can be used to make estimates for the RMI on a pro rata basis.

³⁸ PacWaste e-waste Country Assessments 2014

³⁹ RMI Statistical Yearbook 2003, Chapter 10, fig 10.19

⁴⁰ Pers. Comm NTA official by phone.

⁴¹ PacWaste e-waste Country Assessments 2014

Table 10: Estimate of the number of common WEEE available for recycling per annum in the RMI 2014

Item	Est. no per annum for recycling
Computers	300 -400
Cell phones	3000 – 5000
TV/Monitors	1200
ULAB vehicles	2000
ULAB PV	1,000

5.3 e-waste Collection Activities to Date

MAWC does collect some e-waste that arrives into the Batkan dumpsite on Majuro, but this is haphazardly stockpiled and quantities are minimal. There is no collection at the only other formal dumpsite in the RMI, which is on Ebeye Island in Kwajalein Atoll.

White goods are directed to a scrap metal pile, and a scrap metal crushing machine was installed in 2017 which is capable of crushing many white goods items completely.

5.4 e-waste Exports to Date

There are no records of any specific e-waste exports to date. Non-ferrous scrap has been exported by low-profile private operators, Korean and Chinese.

5.5 Relevant Legislation

There is only one Act that is relevant to e-waste, the National Environmental Protection Act which largely covers the administrative structure of the EPA and its general powers, with the specifics concerning areas of responsibility provided for in various powers to regulate certain activities. One of these areas is solid waste, and within that regulation is a hazardous waste provision, although e-waste is not defined as such.

Regulations covering hazardous waste are contained with the wider Solid Waste Regulations from 1989, and are short and simple⁴², and very similar to those found in Palau. EPA permission is required before any dumping of hazardous wastes in any local dumpsite or landfill can occur. Nothing specific deals with WEEE or any export of hazardous wastes. Under the regulation definitions, e-waste would classify as hazardous if reference was made to international convention definitions such as is found in the Basel Annexes. The regulations are largely concerned with controlling what happens if, and where, someone dumps hazardous waste into a permitted solid waste facility (landfill / dumpsite).

The POPs regulations of June 2004 would appear to be based on a generic model and are specific to chemicals covered by the Stockholm Convention, along with various identified pesticides, and do not have a direct bearing on the hazardous chemicals that might be found in e-waste, largely because the legislation is aimed at dealing with the chemicals themselves rather than when chemicals might be found as combined constituents of some consumer product.

The RMI is a Party to the Basel Convention⁴³, but not Waigani. Focal Point for Basel is the Ministry of Foreign Affairs, and the Competent Authority is the RMI EPA.

⁴² 2401-31-21 Hazardous Waste Disposal Standards

⁴³ Ratification was January 2003

OEPPC has a draft National Solid Waste Management Strategy which identifies, as a priority, the export of ULAB⁴⁴, and for e-waste: “Incorporate best practice disposal or recycling practices for ODS⁴⁵ and e-waste into routine landfill operations” as a priority action area⁴⁶.

5.6 Key Counterparts In-Country

The counterparts for any work on e-waste in the RMI are primarily the Majuro Atoll Waste Company (MAWC), the RMI Environmental Protection Authority (RMI EPA), and the Office of Environmental Policy and Planning Coordination (OEPPC). In addition, three NGOs have done some work on waste and would be useful partners in any public engagement work: Women United Together in the Marshall Islands (WUTMI), the Marshall Islands Conservations Society (MICS), and Jo Jikum, a youth/environmental issues activist group.

5.7 Specific Project Involvement

The PacWaste Project did do work on hazardous waste as part of its' Integrated Atoll Waste Management Thematic Component, but the focus was on Used Lead-Acid Batteries (ULAB) rather than e-waste as such. The ULAB work set up a product stewardship system for ULABs that involved MAWC and Marshalls Energy Company (MEC), as MEC nominally owns a large number of batteries in SHS across the outer islands, installed as part of the decade long Rural Electrification Programme. There has not been any other specific involvement by any project on e-waste.

5.8 Recommendations for Future Action

The MRF at the Majuro dumpsite has improved dramatically over the past year with the erection of a processing shed and the installation of baling equipment. Work could usefully be done to see how collection of e-waste could be integrated into the operation of the MRF. It may well be that some support could be provided to create some e-waste collection point and dismantling area, using the models tried elsewhere, such as Kiribati and Palau.

⁴⁴ Draft RMI NSWMS point 26. page 22

⁴⁵ Ozone Depleting Substances

⁴⁶ Ibid, point 36 page 24.

6. Nauru

6.1 Overview

Nauru is another small nation, a single island of around 10,000 people. All flights and trade routes go through Australia, and so any e-waste exported would use that route. Standard of living is reasonable, and it can be expected that there will be a quantity of e-waste that needs dealing with.

6.2 Data on Selected Electronics Imports / WEEE Materials Flows

There are no reports of actively collected data on potential e-waste flows. Given everything imported comes via Australia, reasonable data might be fairly easily ascertained through inspection of customs statistics.

6.3 e-waste Collection Activities to Date

Four bins of e-waste are reported⁴⁷ collected at the Government Warehouse.

6.4 e-waste Exports to Date

None reported. Quantities of e-waste from a population as small as Nauru, if broken down to e-scrap, would be very small, and it would take a long time to fill a shipment.

6.5 Relevant Legislation

There is not known to be any specific legislation covering e-waste. Nauru is a Party to the Basel Convention, but all exports would be expected to go to Australia, at least initially.

6.6 Key Counterparts In-Country

The Department of Commerce Industry and Environment (CIE) is the SPREP Focal Point and would be the key contact for any e-waste work. The Government Warehouse is collecting e-waste from government departments and would be the main collector currently.

6.7 Specific Project Involvement

No specific project involvement for e-waste is recorded: Nauru did not participate in the e-waste projects run under PacWaste.

6.8 Recommendations for Future Action

The first requirement for Nauru is to get some idea of the scale of the problem, and conduct a baseline study of estimated flows of WEEE, key stakeholders in government, private sector and NGO - if any - and develop some ideas for activities, which would almost certainly involve looking at how to interact with the commercial e-waste sector in Australia. This is the type of work PacWaste conducted with its baseline studies for some PICs in 2014.

⁴⁷ Pers. Com. Bryan Star, CIE,9999 February 2018

7. Niue

7.1 Overview

Niue is a very small nation, a single island of around 1,800 people. There is a small tourism industry operating in the country. All flights and trade routes go through New Zealand, and so any e-waste exported would use that route. Standard of living is reasonable, and it can be expected that there will be a quantity of e-waste that needs dealing with.

7.2 Data on Selected Electronics Imports / WEEE Materials Flows

There are no reports of actively collected data on potential e-waste flows, although some effort was made by the Department of Environment as a result of the request for this report, from Customs. Given everything imported comes via New Zealand, reasonable data might be fairly easily ascertained through inspection of customs statistics.

7.3 e-waste Collection Activities to Date

There have been 3 island-wide collections of e-waste carried out by the Department of Environment (DOE). Latest e-waste collection was done for households and government departments from October 2017 to March 2018. DOE has stockpiled these e-wastes at the time of writing.

7.4 e-waste Exports to Date

None reported. Quantities of e-waste, if broken down to e-scrap, would be very small, and it would take a long time to fill a shipment from Niue

7.5 Relevant Legislation

There are regulations in draft form, under the Environment Act of 2015: these are the Environmental Standards (Waste) Regulations, and these provide for the collection of deposits ('levies' in the regulation) on certain recyclable items, in order to get refunds. 'e-ware' is listed as something to pay a deposit, but in the draft regulation provided the deposit - 'levy' - is not specified and there is no refund listed; but clearly there are plans to address the issue of e-waste through regulation. Niue is not a Party to the Basel or Waigani Conventions, but it is reasonable to suggest that given the close relationship with New Zealand, that NZ and Niue could have a bilateral agreement that would allow exports of e-waste from Niue to NZ.

7.6 Key Counterparts In-Country

The DOE is the SPREP Focal Point and is the key contact for any e-waste work.

7.7 Specific Project Involvement

No specific project involvement for e-waste is recorded: the e-waste collections and stockpiling has been done under the DOE budget.

7.8 Recommendations for Future Action

The first requirement for Niue is to get some idea of the scale of the problem, and conduct a baseline study of estimated flows of WEEE, key stakeholders in government, private sector and NGO - if any - and develop some ideas for activities, which would almost certainly involve looking at how to interact with the commercial e-waste sector in NZ. This is the type of work PacWaste conducted with its baseline studies for some PICs in 2014. Some on-island training at how to break down e-waste into commercial categories would be useful and a requirement.

8. Palau

8.1 Overview

Palau has a vibrant commercial sector and a large tourism industry. Population is very much concentrated in Koror State, which comprises largely a single island connect via a bridge to the other states on the 'mainland'. Much of the time, the population of Koror might be doubled by the number of tourists present, and each hotel room can be expected to contain a TV screen and a small fridge.

Commercial recycling is well developed, but e-waste is proving a challenge for the recyclers, even though they are trying to engage with the e-waste stream. The Palau Environmental Quality Protection Board (EQPB) - the local EPA equivalent - is addressing the issue and worked with PacWaste to set up a Collection Point at the country's single controlled dumpsite, the 'M Dock' landfill. A local recycling company does have a whiteware and scrap metal collection point at the entrance to the M Dock site.

The presence of a deposit/refund recycling system in the country does mean that there is a reasonable level of local awareness of waste and recycling issues.

8.2 Data on Selected Electronics Imports / WEEE Materials Flows

Parsing of various data streams can give some 'ballpark' estimates of the quantities of WEEE that might be generated annually in Palau. For example 92% of Palau households had a refrigerator in 2005⁴⁸, and that can be expected to be higher today; that would mean that around 4,300 fridges were in Palauan households.

