

Table of Contents

Contents

Summary	2
1 Introduction.....	3
2. Objective	3
3. Methodology	3
4. Definition of e-waste.....	5
5. Hazardous Materials	7
6. General trend flow of e-waste.....	8
7. E-waste Regulation	15
8. Recycle Initiatives.....	17
9. Disposal site	18
10. Recommendations.....	19
References:.....	21
ANNEX 1.....	22
ANNEX 2 - Questionnaire.....	26
Annex 3 – Table of conversion of units into kilograms.....	28
Figure 1 - Stages of e-waste generation	4
Figure 4 - Material flow analysis	9
Figure 5 - Monitor, printer and computer in transit to its final retiring place.....	10
Figure 7 - Close up of the notice buying at \$2.50.....	11
Figure 9 - Discarded DRCS at TSKL Nanikai storeroom	12
Figure 10 - Printer outside Lands Office, Bairiki	15
Figure 11 Couple of DRCS at TSKL Storeroom.....	17

Summary

The use and introduction of Electrical and Electronic Equipment has rapidly increased in Kiribati over the years, resulting in growing amounts of electrical and electronic waste (or e-waste for short) that are discarded and carelessly thrown away in our own backyard once they have reached their useful life. E-waste is categorized as hazardous waste, as it also contains hazardous substances like lead, cadmium and mercury. Incorrect disposal of e-waste, could cause serious damage to our environment and to our own health.

To this end this base line study is launched to determine the problem on the amount of e-waste that has been generated with some self induced due to lack of quality control at point of entry.

On the amount of electrical and electronic equipment that has been so far imported into the country since 1999 there are indeed e-waste produced. This would tend to increase over the years as newer gadgets are imported; replacements of old gadgets are made with the old ones discarded. Therefore management decisions need to be in place to address this potentially increasing problem at this stage whilst it is still controllable and manageable.

The main recommendation is to launch a pilot project similar to the successful “Kaoki Mange Project” to collect what so far being produced as e-waste and to evaluate the viability of the project in its long term approach. This pilot project is to be used as well as a launching pad for public awareness on this growing problem. It also asked for a detailer study on e-waste to strengthen legislation so that the problem is properly addressed.

1 Introduction

Electrical and Electronic waste or e-waste for short is a growing global threat and there is a need to have a status situation of e-waste as applied to Kiribati, which forms the basis for this study. This report is based on series of interviews with the main stakeholders and analysis of a survey that was carried out. Various supporting documents and communications are listed out as a series of appendices with due acknowledgement.

Due to lifestyle changes people in Kiribati are becoming more sophisticated especially those who lived in South Tarawa and Betio that now see the provision of the supply of electricity as a must to power their lights, personal computers, TV sets, video recorders, radio players, charge their mobile phones etc that do not exist before in any typical Kiribati household in the urban area. However, this is expected as a sign of progress and accumulation of wealth in developing economies like Kiribati. The advantages are enormous but on the other side there are disadvantages that are detrimental to our environment.

This high-tech boom has brought with it e-waste, a category that barely existed before. Looking at the product in its complete form the problem is not there but it is in the process of disposing it when it reached the end of its useful life time in the hands of an owner that leads to problems. This is when it is thrown out to the elements that it becomes potential hazardous wastes just waiting to be released to the environment. This is where this report comes in to provide a starting point for discussion on a responsible management concept to handle the disposal of this form of waste in an environmentally sound manner.

2. Objective

The objective of the report is to determine the existing status of electrical and electronic waste in Kiribati in identifying the source, the flow and the quantities of e-waste generated with a view to have a better insight understanding of this in the country. The findings are expected to provide basic information on how to manage such waste in an environmentally sound manner.

The signed term of reference for the study is attached as Annex 4.

3. Methodology

The study was made relatively straight forward in that all electrical and electronic products that are used in what ever form in Kiribati are all imported as finished products and if there are assembling done the number is very small and not in huge quantity to make any real difference. There are traces of trans-boundary movement of these products in other form such as copper and the like but not as toxic waste once the finished product reached Kiribati in its original form. This means that the products when it reached its useful life in Kiribati it is disposed of in the country

The study concentrated in identifying the flow of material within the system to trace the life cycle of the electrical and electronic products that went through when it first enters the country as finished product its conversion until it is eventually disposed as e-waste. In following through these stages we would be able to identify the main stakeholders that play active role and major process that took place within the system to produce the e-waste.

This study defines the system boundary as Kiribati, with Tarawa and Kiritimati as port of entry of all electrical and electronic products into the country shown as follows:

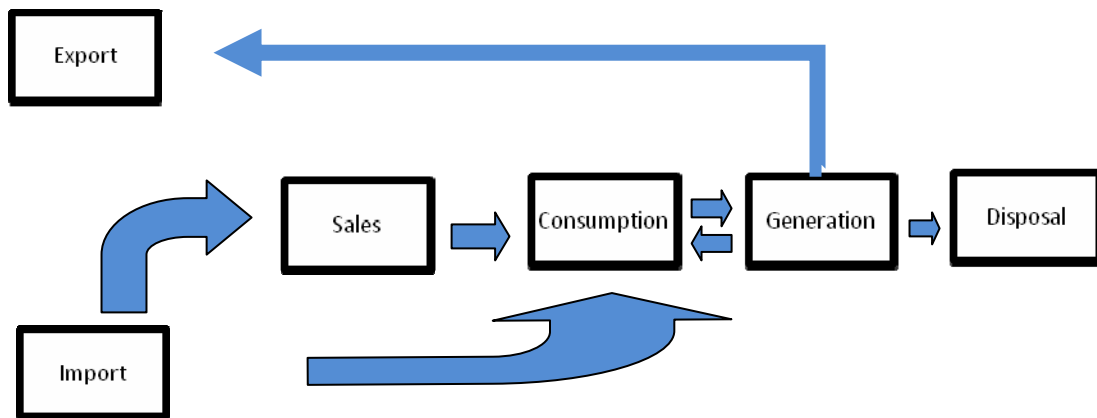


Figure 1 - Stages of e-waste generation

Therefore the sequence and the means by which information was derived in the study were as follows:

