

Summary Report

to the

PacWaste Technical Advisory Panel

E-waste Country Assessments



**E-waste Generation and Recycling,
and the
Potential for Interventions by PacWaste**

**Palau, The Marshall Islands,
Vanuatu, The Solomon Islands
and
Fiji**

July 2014

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Summary Report
to the
PacWaste Technical Advisory Panel

**The Collection, Collation and Review of Data
on the
Status of E-Waste Management
In
Pacific Island Countries
Including a
Cost-Benefit Analysis of Capacity
for
Electrical and Electronics Goods
Recycling, Repair or Refurbishment**

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Summary Report to the PacWaste Technical Advisory Panel

1. Introduction

This report is a Summary document for the Technical Advisor Panel to PacWaste; it comprises materials extracted and summarised from the full E-waste Country Assessments report, which provides full detail of the five countries assessed by the project from February to May 2014 – Palau, Marshall Is., Vanuatu, Solomon Is. and Fiji. This Summary Report includes the Executive Summary from the full report, along with extracts from each country report concerning proposals for interventions. In addition, information and recommendations from the 2013 E-waste reports conducted by SPREP on Kiribati, Tonga, Samoa and the Cook Is.

PacWaste (Pacific Hazardous Waste) is a €7.85 million, four year project, funded by the European Union and implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP), to improve regional hazardous waste management across the Pacific, working in the priority areas of asbestos, healthcare waste, E-waste and integrated atoll solid waste management. The PacWaste project will potentially cover fourteen Pacific Island Countries (PICs).

For the E-waste component of the PacWaste project the overall stated aim in the project documentation is that: *'The project component will contribute towards the sustainable management of E-wastes through an integrated In-country approach'*¹. The project documentation also states²:

'This project will assist in establishment of sustainable national E-waste management in ... demonstration countries. This will be achieved in collaboration with the private sector through identification of E-waste recycling opportunities, development of national E-waste storage and export arrangements, and institutionalization of ongoing public awareness and periodic E-waste collections. Concurrently, development of model legislation to enable the government to adopt and enforce appropriate financial instruments and policies (such as extended producer responsibility and introduction of advanced recycling fees and import taxes or duties) is expected to finance the sustainable management of national E-waste into the future'. The specific objective of this work being³: 'Pacific ACP countries adopt cost-effective and self-sustaining E-waste management systems'.

With a total budget of €1,372,638 (US\$1,741,877) allocated to the E-waste component of the PacWaste project, including approximately €945,000 (US\$1,200,000) for equipment, infrastructure and training and more than €50,000 on regional collaborations, project visibility and information exchange, considerable financial resources have been provided to achieve the aims sought.

¹ Annex I Description of Action

² Financial Agreement 022-937 Annex 4 Detailed list of activities, III) E-waste Management p25

³ Ibid.

This report provides Country Assessments for five Pacific Island Countries, being Palau, the Marshall Islands, Vanuatu, the Solomon Islands and Fiji. An additional four countries were previously surveyed in a very similar manner in 2013 as part of the UN-funded Strategic Action on International Chemical Management (SAICM) project, also administered by SPREP.

The 2013 SAICM work was specifically tasked with assessing where there may be potential in the Pacific Island Countries to develop Product Stewardship approaches to improve the management of the rapidly escalating E-waste problem. It also conducted essential research into the nature of commercial E-waste recyclers within the Pacific region, both in PICs and some of the developed Pacific regional nations. These 2014 PacWaste Country Assessments provided below have sought to build on the research and information collected in the 2013 SAICM study. The SAICM E-waste baseline surveys were conducted in the Pacific Island Countries of Kiribati, Tonga, Samoa and the Cook Islands sequentially from April 2013 to late June 2013, while the PacWaste E-waste baseline surveys covered Palau, the Republic of the Marshall Islands (RMI), Vanuatu, the Solomon Islands, and Fiji, sequentially from early February 2014 until the end of May 2014.

2. Outcome of the Consultancy

The primary objective of this consultancy is to provide baseline information on E-waste management in the participating Pacific Island Countries and to recommend and prioritise which countries and E-waste management areas should be focused on to best achieve the objectives of the PacWaste project. These recommendations will be used to plan the physical actions and interventions on E-waste management in a limited sub-set of the countries surveyed, with a later extension of the project to a lessons learnt and information sharing phase, applied across more PICs later in the project.

The consultancy has met its aims through surveying the situation on the ground in the nations covered, and has incorporated the work from 2013 on the cost-benefit of different approaches to collecting E-waste, as well as using the model Advance Recycling Fee approach that was developed through the 2013 work; this previous consultancy was conducted by the same consultant as that which wrote this report. In addition, as well as identifying potential partners for future work with PacWaste in the nations visited, the consultant has endeavoured to produce proposals for next steps as to actual projects that might be undertaken given the relative conditions prevalent in each place.

Key elements of the proposals offered are:

- Availability and capacity of partners in country, particularly the private sector;
- Management requirements of the PMU given the remoteness and distances;
- What the data is telling us about the type of E-waste in-country;
- Logistics of particular environments;
- Means of communication to target audiences;

- The potential for interventions to support commercial operations;
- Potential for intervention replication outside of those countries;
- The potential to generate significant lessons for further work on E-waste.

Other important considerations that drive the proposals concern the availability and reliability of data in-country, where that E-waste may be concentrated, and any other country-specific conditions, which are found detailed in the relevant country baseline surveys that follow below.

The report is split into two parts: Part One takes an overarching view that details the rationale and approaches used, and the key differences that are found between the nations assessed. This part looks at a variety of points that include methods of communication, logistics, target types of E-waste and incentives for recyclers. It also looks at what the SAICM work found regarding the economics of one-off collections as opposed to setting up regular systems and the logistical arrangements found throughout PICs with regard shipping; Part One also looks at how Advance Recycling Fees (ARFs) might be put in place, and the practical application of the project in this process, such as the importance of capitalising revolving funds that hold ARFs. Part One concludes with an overview of each country assessment, including the work from the 2013 SAICM report. The Country Assessments follow in Part Two; these are also summarised below in Table I, along with the SAICM assessments. The Country Assessments include proposals for interventions by PacWaste, and some initial cost estimates that can be used by the Project Management Unit (PMU) at PacWaste when developing more detailed intervention plans and budgets.

3. Proposals Common to Several Countries

Some proposals are common across several countries; these are summarised here:

3.1 *Basel Convention*

Assistance to countries that are not Parties to the Basel Convention on the Transboundary Movement of Hazardous Wastes (commonly called the Basel Convention) to subsequently become a Party, should they wish to, through assistance from the project with public consultation phases, drafting of documents such as cabinet papers, and training to selected people who would be involved in implementing the provisions of the Convention on an on-going basis, for example customs officers and the designated 'Competent Authorities'.

3.2 *Training to Recyclers*

A very common theme is the lack of experience and knowledge of the commercial value of e-scrap across the countries visited, with only Vanuatu and Tonga having recyclers who actively buy E-waste, and even then this part of their business is still in its infancy. Most of these recycling companies could very usefully use some training from someone who has spent years in the e-scrap industry at the level at which they are operating; someone who can help them maximise the value of the materials they receive through disassembly and identification of parts (as detailed in the 2013 SAICM report). A

practical trainer with experience of shipping under Basel Convention rules can also assist in training concerning compliance issues, and packing of e-scrap to meet international requirements.

3.3 Incentives for Private Sector Recyclers

All the recycling companies in the countries visited are small operations whose core business is non-ferrous and ferrous scrap metals. Getting involved in e-scrap trading is seen as a risky business by most of them. A key proposal is to mimic an Advance Recycling Fee system by providing an export subsidy to companies who agree to export in compliance with international rules (from both the Basel Convention and the International Maritime Organisation) and supply data on exactly what type and how much E-waste they are shipping. This subsidy would be only paid on presentation of a Bill of Lading, but will allow the companies to 'test the waters' and lessen the risk of experimenting in a new field with uncertain returns. In exchange for participating in the scheme, PacWaste will receive data from the companies regarding the composition and costs of making up their shipments, and this information will be extremely useful in future efforts to develop ARF systems, and in particular when determining what level of ARF – in dollars – might be required in a specific country, and on what tariff lines that ARF might be levied at import.

4. Countries Assessed by PacWaste

Five countries were assessed in early 2014, two in Micronesia, and three in Melanesia.

4.1 Palau

Palau is a small nation with a highly urbanised population centred on the town of Koror; it has a large tourism industry, and is the most developed of the five nations visited in 2014. It has a product stewardship system that covers beverage containers, but the law as it stands could not be directly used to develop a similar system for E-waste. Palau is a Party to the Basel Convention. It has the most developed electrical repair sector, and some recycling companies who are starting to familiarise themselves with the E-waste stream; there is also a community college that is training technicians from across Micronesia that could usefully benefit with training in e-scrap from the PacWaste project.

