Pacific E-waste:
A Regional Strategy and Action Plan 2012

Secretariat of the Pacific Regional Environment Programme (SPREP)

With assistance from the:

National Environment Service, Cook Islands
& the Secretariat of the Pacific Community

SPREP
Secretariat of the Pacific Regional
Environment Programme

NATIONAL ENVIRONMENT SERVICE
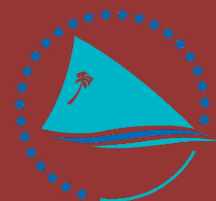TU'ANGA TAPOROPORO
COOK ISLANDS

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(to be) Adopted by the 23rd SPREP Meeting (September 2012) by:
American Samoa, Australia, Cook Islands, Federated States of Micronesia, France,
French Polynesia, Kiribati, Marshall Islands, Nauru, New Caledonia, New Zealand,
Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu,
United States of America, and Vanuatu.

Nothing in this strategy or action plan is intended to give rise to rights or obligations under international law.

Foreword

End-of-life electrical and electronic equipment is of increasing concern in the Pacific, with growing stockpiles of television sets, refrigerators, washing machines, radios, mobile phones, computers, printers, photocopy machines, fluorescent tubes and toys accumulating in Pacific landfills and on Pacific beaches. This electrical and electronic (E-waste) should be managed to recover and recycle the range of components it contains to prevent future contamination of the environment. The Secretariat of the Pacific Regional Environmental Programme (SPREP), Secretariat for the Pacific Community (SPC) and the Cook Islands Government have agreed to a collaborative approach to E-waste management in the region, and will together take the lead in addressing this issue.

The highly successful Cook Islands eDay, held in December 2010, with support from the eDay New Zealand Trust, presented an effective demonstration of E-waste disposal for small Pacific Island communities. The Cook Islands eDay project was able to secure in-country and regional sponsors as well as volunteers to cover most of the costs of collecting and packing E-waste into containers and shipping the collected waste to New Zealand (which exceeded $NZ 70,000). The Government of New Zealand (Waste Minimisation Fund) provided this essential donor support for the Cook Islands as part of the eDay 2010 programme. Whilst the Cook Islands eDay was a highly successful interim project, relying on donor funding to cover the costs of international shipping and recycling of E-waste is not sustainable over the longer term. Long-term solutions need to be tailored for individual countries, as appropriate, and may include product stewardship schemes, recycling incentives, recycling capacity development, and other policies. It is important that all stakeholders in individual countries work together to identify the best solution that meets the need of that country.

This Pacific E-waste management strategy describes an integrated framework to progressively collect, store and dispose of E-waste in the region and is supported by an action plan which presents a five year timeframe in which to improve regional E-waste management. The strategy promotes and reinforces responsible E-waste management by incorporating extended producer responsibility and mandatory advanced recycling fees, as well as import taxes or tariffs where necessary, to effectively capture all imported electrical and electronic goods coming into the Pacific. Adoption of National E-waste Management Policies will also ensure that the regional transport of E-waste is controlled through Waigani and Basel Convention protocols (where applicable) to ensure its safer transport, recycling and disposal.

Woking together within this proposed framework, Pacific nations will begin to see a significant reduction in the amount of E-waste going to our landfills and being dumped in other ways in the Pacific.

David Sheppard   *Jimmy Rogers*   *Hon Henry Puna*
Director   **Director-General**   **Prime Minister**
SPREP   **SPC**   **Cook Islands**

Contents

Executive Summary

E-waste refers to discarded electrical and electronic equipment that is at the "end of its life" or is no longer suitable for use. The specific definition and categorization of E-waste varies from country to country, but typically refers to end-of-life electrical and electronic products including computers, printers, photocopy machines, television sets, washing machines, radios, mobile phones and toys, which are made of sophisticated blends of plastics, metals, and other materials. Due to the demand for newer technology, the life-span of electrical and electronic products is progressively decreasing. Consequently, older and out-dated items are becoming obsolete and being discarded in large quantities and at increasing rates worldwide.

The extent of the E-waste problem in the Pacific has not been comprehensively documented, but the limited information available indicates that the use of electrical and electronic equipment is increasing significantly on an annual basis in Pacific island countries. Electrical and electronic waste contains hazardous but also valuable and scarce materials such as metal and alloys which can be recovered and recycled. Proper management and disposal of E-waste is important to the long-term protection of local and regional Pacific environments, as well as to the maintenance of long-term regional sustainability.