The customs department was contacted and their database analyzed under various tariff codes to ascertain imports of electrical and electronic products mainly air conditioners, computers, lap tops, televisions and video players as tracer items in order to understand the flow process in the country and any trans-boundary movement of these products in any other form once it reached Kiribati.

A structured questionnaire, Annex 2 was sent to government agencies and the private sector to collect information on waste generation and disposal. Two separate questionnaires were prepared one targeted on existing electrical and electronic assets that are currently used and the other was aimed at wholesalers and retailers that stock electrical and electronic products to sell to the general public. The latter questionnaire was poorly answered and subsequently abandoned.

Interviews were carried out with the main stakeholders both government and the private sector on Betio and South Tarawa as a follow up for extra information on waste management in general, generation of e-waste and its disposal including re-cycle initiatives.

Both the BTC and TUC were contacted to identify the status of recycling industries of e-waste especially electrical and electronic repair shops, and current awareness on e-waste appearing in major websites were looked into to ascertain the possible generation data with on-going recycling activities and whether it has any relevance of it being modeled in Kiribati.

A compilation of international efforts on e-waste and waste management was also carried out. This strengthens awareness on e-waste and help to compile this report. The method was based on the search on the internet of documents on e-waste to which the following websites were accessed; http://ewasteguide.info/ewaste_guide; http://www.ban.org/main/about_basel_conv.html etc

4. Definition of e-waste

To allow for a proper study to be carried and proper records established to monitor the flow of electrical and electronic appliances into the country it is appropriate that a proper definition of e-waste is agreed upon from the purpose of clarification for Kiribati and its adoption into our national law to remove any ambiguity. It should be noted at the start that there has been no general agreement reached as to the definition of electrical and electronic waste and in what form. It seems that each country is left to develop its own definition. The Kiribati national committee does not have its own definition, but instead produced a list of what it considered as national classification of e-waste that it considers as most important e-waste items for Kiribati. That list is attached as Annex 5.



Figure 2 This community uses a lap top and CRT monitor to play game of bingo to raise fund

For Kiribati waste is defined in the Environment Act 1999 in the definition clause as "waste" includes matter -

1. whether liquid, solid, gaseous or radioactive, whether toxic or not, which is discharged into the environment; or
2. which is the by product of any process activity or development with no apparent value or beneficial function; or
3. human excrement or farces; or
4. animal excrement or remains; or
5. which is prescribed by regulation to be waste.

The definition does not come that close to what we know of electrical and electronic equipment and its conversion to waste.

The most popular definition so far is one that has been developed by the European Union in its Waste Electrical & Electronics Equipment Directive and used by member countries of the EU in developing their own law. It is defined as:

“Electrical or electronic equipment which is waste including all components, subassemblies and consumables, which are part of the product at the time of discarding.” Directive 75/442/EEC, Article 1(a) defines “waste” as “any substance or object which the holder disposes of or is required to dispose of pursuant to the provisions of national law in force.” (a) ‘electrical and electronic equipment’ or ‘EEE’ means equipment which is dependent on electrical currents or electromagnetic fields in order to work properly and



Figure 3 Computer with so many uses - as stock verifier

equipment for the generation, transfer and measurement of such current and fields falling under the categories set out in Annex IA to Directive 2002/96/EC (WEEE) and designed for use with a voltage rating not exceeding 1000 volts for alternating current and 1500 volts for direct current.

It is suggested that a similar definition of some thing along the line proposed by the EU in

its Directive to be look into and developed as a source of Kiribati

definition on e-waste. This is based on the understanding that e-waste management is more developed in Europe and that Kiribati is a user of those electrical and electronic appliances imported into the country as finished products. Kiribati is not a manufacturer or producer of electrical and electronic products it is an end user hence it is easy to work on what has already been developed.

Further advantage of having a definite definition and proper classification of electronic and electrical equipment as in the foregoing it would help custom assessors when evaluating an appliance in properly allocating an appliance into its proper category such as in 1999 a tariff code 84711000 was for Data processing machines; analogue or hybrid automatic type and for tariff code 84714000 is for Other digital automatic data processing. Only an experienced custom assessor would know the difference as to what type of computer falls under category 84711000 and which falls under 8474000. With this vague explanation it would not be a surprise if each assessor has different definition. Therefore it is further suggested that a proper definition of electrical and electronic equipment is made and to avoid the ambiguity they are properly categorized.

5. Hazardous Materials

The formation or discharge of hazardous emissions of electrical and electronic equipment depends highly on the handling of electronic waste. Hazardous materials contained in e-waste do not lead automatically to a risk for the environment and the human health. The process applied in transition that can cause serious health problems and contaminate air, water and soil.