The proposal is that an E-waste Collection Point be set up at the entrance to the existing main M-Dock dumpsite - where scrap metal and white goods are already being collected - and have this operated under contract with the existing contracted recycler. Some construction would be required, and this can be done on government land at the dump entrance which is occupied by the Environmental Quality Protection Board (EQPB), who are also the Focal Point for SPREP in Palau and so would be the institutional partner.

Training would be provided to the recycling companies, electrical equipment repairers, and the college lecturers who run the technicians courses in how to split up WEEE to maximise the e-scrap potential, so that this e-scrap can then be exported. A subsidy system to exporters of e-scrap will help kick-start their participation and interest in the collection and processing of E-waste; this system can possibly be institutionalised in the future by adapting the existing beverage container recycling system, and the project could demonstrate to the government of Palau the viability of taking such a step. A summary of the proposals for Palau is provided at Section 8 below.

4.2 Marshall Islands

The Republic of the Marshall Is. (RMI) is an atoll nation with three quarters of its people on two islands. Recycling is poorly developed, and has lessened in recent years. The RMI is also subject to a separate component of PacWaste work - that of developing an integrated solid waste management system in an atoll environment - and the proposal here could be easily conducted along with any proposals resulting from the current integrated management assessment underway.

The most serious common hazardous waste problem in the RMI is that of used lead-acid batteries (ULAB): the nation has been conducting a major push over the last decade in rural electrification using solar power (PV), and as a result, large numbers of ULAB are coming into the waste stream from solar systems, as well as a high rate of vehicle ownership in the capital of Majuro contributing to this situation. The strategy proposed is to work with the Marshalls Energy Company (MEC) - the electricity utility that is the solar installer and service body - to create a reverse logistical process to recover and export ULABs, and in so doing, use this process to drive the development of an ARF system that will ensure that ULABs are collected in future using an incentive scheme (as works so well in the neighbouring countries of Kosrae and Kiribati) which can then also be legally drafted to include E-waste using an ARF, should the government so agree.

PacWaste can cooperate with the current EU solar project NorthRep on this work, as they have a project-driven requirement to address this problem, but may lack the expertise to do so. The ULAB system proposals will require some infrastructure for handling pallets that can be installed in the MEC warehouse that handles PV equipment. Once the ULAB recovery system is functioning well, work can be done to address the wider issue of E-waste in the country; but at the moment, with so many other waste challenges entering critical phases (as the Atoll component will address) to try and tackle E-waste directly would be a difficult task right now. A summary of the proposals for the Marshall Is. is provided at Section 9 below.

4.3 Vanuatu

Vanuatu is a rapidly developing country that does have a single recycler, who is handling E-waste. Vanuatu is not a Party to Basel, and as such could usefully use assistance in that area. Most of the recoverable E-waste will be in the Port Vila or Luganville urban areas; PacWaste can usefully work with the existing sole recycling company to direct flows into his processing stream, and much could potentially be collected from around Port Vila and Luganville using effort targeted at offices, businesses and institutions.

A similar collection can be operated through the second largest urban centre of Luganville, in Espiritu Santo, this one driven by ULAB collection in the market place. With PacWaste working with the Luganville Municipal Council, and directing E-waste to the local recycler the price paid for ULAB in Luganville can be lifted to the same level as paid in Port Vila, and so reach much improved levels of recovery. At the same time, the Luganville collection can act as a cell phone collection, as well as any other local E-waste that people might bring in.

A major and increasing source of E-waste in Vanuatu is cell phones; also, import data and social observation indicate that the future of personal electronics is moving away from the desktop computer, through the laptop phase, to the highly portable pad and tablet devices, particularly of the 7 – 8 inch range. The proposal for Vanuatu is for PacWaste to experiment in a PIC setting with a system similar to that used in Australia and NZ, and target cell phones. However, the proposal is to work with the phone company service providers in two ways: to send out messages to the owners of phones about how to recycle devices, and also to direct incentives to a percentage of people who return phones for recycling by putting credit on their mobile phones. The actual phone recovery can be done via several routes, primarily through the mail system using a pre-paid business reply envelope, but also through some other potential pathways detailed in the country report section. A system for cell phone recovery that is fully tested and developed in Vanuatu has real potential to be replicated in similar countries around the Pacific, in particular Fiji and Samoa would lend themselves to a replication effort. A summary of the proposals for Vanuatu is provided at Section 10 below.

4.4 Solomon Islands

The Solomons is also not a Party to Basel, and could usefully use assistance in that regard. The recycling sector is poorly developed, but there is potential to find a partner to work with regarding E-waste. The country is divided between one large urban area of Honiara, and a huge rural area of considerably less development. With a local recycling partner, much of the potential E-waste would be found in the Honiara area, and much of that would be found in office and institutional settings.

Here is seen the nexus between cell phones and ULAB with the rapid installation of small PV systems in rural areas that are used for lighting and to charge phones. A visit to Auki, the second largest town in the country, provided the basis for the proposal to work with the Malaita Chazon Development Authority (MCDA) and for them to operate a ULAB and cell phone collection in the Auki Town Market Place - which they manage - as this is the central meeting point for the province. Data collection will again be essential, and communication can be made to the target audience through mass text messages their cell phones, as messaging of discrete areas can be done via individual transmission towers when coordinated with the phone service providers. The Honiara Town Council may well be able to provide some assistance with Honiara-based E-waste collections, and the proposed activities in the Solomons include efforts to recover institutional E-waste around Honiara in particular. A summary of the proposals for the Solomon Is. is provided at Section 11 below.

4.5 Fiji

The recycling sector in Fiji is going through difficult times, and there is no recycler putting any real effort into E-waste collection. But potential does exist to build on the development of kerb-side recycling in the west of Viti Levu, and use the fact that dumping into Fiji dumpsites now has a cost in many Fijian towns: this can be used to create an incentive for people to remove E-waste at the dump entrance where a collection point for E-waste has been put in place.

The proposal would be to work initially with the Lautoka City Council to develop a collection point at the dumpsite gate to divert E-waste away from the dump; this would

also assist Nadi Town Council as they use the same dumpsite. The proposal would require construction of a receiving shed, operated by a local recycler under contract to the Council, and a shipping subsidy support to the recycler so that they put effort into developing collection of E- waste. The proposal would allow the recycler to strip out the E-waste collected at the Collection Point at the dumpsite, and dump non-recyclable components into the dumpsite for free; the intention here is to assist the recycler such that it is worth taking things like freezers and washing machine completely to pieces, and dumping the large plastic parts and insulation only, rather than just stripping out the motors and dumping the rest informally, as is a frequent problem. The experience and data collection at Lautoka should help feed into the design of the Nasinu Waste Transfer Station in the east which could be a very effective E-waste collection point for Suva conurbation if E-waste collection was included in the Transfer Station design.

Partners would be the Department of Environment as the SPREP Focal Point (they have a regional office in Lautoka), the Lautoka City Council (LCC) and the contractor whom LCC uses to handle its kerb-side recyclables. Fiji is not a party to Basel and so could use assistance in becoming a Party should the government so wish. A summary of the proposals for Fiji is provided at Section 12 below.

5. Countries Assessed by SAICM in 2013

In 2013, the SAICM project conducted similar – but not identical – assessments of four countries that were part of a two-year SAICM regional project in partnership with SPREP, and the following points are offered as potential interventions for the PacWaste project in the countries covered by the SAICM country reviews, also undertaken by this author. The SAICM Final Report includes recommendations at each Country Report.

6.1 Kiribati

Kiribati has an E-waste project supported by NZAID at the moment, as part of the overall NZAID Tarawa SWM project. This project commenced in 2011 and work on E-waste started in mid 2012; NZAID has agreed to provide support on E-waste until 2015, and the project is currently collecting E-waste at the Tarawa MRF and expects to make a single TEU shipment by the end of 2014. Infrastructure has been built which comprises three shipping containers on fixed foundations under a permanent roof, and this allows sufficient space to receive, process for dismantling, pack and store E-waste for future shipment. Project management is under the Kiribati Environment and Conservation Division (ECD).

As NZAID is providing funding (which is quite sufficient to cover activities at current rates) no financial intervention would be required by PacWaste at this time. The most useful activity for PacWaste would be to coordinate with ECD and NZAID and ensure that should this existing effort find that it requires any technical support whilst it is doing useful work, then perhaps there would be a way of PacWaste to get involved. On the other side, the information and experience being generated by the NZAID project will be very useful to help develop PacWaste work in other countries, and as such a good working relationship between PacWaste and ECD should be established. A summary of the proposals for Kiribati is provided at Section 13 below.