This regional E-waste management strategy:

- provides background information on health risks associated with E-wastes;
- provides guidance on best practice in E-waste handling and disposal options;
- describes an integrated framework to progressively collect, store and dispose of E-waste in the Pacific region;
- presents a draft of a model National E-waste Management Policy for further discussion and consultation prior to national adoption; and
- supports co-ordination and capacity building in hazardous waste management.

The strategy is supported by an action plan (2012–2015) which presents a four year timeframe and framework in which to improve regional E-waste management. Appropriate public consultation will ensure that acceptable, cost-effective options are utilised in any future disposal actions for E-waste.

Development and adoption of national E-waste policies will establish a framework for the Pacific that improves management of E-waste and promotes and enforces responsible E-waste management. It is suggested that this framework is expected to incorporate extended producer responsibility and mandatory advanced recycling fees as well as import taxes or tariffs (that are consistent with international trade rights and conventions) to effectively capture all imported electrical and electronic goods.

Adoption of National E-waste Management Policies will also ensure that the regional transport of E-waste is controlled through Waigani/Basel Convention protocols (where applicable) to ensure its safer transport, recycling and disposal.

The Need for a Regional Approach to E-waste Management

Introduction

E-waste refers to discarded electrical and electronic equipment that is at the "end of its life" or is no longer suitable for use. The specific definition and categorization of E-waste varies from country to country, but typically refers to end-of-life electrical and electronic products including:

- **Large domestic appliances** including refrigerators, air conditioners, washing machines, electric cookers, microwave ovens, dish washing machines, electric fans, electric radiators
- **Small domestic appliances** including toasters, irons, vacuum cleaners and hairdryers
- **IT and telecommunications equipment** including laptops, servers, photocopiers, phones, printers, monitors, fax machines, cellular phones
- **Consumer equipment** including TVs, DVD players, hi-fi equipment, electric guitars, amplifiers, radios, cameras
- **Electrical and electronic tools** including drills, saws, sewing machines, lawnmowers, sanders
- **Toys, leisure and sports equipment** including video game consoles, electronic fitness equipment, and electric trains
- **Medical devices** including analysers, imaging and radio therapy equipment
- **Monitoring control instruments** including smoke detectors and thermostats
- **Automatic dispensers** including cold drinks and snacks dispensers

Electrical and electronic equipment of these types are made of sophisticated blends of plastics, metals, and other materials[1]. Due to the demand for newer, more efficient and effective technology, the life-span of electronic products is progressively decreasing. As a consequence, older and out-dated electrical and electronic items are becoming obsolete and are being discarded in significant amounts worldwide. E-waste is growing at about 4% per year, and has become the fastest growing waste stream in the industrialized world.[2]

E-waste: a valuable resource

In theory, everything used in electronic and electrical equipment (including computing equipment) can be reused or recovered and made into new products. In practice, recovery of specific materials is driven by their economic value, primarily found in precious metals and other metals, but which may also include plastics and glass. Experience in the Pacific has so far suggested that there is or will be a net cost to environmentally sustainable E-waste recycling in the region, with an E-waste collection in the Cook Islands in 2010 costing over $NZ 70,000 to collect and export waste components to New Zealand.

End-of-life electrical and electronic equipment, when collected in sufficient volume and brought into a material recovery industry, are a useful source of copper, tin and steel, gold,

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[1] Wong *et al*. (2007). Environmental Pollution 149, 131–140
[2] UNEP (2005). *www.grid.unep.ch*

silver and palladium, among others. Cathode ray tube (CRT) glass recovery is also possible and recycling of engineered plastics from electrical and electronic equipment is also technically feasible, especially when plastics are carefully separated by type. Plastic is sometimes not recovered because of the presence of brominated flame retardants, unless the brominated compounds can be removed, or the recovered plastic has continued uses that require flame retardant properties.

Examples of E-waste dumped in the Pacific islands

As an example of the potential recycling options for discarded electrical and electronic goods, the typical components contained in a computer and their recycling potential are detailed below:

Component	Recyclable material typically present in a personal computer (www.zerowaste.sa.gov.au)
CRT Tube monitor	95% glass 2% ferrous metal
Monitor case and base	98% plastic, 2% ferrous metal
Degaussing wire	95% copper wire, 5% PVC plastic tape
Monitor yoke	75% copper, 10% ferrous metal, 15% plastic
Monitor circuit board, mother board, expansion cards	90% Fibreglass or plastic, 5% non-ferrous metal, 5% other
Computer case	90% steel, 10% ABS or resin plastic
Floppy drives	95% metal, 5% circuit board
Mouse	90% plastic, 5% circuit board, 5% cable
Cables	90% PVC Case, 5% copper, 5% plastic
CD Rom case	50% ferrous metal, 50% plastic resin
Keyboard	99% plastic resin, PVC and copper cabling
Hard drives	80% aluminium, 15% steel, 5% circuit board
Heat sink	95% aluminium, 4% polystyrene plastic, 1% metal
Power supply units	85% steel case, 15% printed circuit board
Screws	100% ferrous metal