The PacWaste baseline study of 2014 obtained information from the National Statistics Office, which involved inspection of each individual import entry over several years for selected tariff lines. This allowed, for example under 84.71, only desktop, laptop and tablet computers are counted, and a strong data set to be collected.

The results are provided in Table 11 below. Numbers under the year column represent whole units, but should not be considered definitive. Growth rates and rate of import numbers are rounded. As this was a particularly complete dataset, a *per capita* and *per household* measure was derived for possible use as a crude 'universal measure' that can be useful for comparison in similar PICs where this import data is not available.

Table 11: Selected Imports into Palau, and annual rates of import per Capita and per Household based on 2012 imports

HS Tariff	Description	2008	2012	5 yr growth rate	Per HH	Per Capita
84.15	Air Conditioners	731	824	12%	0.18	0.04
84.18	Fridge & Freezer	621	811	30%	0.17	0.04
84.50	Washing Machines	284	347	20%	0.07	0.02
84.71	Computers	741	1250	70%	0.27	0.06
85.28	TV/Monitors/ DVD	872	1497	70%	0.32	0.07

It is clear that imports of electronics such as computers and screens are increasing rapidly. Palau has a large tourism industry that is expanding, and each hotel room

⁴⁸ *ibid*, table 3.30 p 27

will have a TV screen. These numbers come from years just prior to the boom in smart phones and tablet type devices.

8.3 e-waste Collection Activities to Date

Palau has a lively electrical repair sector, staffed by mainly Pilipino technicians, and so a fair bit of e-waste exists in repair shops. Two recycling companies have collected e-waste: one, who focuses on auto wrecking, has collected e-waste on a very small scale, and the other, Palau Waste Collection company (PWC), in a much more systematic way. PWC is the contracted recycler/exporter of the materials collected by the Palau CDL system, but also collects other scrap materials that can be recycled. They operate a scrap metal Collection Point at the entrance to the M Dock landfill site in Koror, and they typically have one worker full-time stripping out WEEE to recover copper and other non-ferrous scrap. They have collected sacks of PCBs and cabling, and these materials are kept under cover, and are believed to be shipped in containers of mixed non-ferrous scrap where they can get a buyer to accept them.

The Environmental Quality Protection Board (EQPB) of Palau was a counterpart with PacWaste for e-waste, and PacWaste provided funding for the construction of a fixed e-waste Collection Point at the M Dock facility, which would include a dismantling area, following the style of the Tarawa MRF e-waste Collection Point, using shipping containers on fixed foundations. Palau EQPB has not responded in substance to a request for information as to the status of the PacWaste project activities.

8.4 e-waste Exports to date

There have been no formal e-waste exports as such; if anything apart from copper and cabling has been exported - and this is not clear - it will have been put in mixed containers of non-ferrous scrap metals. But the main scrap dealer/recycler PWC is a Taiwanese company, and the accession of Palau to the Basel Convention creates something of a potential problem for them as their scrap markets are in Taiwan, and Taiwan is not part of the Convention. The recycler could do with some help to find an alternate market that they can ship to.

8.5 Relevant Legislation

There are no laws that specifically targeted at e-waste as such. The 'Environmental Quality Protection Act' sets up the EQPB, and largely deals with the functions and structure of the EQPB as an independent agency, roughly along the lines of the EPA in the USA. The Act provides for the power to regulate in certain areas: real detail of what EQPB is responsible to do with regard to solid waste is in the regulations. The regulations on hazardous waste are short and simple⁴⁹: the EQPB Chairman is required to give permission before hazardous wastes can be dumped in any local dumpsite or landfill, and States are responsible to ensure that 'facilities for the disposal of Hazardous wastes are available', but it does not specify that those facilities must actually be located in each state, which is useful as some states are very small entities: this allows for cooperation between states on this point. Nothing specific deals with WEEE or export of hazardous wastes. Under the regulation definitions, e-waste would classify as hazardous if reference was made to international convention definition such as is found in the Basel Annexes.

Palau has a CDL recycling system, the Palau Recycling Program, which is specifically targeted at beverage containers. The Act is detailed as to the mechanism for the system, and as such would have no applicability – as it is written - to any

⁴⁹ 2401-31-21 Hazardous Waste Disposal Standards

product stewardship approach aimed at leveraging e-waste exports. Palau is a party to the Basel Convention, having ratified in September 2011; Palau has signed Waigani, but is not a Party as it has not ratified. Focal Point for the Basel Convention is the Ministry of State, and the Competent Authority is the EQPB.

8.6 Key Counterparts In-Country

The Environmental Quality Protection Board (EQPB) is the primary contact when it comes to e-waste, being the local equivalent of an Environmental Protection Agency. EQPB was the local partner with PacWaste for e-waste, and funding for the e-waste Collection Point was directed through, and managed by, EQPB. EQPB was also responsible for e-waste awareness publicity work.

The Bureau of Public Works is a division of the Ministry of Public Infrastructure, Industry and Commerce (MPIIC). The Bureau has a Solid Waste Management office, whose main responsibility is to operate the national landfill at M Dock near the town centre of Koror, which is where the e-waste Collection Point is sited. The Bureau has a Solid Waste Management unit whose manager is directly responsible to the Director of the Bureau for landfill operations.

Koror State is the state government responsible for Koror Island, and it has its own waste management office based in the Redemption Centre next to M Dock that receives cans and bottles under the Palau Recycling Program. This office and staff may well have a role to play in any future e-waste collection efforts, as Koror has by far the largest number of people and commercial activity.

8.7 Specific Project Involvement

PacWaste had an agreement with EQPB to set up an E-waste Collection Point at the entrance to the Koror M Dock landfill site, where scrap metal and tyres are already removed from the incoming waste stream. Beverage containers are recovered about 100m away by the Koror State Redemption Centre under a national CDL system.

The Collection Point design followed the successful model pioneered in Kiribati, using two shipping containers with a roof over the top that provides a suitable shaded workspace for dismantling E-waste. EQPB was responsible to publicise the Collection Point to the Palauan public and businesses. The local recycling company, who operates the scrap metal collection and beverage container processing and export under contract to the Palau government, was expected to operate the Collection Point with their own staff, and paid a monthly fee to do so from the PacWaste funding. The plan was that they would collect and dismantle the collected E-waste in their recycling yard, and pack for export.

The PacWaste TA made contact with a potential Japanese buyer and suggested that funding be made for a trainer to visit Palau from the company, as was expected under the LOA with PacWaste. The LOA with PacWaste allowed for funding up to US\$43,000, which include support for shipping e-waste, a visit by a trainer for the recycler in commercial dismantling of e-waste, publicity work, and buying shipping containers and constructing the e-waste Collection Point. There is no further information supplied about what has happened since the PacWaste TA visit of September 2016.

8.8 Recommendations for Future Action

The situation in Palau needs assessing as to the utility of the PacWaste intervention, and whether the Collection Point is functioning and collecting e-waste, as intended. Training, as envisaged under PacWaste, has been recommended by EQPB.

9. Papua New Guinea

9.1 Overview

The SPREP Focal Point was contacted with a list of questions regarding e-waste in PNG, and the limited information below, including the recommendations, is a result of that contact. There is very little to report, no work having been done on this subject. However, with PNG being the largest PIC, and parts of the country having quite significant development, there will be significant quantities of e-waste generated, especially in the Port Moresby area and by the resource extraction industries.

The geography of PNG will make collection a challenge, and likely militate against a central collection point, by the issue clearly needs some study.

9.2 Data on selected electronics imports / WEEE materials Flows

There is no data analysis or reports specific to e-waste and PNG. No one appears to have studied the issue.

9.3 e-waste Collection Activities to date

The SPREP focal point reports that some recyclers are collecting e-waste, but have no details as to what or where, or quantity.

9.4 e-waste Exports to date

None specifically known of. No Basel permits have been issued for e-waste export.

9.5 Relevant Legislation

None reported that covers e-waste or hazardous wastes.

9.6 Key Counterparts In-Country

The Conservation and Environment Protection Authority (CEPA) will take lead in any management and policy development.

9.7 Specific Project Involvement

No projects report to have done work on e-waste. PacWaste only worked on Hospital incinerators in PNG.

9.8 Recommendations for Future Action

Clearly, the first step would be to comprehensively assess the situation in PNG with regard to e-waste and create some sort of baseline to indicate quantity, and the main centres where it might be viable to collect e-waste. The local recycling industry needs to be assessed to determine what is being collected, and where it is being shipped to. It is likely that the valuable fractions are being 'cherry picked' (for example copper wires) and the rest dumped. CEPA recommends that PNG should as part of any future regional project attempts to deal with e-waste issues as it has never participated in previous projects on e-waste.

10. Samoa

10.1 Overview

Samoa has a lively Information Technology sector, with an organisation in Apia that brings together professional dealing with all aspects of IT. Standard of living is reasonable, and there are several regional organisations based in Samoa - including SPREP and UNEP - along side a significant sized government sector, and these will generate significant office equipment e-waste. It can be expected that there will be a sizable quantity of e-waste that needs dealing with, and some attempts have been made to raise awareness of the issue and one small collection was made in the past.

10.2 Data on Selected Electronics Imports / WEEE Materials Flows

There are no reports of actively collected data on potential e-waste flows.

10.3 e-waste Collection Activities to Date

There was an effort to collect e-waste in Samoa, organised by the local newspaper in 2012 to push the issue in recognition that something needed to be done. The Samoa Observer newspaper urged their readers to bring in e-waste, and they passed the items on to the Westend recycling company. There are no reports of collection since then, although stockpiles are thought to exist in offices and at repairers as there is an awareness that this material should not go to landfill if possible. There is a bulky waste collection conducted three times a year in Apia, which includes large electrical and electronic waste such as TVs, refrigerators, washing machines, air conditioners etc.

e-waste that arrives at the landfill, if it is intercepted at the gatehouse, is diverted to Pacific Recycling who has a recycling operation immediately adjacent to the landfill gateway. Some e-waste on the landfill appears to be stripped of copper by the waste pickers on the landfill. The materials so collected will no doubt be going for sale to Pacific Recycling⁵⁰.