6.2 Tonga

Tonga has an E-waste NGO that has been supporting the local recycling company GIO to recover e-scrap from the waste stream; they had provided support that included rent for a small industrial unit for processing collected E-waste and for two workers to dismantle E-waste; the NGO support, derived from a GEF small grant, has now finished. At this time GIO have not managed to make an export as the cost of doing so is significant and returns are uncertain until the importing buyer can evaluate the value of the shipment at the destination.

If PacWaste was to provide some support to E-waste recycling through the medium of the E-waste Tonga NGO, in possibly the same manner in which the previous GEF small grant worked, it could follow the same methodology as the GEF grant and allow a recycler to make a shipment of only E-waste. It would be useful to provide a shipping support value (estimated at around US\$3,000) so as to get an export shipment out. This would then allow a clear evaluation of the shipment, and the inputs conducted to achieve a shipment.

The project should specifically require information regarding the value of any shipment once bought by the buyer, the cost of preparing and shipping, and the number of various items that were dismantled to make up the shipment in return for the support. This information would be extremely useful in developing interventions in other countries. As Tonga is the PIC most advanced in this area, it is best placed to provide essential information to help the project properly evaluate the cost of facilitating shipments in other PICs. This potential intervention could happen quickly and a strong foundation for the development of other country interventions. A summary of the proposals for Tonga is provided at Section 14 below.

6.3 Samoa

In Samoa, a significant step could be made to encourage the existing IT community and the recyclers to start breaking down E-waste for scrap, and this could be done by running a workshop at SPREP. This workshop could potentially be replicated in many PICs under PacWaste, as lack of knowledge about the commercial categories for e-scrap is a significant constraint everywhere.

Holding the first workshop in Samoa at SPREP should involve the SPREP IT dept. and feed into the in-house programs at SPREP to improve the organisation's own ecological footprint. It will also allow the PacWaste project to evaluate the workshop Trainer, with direct support from SPREP IT with regard to how well the Trainer performs. The results of the workshop and impact on the existing Samoa recycling businesses can also be evaluated by the project, as PacWaste is in Samoa, and the validity of the approach can be easily measured simply through seeing if the local recyclers improve their recovery rates of E-waste.

6.4 The Cook Islands

The Cook Islands has potential to develop a useful legal model to have a flat-rate levy system for WEEE that could be used for recycling. But work on this will take time, and involve significant interaction with the government to develop anything along these lines.

However, it also has a very competent recycling company, who took up E-waste recovery after the 2013 SAICM visit provided useful information; the director is also closely involved in policy development on waste and recycling in the Cook Islands, sitting on the national SWM committee. Working with the existing recycler has the potential to provide very useful information on the larger logistical and cost requirements for any e-scrap recovery system. Engaging with this recycler, in return for information regarding what is processed, what it cost to do so, and the value of that recovered, would be extremely useful for developing other in-country work around the region, and provide a solid foundation for the private sector development work which is part of the PacWaste remit, as this recycling company probably has the most potential of any Pacific recycler to provide very solid and detailed information. A summary of the proposals for the Cook Is. is provided at Section 16 below.

7. Brief Summary of Proposals

A summary of the total suggested budget for each country is included at table i, details of which can be found in each Country Assessment in the report below as well as in the full report. A summary of the proposed interventions is provided at table ii. The details from which this summary is drawn can be found in the full report which contains comprehensive Country Assessments. The intention of providing budget estimates is to assist the PacWaste PMU with the next round of work on E-waste which will involve drawing up intervention plans and budgets.

Table i: Summary of Suggested Budgets for initial Interventions in the Countries Assessed, and also including Countries Assessed During the 2013 SAICM project

Country	Project Result	Budget (Euros)
Palau	Training; Infrastructure; Awareness; Operations	€45,000
Marshall Is.	Equipment; Operations; Training; Awareness	€56,000
Vanuatu	Operations; Awareness	€80,000
Solomon Is.	Training; Infrastructure; Awareness; Operations	€62,000
Fiji	Training; Infrastructure; Awareness; Operations	€89,000
Kiribati	Regional collaboration & information exchange	€0
Tonga	Training; Operations; Awareness	€49,000
Samoa	Training; Infrastructure; Awareness; Operations	€29,000
Cooks	Training; Operations; Awareness	€19,000
Total		€429,000

The overall budget for E-waste activities for PacWaste is €1.37 million, and so the budget proposals here potential represent useful effort for next year or so of PacWaste intervention.

Table ii: Summary of Proposed Activities from Country Assessments

Country	Target E-waste	Location	Intervention Type	Action required
Palau	Office/Private/Govt.	Koror	General E-waste Collection	Collection point construction; initial shipping support; Training; integration with CDL system
Marshalls	ULAB	Majuro (collected from Outer Islands)	Establish ULAB collection system as initial E-waste recycling step	Storage Infrastructure & initial shipment support
Vanuatu	Cell Phones	National	Mobile phone collection	Take back system developed/financed (phone credits)
	Govt/commercial	Efate	Improved institutional Awareness	Education for Govt E-waste directed to the existing recycler
	ULAB	Espiritu Santo	ULAB buy-back	Financial & infrastructure support to improve ULAB return
	Existing successful Recycler	Efate	Source of logistical & economic data	Networking with associated assistance
Solomons	ULAB	Malaita	Establish ULAB collection system as initial E-waste recycling step.	ULAB collection point (shipping container purchase & installation)
	Cell Phones	Malaita	Cell phone collection with ULABs	Take back system developed & financed (phone credits)
	General E-Waste	Honiara	Capacity building in export protocols for e-waste.	Training in e-scrap export; shipping subsidy
Fiji	General E-waste	Lautoka	Establish E-waste collection point at the landfill	Infrastructure construction
		Lautoka	Training in e-scrap recovery & capacity building for export	Training in E-waste dismantling & export
Kiribati	General E-waste	Tarawa	Good Practice Example and source of logical & economic data.	Networking with associated assistance
Tonga	General E-waste	Tongatapu	Support to Existing NGO; test the logistics chain from recycler to end users.	Financial support to ongoing E-waste dismantling and initial shipment support for export
Samoa	General E-waste	Upolu	Development of training materials in commercial e-scrap	Training in E-waste dismantling
		Upolu	Enhance E-waste collection (AFD project)	Expand on AFD awareness raising and collection pilot
		Upolu	Networking between electronic repairers & recyclers.	Co-ordination with local recyclers
Cook Islands	General E-waste	Rarotonga	Best Practice Example and source of logistical & economic data	Networking with subsidy assistance to kick-start ARF

Summary of Country Intervention Proposals

8. Scenarios for PacWaste Intervention in Palau

The following scenario for commencing efforts to tackle the E-waste problem in Palau. The scenario for Palau concentrates on recovering the electronic E-waste component of the waste stream.

There is a healthy electronic repair commercial sector. The next step needs to be to direct the electronic waste resulting from either repair or complete failure / obsolescence towards a recyclable system. Given that a degree of recyclables recovery is taking place at the M Dock dumpsite gateway, and it is clear that E-waste in Palau is very largely heading into M Dock landfill, this is a good place to develop an intervention.

There is a contractor already in place who is recovering some recyclables from the M Dock dump gateway: this contractor could be recovering E-waste items there too, rather than simply extracting any copper and aluminium components, as is their current effort – which actually has the effect of devaluing the rest of the potential e-scrap stream. This contractor has already collected some E-waste - as seen – and this process needs to be encouraged. The key points missing that would encourage this process are:

- Knowledge of commercial value of components, so that disassembly can maximise value;
- Lack of knowledge regarding potential markets;
- Lack of infrastructure at the M Dock gateway to collect E-waste and temporarily store it under-cover;
- Reluctance to participate in a new market where the profits are doubtful.

With the above as the primary elements that any project intervention should address, the recommendations below are offered. These recommendations aim to address two key points: the policy development work required for the government to have a clear and agreed role in the promotion and regulation of E-waste recovery, and support to the physical and commercial recovery and export of e-scrap in such a way that any project intervention provides for a solid future foundation.

8.1 Recommendations for Further Action in Palau

The following recommendations are drawn from the information and analysis in the Country Assessment and are suggested as next steps for the project to take in Palau.

- Establish EQPB as project partner through development of an MOU between PacWaste and EQPB; EQPB is the current environmental technical agency, and has experience in interaction with international projects. Any PacWaste work must have a dedicated local partner, and one who is committed to working with the project, and prepared to support any local activities and visiting Technical Assistance.
- Encourage and assist EQPB to revise the existing Proposed Hazardous Waste Policy at points 5, 6 & 10 to reflect this as government policy, should the relevant government agencies agree on the above point. Encourage EQPB to resubmit

the revised policy to Cabinet and get the document adopted as official government policy before the end of 2014.