A Pacific Approach to E-waste Management

Electrical and electronic equipment may contain a range of hazardous substances including heavy metals (such as mercury, cadmium, lead), flame retardants (pentabromophenol, polybrominated diphenyl ethers (PBDEs), tetrabromobisphenol-A) and other substances.[3] Due to the presence of these substances, E-waste is generally considered a hazardous waste, which, if improperly managed, may pose significant environmental and human health risks.[3] Consequently, planned management and disposal of E-waste in the Pacific region is important for the maintenance of long-term community and environmental health. This Pacific regional strategy provides background information on the health risks associated with E-waste disposal and describes an integrated framework to progressively assess, collect and dispose of E-waste, as well as implement comprehensive extended producer and consumer responsibility mechanisms to sustainably fund E-waste collection and disposal.

Strategy vision

An E-waste free Pacific that minimizes environmental and public health impacts in Pacific island countries.

Policy goals

This E-waste management strategy has the following goals:

- to minimize the adverse effects of E-waste on the environment and human health in the Pacific Region;
- to minimize duplication of effort and maximize coordination of E-waste management activities;
- to build capacity of stakeholders to promote effective E-waste management; and
- to ensure national policy objectives are being met.

Scope

This strategy covers management of all types of E- waste consistent with the classification of hazardous waste under the Basel[4] and Waigani[5] Conventions.

Guiding Principles

The objectives of this regional strategic framework are compatible with the objective of sustainable development. Management of E-waste in the region should be in accordance with the following policy principles:

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[3] Tsydenova and Bengtsson (2011). Waste Management 31, 45–58.
[4] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
[5] Waigani Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region

(i)   Sound decision-making

Decision-making should be based on scientific information and risk analysis from national, regional and international sources and should promote the optimization of resources.

(ii)   Precautionary approach

Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

(iii)   Adherence to regional and international conventions

Pacific Island countries should abide by their obligations to regional and international conventions to which they are a Party.

(iv)   Adoption of the user pays approach

The costs associated with pollution will be borne by those who cause it.

(v)   Transparency

All regional E-waste management activities should be conducted in an open and transparent manner and Pacific Islanders should have access to information regarding E-waste management where this does not infringe on the rights of individuals or private businesses.

(vi)   Public Participation

E-waste management considers the interests and concerns of all interested and affected when decisions are being made.

Implementation timeframe

This regional E-waste strategy will be implemented over a four year period (2012–2015).

Pacific thematic priorities

To achieve the stated goals, five priority thematic areas are identified. These thematic areas cover:

i.   Safeguarding public health;
ii.   Assessment and planning;
iii.   Financing for action;
iv.   National capacity development; and

v.   Coordinated, environmentally sound E-waste management.

Safeguarding public health

The issues

Electronic and electrical equipment can contain a large number of hazardous substances including heavy metals, flame retardants and other potential toxic materials (Appendix 1), and as a consequence, their disposal needs to be carefully controlled. E-wastes are likely to pose little risk to human health until the time that their constituent metals and alloys are disposed of, or extracted and recycled.

What we want to achieve

Pacific island communities are informed and aware of the relative risks posed by E-waste. Up-to-date National Occupational Health and Safety (OH&S) guidelines are enforced to minimise the health risk to workers in contact with E-waste.

How we will achieve the targets

1. Undertake national public awareness campaigns to provide accurate information concerning the relative health risks posed by E-waste to Pacific island communities.

2. Implement and enforce minimum OH&S standards for personal protective equipment (PPE) for all workers involved in handling E-waste (Appendix 2).

3. Implement standardised regional or national training for workers involved in handling and processing E-waste.

Assessment and planning

The issues

The extent of the E-waste problem in the Pacific has not been comprehensively documented, but the limited information available indicates that the use of electrical and electronic equipment is increasing significantly on an annual basis in Pacific island countries including the Cook Islands,[6] FSM,[7] Kiribati,[8] Fiji[9] and Samoa,[10] with a concomitant increase in the quantity of E-waste generated in the region. As an illustration, the first Cook Islands E-waste collection day (December 2010) collected 5154 pieces of E-waste,[11] including 1147 computers, 1101 monitors, 543 printers and scanners and 476 keyboards. Other electrical and electronic goods were unable to be collected at this event. The lack of information on the extent of the use of electrical and electronic goods, or of country E-waste stockpiles currently hinders effective planning and, as a consequence, most Pacific countries have no current systematic management of this waste stream.