10.4 e-waste Exports to Date

None reported specifically, although some e-waste fractions are being exported in with non-ferrous shipment by local recyclers, largely after stripping out the low value parts and dumping these to landfill. ULAB are regularly exported.

10.5 Relevant Legislation

The Waste Management Act 2010 clearly contains provisions that would allow a product stewardship process to be put in place. There have been suggestions to implement Container Deposit Legislation, and this would be done via regulations under the existing Act, which is how any ARF system for e-waste would also operate. Samoa is a Party to the Basel Convention.

10.6 Key Counterparts In-Country

The Ministry of Natural Resources and Environment is the SPREP Focal Point and would be the key contact for any e-waste work. The local IT professionals based in government, larger business and regional organisations do cooperate and could prove to comprise useful stakeholders in any work to assess the problem in Samoa.

⁵⁰ These observations come from the 2013 SICM report, along with similar anecdotal observations in this section on Samoa.

10.7 Specific Project Involvement

No specific project involvement for e-waste is recorded: Samoa did not participate in the e-waste projects run under PacWaste, although training with local professionals and recyclers on how to dismantle e-waste into e-scrap fractions, for commercial sale, was initially part of the PacWaste programme; however, it is understood that this training never took place, reason unknown, as other PacWaste activities related to health care waste and asbestos did occur. Samoa was not part of the PacWaste e-waste TA contract.

10.8 Recommendations for Future Action

Again, conducting a baseline study of estimated flows of WEEE, key stakeholders in government, private sector and NGOs would be an essential first step. There is a strong recycling sector, and good legislation, so development of potential solutions would emerge from a systematic study of the situation in Samoa. MNRE requests support to provide technical advice and guidance on e-waste management, in terms of enforcement, collection, transport, shipping and/or disposal. Development of a funded mechanism to implement e-waste management would be much appreciated.

11. Solomon Islands

11.1 Overview

E-waste is an emerging issue in the Solomon Islands, but given the poor state of overall waste collections - even in the capital Honiara - and the comparative small quantities involved, e-waste is low in the priorities for waste. The Solomons is a large country in PIC terms, with a highly dispersed, mainly rural population, and simply moving around the country is often time-consuming and difficult.

Recent data indicates far more tablet and smart phone type devices coming into the country, which are potentially easy to recycle if collected and exported. The key challenge for the Solomon Islands is the collection of these devices. The way ahead may well involve using text messages to phones to communicate recycling options to the public, and tying in collection of phones, tablets and laptops with used lead-acid battery (ULAB) collection, as ULABs have good value for export, and the two items are closely tied in a rural setting with widespread use of small solar systems to operate and charge small electronic communication and entertainment devices. Commercial e-waste can be fed into the same recycling stream, as this will only come from the few provincial centres. The largest centre is by far Honiara and environs, with around 20% of the population and virtually all commercial activity that might use significant quantities of electrical equipment.

11.2 Data on selected electronics imports / WEEE materials Flows

During preparation of the recent Solomon Islands National Implementation Plan to the Stockholm Convention, import data for selected electronic goods was analysed. Data on imports over the last decade indicate a rapidly increasing e-waste stream in the coming years. Selected items are useful to provide benchmarks that can help assess the scale of the problem: for example, laptop imports have risen from around 700 per annum in 2009 to around 2,300 in 2016; total computers imported annually have tripled from around 3,000 to 9,000 in the same period (see Table 12). TV / Monitors look to be of the order of 5,000 items imported per year (Table 13).

Cumulative numbers are worth taking note of, as there will have been very little recovery - if any - of this e-waste, and in the environment of the Solomons, life expectancy of electronic equipment is short. Recent data indicates an overall shift to tablet and smart phone type devices, which are potentially easier to recycle if collected and exported

Table 12: Imports of computers into the Solomon Islands, 2008 - 2016

Year	Laptop	Desktop/server	All computers
2008	770	1,950	2,720
2009	640	1,680	2,320
2010	820	1,330	2,150
2011	950	1,290	2,240
2012	1,730	1,520	3,250
2013	2,260	1,670	3,930
2014	1,650	2,150	3,800
2015	2,060	3,730	5,790
2016	2,230	6,900 ⁵¹	9,130
Total	13,110	22,220	35,330

⁵¹ This number looks to be high.

Table 13: imports of TVs and Monitors to the Solomon Islands 2008 - 2016

Year	Computer monitor in 8471	TV & Monitor in 8528	Total
2008	200	5,050	5,250
2009	460	1,650	2,110
2010	1,080	4,900	5,980
2011	710	3,200	3,910
2012	1,200	2,600	3,800
2013	1,030	2,800	3,830
2014	1,150	4,000	5,150
2015	1,040	2,760	3,800
2016	910	4,600	5,510
Total	7,780	31,560	39,340

The numbers for the last few years show the explosion in growth of mobile phone use. The actual numbers of mobile phones may be less than the numbers indicate, given that - for example - if we assume a population of around 600,000 people then in the three years 2014 - 2016 some 723,000 mobile phones might have been imported which is significantly more than one for every person in the country, a seemingly high figure. Data is patchy (for example much mobile phone import data is value only); these estimates were made by PacWaste in 2014 as part of the baseline assessments.

Clearly, the number of mobile phones that have entered the Solomon Islands in the last ten years can be expected to be of the order of a million units, and these are the most widely used item of potential e-waste. If the average weight of a phone is 100g over that period, then that translates to something like 100 tonnes of mobile phones. Given a typical phone may have a life of three years, it can be expected that there are currently well in excess of 50 tonnes of mobile phone waste somewhere in the country.

Table 14: Estimates of mobile phone imports to the Solomon Islands 2008 - 2016

Year	Phones
2008	11,000
2009	10,000
2010	73,000
2011	66,000
2012	52,000
2013	180,000
2014	280,000
2015	310,000
2016	125,000
Total	1,107,000

11.3 e-waste Collection Activities to Date

There have not been any formal, targeted efforts on e-waste collection; there is at least one scrap dealer in Honiara who targets non-ferrous metals, and some e-waste may have been collected by them, but quantities will be small and probably mostly copper wires and cabling. This company is not known to have applied for any Waigani permits to export any e-waste.

11.4 e-waste Exports to Date

No specific e-waste exports are recorded. However, ULABs have been exported, both to Fiji and Australia. PacWaste worked on ULAB collection and export, with potential support for shipping ULABs to Pacific Batteries in Fiji, as Solomons is a Waigani Convention member - not Basel - and so is Fiji.

11.5 Relevant Legislation

The legislative framework in the Solomons with regard to waste is not well developed, primarily being the Environment Act 1998. This Act set up the ECD and deals with administrative requirements for the Division; a significant portion of the Act is given over to the requirements for EIAs, but Part IV does deal with the control of pollution. There is no definition of 'hazardous' or 'toxic', and these words are not used in the Act, except that 'toxic' is used as part of the definition of 'waste'⁵². The Act does include as an object⁵³: '*promoting recycling, re-use and recovery of materials in an economically viable manner;*' but recycling is not mentioned further. The Act has pursuant Environment Regulations of 2008, but as they stand, the regulations have no bearing on the problem of e-waste.

There is a new National Solid Waste Management Strategy (2017 - 2026) that does include a brief section about e-waste, merely noting that it is a problem that needs addressing. The Strategy does include: the 'Polluter Pays Principal', the 'Sustainable Development Principal' and the 'Extended Producer Responsibility Principal' as part of its stated Guiding Principals, so the basic requirements are recognised upon which could be built a long-term system of managing e-wastes.

The Solomon Islands are not a party to the Basel Convention, but are a Party to Waigani. Waigani covers movements of waste in the Pacific Forum Countries region, but not beyond, unless specific agreements with other countries are in place.

11.6 Key Counterparts In-Country

The Environment and Conservation Division (ECD) is part of the Ministry of Environment Climate Change Disaster Management & Meteorology (MECCDMM) and is responsible for waste regulation and policy⁵⁴. The ECD's main work is on EIAs and development permits; there is no dedicated SWM Officer, nor dedicated Hazardous Waste Officer; given the size of the country, and compared to other Environment ministries elsewhere, the ECD is a small and understaffed unit. However, the Permanent Secretary does have a PhD in SWM from Murdoch University, Australia, and has a strong interest in the subject.

The Honiara City Council is responsible for waste collections in the City Council area; the Environmental Health Division is directly responsible for waste collections and also the Honiara Renadi dumpsite management. Large amounts of waste in piles can be seen all around the urban area, and burning of waste in backyards is very common.

⁵² Environment Act 1998, Part 1 Interpretation 2. "waste" includes matter - (a) whether liquid, solid, gaseous or radioactive, whether toxic or not, which is discharged into the environment;

⁵³ Ibid, Part 1 3. (c) (iii)

⁵⁴ NSWMS 2.2 Institutional arrangements, p 10.

11.7 Specific Project Involvement

PacWaste conducted a Solomon Islands intervention in partnership with ECD, along with Sol Power Solomon Islands Ltd. (SPSIL), a local solar power company who is responsible to install and service solar photovoltaic (PV) systems installed under donor-funded projects for the Ministry of Mines, Energy and Rural Electrification. The project provided SPSIL with a Handling Fee to bring in ULABs from these PV systems to Honiara and pack them for export. The original aim from the baseline study of 2014 had been to combine cell phone collection with ULAB collection, given the synergies with SHS use in rural areas, as part of a pilot project, but by the time project implementation actually commenced in mid 2016 there was insufficient time remaining with PacWaste to do this.