- Provide for a training workshop in Palau to be conducted by someone with longstanding experience in the e-scrap industry, who can provide training on three main themes: how to assess incoming equipment and evaluate for simple repair and resale; how to conduct manual disassembly on common E-waste items, and sorting into suitable commercial categories in order to increase the value of any shipments; and how to pack and export e-scrap in a manner that complies with Basel Convention requirements and IMO DG regulations, where applicable.
- Support the installation of a suitable E-waste collection point at M Dock landfill entrance, probably contiguous with the EQPB warehouse that is under construction there. A structure that utilises shipping containers on permanent foundations, and with a purpose built roof, would quite possibly fulfil the role adequately⁴, or else it may be feasible to build an extension on the proposed building. (This building already has a foundation slab laid, so this may not prove practical given time constraints.) The intention would be that the contracted recycler would take items from this collection point to their local recycling yard for manual disassembly on a very regular basis, say at least weekly.
- Support the export cost of at least one shipment of e-scrap – and perhaps more – so that the commercial value of e-scrap is clearly understood by the recycling contractor. In return for a shipping subsidy, the contractor must supply detailed data on what items were broken down to comprise the shipment, and the value obtained from the sale of the shipment, and any difficulties that arose from making up and completing the shipment.
- Support EQPB to fulfil the requirements of a Basel Competent Authority through participation in signing off on the subsidised e-scrap shipment, so working over the actual process in a real-life situation.
- Open discussions through the local partner regarding the potential to use some of the money in the Recycling Fund - controlled by MPIIC - to subsidise shipping costs for e-scrap to encourage the collection and export. This must be done in close collaboration with the Bureau of Public Works as they are the people who decide how funds from the Recycling Fund can be spent, but the existing legislation would allow use of those funds for that purpose. This process will need the information received from the contract with the recycler to support shipments of e-scrap in order to develop a suitable subsidy system that achieves the outcomes intended (without creating perverse incentives - for example to export fresh air).

8.2. Provisional Budget Estimates for Palau

The following budget estimates in table iii are offered as a guide to future PacWaste planning for any intervention.

⁴ Cost of a 'three container' option would be around \$15 – 20,000.

Table iii: Intervention Budget Estimates for Palau Activities

Project Result	Activity	Contractor	Budget (Euros)
Training	Commercial E-waste Training	Commercial E-waste trainer	€5,000
Infrastructure	Collection point at M-Dock	Local builder	€30,000
Awareness Raising	Flyers & notices to direct urban E-waste to recycler, printing and distribution	EQPB	€3,000
Operations	Export of E-waste collected - subsidy for shipping	Local recycling business	€7,000
Total			€45,000

9. Scenario for PacWaste Intervention in the Marshall Islands

The most serious E-waste pollution problem is clearly that posed by the poor disposal of used lead-acid batteries (ULAB). By regularising the packing and exportation of ULAB, the intention is that the pathway is also cleared for the exportation of e-scrap, through institutionalisation of Basel processes with the various concerned parties. It is also useful to note that those people who will buy ULAB will usually be happy to buy e-scrap; also, due to constraints regarding how batteries can be properly packed (only two layers to a pallet, and only one pallet on top another) there is significant space above the batteries in a container that could take some fairly light bags of e-scrap, at least in the early case of kick-starting some e-scrap exports.

9.1 Description of Potential Activities

The following scenario is offered: the project should engage with Marshalls energy Company (MEC) to support them to collect and pack ULAB. As MEC is currently building a warehouse space that will store the new batteries coming in for PV projects, so the project could add value to that space by supporting the purchase of pallet racking so that the space in the building can be maximised, and room made for storing ULAB prior to shipment. The MEC warehouse will be equipped with pallet trucks, forklift and an outside area where incoming shipping containers will be handled and discharged. ULAB can come in to the warehouse (which is situated in the port area of Majuro) and be wrapped by MEC warehouse staff as they come in; then fully wrapped, marked pallets can be stored on the vertical pallet racking until sufficient are packed to comprise a shipment. These can then be easily taken down and put into any recently emptied container and shipped out, using a fully reverse logistical process.

MEC may need help around developing a simple system to get people to bring in ULAB for recycling; NorthRep (the EU-funded PV project) also has development of such a ULAB recovery system as part of its project planning, but has so far made little progress in this aspect of the project. The simplest method is to provide a 'refund' value, as has so successfully been implemented in Kiribati, and has run well for the last nine years. If there were 3,000 ULAB to be recovered per annum, and a \$5 recovery payment per unit was made available to anyone bringing them in, then that would cost \$15,000/annum, not a huge sum. (It must be noted in this context that if such a system were put in place, a large number of batteries would come in for recycling initially. In Kiribati the system

has a \$5 refund on batteries, and the recycling system received 8,400 ULAB during its first year of operation in 2005 from an estimated 3,000 imports that year; 8,000 ULAB at \$5 each would require \$40,000 in funding.)

MEC can be encouraged to get involved in ULAB recovery by PacWaste providing material support in the form of pallet racking, pallet wrap plastic film, possibly a pallet turntable to facilitate pallet wrapping, and the payment of at least the first shipment's shipping cost. Ideally, the recovery payment could become institutionalised, either nationally by a legislated CDL type system, or else simply within the MEC PV technical support process by MEC adding \$5 to the cost of any battery to allow the refund amount to be available. It might be that under this scenario MEC could buy in other ULAB from the public on a per kg basis⁵.

Whilst ULAB exports are getting packed and moving out of the RMI, there could be some effort to get one of the local electronic repair shops and/or MWAC involved in breaking down some E-waste into commercial e-scrap and exporting this in the battery containers. It is likely that the amount generated initially will be small, but moving some e-scrap might encourage these people to see the potential for effort in this business once they see some income from their efforts.

As usual, a fundamental barrier to commercial e-scrap export from the RMI is the lack of knowledge of the potential exporter regarding how to spilt-up and pack e-scrap to maximise commercial value. This is dealt with below with the recommendation to provide a brief technical workshop - from a seasoned commercial practitioner from somewhere in the region, as recommended for Palau - for potential e-scrap participants.

The key information missing is a realistic translation of the amount of E-waste available per annum - in the RMI - into an estimated number of TEU shipments. This is the sort of information that should be derived through any partnership arrangements with any e-scrap processor so that the 'guesstimates' provided in the Country Assessment can be turned into tighter projections of quantity and cost, and thus potential project inputs required.

9.2 Recommendations Further Actions in the Marshall Is.

- Support MEC with pallet racking and also a pallet wrapping turntable for their new warehouse so as to create a dedicated ULAB processing for export and storage area;
- Pay for at least one shipment of old batteries and measure the weight and the space above battery export accurately, to calculate potential to include some small quantities of e-scrap in the next containers exported;
- Allow MEC to keep all income generated by any ULAB export so as to provide them with the capital to continue in ULAB export under their own commercial cognizance in the future; MEC will need to agree to provide full data concerning numbers of batteries, weight, all shipping and other measurable costs, and income received from sale in return for this support;

⁵ For example rural NZ scrap dealers are paying a round 60¢/kg for ULAB at the moment. A 20t TEU of ULAB would be worth around \$12,000 at that price.

- The three above points will require an MOU to be drafted and agreed between PacWaste, the local implementing partner OEPPC and MEC; this will need to be a first step before committing to the other activities;
- Provide a technical assistance workshop - run by someone from the region who has direct commercial experience in the e-scrap industry - to local electronic repairers and MWAC to identify commercial value in E-waste and how to process E-waste into an e-scrap export;
- Allow any e-scrap locally processed to be exported either for free in the ULAB container where amounts are small, or else support the export of a shipment of e-scrap, but only where the exporter follows Basel and IMO DG processes and will provide information as to the number of items of E-waste that have been processed to generate the shipment, and also the value received after sale;
- Provide technical support to EPA and MEC around shipping requirements (IMO DG) and Basel Permitting processes;
- Provide assistance to OEPPC for a hazardous waste policy document – and get the document endorsed by Cabinet - that clearly supports the project to intervene in the ways outlined above, and puts ULAB at the centre of E-waste recovery efforts. Such a policy could include provisions to use the NEPA Fund as a revolving fund for e-scrap exports;
- Develop an outline work plan for interventions by PacWaste in the RMI to be agreed with OEPPC as an initial step, which agrees to the PacWaste project being able to deal directly with MEC for financial support and procurement purposes.

9.3 Provisional Budget Estimates for the Marshall Islands

The following budget estimates in table iv are offered as a guide to future PacWaste planning for any intervention.