The following harmful substances is said to be contained in e-waste

Substance	Occurrence in e-waste
Halogenated compounds:	
- PCB (polychlorinated biphenyls)	Condensers, Transformers
- TBBA (tetrabromo-bisphenol-A) - http://www.atsdr.cdc.gov/tfacts68.html - PBB (polybrominated biphenyls) - PBDE (polybrominated diphenyl ethers)	Fire retardants for plastics (thermoplastic components, cable insulation) TBBA is presently the most widely used flame retardant in printed wiring boards and casings.
- Chlorofluorocarbon (CFC)	Cooling unit, Insulation foam
- PVC (polyvinyl chloride)	Cable insulation
Heavy metals and other metals:	
- Arsenic	Small quantities in the form of gallium arsenide within light emitting diodes
- Barium	Getters in CRT
- Beryllium	Power supply boxes which contain silicon controlled rectifiers and x-ray lenses
- Cadmium	Rechargeable NiCd-batteries, fluorescent layer (CRT screens), printer

	inks and toners, photocopying-machines (printer drums)
- Chromium VI	Data tapes, floppy-disks
- Lead	CRT screens, batteries, printed wiring boards
- Lithium	Li-batteries
- Mercury	Fluorescent lamps that provide backlighting in LCDs, in some alkaline batteries and mercury wetted switches
- Nickel	Rechargeable NiCd-batteries or NiMH-batteries, electron gun in CRT
- Rare Earth elements (Yttrium, Europium)	Fluorescent layer (CRT-screen)
- Selenium	Older photocopying-machines (photo drums)
- Zinc sulphide	Interior of CRT screens, mixed with rare earth metals
Others:	
- Toner Dust	Toner cartridges for laser printers / copiers
Radio-active substances - Americium	Medical equipment, fire detectors, active sensing element in smoke detectors

6. General trend flow of e-waste

There are no manufacturing production facilities in Kiribati nor is assembling done of electrical and electronic products to allow for e-waste on excess stock on spare - parts. All of the electrical and electronic products that are used in the country are finished products imported into the country from Kiribati's trading partners mainly Australia, New Zealand and Japan. There is no evidence of these products of being re-exported out of the country in the form they were received or as toxic waste, however there are valuable metal that has been exported out of the country such as copper that may have originated from an un-repaired fridge, transformer or other electrical items such as under ground cables. Therefore it could be concluded that the products when it reached the country are used until eventually disposed of as e-waste.

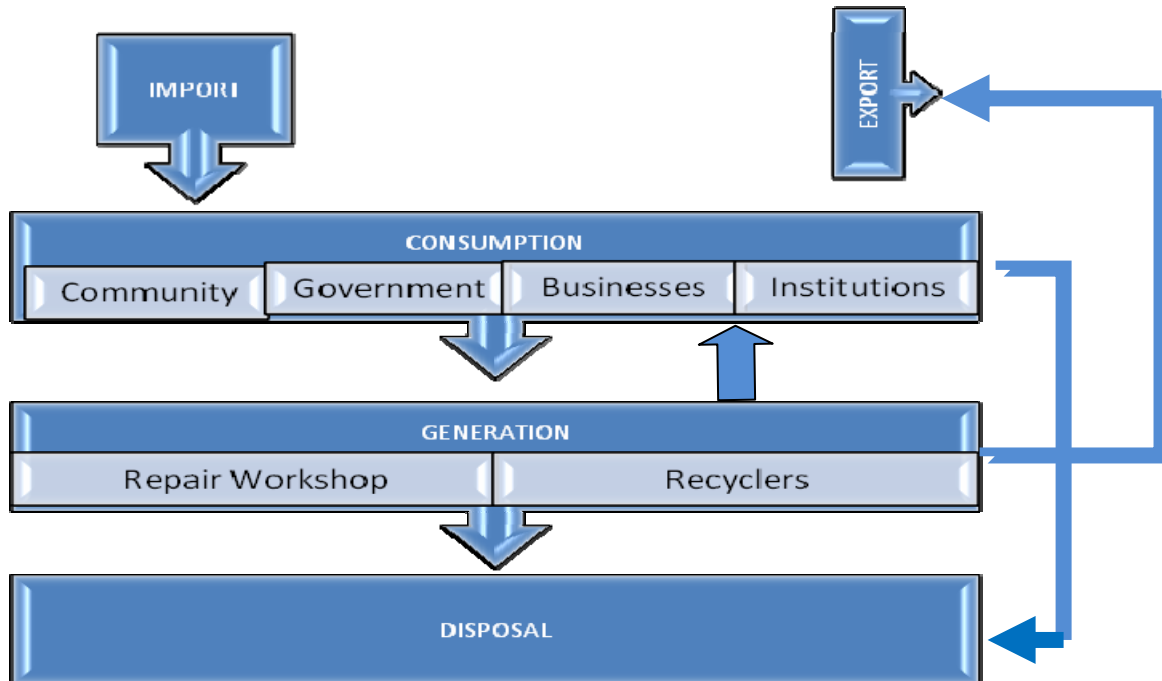


Figure 4 - Material flow analysis

From the diagram the main sources of e-waste are the main consumers mainly the Government agencies, institutions, businesses, and the community. All of these products once used are destined to be disposed at the open land fill at either Nanikai or the Red beach in Betio like any other solid waste. The disposal of the e-waste would involve calling either the Tarawa Urban Council (TUC) or Betio Town Council (BTC) which ever is the nearest to pick up the e-waste or it is left along the road side or under stairwells of an office for the council truck to pick it up. In some cases the owner would transport it to the site. There are no designated areas for members of the public to place their e-waste. However the BTC is attempting to have a permanent location for members of the public to place their solid waste. At the moment the disposal of e-waste is treated like any other solid waste.