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[6] Rongo (2009). To Implement the Electronic and Electric Waste (E-Waste) Project in the Cook Islands
[7] Anon (2009). The E-waste situation in FSM, Country Report
[8] Anon (2008). Kiribati E-waste
[9] National Toxics Network (2008). E-waste in the Pacific: The Rising Tide Fiji and Samoa
[10] Sagapolutele (2009). The national inventory of E-waste in Samoa
[11] Marsh et al. (2010). eDay – Cook Islands 8th December 2010

What we want to achieve
A comprehensive understanding of the major sources of electrical and electronic equipment imports, and the extent, status and trends of E-waste distribution in the Pacific to inform and be included in the development of appropriate national management frameworks and policies. These national policies will improve country management of E-wastes and minimize future environmental risks to Pacific island communities.

How we will achieve the targets

4. Complete an inventory of the major sources of electrical and electronic equipment being supplied to Pacific island countries based on a regionally adopted assessment method.

5. Complete an inventory of the quantity and status of national E-waste stockpiles and E-waste recycling activities based on regionally adopted assessment methods.

6. Complete a regional database (using relevant Basel convention guidelines) to house collected waste information and data.

7. Establish a Regional Industry Consultative Group to provide guidance and input into national E-waste management policies and strategies.

8. Establish and operate an appropriate national framework that improves country management of E-waste and promotes shared E-waste management responsibility by all stakeholders (template in Appendix 3).

9. Develop a list of certified and accredited E-waste recyclers and disposers able to operate in the Pacific Region.

10. Establish regional minimum technical standards (using related Basel convention guidelines and with due regard to international trade rights and obligations) for major categories of imported electrical and electronic equipment.

Financing for action

The issues
Removal of E-wastes requires a skilled labour force and is time consuming and costly. National budgets currently have minimal or no allocation to deal with E-waste management.

What we want to achieve
Sufficient funds secured for the inventory, collection, storage and removal of E-wastes in the Pacific region to prevent them becoming, or continuing to be a significant country waste issue.

How we will achieve these targets

11. National governments adopt and enforce appropriate financial instruments and policies (such as extended producer responsibility and introduction of advanced recycling fees and import taxes or duties) to finance the sustainable management of

E-waste (Appendix 4). Any such measures adopted should be consistent with international trade rights and obligations.

Country capacity development

The issues
National integrated management of electrical and electronic goods requires a skilled, professional workforce with a range of management and organisation and logistical experience. E-waste collection also relies on the participation of trained and equipped volunteers and participants from the private sector to support national E-waste collection activities.

What we want to achieve
Skilled and experienced Pacific island government employees and citizens actively engaged in all facets of E-waste management. This includes national commitment to enforce the requirements of International and Regional Conventions on the shipment of collected E-waste.

How we will achieve these targets

12. Pacific island countries maintain a core team of personnel with experience and expertise in the management of E-waste and operation of periodic E-waste collection events.

13. National customs and environment officers trained in and cognisant of national requirements and obligations under regional and international waste management conventions including trans-boundary movements.

Coordinated, environmentally sound E-waste management

The issues
Environmentally sound management of electrical and electronic equipment encompasses prevention, reduction, collection, storage and disposal of E-wastes. Many countries lack the appropriate standards on equipment imports which could help to manage and reduce the proliferation of E-wastes. Once the waste is generated, there are a range of potential options for its disposal; however, there is a lack of objective evaluation of each option in Pacific island countries and territories.

What we want to achieve
Economically sustainable and environmentally sensitive disposal of E-waste within the Pacific region.

How we will achieve the targets

14. Undertake national public awareness campaigns to provide accurate information concerning the relative risks posed by E-waste to Pacific Island natural environments.

15. Undertake national public awareness campaigns to provide accurate information on practices that individuals and businesses can adopt to better manage E-waste at a local scale.

16. E-waste disposal is guided by a national E-waste management framework following assessment and consolidation of relevant environmentally sound disposal options and public preferences (Appendix 4).

17. The collection and removal of all E-waste in the Pacific region is completed on a prioritised basis taking into account the best cost-effective environmental solution available for its disposal (Appendix 5).

18. Establish dedicated, securely located facilities for temporary storage of legacy E-waste prior to removal to minimise component contamination and degradation from other waste streams and prevent the discharge of any associated pollutants to the environment (Appendix 5).