With the ULAB collection project, the overall aim was to develop enough experience and costings to work out what a deposit refund regime for ULABs in the Solomons might need, in terms of deposit and refund values, in order to bring in ULABs from extremely remote rural areas, where PV is increasingly common.

11.8 Recommendations for Future Action

As determined by PacWaste, the way ahead in the Solomons may be to target mobile phones, so as to gain some experience with an item that is potentially easier to collect as the public can be contacted through the mobile phone system. This approach was outlined by PacWaste with the proposals for work in Vanuatu, but time constraints meant that the project never got off the ground. It would be easier to pilot such an approach in Vanuatu - or even Fiji - where mobiles are ubiquitous, but it could be a viable approach to run a pilot in Solomons and work out some detail for up-scaling to a larger system and other countries.

12. Tonga

12.1 Overview

Tonga has taken an active role in tackling the e-waste problem since 2009, when a local NGO - E-waste Tonga - was formed to address the issue. E-waste Tonga has been the driving force behind attempts to collect and recycle e-waste, and key to this has been the inclusion of the largest local recycler, staff of the Tonga Technical Institute, and staff of the Waste Management Authority on the board of the NGO. The organisation was originally set up in response to imports of donated second hand computers which proved to be largely unusable.

A significant quantity of e-waste has been collected over the last few years, and a little has been exported, after breaking down into e-scrap. PacWaste partnered with E-waste Tonga and the recycler GIO Recycling Ltd. in order to continue collections. PacWaste experimented with a similar model to the Cooks, but in Tonga the Handling Fee was based on weight, not per specific item as in the Cooks. The aim was to see if weight could be used as a successful proxy for a Handling Fee payment to make e-waste processing and export viable, weight being a simple metric to determine and with least administrative effort. The Handling Fee was set high enough so that the recycler could afford to pay for e-waste bought in on a per kilogram rate, as an incentive, and a price of 20¢ Tonga Pa'anga (about US\$10) per kg was paid. The overall aim was to generate some information to see if a useful recovery model could be developed using weight as the metric to determine subsidies to a recycler, given that the cost of collecting and dismantling e-waste is typically greater than the value of the materials sold, after shipping costs. GIO was paid US\$1 per kg collected, and this gave GIO an incentive to go looking for waste. This money also paid for the breakdown of the e-waste into e-scrap. A maximum of US\$25,000 was allowed for buying e-waste under the agreement with PacWaste, which would have bought 25 tonnes. A Letter of Agreement between GIO, E-waste Tonga, and PacWaste covered these arrangements, with E-waste Tonga responsible for promotion of the collections.

GIO Recycling invoiced E-waste Tonga for e-scrap collected, as per the agreement, and E-waste Tonga was provided funding by PacWaste; E-waste Tonga was responsible for advertising. However, the finances stumbled after the first round of collections, and whilst 2,362 kg were collected in the first round and paid for, another 6,438 kg collected has not been paid for by the PacWaste programme. No shipment was made, although around an FCL of e-scrap is potentially available for export from Tonga.

12.2 Data on Selected Electronics Imports / WEEE Materials Flows

There is no systematic data on potential e-waste for Tonga, but from the quantities collected by E-waste Tonga and GIO over the last few years, there appears to more than the capacity of the recyclers to handle it given its current value. The PacWaste baseline studies of 2014 did not include Tonga, and whilst Tonga was included in the 2013 SAICM report, this was only on the basis of a study visit to see what had been achieved in the country by E-waste Tonga and GIO, working together. However, PacWaste did make some attempt to quantify material flows during the 2016 TA visit, but import data was only available for a single year, 2013. These numbers provide some general scale indication; data is also available from the last census report. These numbers indicate something around 2,000 computers, and 2,000 TVs and monitors are imported into Tonga each year⁵⁵.

⁵⁵ Note that imports of TVs include a significant number of second hand items.

Table 15: Imports of selected electronic goods into Tonga, 2013

HS no.	Description	Number imported 2013
8471	Desktops/servers	887
	Laptops	627
	Monitors	276
	ipad type	442
	Total Computers/yr	1,956
8517	Mobile phones/yr	46, 246
8528	New flat screen TV	1165
	Used flat screen TV	324
	CRT TV	118
	Total screens/yr	1,607

Census data⁵⁶ from 2011 indicates that out of just over 18,000 households in Tonga, 4,500 households have a computer, 17,000 a mobile phone (expected to be several mobiles per household), and 14,000 a television, so these numbers may provide a reasonable picture of the situation: if anything, they may give low figures. It can also be seen that the census data for households includes nearly 3,000 gaming sets (Play Stations), over 7,500 tape recorders, 12,000 DVD/Video players, and over 14,000 radios sets. Altogether this amounts to a significant quantity of potential e-waste. To these numbers should be added the significant quantities that will be found in the commercial sector, especially hospitality, as nearly every hotel room will include a TV set. The totals for each type of household goods, for the entire country, as found in the 2011 census are provided below at table 16.

Table 16: extract from Tonga Census Table H11 Private Households' goods

Household goods	Total
Boat	848
Computer	4,508
Motor bike	695
Motor vehicle	9,759
Play station	2,893
Radio	14,465
Refrigerator	12,016
Tape recorder	7,674
Telephone landline	8,141
Telephone mobile	16,907
TV screen	13,965
Video/DVD player	12,094
Washing machine	11,879

Overall, it can be said that ownership of electronics and electrical goods is high, especially given that these figures are now eight years old.

⁵⁶ Tonga 2011 Census of Population and Housing Table H11, p 189

12.3 e-waste Collection Activities to Date

GIO is the only recycler collecting e-waste; there was another, Fijian, recycler, but they have shut down. GIO has significant quantities of e-waste from collections over the past decade, and a significant portion of this has been dismantled to e-scrap. GIO is currently looking at the potential to export the e-waste, and reaching out to buyers on their own⁵⁷ as PacWaste has finished, and the e-waste takes up very significant warehouse space in their Nuku'alofa recycling yard.

E-waste Tonga had funding from a GEF Small Grant to operate a dedicated Collection Point and e-waste dismantling facility during 2012 - 2014, but this was closed once the project ended and funding ceased. The GEF funds provided for some truck collection runs to villages on Tongatapu, and also two staff to do the actual dismantling. The Collection Point was located in the Nuku'alofa Small Business Centre, and operated by GIO Recycling; GIO management had training in Japan through JICA in how to dismantle e-waste into e-scrap materials. The materials were split into commercial e-scrap categories and stockpiled as not enough was created to fill a shipping container, and any non-ferrous materials were exported through non-ferrous scrap avenues. Even plastic housings were collected and baled, but these proved un-exportable as the only potential buyers would not accept materials that contained BFRs, and these were not sorted out prior to baling (this is a difficult process at best anyway). By mid 2013, the GEF project had about one quarter FCL of e-scrap that was potentially exportable. Some e-waste was collected via the Waste Management Authority and its landfill recycling collection point. Much of what the GEF project collected was bulky waste, that is washing machines, fridges, air conditioners etc, and so was largely fed into scrap metal streams once dismantled, but significant quantities of un-dismantled e-waste remained stored in five old shipping containers on GIO property as the cost of dismantling was no longer supported and GIO could not afford to pay staff to dismantle it, given the potential return.

GIO collected 8,800 kg of e-waste during the period September 2016 and March 2017. This included a significant quantity of CRT TVs it appears from the records. GIO collected e-waste from both Tongatapu and Vava'u - in the northern group of islands, where they have a small yard. All these materials collected are awaiting shipment. The agreement with PacWaste specifically allowed the shipment of e-waste already collected as part of the PacWaste project TOR was to export existing stockpiles of e-waste from PICs where these existed and could be exported.

12.4 e-waste Exports to Date

GIO did export some e-scrap factions that do not require a Basel permit in early 2016 to an Australia buyer, as part of a mixed non-ferrous container shipment, but prices were so low it was not worth pursuing this approach (the non-ferrous scrap buyer was simply on-selling the waste). Most of the e-waste collected over the last decade in Tonga is still in GIO's yards. GIO has recently (March 2018) visited Singapore and is hoping to export to a Singapore company - either Camelia or TES-AMM - in the near future.

12.5 Relevant Legislation

There are potentially three pieces of legislation that might affect this issue: the Environment Management Act 2010; the Waste Management Act 2005; and the Hazardous Wastes and Chemicals Act 2010: the most potentially useful one for e-waste is the Waste Management Act 2005. This Act's main content is to create the

⁵⁷ Pers Comm 'Ofa Tu'ikolovatu, GM GIO Recycling, February 2018.

Waste Management Authority for Tongatapu, and provide for the Ministry of Health to be the prescribed waste management authority in other islands.

The Waste Management Act contains both the power to make regulations (a power of the Minister of Environment) and also the power for the WMA to levy, at section 27 (e): *special levies on particular goods the disposal of which is likely to have adverse effects on the environment*. The Act charges the WMA with various functions, including: section 21 Recycling of Wastes: (1) *An approved Authority [the WMA] shall promote the recycling of wastes*; and also at section 13 Fees and Charges: (1) *An approved Authority may levy and vary the following fees — [for the collection and disposal of] (d) disposal of hazardous wastes*. These various provisions could be seen as potentially creating an existing legal framework to develop an Advance Recycling Fee system.

12.6 Key Counterparts In-Country

The key people are E-waste Tonga and GIO Recycling; a director of GIO Recycling sits on the board of E-waste Tonga, but the involvement of others on the board - including from the Waste Management Authority - ensures that potential conflicts of interest are noted and monitored. GIO Recycling has been the primary driver of e-waste collection, and has taken significant commercial risk, and provided plenty of their time and effort, in seeing if e-waste can be commercially viable for Tonga. The other members of E-waste Tonga have provided essential expertise in education and awareness aspects of promoting e-waste recovery.