The electrical and electronic product is subject to be scrapped is when it becomes inoperative. When it reached this stage it means the appliance is unfixable and its next destination is the disposal site. The timing of the eventual disposal of the appliance to reach the disposal site could be further prolonged with the inoperative appliance temporarily taken on stock if the parts are inter changeable with an operating product on hand. This could be seen at government owned companies that provide their own repair for their working assets such as BPA, TSKL and privately owned company like Pintech, KOES etc and in the office of IT Managers in Government ministries and departments.



Figure 5 - Monitor, printer and computer in transit to its final retiring place

Unlike inoperative fridge and air condition stripping of electronic appliances is rarely done, to take out materials of economic value as noted to be contained in these appliances. The master thesis presentation "*Mechanical Recycling of Consumer Electronic Scrap. Licentiate, Luleå University of Technology, Luleå, Sweden, 2005*," notes the existence of such elements of economic value that can be extracted. The lack of interest may be due to lack of knowledge to the existence of such things in those appliances and maybe the volume is not that much to justify the trouble involved in extracting the material. For a fridge it is stripped and copper is taken out and sold to copper dealers in town who buy copper at the price of \$1.50 a kilo.



Figure 6 - Copper dealer in Bikenibeu



Figure 7 - Close up of the notice buying at \$2.50

The disposal of all Government purchased assets that would include electrical and electronic appliances is required to be verified prior to being disposed. This is specified by the Stores Regulation which has been inherited since the colonial days and has not been change since.



Figure 8 - Stairwell at MFEP Bairiki

The regulation dictates that any stock declared by a senior responsible officer of a ministry to be inoperative before it is thrown out of the office it has to be verified to be so by the Government Stock Verifier in the Ministry of Finance. Once it has been inspected the waste is then disposed in a manner recommended by the Stock Verifier. Generally it is retained as spare-part, and in most cases it is ordered to be burnt or

demolished like any other solid waste. The process normally takes a year from the day the item becomes inoperative until it is eventually inspected and disposed in a manner recommended. Sometimes it is left where it was when inspected under a stairwell or at the corner of an office waiting to be moved and this could be until the next office cleans up which can be another year or two later. This legal requirement may also explain why there are no immediate build up of e-waste in the land fill area given that the Government is the major IT technology user in the country. Copy of the disposal notice is attached.

The purchases of all Government assets are also governed by law. The applicable law is the Procurement Act 2002 which requires all government ministries, departments, statutory corporations and government owned companies to go through a tender process for all purchased assets. Since Government is the main source of e-waste producer it should look at incorporating into the tender process a disposal clause in the sales contract.

On the 5 identified means of disposal given in the questionnaire which were (i) give it away; (ii) Store it; (iii) Sell it; (iv) discard it with other waste and (v) donate. The favorable answer to it is that the e-waste is discarded like any other solid waste and the next favorable answer was storage. The storage answer comes mainly from the Government and the IT companies such as TSKL storage room at the Anderson causeway transmitter station:



Figure 9 - Discarded DRCS at TSKL Nanikai storeroom

There was no answer for re-selling the appliance nor was it donated. Lack of response on the re-selling of the appliance could be due to lack of repair shops around. Indeed in the

TUC area there are no officially registered electronic repair shops except several air condition and fridge repair shops, and at the BTC there was only one officially registered electronic repair shop and several for air condition and fridge repair shops. However there are indeed companies like TKL, TSKL, Pintech, KOES etc that provide after sales services but their services in most cases is concentrated on the product that they sell in addition to repairing their own working assets so they have their own stock to serve their need. They noted they could attend to other electronic works if time permits which is a rare commodity in some cases.

Given the above and taking air-condition, computer, lap top, television and video player as input because this is readily available data from custom and use it as a tracer for electrical and electronic products flow of e-waste in Kiribati. The following was what was imported on those items from 1999 to 2007:

	1999	2000	2001	2002	2003	2004	2005	2006	2007
	Units	Units	Units	Units	Units	Units	Units	Units	Units
Air condition	520	553	291	527	201	266	697	536	590
Computer	355	471	83	42	936	173	1661	674	261
Lap top	67	29	26	247	54	7	82	18	49
Television	459	430	218	249	415	345	1751	1143	1126
Video	56	20	53	5	40	84	264	178	298

These units are then converted into kilograms to approximate the amount of e-waste so far received and accumulated on the 1999 import for these 5 appliances alone.