19. All collected E-waste is transported and stored in compliance with provisions concerning the transport of dangerous goods and hazardous wastes including relevant regional and international conventions (Appendices 6 and 7).

20. Annual public reporting of national E-waste associated activity completed and publically released to document and audit the financial and logistical status of implemented national E-waste programme(s).

Pacific Regional E-waste Strategy Action Plan (2012–2015)

Strategy Objectives	Action	Intended Outcome	Lead Agency	Time frame	Assumption
Pacific E-waste strategy endorsed	1. Conduct stakeholder consultation on draft strategy 2. Refine strategy based on consultation outcomes 3. Present Pacific E-waste strategy to 2012 SPREP, SPC and StEP Meetings	The Pacific E-waste strategy addresses the needs of Pacific Island Members Regional E-waste strategy endorsed by Members	SPREP	2012	Pacific E-waste management a SPREP and SPC priority National E-waste management a Member priority
National E-waste policies completed	1. Complete draft national E-waste policy 2. Establish regional expert stakeholder consultative group 3. Conduct stake-holder consultation workshops on draft policy 4. Finalise national policies based on workshop outcomes	National E-waste policies meet the needs of Pacific Island countries Expert stakeholder input included in national E-waste policy National E-waste Policy actions endorsed and supported by Pacific Island countries	National Environment Departments SPREP SPC	2012	National E-waste management a Member priority
Development of SOPs for E-waste handling and removal	1. E-waste handling guidelines adopted and enforced 2. Training of E-waste workers completed 3. PPE worn by all E-waste workers	Routine management of E-waste does not result in unnecessary health and safety risks to workers and the community	OHS/Labour Department	2012	Seed funding available
E-waste stockpile management funding	1. Funding applications submitted for PACE, SAICM, AusAID, NZAid and EU funding	Funding secured for regional E-waste inventory and stockpile removal	SPREP	2012	Pacific E-waste management a SPREP priority
Pacific survey of E-waste sources and stockpile distribution	1. Regional survey of electrical and electronic imports 2. National surveys of E-waste stockpile distribution 3. Complete public awareness campaign that provides accurate information on the relative environmental and health risks posed by E-waste	Prioritised E-waste removal planning completed Public awareness campaign completed	National Environment Departments, SPREP SPC	2012 & 2013	Seed funding available National Environment Departments have available resources

Strategy	Action	Intended Outcome	Lead Agency	Time frame	Assumption
Completion of pilot E-waste management programmes	1. Completion of feasibility study for regional recycling facility based on inventory results involving a model Public-Private-Partnership				
Prioritised regional E-waste removal and disposal	1. Training in International convention requirements for export of E-waste completed 2. E-waste stockpile removed on a prioritized basis	All E-waste stockpiles removed and disposed of in a safe and environmentally acceptable manner	National Environment Departments	2012–2015	Funding available Appropriate E-waste disposal options agreed
National E-waste disposal sustainably financed	1. Sustainable user-pays financial framework for E-waste disposal implemented and enforced at a national level 2. National customs, financial and taxation departments trained in E-waste financial issues and strategies	User-pays system in place to sustainably fund E-waste disposal	National Environment Departments National Finance Departments	2012–2013	Pacific E-waste management a national priority Funding available
Annual national collection of E-waste	1. Annual public E-waste education and information campaigns completed 2. Annual national E-waste Day collection of E-waste 3. Secure national E-waste storage facilities maintained	Annual E-waste collection completed and collected waste stored securely or exported	National Environment Departments	Ongoing	Pacific E-waste management a national priority Funding available
Follow up long-term monitoring and assessment	1. Routine ongoing environmental monitoring of Pacific E-waste storage sites 2. Annual national reporting and audit of financial and logistical status of country E-waste programme(s)	Environmental impacts arising from local E-waste storage documented and managed	National Environment Departments	Ongoing	Pacific E-waste management a national priority

Appendix 1

Components of E-waste and their associated health hazard

There are certain common components/parts of electrical and electronic appliances that contain the majority of the hazardous substances. The following components in electrical and electronic goods are considered to be the most hazardous to waste workers and the environment:[12]

Source	Component	Hazardous substance
TVs, PC monitors	Cathode ray tubes (CRT)	Heavy metals (lead, barium, cadmium)
Almost all electronic equipment	Printed circuit boards	Heavy metals (lead, tin, cadmium, beryllium, mercury), Brominated flame retardants
Portable devices	Batteries	Heavy metals (cadmium, lead, mercury, lithium)
Liquid Crystal Display (LCDs)	Cold cathode lamps	Mercury, cadmium
Neon tubes	Neon lights	Mercury
Insulation, housings, circuit boards	Plastics	Polychlorinated biphenyls, Brominated flame retardants Dioxins Polyaromatic hydrocarbons
Light Emitting Diodes	Indicator lights	Gallium, arsenide
Smoke detectors	Sensors	Radioactive elements
Air conditioners	Cooling unit	CFC
Photocopiers	Photodrum	Zinc sulphide