Table iv: Intervention Budget Estimates for RMI Activities

Project Result	Activity	Contractor	Budget (Euros)
Equipment	Pallet racking and turntable + shipping to RMI	O/S supplier/MEC	€20,000
Operations	Export of ULAB –shipping cost for first container	MEC	€3,000
Operations	Buy-up of existing ULAB at \$5 each / kick-start ARF fund at EPA	MEC / EPA	€25,000
Training	Training to commercial sector on E-waste	Commercial E-waste trainer	€ 5,000
Awareness Raising	Flyers & adverts to notify ULAB collection by MEC, printing and distribution	MEC	€3,000
Total			€56,000

10. Scenarios for PacWaste Intervention in Vanuatu

The Country Assessment analysis identifies three potential scenarios for action by PacWaste in Vanuatu, with the biggest effort being targeted at cell phones. With such a high penetration of cell phone use into the local population, cell phones provide an excellent strategy to raise the overall level of awareness with the public around E-waste recovery in general. Two other activities are proposed, one targeted at computers and other electronics found primarily in institutional and commercial sectors, and the other at ULAB from outside Port Vila. The potential to have three different activities can allow flexibility in the project so that if one activity is largely ineffective, the others may turn up results. The three activities proposed are, in short:

- Develop a system to encourage recovery of cell phones, as these are clearly the largest single category of WEEE in Vanuatu, and direct these to the existing recycler for packing and export;
- Improve the recovery rate of ULAB from Santo and the northern provinces, through a Luganville collection point based in the town market, and this can also collect cell phones;
- Target the recovery of end-of-life computers and electronics from institutions in the Port Vila – and perhaps Luganville - directing the items collected to the existing recycling company for packing and export.

10.1 Cell Phone Recycling

In Australia - and to a lesser extent New Zealand - mobile phone recovery has used a simple mail-based system to collect cell phones, using a specially printed, pre-paid envelope, typically available at Post Offices⁶. As phones are small, this is a relatively simple and cheap logistical system, and can accept cell phone chargers and old phone batteries too. However, to use the same system in Vanuatu would almost certainly require some refinement, and also likely an incentive process and this is proposed to be thus: when someone puts their phone in an envelope for recovery, they write their name and cell number on the envelope – in the space provided. A certain proportion of those sending in phones will get a free phone credit directed to their phone. This process is logistically simple and done by providing the mobile phone company with a list of numbers to credit, say once per week. The project can set up a pre-paid account with both the local companies⁷, and so the amount of money spent on this promotion can be controlled. It also greatly simplifies the logistical problem of getting incentives back to participants. It might also be decided that an occasional winner would get a new, fancy, mobile, but that is a detail not required at this stage as to determine whether the approach would work or not.

Pre-paid envelopes can be arranged through Vanuatu Post, so that only those that actually return through the system are charged the postage. Postage for a phone would be perhaps \$1 each, or less⁸. Whilst the Post Office has only six official outlets, it has 50 agencies around the country. Paradoxically, the biggest challenge for accessibility for posting might be in Port Vila, but it is probably possible to arrange some local Port Vila

⁶ Called Mobile Muster in Australia: <http://www.mobilemuster.com.au/>

⁷ This has been discussed with both companies.

⁸ Standard postal rate for a 100g phone would be vt100

logistical chain if required, with potential to use the multitude of street phone top-up workers, operated by the two companies, to accept phones for recovery.

The system would need promotion, and this could be by FM radio spots into urban areas (as the AM rural broadcast is erratic), but one medium is to send messages to users via their cell phones. Areas of the country can be selected by this process, by use of selected cell phone towers. The bulk messages would need be short (under 160 characters) and have a cost, but the cost would be paid to the same people running the credit accounts, making the project finances simple from the point of view of the PMU, which could deal directly financially with the phone companies.

A suitable envelope design, with messaging in Bislama, could be developed by local NGO Live & Learn at their Melbourne branch, the envelopes sourced and printed in Australia, and shipped to Vanuatu. In Vanuatu, envelopes would need distribution, some to the Post Office to go around their offices and agents, and perhaps some distributed by the mobile phone company logistical networks. Local NGO Wan Smol Bag could also distribute envelopes, and maybe collect phones, via their distribution division and their Turtle Monitoring Network.

Phones mailed back to the Port Vila Post Office would go to a Private Mail Bag which would be collected by the local – and only - recycling company; the company then takes the phones and packs for export. No payments to the recycling company would be required for any service, as they undertake to take the phones for free. They will need to remove batteries prior to shipping, and ship the batteries along with ULAB, with the appropriate IMO documentation.

10.2 Potential Costs for Cell Phone Recovery

If a phone costs \$1 to mail into the Post Office⁹, and there are 40,000 phones available for recovery per year, then that would cost US\$40,000 if ALL were collected (unlikely). In addition, the envelopes cost money, let it be 20¢ each, being US\$8,000. Cost of developing the envelop artwork and arranging printing at US\$60/hr might be US\$2,000. Suppose 10% of returned phones gained vt500 of credit, that would be US\$20,000 (for the same money, it would be possible to give vt100 credit to every second phone.

With the financial structure indicated, it is possible to create fairly ring-fenced budgets; where an SMS system is used to call for phone recycling, discreet areas can be targeted if required. SMS messaging would have to be negotiated with the two phone companies at bulk rates: this is a new area for the phone companies, as it is usually only themselves who bulk text their customers.

There are no costs to handling the phones collected through the mail system, as Recycle Corp will take them for free. If WSB is used to collect phones, then it may be that they could get the postal value for an envelope where it went through their systems instead of the mail system. This would require negotiation; it may also be that there are some costs associated with distributing envelopes. It can be seen that for a budget of US\$80,000 or so a potentially large number of phones might be collected. Some costs, the mail and the credit prizes, will be directly related to the number of phones collected,

⁹ Average weight of a cell phone is around 110g – see http://www.gsmarena.com/mobile_phone_evolution-review-493p6.php - and at that weight it just comes into the Vanuatu Post category of 101g – 250g, at vt150 per parcel. If Vanuatu Post accepted the cell phone envelopes at a 51g – 100g rate, that would be vt100 (or around US\$1).

so avoiding a situation where significant financial resources are committed to a system that fails to produce acceptable results; this is a key element of the proposal design, to allow the project to avoid investing heavily in areas that fail, but allow flexibility over the project lifetime to shift strategies if experience shows that is needed.

10.3 Institutional Computer Recycling

The biggest constraint to recycling of computers and monitors originating through institutional use is lack of knowledge about what to do, and then initiating action about collecting them¹⁰. This can be addressed by a campaign to inform government offices, businesses and schools etc. that the local recycling company will come and collect their WEEE if they call a certain number. The recycling company has agreed that they will pick-up WEEE in the urban areas of Port Vila and even Luganville if they are notified. What is needed is a targeted campaign to get that message out, and encourage action. This process could be undertaken by the Department of Environmental Protection and Conservation (DEPC) and would involve distributing a poster and flyers on the subject with the number to call. The poster and flyers could again be designed by Live & Learn in Melbourne as part of their contract - using similar language as the envelopes to ensure some consistency of messaging - and either printed in Australia and sent up, or printed locally.

This would be a targeted campaign, which should be fairly easy for DEPC to implement. Costs would be printing and design, and some funds for logistical operations to get around, and probably a temporary hire of someone (perhaps using the DEPC volunteer system) to go around and distribute and promote the posters and flyers to offices, and get action on the piles of WEEE lying around those institutions.

The local recycling company, in return for all this free publicity and quantities of mobile phones at no cost, need to provide information on how much material they collect, where it is sent etc; crucial parts of this process will also come if/once Vanuatu joins the Basel Convention, when DEPC and the recycler can work together to make sure that the Basel permitting process is properly conducted. This recovery activity could be expected to be comfortably financed initially for well under \$20,000. Again, a set budget can be allowed that does not commit excessive resources to a strategy that might not produce significant quantities of E-waste recovered, but increased if the system proves to be working well.

10.4 ULAB Recycling from Santo Province

ULAB recycling is working reasonably well in Port Vila, but as solar PV systems become increasingly common in rural areas, there is a need to develop systems to help rural people get batteries back to Vila for export and recycling. Batteries are often heavy and difficult to handle, so any system needs to be based around existing logistical pathways. Luganville Marketplace presents an opportunity to experiment with a rural recovery system, whereby country people bringing in goods to the market can also bring in old batteries on the same carriers, and gain some money in the process.

The value of ULAB at the recyclers depot in Luganville is currently less than half that of Port Vila; also, the place to sell ULAB to the recycling company is about two kilometres out of town, though it is near the inter-island wharf. ULAB could be bought, one day a

¹⁰ In the first two days many people asked told the consultant that no E-waste recycling was in place, but it took him only a day – an outsider - to find that this was not true.

week, at the central market at Port Vila prices: the system could work using funds from the project deposited in the SWM account operated by Luganville Municipal Council (LMC). LMC would appoint a staff member to sit in the market (which is right next to the LMC office and the LMC workshops) and that money could be used to buy ULAB by the kg at the same price as Port Vila. At the end of the day, the recycling company collects the batteries and takes to their local depot and pack them and send them to Port Vila for export packing and shipment. In return for the batteries, the company will provide details of previous ULAB purchases in Santo, and also agree to export ULAB under IMO DG rules, and this will involve work with DEPC similar to that around Basel and e-scrap. Someone would need to do local publicity around this, and there is a small local NGO in Luganville¹¹ - who have had a previous small grant from SPREP - who might be able to do this as they work on performing arts, and so could develop a local radio spot and perhaps a flyer. Also, SMS messages via mobiles targeted at Santo and the province could be used to publicise the system through selected cell phone towers. This market place collection point could also collect phones coming in to the cell phone system, with envelopes used and the phone numbers written on them going into the weekly draw.