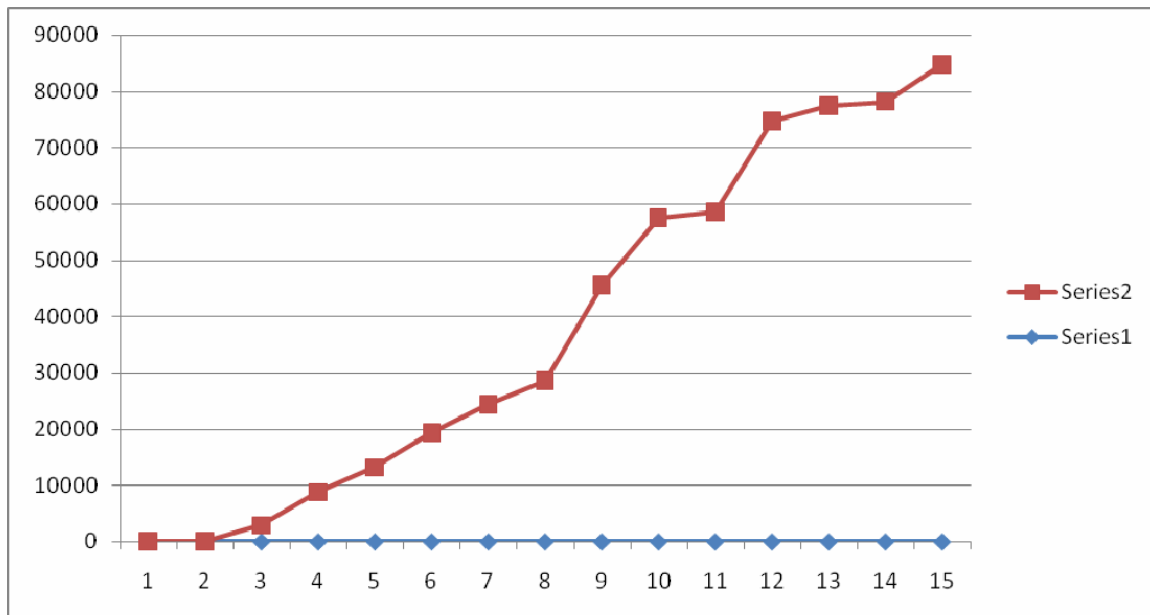
Other records that could be relied upon to get the needed data is the 2005 census. However the 2005 census only concentrate on a few electrical and electronic appliances such as the fridge, television, computers, home phone and mobile phone and the following was noted from the 2005 census record:

- Every fifth household (20 per cent) owned a *fridge*. This percentage was 41 per cent in South Tarawa and only 8 per cent in the rural areas.
- A *home phone* was available to 57 per cent of all households; this was 67 per cent in South Tarawa and just over half of all households in the rural areas.
- Every tenth (11 per cent) of all households owned a *TV*, being 20 per cent in South Tarawa and 5 per cent in the outer islands.
- More than 60 per cent of all households owned a *radio*.

These electrical and electronic equipments when they arrive in the country are not immediately placed into the owner immediate use. In some cases they are stored for a while others on public display until eventually purchased by the new owner, when the count down to the end of it useful commences. The extent of the equipment useful life at the hands of the owner varies and subject to the owner use of the equipment. If it is used far more frequent the sooner the equipment is expected to find it self in the waste disposal area the less frequent it is use the longer it will stay with the owner. This is reflected in the questionnaire as there is no general agreement as to the length of a productive life of

such equipment as to draw a general guideline as this happens to such equipment in Kiribati. The time frame given ranged from 2 to 10 years with only one company reports providing write off of stock obsolesce in its account in 4 years at the rate of 25% for one year, 50% in 2 years, 75% in 3 years with a complete write off in the 4th year. This methodology of write of was accepted by its auditors. Other study pointed out the life cycle ranged from 13 to 15 years for video products, audio products from 3 – 15 years and information products from 2 to 4 years.

Given there is no general agreement as to what figure is to be agreed upon in order to determine the projected e-waste it is not unreasonable to assume for the purpose of this study a 10 year discard cycle rate wherein nothing was thrown away in the first two years after purchase; 5 percent are discarded in year 3; 10 percent discarded per year in years 4-5; and 15 percent per year in years 6-10 then the projected flow for the import from 1999 – 2013 would be as follows:



This of course is to assume that there are no imports prior to 1999 and if the assumption is acceptable then the estimated flow of e – waste to Kiribati for imports for 1999 to 2007 based on the custom figures obtained is as above that would culminate to the build up of e – waste to 84,000 kg by 2013.

However the point that can be concluded on the foregoing simple analysis there are indeed e-waste in the country waiting to be properly disposed in an environmental friendly manner. The exact amount need to be determined in another study with proper records established so that a trace of all electrical and electronic appliances entering the country are properly accounted for and hopefully informed decision made on the method on how it should be disposed. The study should also attempt to answer the question on whether there is a volume to commercially disassemble these appliances here in Tarawa or to ship it overseas to a central pacific point for collection and proper disposal.



Figure 10 - Printer outside Lands Office, Bairiki

When asked whether they know that an electrical and electronic appliance contained toxic materials, most answer in the yes but there are others returned a ‘no’ answer. In light of the ‘no’ answer and the evidence of the way e-waste is disposed in some cases left lying around in public places near offices shows that there is no concern on the toxic materials stated in e-waste literature to be contained in those equipment. It is suggested a public campaign is launched to educate members of the public of the existence of the toxic materials and the danger if not properly disposed.

7. E-waste Regulation

Given the proposed definition of e-waste there is no specific mention of the management of e-waste in the Environment Act 1999. However there are noted references in Part IV of the Act with reference on Control of Pollution where in s30 it states

“No person shall emit or cause to be emitted from any premises noise, odour or pollutant waste or electromagnetic radiation which unreasonably interferes with the health, welfare, convenience, comfort or amenity of any person.”

It went further at s31 to forbid the discharge waste in any position, place, land, beach, sea, lagoon or foreshore from which the waste or pollutant is likely to result in pollution or in the unreasonable interference with health. The Act under that Part as well warn occupier of any premises not to discharge waste pollution and to take reasonable care to minimize the discharge. The Part IV refers to solid waste in general rather than e-waste.

The BTC and TUC both have bye laws on waste issued under the powers conferred under the Local Government Act. However the bye law is not at all relevant, it is old out dated and unenforceable. Furthermore it does not contain any reference to e-waste.

The other relevant Act is the Public Health Act. Again there is no specific reference to e-waste except the reference to pollution.