Associated human health effects can include:[13]

Component	Effect
Dioxins	Reproductive, carcinogen
Polychlorinated biphenyls	Reproductive, carcinogen
Brominated compounds	
PAHs	Carcinogen, mutagenicity
Arsenic	Diabetes, cancer
Cadmium	Kidney damage, bone disease
Copper	Liver damage
Lead	Neurotoxicity, kidney damage
Mercury	Neurotoxicity, kidney damage
Zinc	Anaemia, neurological abnormalities

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[12] Tsydenova and Bengtsson (2011). Waste Management 31, 45–58

[13] Frazzoli et al. (2010). Environmental Impact Assessment Review 30, 388–399

Appendix 2

Personnel Protective Equipment (PPE) for E-waste workers

Electronic and electrical equipment can contain a large number of hazardous substances including heavy metals, flame retardants and other potential toxicants. E-wastes are likely to pose little risk to human health until the time they are disposed of, or recycled.

Collection of end-of-life electrical and electronic goods typically involves the usual physical risk to workers associated with movement of heavy and awkward equipment and it is essential that workers are not unnecessarily exposed to dangerous substances.

Workers equipped and educated

1. Workers involved in electrical and electronic goods recycling should be provided with training and information about handling E-waste as well as about its safe disposal. This training should include simple and easy-to-understand information that describes what E-waste is, what the hazards are, and how to handle, package, store and dispose of it safely.

2. Workers handling E-waste should be provided with, and required to wear:
   - Protective footwear, i.e. steel capped shoes or work boots
   - Gloves to protect hands from sharp corners on the equipment
   - High visibility vest for workers in the vicinity of vehicular traffic or fork-lifts
   - Sunscreen and hats and other sun-protection as necessary

3. Workers should have access to potable drinking water and toilet facilities.

4. Workers should also be instructed in safe lifting techniques for heavy equipment such as computer monitors.

Appendix 3

Recommendations for elements of a Model National E-waste Policy

Policy vision
Integrated management of electrical and electronic goods and associated E-waste to minimize potential environmental and public health impacts in Pacific island countries.

Purpose
To establish and operate an appropriate management framework that improves country management of E-waste and promotes shared E-waste management responsibility by all stakeholders.

Policy goals
This E-waste management policy has the following goals:
- To minimize the unnecessary, untimely, and uncontrolled generation of E-waste
- To minimize the adverse effects of E-waste on the environment and people of the Pacific region
- To ensure the systematic replacement of electrical and electronic goods containing unnecessary hazardous materials
- To minimize duplication of effort and maximize coordination of E-waste management activities
- To build capacity of stakeholders to promote effective E-waste management
- To ensure policy objectives are being met

Scope
This policy covers all E-waste consistent with the classification of hazardous waste under the Waigani and Basel Conventions.

Background
[To be completed, using information from previous sections of the regional strategy.]

Policy principles
The objectives of this Policy Framework are compatible with the objective of sustainable development. Regional E-waste should be managed in accordance with the following policy principles:

Transparency
All regional E-waste management activities should be conducted in an open and transparent manner and Pacific Islanders should have access to information regarding waste management where this does not infringe on the rights of individuals or private businesses.

Sound decision-making
Decision-making should be based on scientific information and risk analysis from national, regional and international sources and should promote the optimization of resources.

Precautionary approach
Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Adherence to regional/international conventions
Pacific Island countries should abide by their obligations to regional and international conventions to which they are a Party.

Public participation
E-waste management should take into account the interests and concerns of all interested and affected persons when decisions are being made.

E-waste management policy strategies

Objective	To minimize the unnecessary, untimely, and uncontrolled generation of E-waste
Policies	To achieve this objective, National Governments should: i. Promote and enforce responsible E-waste management through extended producer responsibility (EPR), advanced recycling fees (ARF) and other appropriate tariffs and duties to ensure that environmentally appropriate E-waste disposal is sustainably financed. Any such measures should be consistent with international trade rights and responsibilities.

Objective	To minimize the adverse effects of E-waste on the environment and people of the Pacific Region
Policies	To achieve this objective, National Governments should: ii. Require the establishment and application of appropriate standards, guidelines, and safeguards for the handling, collection, transportation, storage and disposal of E-waste which ensures environmental and public health protection; iii. Promote compliance with existing obligations under regional and international conventions such as the Waigani and Basel Conventions.