Potential costs might be thus: with Port Vila collecting around 80 tonnes of ULAB per year, the Santo collection would be unlikely to generate more than 20 tonnes, which would cost US\$2,000 at 10vt a kg. Money used to buy batteries can be provided to LMC and batteries bought are then collected by the recycler at the end of the day (probably only once a week). LMC could receive a payment from the recycling company at the rate it would normally pay for batteries (5vt/kg) and that money can go into the account and help LMC deal with its local waste problems, as LMC will make 5vt/kg as an incentive to get them to operate the system; LMC would provide staff for the collections as their contribution. (Battery numbers must be counted and noted from the recycler to PacWaste to make sure that the same batteries are not going around and around picking up money each circuit.)

10.5 Provisional Budget Estimates for Vanuatu

The following budget estimates are offered for the first year of effort as a guide to future PacWaste planning for any intervention.

Table v: Intervention Budget Estimates for Vanuatu Activities

Project Result	Activity	Contractor	Budget (Euros)
Awareness Raising	Flyers & notices to direct urban E-waste to recycler, printing and distribution	DEPC	€3,000
Operations	Export of E-waste / cell phones, first container subsidy	Existing recycler	€2,000
Awareness Raising	Design and print envelopes for cell phone return	NGO	€10,000
Operations	Postage for envelopes	Vanuatu Post	€20,000
Awareness Raising	Newspaper and radio adverts promoting cell phone recovery	NGO	€5,000
Awareness Raising	Targeted SMS messaging	Cell phone service providers	€10,000
Operations	Phone credit for returned phones	Cell phone service providers	€20,000
Operations	Buy-up of existing ULAB through Luganville marketplace	LMC	€10,000
Total			€80,000

¹¹ Canal Studio Association

10.6. Recommendations Further Actions in Vanuatu

The following specific actions are recommended as a result of the above scenarios:

- Engage DEPC to distribute a flyer / poster to all government departments, SOEs, hospitals and schools that provides information on where to recycle E-waste and why. Later distribution could include businesses;
- Get written agreement with the local recycling company to accept all E-waste generated by project collection programs. The recycler must export any materials that can be exported;
- Make agreement with the recycling company to provide data on what amount of e-scrap it takes to fill a container, costs involved in shipping, value of shipment when sold, who it was sold to, and shipping cost support (around \$3,000 maximum per container) if the shipment is not found to be commercially viable;
- Require that the recycler and DEPC export materials under Waigani / IMO procedures in order to gain shipping subsidy support (shipping subsidy can be achieved in part through ULAB gifting from ULAB collections at Santo, if required);
- Source and print pre-paid envelopes for distribution around Vanuatu Post Offices and Agents. Envelopes to be returned to a Private Mail Bag at Port Vila set up solely to accept phones. Use the business-reply mail system for postage costs, and negotiate a rate with Vanuatu Post;
- Develop radio and newspaper adverts that include promotion of prizes for the return of old mobile phones. Prize winners can be contacted via text message: contact details – mobile number only - must be provided on the envelope when returning a cell phone;
- The envelopes to be printed with relevant messaging about E-waste recycling;
- Negotiate with LMC around the potential for LMC to run a ULAB buying system at Luganville market. There would also need to be an agreement with the recycling company around this system, about who is paying who what – if anything- but with safeguards specifically aimed at making sure ULAB did not revolve around a local system picking up a purchase price at every revolution!

11. Scenario for PacWaste Intervention in the Solomon Is.

Recycling of anything in the Solomon Is. is poorly developed, and overall SWM is in a poor and undeveloped state. The legal framework is very basic with regard to SWM, and responsibility for the areas under consideration by PacWaste is not clearly defined. The overall aim is to show where effort might be best targeted, so the recommendations here are provided with this situation in mind: a mix of capacity building and foundation laying, and experimenting with a rural ULAB/cell phone recovery system, similar to the proposal for Santo in Vanuatu. The singular advantage of having very little in place is that a good, coherent approach can be taken, starting from scratch rather than having to accommodate an existing situation.

11.1 Basel Convention Ratification

A clear first step is to work with Environment and Conservation Division (ECD) to draft up a Cabinet Paper that might initiate Basel Convention ratification. This is largely a desk job that can be done from SPREP through remote communication. Some budget could be set aside so that if the Cabinet agrees to go ahead, the consultation processes can be funded in a timely manner to keep momentum for the process. Getting Basel ratification in place can also mean that if new legislation comes up for SWM, then the legislation can reference Basel in terms of definitions for hazardous materials; this can already be done today if the Waigani Annexes are used, but becoming part of Basel will certainly be an advantage if e-scrap is to be heading towards places such as Singapore, which are not part of Waigani.

In addition, if a training expert is engaged - as proposed below – that person can do some training with ECD staff as to the requirements of being a ‘Competent Authority’, to check and complete Basel / Waigani paperwork. The Competent Authority should be inspecting shipments, at least occasionally, and with the current situation in the Solomons of ULAB having their acid tipped out before shipping, working to prevent this practise would be a good first step.

11.2 Capacity Building of the Recycling Sector

As in the case of Palau and some other PICs - but to a greater degree in the Solomons – the commercial recyclers in-country could benefit greatly from a visit by an expert from the recycling commercial sector to run a one or two-day workshop in how to maximise the value of the recoverable resources in E-waste and deal with e-scrap commercially.

ECD would need to coordinate this, but the list of invitees is already clear¹² – it needs to be kept small and focused so that the target audience makes maximum use of the expert. ECD, using volunteers and working with the HCC and perhaps some of the recycling companies, would need to ensure a collection of E-waste was made prior to the workshop so that the expert had a good array of items of E-waste to work with and use as examples.

ECD has a separate bank account into which funds being used as part of the current AFD project are placed. This is also to be used for some upcoming waste and chemical management project work, and this account could be used for some local funding transfer from SPREP as required. The Chief Environment Officer at ECD - Rosemary Apa – is in charge of volunteers used by ECD. As noted, environmental students from SINU work as volunteers when needed. They would need paying SDB\$100/day (US\$14/day) for their work: this covers transport to and from the office, and a midday meal¹³. Rosemary says she can handle up to four volunteers at a time. If a local recycler starts collecting E-waste, then there is potential for ECD volunteers to go around government and institutional offices and publicise where to send old equipment, as is proposed for Port Vila. The census data indicates that the vast majority of E-waste is likely to be found in the Honiara urban area, so it makes perfect sense to start there.

11.3 Rural ULAB collection from Auki in Malaita Province

One clear active step would be to engage the Malaita Chazon Development Authority (MCDA) to start a ULAB collection in Auki town marketplace. A good way forward would

¹² A list of contacts is on record with the consultants that has all contact details required.

¹³ This will barely cover that if they bought a midday meal in town at current prices.

be to provide them with funds to buy batteries, as well as some money for a scale to weigh batteries, some pallet wrap and funds to purchase pallets locally, plus money for transport and shipping to Honiara. A hand-push pallet truck and a second hand shipping container purchase for intermediate storage would also be an advantage.

The MCDA would buy batteries using PacWaste funds, and then sell the batteries to a recycler in Honiara. If MCDA then keeps the funds realised, it will encourage them to build the operation, and a subsidy to get things moving can be provided without having any direct subsidy payments. MCDA could also collect cell phones. The key issues of this process would be what price is paid per kg for ULAB, whilst a price per phone would be best. MCDA did indicate an interest in other E-waste, e.g. computers, and they should be invited to any workshop in Honiara if it is held. MCDA does have a large covered area under their office which they suggested could be used for E-waste processing.

What PacWaste needs to receive from MCDA in return is solid data about numbers of ULAB and cell phones collected, unit size of batteries, cost of shipments etc. This information will be essential in developing any nation-wide system for ULAB recovery, and to feed into any system design that could be then used to develop suitable enabling legislation based around an ARF, if required. But without practical experience and data collection, and an opportunity to experiment with different parameters – e.g. price per kg or unit - it will be very hard to develop a viable system. Development of a system in Auki could give insight to development of suitable approaches for other countries with remote areas and a similar set of circumstances. This small project would also complement the effort in Santo in Vanuatu, and perhaps the two can assist one another as they learn, with PacWaste being the coordinating body.