The most recent Act on waste is the Special Fund (Waste Material Recovery) Act 2004 but the Act works towards establishing a special fund for waste recovery that provide for the introduction of a Container Deposit recycling system that is now basically paying people to remove cans and plastic bottles from the environment which has been very successful. Again it does not mention anything on e-waste the general thrust is on other waste. However the Act would be beneficial if there are intentions towards recovery of e-waste from the general public which would require the changes in the Act with reference to e-waste.

The general recommendation under this section is the need to change the relevant Act to account for proper management and disposal of e-waste, and to provide a provision to safe guard processing work on those e-waste in extracting precious metal like copper and the like or disassembling of the parts is not a health hazard and the eventual disposal on what is left is done in an environmentally sound manner.

The other relevant issue that needs to be raised is the self creation of the e-waste in Kiribati due to lack of import quality control. In Kiribati quality of imported product into the country is not regulated and there is no law in existence in Kiribati that neither prohibits nor regulates standards of products to be imported into the country. This sad state of affairs covers consumable goods to electrical and electronic goods so that a typical Kiribati consumer not knowing any Chinese or mandarin would buy imported consumable goods at a typical Chinese shop not knowing the content of the product nor is the expiry date of the product with all Chinese character written all over it. Because of these state of affairs and in absence of relevant laws to self regulate these imports an electrical and electronic good could already had been some one else e-waste when it arrived in the country.

The recent initiative by Telecommunication Kiribati Limited (TKL) prior becoming TAK in its telecommunication network plan to close the digital divide is another typical example of someone else e-waste used in absence of adequate regulatory guidelines. The proposal was for Telecommunication Services Limited Kiribati (TSKL) to accept the DRCS that was once used in the out back of Australia that were write offs in that country to connect the outer islands instead of most recent innovation in telecommunication. The proposal was accepted connecting the islands of Marakei, Abiang, North Tarawa and Maiana after years of installation the network is plagued with problems for lack of spare parts and the inefficiency of the system to carry data which is now typical means of communication.

The DRCS with its bulky structure still can be found at TSKL Nanikai storeroom awaiting their fate as to where the should be dumped.



Figure 11 Couple of DRCS at TSKL Storeroom

Another example of lack of quality control that is evident today on the road on Tarawa is the volume of Japanese used cars that are being run. The list is indeed long but basically it boils down to money and technical know how to institute quality control.

8. Recycle Initiatives

Most repair works that can be seen as recycle initiatives to prolong the useful life of an electrical and electronic appliance offered mainly by IT companies like Pintech, TKL, TSKL, BPA, Taotin Trading and KOES is provided as part of their back up service to support their product that they sell to the public. For some of them this is in addition to support the core business of their existence for such companies like TSKL who is in the telecommunication business, BPA operates mainly broadcasting service, TKL who is in the television business services etc., so that what ever additional repair work done to the general members of the public on their electrical and electronic equipment is done when there is time available. Because this is not part of their core services down time for repair works for an inoperative equipment to be repaired could take long and in some cases it is a short cut to immediate disposal when parts go astray while waiting for an appropriate time to be repaired to make it impossible when that times come and the only solution left is to throw it away.

Noticeably there are hardly any other repair workshops either formal or informal on Tarawa. The absence of other repair shop may be due to lack of interest to would be entrepreneurs as there may be no incentives in terms of good return, lack of knowledge

and capital to start a work shop. Local custom of the “bubuti” to ask a favor of someone in the know to do a repair work in most cases for nothing may also play a part in discouraging those who have a technical knowledge to start a commercial workshop.

In absence of formal or informal repair workshops other than for established brand this could as well play against the means of attempts of extending the life of an appliance beyond its designed useful life and an alternative source of disposal in a second hand retail shops for used electrical and electronic equipments. Whatever the reason for the lack of business opportunities in establishing repair electronic workshops it should be encouraged to allow further extension of the useful life of an electrical and electronic equipment beyond its designed lifetime.

Conversion of air condition and fridge to other form of waste is mostly done to air condition and fridge than to other types of electrical and electronic equipment. Such as copper that are sold to informal copper dealers on Tarawa and eventually exported are at times extracted from a fridge. Fans are also disassembled from air condition with the whole set thrown away after taking out the fan.

9. Disposal site

The following are the official sites along South Tarawa and Betio for the disposal of solid waste that would include electrical and electronic waste:



Figure 12 - Landfill at Betio



Figure 13 - New waste collection point Betio



Figure 15 - landfill at Nanikai



Figure 14 - Landfill at Nanikai

10. Recommendations

The primary recommendation is that given the volume of electrical and electronic waste proven to exist in this study it is suggested that a pilot project should be set up for the time being as a unit to collect the electrical and electronic waste that so far exists with intention to dispose these waste appropriately either externally or locally in an environmentally friendly manner that would not harm the environment. As a pilot project it will investigate the possibility of operating the unit as an ongoing commercial entity that operates on its own along the lines of the successful aluminum can recycling project.

Other ideas warrant considerations as follows:

- Identify alternative productive ways of utilizing e-waste by other means and provide the necessary training;
- Provide training to any practical re cycling initiatives as an attempt to prolong the life of the equipment;
- The unit should set a provision to actively promote the concept of the e-waste in order it is publicly accepted and understood of the dangers of the potential toxic waste to be released;
- The study should ensure as well to look into the commercial viability of disassembling process locally or other means of disposing g the e-waste and provide appropriate training for whatever attempt that is viable;

- To launch a more detail study to determine the amount of e-waste entering the country and to structure a system that will provide a better monitoring of entry of electrical and electronic products to allow for better inform decision in handling the waste that would be created as a result of its use;
- Recruit a lawyer to up date the necessary legislation to incorporate the concept of the management and minimizing the unnecessary generation and creation of e-waste coming into the country.