Objective	To minimize duplication of effort and maximize coordination of E-waste management activities to ensure effective implementation of the Policy.
Policies	To achieve this objective, National Governments should: iv. Ensure that E-waste management concerns are appropriately addressed in existing waste management legislation, regulations, strategies, action plans and programmes; v. Support the inclusion of E-waste management into appropriate existing governance structures such as taskforces or committees; vi. Ensure that E-waste management is appropriately addressed in current or future waste management planning.

Objective	**To build the capacity of stakeholders to promote effective E-waste management**
Policies	To achieve this objective, National Governments should:
	vii. Create opportunities to develop people's understanding, skills and general capacity and to engage with them concerning environmentally sound E-waste management, including the potential impacts and consequences of poor management; viii. Support the processes to build institutional capacity concerning E-waste management.

Objective	**To ensure that the E-waste management policy objectives are being met**
Policies	To achieve this objective, National Governments should:
	ix. Determine a national definition of E-waste using Basel convention guidelines. x. Support the development of a national register of E-waste (which could be integrated into systems for other hazardous wastes); xi. Require regular reporting and auditing of data and information relating to E-waste management activities from the persons; agencies, institutions, groups, or businesses involved; xii. Develop an appropriate monitoring and evaluation framework to ensure midterm review of the policy; and xiii. Report annually on collection, storage and disposal of E-waste.

Roles and responsibilities

In order to guarantee effective implementation of this policy, the Regional delegate responsibilities for E-waste management should be as follows:

SPREP

- Develop a strategy and action plan for E-waste management in the Pacific region which details the time frame, baseline, targets, outputs and outcomes of regional E-waste management
- Take the lead in securing regional funding for E-waste management
- Provide technical support in relation to in-country E-waste management

SPC

- Provide technical support for developing policy, regulation, standards, guidelines and quality assurance concerning national electrical and electronic goods procurement, importation and use.

National governments

- Take the lead in collecting national E-waste data
- Take the lead in the development of national occupational health and safety guidelines for E-waste management
- Take the lead in enforcement of relevant workplace health and safety legislation
- Take the lead in E-waste collection and removal
- Take the lead in development and enforcement of national electrical and electronic equipment import standards

Development of a regional E-waste policy will require completion of a series of steps outlined in the following Table.

Activity	Number of Weeks													
	1	2	3	4	5	6	7	8	9	10	11	12	13	..16
Circulation of draft Regional E-waste Strategy	▓	▓	▓	▓										
Complete draft national E-waste policy incorporating information from Regional Strategy			▓	▓	▓	▓	▓	▓	▓	▓				
Conduct stakeholder consultation workshops on draft policy											▓			
Refine draft policy further based on workshop outcomes												▓	▓	
Final draft National E-waste Policy completed														▓
Incorporate E-waste management policy outcomes into national waste management strategy														▓

Appendix 4

Sustainable E-waste disposal funding

Sustainable financing is central to ongoing management of E-waste. A number of policy and legislative instruments based on the user-pays approach are potentially available to secure ongoing country finance for E-waste management and disposal:

Extended Producer Responsibility (EPR)

Extended producer responsibility (EPR) extends the responsibility of the producer for the environmental impacts of their products to the entire life cycle of the product.[14] The mechanism moves the responsibility for discarded products to private industry instead of government by incorporating the cost of product disposal and/or recycling into the price of new products. This helps keep consumer products and materials out of the solid waste stream and consequently reduce their environmental impact. Designing products that produce less waste, use fewer resources, and contain more recycled and less toxic components is also a critical, economically driven component of EPR. National Pacific governments should encourage all national procurement processes to support EPR goods.

Advanced Recycling Fee (ARF)

Advanced recovery/recycling fees (ARF) are paid by the consumer at the point of sale when purchasing a new product and used to finance some part or all of the recycling process.[15] The two main benefits are that it provides an immediate, reliable and sustainable source of funding for the entire recycling system, and it pays for the recycling of all returned products. In addition, the ARF concept is easily understood by consumers. This fee will only be able to be levied on consumer goods bought locally, and will also require implementation of an administrative system to manage the funds. It will need to be complemented with an import levy to account for electrical and electronic goods brought into the country by private citizens.

Import Levy

A levy or tax imposed at the point of entry (i.e., airport or dock) on all privately imported electric and electronic goods will complement the ARF and capture the remainder of goods entering the country to fund the national E-waste recycling effort. The general tax base model shifts the responsibility to specific consumers of these electrical and electronic goods.