The Waste Management Authority is responsible for all waste collections on Tongatapu, and operation of the landfill. The landfill does have a recycling collection area where e-waste can be collected, and also has a dedicated hazardous waste area which can be used to dispose of old CRTs, as these are a significant problem and to all intents and purposes un-exportable.

The Department of Environment (DOE) of the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC) is the SPREP Focal Point. They also act as the Basel Competent Authority (BCA), and so play a crucial role at the point of export of e-waste where it is required to obtain a Basel Permit. DOE took an informal oversight role to the PacWaste collection efforts with E-waste Tonga and GIO.

12.7 Specific Project Involvement

E-waste Tonga had funding totalling US\$85,000 from GEF during 2012 - 2015 to operate an e-waste collection and carry out public awareness activities around e-waste. These included TV and radio spots - with sponsorship from local media - posters and school visits. The program collected a significant quantity of e-waste, and dismantled it, with any scrap metal parts going into conventional scrap exports streams. The actual residual e-waste - such as PCBs, hard drives and optical drives, and power supplies etc - was insufficient to make up a shipment of e-scrap only.

PacWaste provided support during 2016 - 2017 to re-run the advertising materials developed by the GEF project, as these were successful and had already been made⁵⁸, and pilot a Handling Fee approach based on weight, to see if a weight based model might be viable. The local partners were E-waste Tonga, and GIO Recycling, the local recycling company with long experience of partnering development project dealing with waste. The Tonga Department of Environment played an oversight role

⁵⁸ But the EU logos were added to the advertising materials.

as SPREP Focal Point for Tonga, although the Department was not formally part of the Letter of Agreement (LOA) with SPREP, and had no formal designated role.

All funding was directed through E-waste Tonga, with them paying Handling Fees to GIO monthly based on a kilogram basis of e-waste as received. GIO then dismantled the collected e-waste and packed for shipping.

The agreement with PacWaste included finance to export up to two FCL of e-scrap to a buyer agreeable to PacWaste. PacWaste had been working with TES-AMM of Singapore to get them to accept the e-scrap. The overall aim had been that by covering the shipping cost, GIO would have every incentive to export the scrap, the deal being that PacWaste would receive full disclosure about what was exported - a breakdown of the shipment - and value of the export and all costs involved. This would help develop realistic models for e-waste collection, both in Tonga and elsewhere.

Under PacWaste, a model of supporting e-waste collection and dismantling with a Handling Fee - paid on a kilogram basis - was trialled, the aim being that the Handling Fee was high enough to allow GIO to pay people per kg for e-waste bought in. By paying GIO a Handling Fee based on the metric of weight, the aim was to avoid the complications of separate Handling Fees for different types of e-waste, the method trialled in the Cook Islands. With weight in e-waste, heavy can equate to a high copper wire content, and the aim was to see if the high unit cost of small items could be spread by using weight as a measure, making larger items more attractive.

Using weight as a metric had the desirable effect of encouraging GIO to take old CRT screens, and dismantle them. CRTs have a very high unit cost as they have a high negative value. In Tonga, the landfill has a designated Hazardous Waste area, and CRTs could be stripped out, and the complete glass unit placed in the hazwaste area unbroken. With CRTs typically being dumped indiscriminately, or dumped in landfill waste and crushed by the compactor, this was a good option. Recoverable e-scrap was thus recovered from CRTs. With CRTs being a legacy technology, once existing stockpiles have been processed, there should be few, if any, coming into the future waste streams.

The project got a late start with the TA only visiting in August 2016, and funds arrived in November that year. The delay was in part due to E-waste Tonga not having submitted an invoice to SPREP in May for the first funding tranche, this being an unfamiliar requirement for E-waste Tonga to have to invoice for a grant. The TA visit assisted solving this problem. However, with PacWaste expecting to be finished in May 2017, little time was on hand. E-waste Tonga and GIO rose to the challenge, and GIO started collecting e-waste in September 2016, before funding actually arrived.

E-waste Tonga received TOP\$ 21,480 (US\$10,000 equivalent) in November 2016. They adjusted the advertising materials to include EU logos and ran adverts, paying out TOP\$9,714 for promotion/advertising by mid March 2017. A payment of TOP\$5,055 to GIO for 2,362 kg of e-waste, collected during the period September to October 2016 was paid in December 2016. Administrative / office costs were TOP\$140 during this period.

No further funds were sent to E-waste Tonga from PacWaste. GIO continued to collect e-waste, and sent an invoice to E-Waste Tonga for TOP\$13,778 for 6,438kg sometime after March 2017, but this invoice is outstanding at the time of writing except that a further payment of TOP\$1,000 was paid to GIO in February 2018, by E-

waste Tonga, for the next round of collections. The PacWaste project closed in December 2017. E-waste Tonga reports difficulties⁵⁹ around reporting and agreement with the Department of Environment and PacWaste about a further round of funding: the LOA allowed for up to US\$40,000 for e-waste collection and advertising/promotions, with another US\$10,000 provided for shipping e-scrap.

It appears that the PacWaste Project Manager visited Tonga during 2017 but did not meet with E-waste Tonga or GIO⁶⁰, which is surprising if there were difficulties around the project partners and reporting. Without face-to-face meetings with the people concerned it is difficult to get a true picture of what has occurred. At the time of writing, E-waste Tonga has submitted a report dated April 16th 2017 which provided the above figures, and showed a balance of TOP\$6,493 of the original TOP\$21,480 sent in 2016. The provisions of the LOA do allow for a second tranche of US\$10,000 to be sent after paying half of the money in Handling Fees to GIO for e-waste collected; but it is not clear why the remaining money was not paid out to GIO - even though this would be a part payment of the invoice, and more funds should have been remitted by PacWaste. E-waste Tonga had in fact moved reasonably promptly to expend funds, and GIO had actively collected e-waste, paying out TOP20¢ per kg even though the LOA did not call for this, as an incentive to get materials bought in.

There does not appear to be any documentation from the PacWaste side⁶¹ that indicates why a second tranche was not paid to E-waste Tonga, so stalling the entire project. Given that the counterparts in Tonga appear to have largely done what they agreed with PacWaste, the reason for the shutting down funding to E-waste Tonga is not clear.

12.8 Recommendations for Future Action

It is important to ascertain exactly what occurred in order to avoid any similar occurrence in the future for any subsequent e-waste collection support. In addition, given that the LOA was between SPREP (as Implementing Agency for PacWaste) and local partners, it is important for SPREP to satisfy itself that the project was shut down for valid reasons.

In addition, the actual data that the project has already effectively generated by collecting 8.8 tonnes of e-waste would be very valuable. If a shipment of that waste could be made, to ascertain the value of the e-scrap recovered (which will be less than the weight collected once larger metal and plastic parts are removed) this would allow some assessment of what level of Handling Fee might be viable for trial in any new round of e-waste collection. Adequate assessment of the situation could probably only be done through a mission to Tonga, which need only be a few days to get to the bottom of the situation, but trying to discover the detail will likely be very difficult if done remotely⁶². Ideally, if all is in fact in order, financial support to ship a FCL of e-scrap would be an excellent step. GIO have taken the initiative, and at their own expense visited TES-AMM and onther company, Camelia, in Singapore in order to find a market for the e-waste collected in their yard. As such, they should be supported in this effort as envisaged by PacWaste, on condition that the information gained is supplied to SPREP for use in other countries' export projects.

⁵⁹ Pers Comm Rev. Sam Fonua, February 2018.

⁶⁰ Pers Comm 'Ofa Tu'ikolovatu, GM GIO Recycling, February 2018.

⁶¹ Pers Comm Dr. Frank Griffin (SPREP) requesting project reports from PacWaste covering the e-waste Thematic Component post November 2016.

⁶² The Dept of Environment has not responded to requests for comment on the situation.

13. Tuvalu

13.1 Overview

Tuvalu is a small atoll nation of around 10,000 people. Much of the population lives on remote outer islands, but the capital, Funafuti, will certainly have some e-waste issues. The challenge will be that quantities are so small, but this is a classic example where a good MRF can play a very useful role to deal with a variety of different recyclables.

13.2 Data on Selected Electronics Imports / WEEE Materials Flows

There are no reports of actively collected data on potential e-waste flows.

13.3 e-waste Collection Activities to Date

There have been no specific e-waste collections reported to date.

13.4 e-waste Exports to Date

None reported. Quantities of e-waste, if broken down to e-scrap, would be very small, and it would take a long time to fill a shipment.

13.5 Relevant Legislation

There is not known to be any specific legislation covering e-waste. Tuvalu is a Party to the Waigani Convention.

13.6 Key Counterparts In-Country

The Solid Waste Agency of Tuvalu of the Ministry of Home Affairs is the SPREP Focal Point and would be the key contact for any e-waste work. There was no specific response to the questionnaire provided to assist compiling this report.

13.7 Specific Project Involvement

No specific project involvement for e-waste is recorded: Tuvalu did not participate in the e-waste projects run under PacWaste.

13.8 Recommendations for Future Action

The first requirement for Tuvalu is to get some idea of the scale of the problem, and conduct a baseline study of estimated flows of WEEE, key stakeholders in government, private sector and NGO - if any - and develop some ideas for activities. This is the type of work PacWaste conducted with its baseline studies in 2014.

14. Vanuatu

14.1 Overview

Vanuatu is a largely rural nation, with about one fifth of the population in the large urban area of Port Vila. The predominant electronic device is the cell phone, which is ubiquitous; Port Vila has a well developed commercial sector, and there is significant tourism in the country too. Outside of Shefa Province (where Port Vila is located) and the provincial centres, electricity networks are minimal.