References:

This study was made possible in addition to the research questionnaire was made possible with reference to the following materials:

1. E-waste Generation in Chile – Situation Analysis Estimation of Actual and Future Computer Waste Quantities Using Material Flow Analysis by Bernard Steubing 2007;
2. Key Environmental Impacts of Chinese EEE – Industry by Martin Eugster, Roland Hischer / Empa, Switzerland Huabo Duan / Tsinghua University, China
3. Ewaste in China
4. Ewaste in Malaysia
5. Ewaste Sri-Lanka
6. Ewaste assessment in South Africa by Rolf Wideman and ray Lombard
7. Volume II Ewaste management manual - UNDP
8. Custom Imprt Entry Years 1999 – 2007
9. Census Final Report 2005

ANNEX 1

The 10 category of electrical and electronic appliances covered by the EU Directive should also be looked into and adopted for similar reasons and these 10 categories are as follows:

- Large household appliances
- Small household appliances
- IT and telecommunications equipment
- Consumer equipment
- Lighting equipment
- Electrical and electronic tools (with the exception of large-scale stationary industrial tools)
- Toys, leisure and sports equipment
- Medical devices (with the exception of all implanted and infected products)
- Monitoring and control instruments
- Automatic dispensers

Having these categories the appliances then that would fall under each category could be listed as follows:

- Large household appliances
 - Large cooling appliances
 - Refrigerators
 - Freezers
 - Other large appliances used for refrigeration, conservation and storage of food
 - Washing machines
 - Clothes dryers
 - Dish washing machines
 - Cooking
 - Electric hot plates
 - Microwaves
 - Other large appliances used for cooking and other processing of food
 - Electric heating appliances
 - Electric radiators
 - Other fanning, exhaust ventilation and conditioning equipment
- Small household appliances
 - Vacuum cleaners
 - Carpet sweepers
 - Other appliances for cleaning
 - Appliances used for sewing, knitting, weaving and other processing for textiles
 - Iron and other appliances for ironing, mangling and other care of clothing
 - Toasters
 - Fryers
 - Grinders, coffee machines and equipment for opening or sealing containers or packages

Electric knives

Appliances for hair-cutting, hair drying, tooth brushing, shaving, massage and other body care appliances

Clocks, watches and equipment for the purpose of measuring indicating or registering time Scales.

IT and telecommunications equipment

Centralized data processing

Mainframes

Minicomputers

Printer units

Personal computing:

Personal computers (CPU, mouse, screen and keyboard included)

Laptop computer (CPU, mouse, screen and keyboard included)

Notebook computers

Notepad computers

Printers

Copying equipment

Electrical and electronic typewriters

Pocket and desk calculators

And other products and equipment for the collection, storage, processing, presentation or communication of information by electronic means

User terminals and systems

Facsimile

Telex

Telephones

Pay telephones

Cordless telephones

Cellular telephones

Answering systems

And other products or equipment of transmitting sound, images or other information by telecommunications

Consumer equipment

Radio sets

Television sets

Video cameras

Video recorders

Hi-fi recorders

Audio amplifiers

Musical instruments

Other products or equipment for the purpose of recording or reproducing sound or image, including signals or other technologies for the distribution of sound and image than by telecommunications

Lighting equipment

Luminaries for fluorescent lamps with the exception of luminaries in households
Straight fluorescent lamps
Compact fluorescent lamps
High intensity discharge lamps, including pressure sodium lamps and metal lamps
Low pressure sodium lamps
Other lighting or equipment for the purpose of spreading or controlling light with the exception of filament bulbs

Electrical and electronic tools (with the exception large-scale stationary industrial tools)
Drills
Saws
Electrical sewing machines
Equipment for turning, milling, sanding, grinding, sawing, cutting, shearing, drilling, making, holes, punching, folding, bending or similar processing of wood, metal and other materials
Tools for riveting, nailing or screwing or removing rivets, nails, screws or similar uses
Tools for welding, soldering or similar use
Equipment for spraying, spreading, dispersing or other treatment of liquid or gaseous substances by other means
Tools for mowing or other gardening activities

Toys, leisure and sports equipment
Electric trains or car racing sets
Hand-held video game consoles
Video games
Computers for biking, diving, running, rowing, etc.
Sports equipment with electric or electronic components
Coin slot machines

Medical devices (with the exception of all implanted and infected products)
Radiotherapy equipment
Cardiology
Dialysis
Pulmonary ventilators
Nuclear medicine
Laboratory equipment for *in-vitro* diagnosis
Analysers
Freezers
Fertilization tests
Other appliances for detecting, preventing, monitoring, treating, alleviating illness, injury or disability

Monitoring and control instruments
Smoke detector
Heating regulators
Thermostats

Measuring, weighing or adjusting appliances for household or as laboratory equipment
Other monitoring and control instruments used in industrial installations (e.g. in control panels)

Automatic dispensers

Automatic dispensers for hot drinks

Automatic dispensers for hot or cold bottles or cans

Automatic dispensers for solid products

Automatic dispensers for money

All appliances which deliver automatically all kind of products

ANNEX 2 - Questionnaire

This questionnaire is aimed to identify the flow of electrical and electronic appliances into Kiribati, its useful life and how it was disposed as electronic waste (e-waste). The study will contribute to a better understanding of e-waste in Kiribati which is becoming a growing global problem. This questionnaire is anonymous of course, so there will be no connection of your data and name in the study. Please fill out the questionnaire and return it to E-WASTE PROJECT, Environment Division, MELAD, Bikenibeu or call Environment Division for it to be picked up. It is important to return this questionnaire.