11.4 Potential Costs

Any commercial E-waste recycling expert visit will have the usual consultancy level of expense, but the expert would need to be in country no more than five days. Visits to different recycler's yards, and the opportunity to spend time with the most promising businesses would be an advantage. For any volunteer-dependant work around publicising where to send E-waste the materials developed for Vanuatu can be easily adapted for local use at low cost.

For the ULAB collection working with MCDA, the potential there is to start with a fixed sum - including enough to buy the required equipment - get things started, and then see how the project develops. An initial expenditure of US\$10,000 would be a very healthy kick-start, as the equipment needed – scale, pallet truck and pallet wrap – would probably be comfortably covered by US\$3,000 or so including shipping. If the system gains momentum, it is a simple matter to spend more if the situation looks promising; this is when the purchase of a shipping container for ULAB storage might be considered (they have an old one already in the market that can be used for a start), but this will likely need transport from Honiara as well as purchasing from the shipping company – perhaps another US\$3-4,000 all up. Having staged payments may also allow points to change the parameters, so as to see what happens when the system is tweaked.

11.5 Provisional Budget Estimates for the Solomon Is.

The following budget estimates provided in table vi are suggested for the first year of effort as a guide to future PacWaste planning for any intervention.

Table vi: Intervention Budget Estimates for Solomon Island Activities

Project Result	Activity	Contractor	Budget (Euros)
Awareness Raising	Flyers & notices to direct urban E-waste to recycler, printing and distribution, volunteers to distribute	ECD	€3,000
Operations	Export of E-waste collected - subsidy for shipping	Local recycling companies	€10,000
Awareness Raising	Newspaper and radio adverts promoting E-waste recovery	ECD/NGO	€5,000
Awareness Raising	Targeted SMS messaging	Cell phone service providers	€5,000
Operations	Phone credit for returned phones	Cell phone service providers	€5,000
Infrastructure	Collection Point Infrastructure at Auki Market place for E-waste	MCDA	€10,000
Training	Training to commercial sector on E-waste	Commercial E-waste trainer	€4,000
Operations	Buy-up of existing ULAB and cell phones through Auki marketplace, ship to Honiara	MCDA	€20,000
Total			€62,000

12. Scenarios for PacWaste Intervention in Fiji

This section provides proposals as to what can be done by the PacWaste project to assist in the improvement of the recycling of WEEE in Fiji.

12.1 Support to Join the Basel Convention

As in several of the countries visited, Fiji is not a Party to the Basel Convention, and could potentially benefit by being so and thus aligning WEEE exports with other potential destination countries procedures; whilst in the past (and perhaps currently) any WEEE is going to Australia - which is a Party to Waigani - prior to re-export to Asia, this does not help with economic development of the e-scrap export sector as the materials sent for recycling need to go to Asia direct, most likely Singapore or South Korea. A fairly standard package of assistance measures could be provided by PacWaste to all PICs who are not currently part of Basel but who would agree to do so. This has the advantage of being a commonly developed piece of work that can be applied in several countries with only minor local modification.

12.2 Encourage a Policy of Recyclers Allowed Free Tipping at Landfill

With the generally depressed nature of the recycling businesses in Fiji, and with the general marginal nature of E-waste being such that it will only be taken on by existing sound commercial operations, the following proposal should help with the economics of the situation. Clearly there is a case to be made that recycling companies should get a

reduced rate - or free tipping - for waste derived from stripping out WEEE; this would largely be plastic cases from electronics, but might also encourage more dismantling of things like refrigerators and washing machines which can have a bulky plastic or insulation waste component. A detailed piece of work that allows a clear case to be made to make this a policy would have application to any PIC where tipping fees to landfill are in place; Hydea Consulting has already done much work in this area with DoE regarding the costs of landfill¹⁴, and with the good datasets that several councils provided to the consultant, a way forward would not be too hard to determine.

12.3 WEEE Collection at Lautoka Landfill

The key intervention area, given the project resources and the proposals contained in the Project Financing Agreement would appear to be at Lautoka dumpsite: the dumpsite has a weighbridge and surrounding area that could accommodate a simple building which could be used as a collection point for WEEE. The process would be that items can be placed there for free, and the incentive for those arriving at the dumpsite with such items is that it will reduce their tipping fee as they can be dropped off prior to going over the weighbridge. Indeed, tipping fees for WEEE could be raised in order to divert them to the free drop-off point, and a tipping fee on a kilogram rate for WEEE – as opposed to the tonne rates used now – could encourage this. Tipping fees at Lautoka are determined by Lautoka City Council (LCC), and so it might be fairly simple to experiment with a WEEE rate as close cooperation with the LCC should be straight forward. Introducing such a process at Naboro would not be possible right now as Naboro has no facility or arrangement to remove wastes for recycling at the entry point weigh bridge¹⁵.

The WEEE collection point building should be sufficient in size so that a recycler can operate there to strip out larger non-recyclable parts on site and then be allowed to send these non-recyclables to the adjoining landfill for free. A contract could be put in place between LCC and a local operator: there are four recycling companies in Lautoka, one of which is the only one in Fiji actively handling E-waste the same as that handling the kerb-side recyclables. The contract would allow all materials dropped off at the collection point to become the property of the contractor, and free tipping of any landfill waste stripped out on site. The deal must include some data collection, so that PacWaste can use this data in future; with a weighbridge on site this can make this part significantly easier. LCC uses contractors for all its existing waste collection work, and so this would make arrangements simpler and easier for PacWaste to have input around the contractual arrangements, particularly data collection. The key staff at LCC are committed individuals, and already have some years of experience working with JICA on the kerb-side recycling project. Location of project activities in Lautoka will also serve Nadi Town, as well as potentially Ba town, and is also in the hinterland of the largest concentration of tourism ventures in Fiji who can be expected to welcome the potential to dispose of WEEE in an environmentally sound manner. This approach detailed here was discussed in outline with the LCC Senior Health Inspector¹⁶ and received a favourable response, but of course the Council itself would need to agree to the proposal. In addition, from an administrative point of view, DoE does have an office in Lautoka which would be of assistance with ongoing relationships and monitoring and evaluation.

¹⁴ Hydea, Op. Cit.

¹⁵ Tyres are separated out where intercepted at Naboro, but stockpiled on site for use.

¹⁶ Mr. Shalend Singh, who has also attended the AFD SWM course in Suva as well as going to Japan with JICA

For the recycler and their relationship with PacWaste, a provision of PacWaste providing a financial incentive at the point of shipping e-scrap could be made, as a way to encourage the recycler to put effort into this project. This incentive would be contingent on agreement that the e-scrap shipped is shipped under the correct paperwork with regards Waigani – and Basel if relevant at the time – and also any IMO regulations. This process will allow hands-on training to ensure that DoE staff are fully familiar with the procedures around e-scrap shipments, as DoE is the Waigani Competent Authority; customs officers can also be involved in this hands-on training opportunity. The presence of a container port in Lautoka will make this easier all around.

Support to LCC and Nadi Town Council can be made to conduct flyer drops and other advertising to encourage local households and businesses to bring in WEEE, or even put them out in the existing kerb-side collections in Lautoka and Nadi if they can be easily directed to the contractor. Public materials developed here can be used as a template in the future for other town Councils in Fiji. With recycling already in place in these western towns, the public awareness ‘baseline’ is higher and so effort can be directed more at the specifics of E-waste than simply recycling in general.

Overall, the points above would make an intervention in Lautoka potentially quite quick, as a building to suit the requirement would likely be a steel pre-fabricated building requiring assembly on site after pouring a concrete slab. The single greatest issue around the landfill gate site is the potential for flooding in the area, and this needs some thought at the time of determining the site and the constructing the foundation, but as there are already buildings at this site, local information to cover this point should be readily to hand.

12.4 Support to DoE with Nasinu Transfer Station Development

Part of the rationale for the Lautoka approach is that the experience gained in Lautoka can be fed into the design and early operation phase of the Nasinu Waste Transfer Station (NWTS). It would be desirable to have a WEEE collection point at the NWTS to prevent these wastes going to Naboro landfill. In addition, the project could perhaps provide technical assistance to DoE to expedite design of the NWTS, and this may co-inside with other PacWaste focal areas around medical waste and asbestos diversion. Diverting CRT glass to the same landfill site as asbestos and medical wastes from clinics, for example, using the Special Waste approach currently in place at the landfill of immediate burial of such wastes in a suitable area of existing landfill, may well be the most viable approach.

12.5 Recommendations for Further Actions and Budget Estimates for Fiji

Some costings and details of actions that need to be taken as first steps are provided here as a result of the discussions above; table vii outlines a first year budget.