Vanuatu is one of the few PICs where some e-waste recovery has taken place, largely due to the efforts of the country's sole recycling company, RecycleCorp Vanuatu (RCV). But these efforts stalled around 2014 as e-scrap prices crashed. General waste collection has improved recently with the introduction of pre-paid garbage bags in Port Vila and the second largest town of Luganville on Santo Island, and ULAB are regularly recovered for recycling, so there is a base of waste awareness to draw upon. The PacWaste baseline study of 2014 found scavengers on Bouffa Landfill collecting e-waste for sale as scrap; the study proposed that cell phones should be targeted for e-waste collection as a way of raising overall awareness of the e-waste issue, through a system using text messages to cell phone subscribers, and this approach would have definite merit, given the central role that cell phones have taken in daily life in the country and the widespread network coverage. This was similar to the approach mooted in the Solomons of using mobile phone networks to reach out to consumers and experiment with e-waste recovery systems.

A proposal along these lines was made by PacWaste to RCV and one of the two main mobile phone providers - Telecom Vanuatu Ltd (TVL) -, but an agreement could not be made within the D +3 contract deadline for EU projects which was in May 2016. The proposal involved TVL providing phone credit for old cell phones bought in for recycling (which would be paid for by PacWaste) and RCV would take the phones for processing and export⁶³.

14.2 Data on Selected Electronics Imports / WEEE Materials Flows

The PacWaste Baseline study of 2014 made some estimates of potential e-waste in Vanuatu, using a combination of census data from 2009, import data, and mobile phone subscriber information.

Cell phones are clearly the largest class of electronic equipment in Vanuatu, as indicated by the analysis below. Subscribers have increased rapidly with the advent of competition into Vanuatu, dramatically reducing cell phone charges for calls.

Table 17: Telecoms users in Vanuatu, selected years

Year	Phone	Mobile	Internet users
2009	7,039	121,000	20,251
2010	6,923	164,000	19,772
2011	6,305	136,000	20,110

Source: Vanuatu National Statistics Office

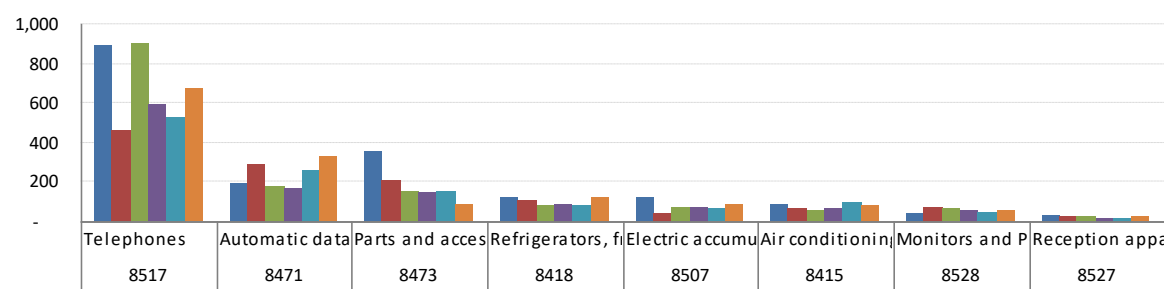
⁶³ Details of the proposals are provided in the PacWaste TA mission report of April 2016 to Vanuatu.

Cell phone use spiked at 164,000 in 2010, but appears to have fallen back, although recent data (after 2011) in this fast moving market was restricted due to commercial confidentiality considerations. The spike was most likely the result of vigorous promotion by the two cell phone providers of cheap phones locked to their networks, in order to capture customers. 2014 indications were that around 60% of the population has a mobile phone: in 2009, 91% of urban and 71% of rural households reported having a mobile phone⁶⁴.

For TVs and computer monitors, numbers from the 2009 census⁶⁵ indicated that 37% of households had a TV, estimated at around 19,600 items; in addition, nearly 5,000 households reported having a computer. Significant is that 72% of urban households report having a TV, along with 22% having a computer, indicating that these items are concentrated in urban areas. There were also nearly 20,000 DVD decks; add in a significant commercial and hotel sector, and there are clearly significant quantities of e-waste in the country, especially given that these numbers are nearly 10 years old now.

An attempt was made by PacWaste in 2014 to determine some picture of materials flows from import data; however, Vanuatu records only kilograms and value. The numbers presented in figure 2 represent imports of selected lines of equipment by value over the previous six years: it can be seen that telephones are significantly larger than the next two classes (moving to the right) which are computers and related parts.

Figure 2: Imports of Electrical Equipment into Vanuatu 2008 – 2013, in millions of Vatu



Clearly, telephones – which are very largely cell phones – as a value at import are more than double computers, and run at around US\$40 million over the last six years. Given that mobile phones used in Vanuatu are largely cheap units, this translates into very significant numbers of mobile phones in the country. As the 4-digit tariff includes ‘base stations’ and the figures show double average imports in 2008 and 2010, a significant part of this value may be network equipment.

14.3 e-waste Collection Activities to Date

Vanuatu is one of the few PICs where there has been some recovery of e-waste. Virtually all e-waste collected will have come from Port Vila or environs, and has gone through the local recycling company. PacWaste observed scavengers on Bouffa Landfill (serving Port Vila) collecting e-waste: their efforts involved breaking open WEEE to extract wire, cabling and printed circuit boards (PCBs). The remains were discarded. Sacks of PCB were observed at the recycler, RecycleCorp, and some hard drives etc.

⁶⁴ 2009 Census Analytical Report Vol. 2, fig. 143 p 141

⁶⁵ 2009 Census Analytical Report Vol. 2, 5.5.13.2 p 155.

PacWaste ran a pilot with RCV and the Department of Environmental Protection and Conservation (DEPC) where DEPC would arrange with government departments and local businesses for an e-waste collection and Recycle Corp would collect and get a pick up fee from PacWaste. The information about what was actually collected is shown in Table 18 below.

Luganville Municipal Council operated a successful system to collect toner cartridges taking printer and photocopier cartridges in 2013 - 2015. In 2013 a NZ volunteer at the Municipal Council put in place a new arrangement working through NZ and the Croxley stationary supply company. The recycling collection boxes were placed in a variety of institutions around the town, those who have large photocopiers and laser printers that use cartridges. This system has stalled since the volunteer left in 2015⁶⁶.

14.4 e-waste Exports to Date

At least one shipment of a 20 ft container has been shipped during the last three years⁶⁷, going to China. Recently, the economics of e-waste have made it uneconomic to undertake further shipments. The recycling export figures would indicate around 4,000 ULAB per year going out, again through RecycleCorp. The Luganville system exported some toner cartridge: a shipment of 3m³ (comprising 27 recycling boxes containing 751 cartridges) went to NZ in 2014.

14.5 Relevant Legislation

There is some legislation and policy in Vanuatu which has a bearing on the issue of e-waste. The Environment Protection and Conservation Act set up the DEPC, and deals largely with the administrative functions of the Director along with provisions for EIAs and conservation areas in Vanuatu, but has no direct provisions regarding e-waste. The objects of this Act are to minimise and manage the discharge and emission of pollution: the Act is guided overall on the Precautionary Principal, and provides for obligations for people and companies to take responsibility for pollution. It does contain a legal definition of 'hazardous substance'⁶⁸ which refers to 'international conventions'⁶⁹ as providing a definition, which is a big advantage overall. A 'pollutant' is also defined as including 'hazardous substance', thus providing a consistent framework of definition, as 'hazardous substance' is not used elsewhere in the Act. The listed activities under 'Control of Air Pollution' include: 'The burning of wire coated with any materials, unless the wire is burnt at the premises of a facility that has a permit that covers the emission.' An Air Pollution Permit is potentially available for vt20,000 - which possibly might allow this activity, but this is not explicit, but effectively implied.

The Waste Management Act 2015 follows a common regional pattern of creating 'designated Waste Management Operators', DEPC being one of these. The others are the Municipal Councils (which are only in Port Vila and Luganville) and 'Local Government Council regions declared under the Decentralisation Act'⁷⁰. Whilst the various local authorities become responsible for waste in their various areas, DEPC is responsible for hazardous waste⁷¹. The Act contains a definition of hazardous waste and hazardous substance⁷² similar to the Pollution (Control) Act that refers

⁶⁶ Pers Comm Wayne Greive, manager, Croxley NZ, February 2018.

⁶⁷ Pers Comm. Andrew Hibgame, RecycleCorp.

⁶⁸ The Pollution (Control) Act, Part 1, 1 Interpretations: Hazardous Substance means:

⁶⁹ Ibid, (c) 'deemed under international conventions applicable to Vanuatu to be hazardous substance'

⁷⁰ Bill for The Waste Management Act (Draft as of March 17/2014) Part 4 clauses 18 and 19

⁷¹ Ibid, 20 (2) (a) 'to introduce programs for the collection and disposal of hazardous and bulk waste;'

⁷² Ibid, Part 1 clause 1 Interpretations.

across to international conventions, with a definition of 'waste related conventions applying to Vanuatu' specifying 'the Stockholm Convention and the Waigani Convention, and any other International Convention relating to the management of waste that is ratified by Vanuatu'. Reference to the Stockholm Convention is also specific at the definition of a persistent organic pollutant; 'Solid Waste' includes specifically 'electronic waste'⁷³. Part 2 also provides for DEPC to be responsible for 'The collection and disposal of waste that cannot be managed by the normal waste collection services.'⁷⁴ Again, at Part 4 the DEPC has responsibility: 'to introduce programs for the collection and disposal of hazardous and bulk waste;'⁷⁵ Together, these provisions, if enacted, very clearly give overall responsibility for hazardous waste management – which would cover e-waste – to DEPC.