Type of institution: Government/NGO/School/Company

How are waste managed in your institution? _____

Does your institution have a procedure to deal with the disposal of electric and electronic appliances that are scrapped? Yes/No

If not does your institution intent to introduce a policy for electric and electronic disposal? Yes/No

When would your institution consider an electrical and electronic appliance to be scrapped?

Operational/Non operational; Technical obsolescence;

Age years of use _____;

Asset value value when disposed \$_____

Does your institution keep track and monitor all appliances on site?

How many of the following electrical and electronic appliances does your institution currently possess?

	Qty Used	Qty Not Used	Total
Computer – desk top
Computer – lap top
Air-conditions
Television set
DVD players
Telephone – mobile
Freezers
Refrigerators
Fluorescent lamps
Electric fan

How was it acquired, New; Used; Leased/Hire purchased

If new, how was it purchased? _____ local store/local tender/direct import

Has the amount increase/decrease over the last 5 years & by how much? _____

What is the average refreshment for new appliance? _____

What is the average life time of used appliance? _____

What happen to the scrapped electrical and electronic appliance?

Give it away; Store it/how long? _____; Sell it \$_____; Discarded with other waste; Donate

Condition of the appliance when disposed?

Broken/defective/Unfixable; Broken/defective/Fixable; In working order

Did you know that electrical and electronic appliances contain toxic waste that can harm the environment if not properly disposed? Yes/No

Annex 3 – Table of conversion of units into kilograms

	Std	1999	2000	2001	2002	2003	2004	2005	2006	2007
	Kg	Kg	Kg	Kg	Kg	Kg	Kg	Kg	Kg	Kg
Air condition	54	28,080	29,862	15,714	28,458	10,854	14,364	37,638	28,944	31,860
Computer	33.3	11,822	15,684	2,764	1,399	31,169	5,761	55,311	22,444	8,691
Lap top	3.6	241	104	94	889	194	25	295	65	176
Television	36.2	16,616	15,566	7,892	9,014	15,023	12,489	63,386	41,377	40,761
Video	5	280	100	265	25	200	420	1,320	890	1,490
Total – kg		57,039	61,317	26,728	39,785	57,440	33,059	157,950	93,720	82,978
Total – Ton		57	61	27	40	57	33	157	93	82

Alternative source to obtaining data on the import of other electrical and electronic appliances from the same period such as the table fans and fridge the figures are only given from 2005 to 2007, as follows:

	2005	2006	2007	Std	2005	2006	2007
	Units	Units	Units	Kg	Kg	Kg	Kg
Table fans	4,686	3,538	2,743	5	23,430	17,690	13,715
Fridge	552	461	769	48	26,496	22,128	36,912
Total Kg					49,926	39,818	50,627
Total Ton					49	39	50

Annex 4 – Terms of Reference of the study

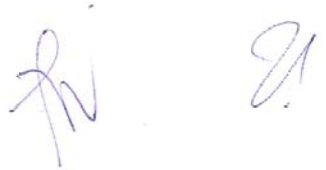
Attachment A.Terms of Reference: Consultant for E-waste Project**Roles and Responsibilities:**

The Consultant will undertake the following tasks in close consultation with the National Coordinator of the e-waste project;

1. Review and compile relevant information on e-waste existing trends including their types and general flow
2. Review existing policies and laws related to e-waste management and identify gaps
3. Prepare and carry out survey to estimate electronic-wastes generators
4. Prepare and carry out survey to estimate e-wastes generated on annual basis
5. Plan and design possible e-wastes collection and recycling operations in future
6. Review and compile information gathered in Tasks 1-4 above
7. Analyze data obtained from surveys and relevant existing literature (Tasks 1-4)
8. Prepare and carry out surveys of custom officers and their data management systems
9. Analyze data gathered from surveys using graphs and other statistical tools for better awareness
10. Prepare the draft report of the project based on Tasks 1-9
11. Prepare and make powerpoint presentations of the project findings and recommendations to the e-waste project committee and the national workshop.
12. Prepare the final draft of the project's report incorporating emerging comments from Task 11.
13. Submit the final draft of the project's report for endorsement
14. Provide briefings on e-waste project activities with other required tasks as may be required by the Project Coordinator from time to time during the project.
15. Participate at e-waste project committee's meetings

Minimum Requirements.

- At least 2yrs relevant working experience in project coordination and managements at the senior level with good skills in data collection, analysis and evaluations. Experiences in managing projects related to solid waste managements in particular would be desirable.
- An advanced degree in project management and planning or any associated tertiary qualification related to environment management would be highly desirable. Master's degrees in any of the above related fields would be an advantage.
- A substantial understanding of socio-economic, cultural and ecological environments particularly of emerging issues and problems faced by communities would be of benefit. Strong communication, analysis and writing skills will be needed as well as good understanding of principles of sustainable development.



Annex 5 National Classification List of E-Waste

Classifications of e-wastes (identify targeted e-wastes)

- Computers (monitors, laptops, rechargeable batteries UPS etc)
- Air-conditions
- TVsets
- Portable DVD players
- Fixed/Mobile phones
- Freezers
- Refrigerators
- Fluorescent lamps
- Electric fans (ceiling, floor and desk)
- Kettles
- Microwaves
- Electric stoves/oven
- Washing machines
- CD, MP3 Players
- Photocopy machines