- SPREP should write to the government and advise them that their entire recycling industry is collapsing, and that this entails potential future costs to both national and local government.
- Develop an MOU with Lautoka City Council, with the agreement of DoE, for the creation of a WEEE collection point at Lautoka landfill if PacWaste goes ahead.
- Determine from the Fiji Government formally if they would like assistance to join up to the Basel Convention.

Table vii: Intervention Budget Estimates for Activities in Fiji

Project Result	Activity	Contractor	Budget (Euros)
Infrastructure	Construction of Ewaste collection Point at Lautoka Landfill	LCC	€30,000
Awareness Raising	Flyers & adverts to direct E-waste to Collection Point in Lautoka / Nadi / Ba area	LCC/NGO	€10,000
Training	Training to commercial sector on E-waste	Commercial E-waste trainer	€ 4,000
Operations	Export of E-waste shipping subsidy container	LCC contracted recycler	€20,000
Infrastructure	Design of WTS at Nasinu to accept E-waste	Engineering Consultant	€20,000
Awareness Raising	Targeted SMS messaging Nadi/Lautoka	Cell phone service providers	€5,000
Total			€89,000

13. Kiribati

Kiribati was visited in 2013 as part of the SAICM work; it has an ongoing project which has potential to provide useful information and experience to the PacWaste interventions.

13.1 Existing E-waste project in Kiribati

Kiribati has an E-waste project supported by NZAID at the moment, as part of the overall NZAID Tarawa SWM project. This project commenced in 2011 and work on E-waste started in mid 2012, but the E-waste work has suffered from several personnel changes and has only gained momentum over the last year or so. NZAID has agreed to provide support on E-waste until 2015, and the project is currently collecting E-waste at the Tarawa MRF and expects to make a single TEU shipment by the end of 2014. Infrastructure has been built at the MRF which comprises three shipping containers on fixed foundations under a permanent roof. This allows sufficient space to receive, process for dismantling, pack and store E-waste for future shipment. The Project Officer and project management are under the Environment and Conservation Division (ECD) of the Ministry of Environment (MELAD).

As NZAID is providing funding (which is quite sufficient to cover activities at current rates) no financial intervention would be required by PacWaste at this time. The most useful activity for PacWaste would be to coordinate with ECD and NZAID High Commission in Tarawa (who manage the local NZAID projects) and ensure that they are fully aware of the PacWaste work in this area, so that should this existing effort find that it requires any technical support whilst it is doing useful work, then perhaps there would be a way of PacWaste to get involved. On the other side, the information and experience being generated by the NZAID project will be very useful to help develop PacWaste work in other countries, and as such a good working relationship with both ECD and NZAID should be established.

No financial or other direct effort is required for Kiribati at this stage.

14. Tonga

Tonga was visited in 2013 as part of the SAICM work, and has existing effort to collect and export E-waste which comprises a collaboration between a small, volunteer NGO and a private sector partner; this effort can be usefully supported by PacWaste.

14.1 Support to Local NGO and Private Sector Partnership

Tonga has an E-waste NGO that has been supporting local recycling company GIO Recycling Ltd. to recover e-scrap from the waste stream. The support had included rent for a small industrial unit, around T\$500/mth, plus support for two workers to dismantle E-waste already collected at around T\$800/mth. Five shipping containers full of E-waste were collected in 2010, and GIO has recently been trying to process them as well as incoming materials. The NGO support, derived from a GEF small grant has now finished, and GIO currently has a debt of T\$1,800 for rental of the industrial unit outstanding. At the time of writing they have not managed to make an export as the cost of doing so is significant and returns are uncertain until the buyer can evaluate the value of the shipment the other end. If PacWaste was to provide some support to recycling through the medium of the E-waste Tonga NGO, in possibly the same manner in which the previous GEF small grant worked, it could follow the same methodology as the GEF grant and allow a recycling company to make a shipment of only E-waste. It would be useful to provide a shipping support value (estimated at around US\$3,000) so as to get an export shipment out. This would then allow a clear evaluation of the shipment, and the work conducted so far.

The project should specifically require information regarding the value of any shipment once bought by the buyer, the cost of preparing and shipping, some estimate of the number of various items that were dismantled to make up the shipment etc. in return for the support. This information would be extremely useful in developing interventions in other countries. As Tonga is the PIC most advanced in this area, it is best placed to provide essential information to help the project properly evaluate the cost of facilitating shipments in other PICs. This potential intervention could happen quickly and really help with the development of the round of interventions, and costing them out, for other PICs. Table viii below provides some budget estimates to help the PMU with planning potential intervention.

Table viii: Intervention Budget Estimates for Activities in Tonga

Project Result	Activity	Contractor	Budget (Euros)
Training	Commercial E-waste Training	Commercial E-waste trainer	€ 4,000
Operations	E-waste collection point: rental to re-open old collection centre	Local recycling business	€5,000
Awareness Raising	Flyers & notices to direct urban E-waste to recycler, printing and distribution	E-Waste Tonga	€5,000
Operations	kick-start ARF fund at WMA	WMA	€25,000
Operations	Export of E-waste collected - subsidy for shipping	Local recycling business	€10,000
Total			€49,000

15. Samoa

Samoa was another country visited in 2013 as part of the SAICM work. This is also the home base of SPREP and this fact is build into the proposals in the area of developing commercial training to recyclers in the other PacWaste intervention proposals.

15.1 Development of Training Workshops for Recycling Companies

In Samoa, a significant step could be made to encourage the existing IT community and the recyclers to start breaking down E-waste for scrap. This requires a workshop to provide the required information. This workshop could potentially be replicated in many PICs under PacWaste, as lack of knowledge about the commercial categories for e-scrap is a very significant constraint almost everywhere.

Holding the first workshop in Samoa can be done at SPREP itself, involve the SPREP IT Department, and feed into the in-house programs at SPREP to improve the organisation's own ecological footprint. It will also allow the PacWaste project to evaluate the Trainer, with direct support from SPREP IT with regard to how well the Trainer performs. The results of the workshop and impact on the existing Samoa recycling businesses can also be evaluated by the project, as PacWaste is in Samoa. This is another reason to do the training first in Samoa, as the validity of the approach can be easily measured simply through seeing if the local recyclers improve their recovery rates of E-waste.

Table ix: Intervention Budget Estimates for Activities in Samoa

Project Result	Activity	Contractor	Budget (Euros)
Training	Commercial E-waste Training and workshop at SPREP	Commercial E-waste trainer	€ 6,000
Infrastructure	Collection point at Tafaigata Landfill	Local builder	€10,000
Awareness Raising	Flyers & notices to direct urban E-waste to recycler, printing and distribution	NGO	€3,000
Operations	Export of E-waste collected - subsidy for shipping	Local recycling business	€10,000
Total			€29,000

16. The Cook Islands

The Cooks were the final country visited as part of the 2013 SAICM work. Whilst there is no immediate large intervention potential here, there is a definite potential to create an ARF system in the Cooks without too much legislative difficulty should the government wish to do so, and at that point PacWaste could provide very useful support.

16.1 Support to Encourage e-scrap exports and model an ARF

The Cook Islands has potential to develop a useful legal model to have a flat-rate levy system for WEEE that could be used for recycling. But work on this will take time, and involve significant interaction with the government to develop anything along these lines.

However, it also has a competent recycling company, who took up E-waste recovery after the 2013 SAICM visit provided useful information: the company director is also closely involved in policy development on waste and recycling, sitting on the national SWM committee. The local recycler has the potential to provide very useful information on the larger logistical and cost requirements for any e-scrap recovery system. Engaging with his company, in return for information regarding what is processed, what it cost to do so, and the value of that recovered, would be extremely useful for developing other in-country work around the region, as this recycling operation probably has the most potential to provide very solid and detailed information.

One additional avenue of engagement might be through the local conservation NGO who also sits on the SWM committee. A contract of supplying a fixed shipping cost subsidy in return for information concerning the make-up and value of a shipment might be the way to go. Encouraging the recycler to push ahead with e-scrap recovery (there is plenty already in storage in the Cooks that can be recovered quickly) would provide a solid foundation to getting the government to start developing the levy system, and that work will almost certainly provide a useful template for interventions in less advanced PICs.

Costs in the Cooks would not be great, but there may be potential to increase support in the future to capitalise an E-waste ARF fund if local partners took up this proposal, as the legislation would not be too difficult to arrange. Table x provides some initial funding estimates.

Table x: Intervention Budget Estimates for Activities in the Cook Islands

Project Result	Activity	Contractor	Budget (Euros)
Training	Commercial E-waste Training	Commercial E-waste trainer	€ 4,000
Awareness Raising	Flyers & notices to direct urban E-waste to recycler, printing and distribution	NGO	€5,000
Operations	Export of E-waste collected - subsidy for shipping	Local recycling business	€10,000
Total			€19,000