Port Vila Municipal Council (PVMC) has a Bye Law 'To prohibit the open incineration of wastes and grassland within the boundaries of the Port Vila Municipality'.⁷⁶ This bye law specifically bans 'large quantities of electrical parts and components such as printed circuit boards, cables, electronic cards, etc' at the Appendix listing 'non-incinerable' waste.

Vanuatu is not a party to the Basel Convention, but is a Party to Waigani. The Basel Convention does not allow a Party to the Convention to import wastes from a Non-Party⁷⁷, so this would probably result in countries to which Vanuatu would want to send e-scrap to for recycling would not allow it, unless a specific bilateral agreement exists. However, DEPC reports⁷⁸ that Vanuatu is intending to join up to Basel and the legislation is expected to go before Parliament this year.

14.6 Key Counterparts In-Country

The key players for any e-waste work in Vanuatu are the Department of Environmental Protection and Conservation (DEPC), Recycle Corp Vanuatu (RCV) - the local and only recycling company - and Port Vila Municipal Council (PVMC) who operate Bouffa Landfill and collect waste in Port Vila. Luganville Municipal Council has also taken a stronger interest in waste in recent years.

The Vanuatu Youth Council (VYC) expressed an interest in an e-waste collection as a way to raise funds as well as increase the level of awareness around recycling e-waste with youth in Vanuatu. This would be of particular help with regard to targeting mobile phone users in the future, and the VYC continued to maintain an interest in the e-waste work of PacWaste up to 2016.

14.7 Specific Project Involvement

The PacWaste pilot project that was finally implemented was a restricted, targeted effort to collect e-waste from government departments. DEPC was responsible to promote the need to collect and recycle e-waste amongst the government departments in the Port Vila area, and make arrangements with the respective departments to schedule a collection time, so that RCV then came and did the pick-up of the e-waste.

Some funding was also budgeted to assist Vanuatu accede to the Basel Convention. Some consultation work had been already conducted to this end, and if Vanuatu

⁷³ Ibid.

⁷⁴ Ibid, Part 2, 7 (5)

⁷⁵ Ibid, Part 4, 20 (2) (a)

⁷⁶ Prohibition On The Use Of Open Burning Bye-Law No. 3 Of 2007

⁷⁷ Basel Convention, (Article 4, paragraph 5) and (Article 11, paragraph 1)

⁷⁸ Pers. Com. Roselyn Bue, DEPC, February 2018.

were to join the Convention as a Party it would greatly facilitate potential export markets for e-waste, which are currently restricted.

RCV dismantled the collected e-waste and packed e-scrap for shipping. RCV was paid for collecting e-waste on an hourly basis of US\$50 per hour, being for a truck and two crew to go from the RCV yard near the airport, to the collection site, pick up the e-waste, and return and unload the truck. US\$5,000 was allotted for e-waste pick-up costs for RCV, being for 100 hours, or an expected 30 to 50 pick-up runs.

A budget to ship up to two FCL of packed e-waste was included, to be invoiced to SPREP by RCV at the time of shipping. RCV also had a large quantity of e-waste - already dismantled - that was collected in the 2012 - 2014 period, but not shipped. This e-waste was mostly packed but not exported before e-scrap prices in the market crashed, and so had been sitting in RCV's yard ever since. RCV was allowed to include these stockpiles of e-waste for shipping under the PacWaste agreement, as shipping existing stockpiles of e-waste was part of the PacWaste remit.

The overall aims were two-fold: remove existing stocks of e-waste in Vanuatu government departments, which were found to be significant during the 2014 baseline study, as well as clear the stocks of e-waste held by RCV as a result of previous collections but not exported due to commodity price collapse.

The plan for Vanuatu had been to develop a system to recover end-of-life mobile phones in cooperation with a local mobile phone provider, Telecom Vanuatu Ltd. (TVL). However, although negotiations were well advanced by late April, an agreement could not be concluded with TVL corporate managers before the EU D +3 sub-contracting deadline in May, and so the plan did not go forward.

Collections were made from November 2016 to March 2017, from the Ministry of Health, DEPC offices, Parliament House, and the Ministry of Education. The total amount collected is shown in Table 18. DEPC made the arrangements with the various offices, and a suitable time for RCV to come and collect the materials.

Table 18: e-waste collected under the PacWaste project from government offices.

Description	Total
Desktop computers	166
CRT computer monitors	17
Flat Screen monitors	34
Laptops	48
Power supplies	27
Hubs, routers, modems	8
cables, Memory Boards, keyboards, mouse, other (KG)	62
UPS / battery packs	9
Small printers, scanners, faxes	45
Office Photocopiers (medium)	15
Office Photocopiers (large)	10
Projectors	1
Stereo / Music system	10
Landline Telephones	19

14.8 Recommendations for Future Action

Assistance to RCV to export the e-waste ready to send would be an essential step, and this would fill an obligation of PacWaste as agreed in the LOA with RCV and DEPC. This should be done on the basis of full disclosure by RCV as to the contents and the value at sale, plus all shipping costs. This data would also allow some analysis of the information regarding the collections and cost. Targeting high producers of e-waste - such as some business and government offices - with a payment to the recycler may be a viable strategy in some instances, for example if government can be persuaded to set aside budget to recycle e-waste.

Again, the crucial thing here in Vanuatu is to look closely and analyse the data and experience gains so far, albeit the data set is small. Clearly, there is plenty of e-waste to be collected from offices as a start.

Further work could be done on the original proposal to collect mobile phones: the local telecom company was open to the idea, and a strong recycling company is present to work with. Development of e-waste collections using mobile phones as the focus could allow piloting a system that would potentially be applicable across Melanesia, given the central role of mobile phones in these countries.

Appendix I: List of Country Contacts for e-waste

Cook Islands

Cook Islands Recycling Ltd. : Jessie Sword
Director, National Environment Service: Joseph Brider joseph.briders@cookislands.gov.ck

Vavia Tangatataia vavia.tangatataia@cookislands.gov.ck
Director Solid Waste Management at Infrastructure Cook Islands: Jaime Short

Basel Convention Competent Authority: Director, National Environment Service
Postal address: P.O. Box 371 Rarotonga, Cook Islands
Phone: +682 21 256 Fax: +682 22 256
Basel Convention Focal Point: Secretary, Ministry of Foreign Affairs and Immigration
Postal address: P.O. Box 105, Rarotonga Cook Islands
Phone: +682 29 347 Fax: +682 21 247 Email: secfa@cookislands.gov.ck

Fiji

Department of Environment, Fiji
Laisani Lewanavanua: laisani.lewanavanua@environment.gov.fj
Cc: Sandeep Singh: singhsk@govnet.gov.fj
Laisa Matagi: laisa.matagi@environment.gov.fj

FSM

Office of Environment & Emergency Planning
Patricia Pedrus: pattiwarm@gmail.com
Cc: Andrew Yatilman: oeemdir@gmail.com
Cindy Ehmes: climate@mail.fm

Basel Convention Competent Authority, Basel Convention Focal Point:
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Micronesia (Federated States of)
Phone: +691 320 8814/8815 Fax: +691 320 8936
Email: climate@mail.fm , andrewy@mail.fm

Kiribati

Director ECD: Taouea Titaake-Rehier: taouear@environment.gov.ki
Head of Waste and Pollution unit: Taulehia Pulefou: taulehiap@environment.gov.ki
Taulehia Pulefou
Teema Biko: teemab@environment.gov.ki

Kiribati Recycling: Derek Andrawatha; onestop.tarawa@gmail.com

Basel Convention Competent Authority: Customs Controller, Kiribati Customs Service,
Ministry of Finance and Economic Development
Postal address: P.O. Box 503 Betio Tarawa Kiribati
Phone: +686 267 50 Fax: +686 265 32 Email: tititaake@mfep.gov.ki , customs@tskl.net.ki
Basel Convention Focal Point: Secretary, Ministry of Environment, Lands and Agricultural
Development (MELAD)
Postal address: Bikenibeu, Tarawa, Kiribati
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Email: timikb@gmail.com, information@environment.gov.ki

Marshall Islands

General Manager, Environmental Protection Authority: Moriana Phillip
morianaphillip.rmiepa@gmail.com

Cc: Ms Jessica Zebedee jeimack.4@gmail.com
General Manager, Majuro Atoll Waste Company: Jorelik Tibon
Director, Office of Environmental Policy and Planning Coordination:
Basel Convention Competent Authority, Basel Convention Focal Point : General Manager,
RMI Environmental Protection Authority
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Niue

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Nauru

Ms Berilyn Bernicke secretary for CIE: berilyn.jeremiah@gmail.com
Cc: Bryan Star: bryanstar007@gmail.com

Basel Convention Competent Authority, Basel Convention Focal Point (FP):
Secretary for Commerce Industry and Environment, Department of Commerce Industry and
Environment
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Phone: +674 557 31 33 ext. 293 Email: secretarycienauru@gmail.com

Palau

Environmental Quality Protection Board
Roxanne Sual Blesam: florox99@yahoo.com or eqpb@palaunet.com
Cc: Ms Lynna E. Thomas: lyнна.thomas7@gmail.com
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Appendix III: A Model e-waste Regulation

Part 1 Preliminary

1 Title

These regulations are the E-waste Regulations 2018.

2 Commencement

- (1) These Regulations come into force on [the day after the date on which they are made] OR [insert commencement date].

3 Interpretation

- (1) In these regulations, unless the context otherwise requires,—

Act means the [name of Act under which Regulations made].

Basel Convention means the Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, Basel, 1989.

electronic and electrical equipment means an item of electronic or electrical equipment listed in the Schedule.

E-scrap means E-waste that has been disassembled into its component parts.

E-waste means end-of-life electrical and electronic equipment.

export means transport to a recognised overseas buyer in accordance with the Basel Convention and the Waigani Convention.

Fund means the Waste Recycling Fund established by regulation 2.4.

import, in relation to electronic and electrical equipment, means import the equipment into [country] for commercial or government purposes.

licensed collector means a person licensed by the Managing Agency to collect, receive and store E-waste, and to dis-assemble, transport and export E-waste.

Managing Agency means the body responsible for administering these Regulations.

recognised overseas buyer means a person in a country other than [country] who is recognised in that country as a person who recycles E-waste in an environmentally sound manner.

recycle, for E-waste, means to dis-assemble, shred or otherwise process E-waste to recover usable materials.

recycling benefit means an amount payable under Part 4.

recycling levy means the levy imposed [by section XX of the Act OR by regulation XX]

Waigani Convention means the Convention to ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region, Waigani, 1995.

whole unit means a piece of electronic or electrical equipment that has not been recycled.

- (2) Any term or expression that is defined in the Act and used, but not defined, in these regulations has the same meaning as in the Act.

4 Objectives of these Regulations

- (1) The objectives of these Regulations are to:
- (a) develop a product stewardship arrangement for E-waste that promotes the sharing of responsibility by importers, retailers, consumers, electronic businesses and users of electrical and electronic equipment for its environmentally sound disposal;
 - (b) provide an arrangement for managing E-waste that is financially sustainable;
 - (c) maximise the export of all E-waste from [name of country];
 - (d) ensure that management of E-waste complies with relevant international conventions and national legal requirements;
 - (e) prevent leachate from E-waste causing adverse public health and environmental impacts;
 - (f) ensure that users of electronic and electrical equipment contribute to the costs associated with exporting E-waste;
 - (g) increase the capacity of the government of [country] to promote effective management of existing stockpiles of E-waste by collecting data and monitoring recycling and environmental protection measures;
 - (h) manage the export of E-waste and E-scrap in an environmentally sound manner.

Part 2

Levy

5 Recycling levy

- (1) For the purposes of section XX of the Act, a levy is imposed on the importation of electrical and electronic equipment into [country].
- (2) The levy is to be expressed in terms of a flat fee for each item of equipment.

6 Amount of levy

- (1) The amount of the recycling levy is to be determined by the Minister.
- (2) In determining the amount of levy, the Minister must have regard to:
- (a) the costs of collecting and transporting E-waste;
 - (b) the costs of storing E-waste;
 - (c) the costs of disassembling E-waste;
 - (d) the costs of recycling E-waste;
 - (e) the costs of exporting E-waste for further recycling or disposal;
 - (f) the estimated amount of the E-waste recycling benefit; and
 - (g) the estimated costs of ongoing initiatives to raise people's awareness of the need to protect the environment by recycling E-waste.

- (3) Before determining the amount of levy, the Minister must consult:
 - (a) [any relevant government bodies, such as the Department of Finance];
 - (b) the importers of electronic and electrical equipment;
 - (c) existing E-waste collectors or exporters; and
 - (d) community representatives.
- (4) The Minister must ensure notice of the amount of recycling levy is published at least one month before the levy commences.

7 Payment of levy

The recycling levy is payable by the importer of the electronic and electrical equipment.

8 Waste Recycling Fund

- (1) A Fund called the Waste Recycling Fund is established.
- (2) The recycling levy is to be paid into the Fund.
- (3) The Fund is to be managed by the Managing Agency, in accordance with the requirements of the [Department of Finance or other government body].
- (4) Moneys paid into the Fund are to be used for:
 - (a) the payment of recycling benefit, in accordance with Part 4;
 - (b) the cost of transporting E-waste to [capital of country] from the outer parts of [country]; and
 - (c) ongoing initiatives to raise people's awareness of the need to protect the environment by collecting and recycling E-waste.

Part 3

Dealing with E-waste

9 Collection of E-waste

A licensed collector must:

- (a) meet all environmental requirements for the environmentally sustainable handling, collection, transport and storage of E-waste; and
- (b) provide storage of E-waste for recycling or export.

10 Recycling and export of E-waste

- (1) In recycling E-waste, a licensed collector must:
 - (a) meet all environmental requirements for the recycling and export of E-waste;
 - (b) provide bulk storage of E-waste and E-scrap for export;
 - (c) recycle E-waste;
 - (d) export E-scrap; and
 - (e) manage any hazardous materials that are recovered from E-waste in a safe and environmentally sound way.
- (2) The licensed collector must make all necessary arrangements to export the E-waste and E-scrap to a recognised overseas buyer in accordance with the Basel Convention and the Waigani Convention.

11 Licensing of collectors

- (1) A person may apply in writing to the Managing Agency to be licensed as an E-waste collector.
- (2) The Managing Agency may grant the licence if it is satisfied that:
 - (a) the applicant has a viable business model to operate an E-waste collection, recycling and export business;
 - (b) the applicant has not been convicted of an environmental offence in [country];
 - (c) the applicant has the relevant expertise and equipment to safely collect, handle and transport E-waste in a safe manner and in compliance with environmental standards and guidelines;
 - (d) the applicant has suitable storage capacity for the secure storage of E-waste;
 - (e) the applicant has sufficient knowledge of the standards and guidelines to be met in dis-assembling E-waste; and
 - (f) the applicant is able to establish that the E-waste will be sold to a recognised overseas buyer of E-waste or E-scrap in accordance with the Basel Convention and the Waigani Convention.

PART 4
E-waste Recycling Benefit

12 Entitlement to benefit

- (1) A licensed collector is entitled to be paid recycling benefit for E-waste that is, within a benefit period, recycled and exported in accordance with these Regulations.
- (2) However, a licensed collector is only entitled to be paid recycling benefit for E-waste that is recycled and exported after [SPECIFIC DATE or the date of commencement of these Regulations].

13 Application for benefit

- (1) A licensed collector may apply to the Managing Agency for payment of recycling benefit for a benefit period.
- (2) The application must:
 - (a) be made using the form approved by the Managing Agency;
 - (b) set out, for the benefit period, the quantity of E-waste recycled and exported; and
 - (c) be signed by the licensed collector.
- (3) The application must have with it:
 - (a) documentation that establishes the quantity of E-scrap that has been dis-assembled; and
 - (b) shipping documentation (including the bill of lading) to show the quantity of E-scrap that is ready to be shipped.
- (4) The Managing Agency must assess the application for benefit and issue a notice of assessment to the licensed collector showing the amount of benefit and how it was calculated.

- (5) In assessing the application for the benefit, the Managing Agency may:
- (a) ask the applicant for further information about the quantity and kind of E-waste recycled; and
 - (b) inspect the E-waste and E-scrap.

14 Amount of benefit

- (1) The amount of recycling benefit is to be based on the quantity of E-waste recycled and either loaded ready to be exported, or exported, during the benefit period.
- (2) In determining the amount of benefit, the Managing Agency must have regard to:
- (a) the amount of E-waste that has been recycled and is ready for export;
 - (b) costs incurred up to the time of shipping that directly relate to the processing and packaging of E-waste and E-scrap;
 - (c) shipping costs payable by the licensed collector.

15 Payment of benefit

Recycling benefit is payable out of the Fund.

**PART 5
MISCELLANEOUS**

16 Contract

The Managing Agency may enter into an agreement with the licensed collector concerning the collection, recycling and export of E-waste or E-scrap.

17 Offences

- (1) A person must not dispose of E-waste or E-scrap otherwise than in accordance with the Act and these Regulations.
- (2) In particular, a person must not:
- (a) deposit E-waste on land other than land approved by the Managing Agency for the deposit of E-waste;
 - (b) deposit E-waste in such a way that it creates a public nuisance or may contaminate soil or water; or
 - (c) burn E-waste or E-scrap.
- (3) A person must not refuse or fail to remove E-waste or E-scrap from land when given written notice to do so by the Managing Agency.
- (4) A person who contravenes subsection (1), (2) or (3) commits an offence and is liable on conviction to a fine not exceeding XX penalty units or imprisonment for a term not exceeding [PERIOD], or both.

18 Offences by licensed collector

- (1) A licensed collector:
- (a) must transport E-waste and E-scrap in such a way that it does not escape from its container;

- (b) must not handle E-waste or E-scrap in such a way that it creates a public nuisance or may contaminate soil or water.
- (2) A licensed collector must meet all occupational health and safety requirements relating to E-waste recycling.
- (3) A person who contravenes subsection (1) or (2) commits an offence and is liable on conviction to a fine not exceeding XX penalty units or imprisonment for a term not exceeding [PERIOD], or both.

19 Report by Managing Agency

- (1) The Managing Agency must give an annual report to the Minister by DATE each year, setting out:
 - (a) how money in the Fund has been spent;
 - (b) the total quantity of electronic and electrical equipment on which levy is paid;
 - (c) the total quantity of E-waste collected;
 - (d) the total quantity of E-waste recycled and exported.
- (2) The Minister must present the report to Parliament within one month of receiving it.
- (3) The Managing Agency must make the report available to the public after it has been presented to Parliament.

20 Reports by licensed collectors

- (1) A licensed collector must give a written report to the Managing Agency and the Minister every 12 months setting out the amount of E-waste:
 - (a) collected;
 - (b) held waiting to be recycled;
 - (c) undergoing recycling;
 - (d) ready for shipping;
 - (e) shipped.
- (2) The report must have with it:
 - (a) copies of relevant documents relating to the recycling and export;
 - (b) a health and safety incident report; and
 - (c) a report concerning whether the collector has complied with relevant standards and codes of practice relating to the environmentally sound management of E-waste.

21 Review

- (1) The rate of levy and benefit payable under these Regulations must be reviewed every 2 years.
- (2) Three years after the commencement of these Regulations, the Minister must appoint a person to review:
 - (a) the operation of the Fund; and
 - (b) generally, the operation of the system of managing E-waste under these Regulations.

SCHEDULE
ELECTRONIC AND ELECTRICAL EQUIPMENT

DETAILS TO BE PROVIDED BY SPREP