End-of-Life Fees (EOL)

End-of-life (EOL) fees are defined as a cost paid by the end user at the point of discard for the electronic device.[15] The main advantages of an EOL fee is that it provides immediate funding for a recycling system, it pays for orphan products, and the financing costs are paid by the consumer and not the taxpayer. The main disadvantage of an EOL fee is that the consumer or end user might resort to illegal dumping to escape the fee, which is counterproductive to what the fee aims to achieve. Introduction of an EOL fee for E-waste is not recommended for Pacific island countries.

Any sustainable financing measures adopted for national E-waste management should be consistent with international trade rights and obligations.

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[14] OTP, 2006. Recycling Technology Products – An Overview of E-waste policy issues. U.S. Department of Commerce – Office of Technology Policy. http://www.epa.gov/osw/conserve/materials/ecycling/pubs.htm

Appendix 5

E-waste collection and storage

Successful E-waste collection (particularly those conducted by volunteers) and medium-term storage of collected E-waste requires consideration of a number of separate but interlinked issues:

1.   E-waste collection equipment and logistics

- Pallets (preferably plastic to avoid quarantine issues)
- Forklift rentals, pallet jacks
- Packaging – boxes, stretch wrap, pallets, tape
- Traffic cones
- Shipping containers
- Freight arrangements
- Directional signage

2.   Operations and traffic control

Adequate numbers of volunteers to help manage the equipment on site are needed (usually at least 10 people). Most volunteers will be dedicated to taking the electrical and electronic equipment out of cars so that people can get in and out of the drop-off site as quickly as possible. A typical collection event scenario would have about 4 or 5 people taking items from people in cars and about 2 others talking to the people dropping off their equipment.

3.   Local laws

E-waste collection and recycling facilities should meet all local and national laws and regulations that pertain to their operations, and should be licensed and permitted by all appropriate governing authorities in their country.

4.   Data security

Computer hard drives should be cleaned (erased) at, or immediately following the collection event. Care should be taken to assure the security of data and subject it to verifiable digital data destruction. Privacy concerns are one of the reasons people are not willing to part with their old computers. If hard drives are to be cleaned this policy should be included with event advertising.

5.   Long term E-waste storage[15]

E-waste should be stored in such a manner that its environmentally sound reuse or recycling is not hindered. To achieve this, stored E-waste should:

- be stored on an impermeable pavement with a weatherproof covering. This will prevent rainfall damaging collected equipment and causing contaminated fluids to leave the site and enter the groundwater
- not exceed a total quantity of 80 cubic metres. Any stack of waste containing HCFCs or HFCs should be no more than two units and 3.5metres high

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[15]

http://www.doeni.gov.uk/niea/waste%20home/authorisation/exemption/wml_complex_exemptions/paragraph_49.htm

- in the case of fluorescent tubes and compact bulbs, be stored in secure containers to prevent the glass being broken and to prevent the potential release of mercuric compounds
- be stored for a maximum of 12 months
- be stored and treated in a manner that will prevent the release of CFCs, HCFCs, or HFCs.

Appendix 6

The policy context for E-waste management in the Pacific

(a) International framework

Basel Convention

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (the Basel Convention) is an international treaty that was designed to reduce the movements of hazardous waste between nations, and includes a specific Ban Ammendment (1995), designed, when entered into force, to prevent transfer of hazardous wastes from developed to less developed countries. The Convention is also intended to minimize the generation of hazardous wastes, to ensure their environmentally sound management as closely as possible to the source of generation, and to develop a regulatory system to assist countries in restricting unwanted imports of hazardous wastes. Some electronic wastes are listed as hazardous wastes under Annex VIII of the Basel Convention, while others may be hazardous if they contain specific materials to an extent causing them to exhibit a hazardous characteristic. Additionally, any wastes determined to be hazardous under domestic law (by Parties of import, export, or transit) are also considered to be hazardous wastes under the Basel Convention.[16] Ten Pacific countries are parties to the Basel Convention.

(b) Regional Framework

Noumea Convention

The Convention for the Protection of Natural Resources and Environment of the South Pacific Region (the Noumea Convention) and its Protocols obliges Parties to endeavour to take all appropriate measures to prevent, reduce and control pollution from any source and to ensure sound environmental management and development of natural resources, using the best practicable means at their disposal and in accordance with their capabilities. Ten Pacific countries are Party to the Noumea Convention.

Waigani Convention

The Waigani Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Trans-boundary Movement and Management of Hazardous Wastes within the South Pacific Region (the Waigani Convention) is similar to the Basel Convention, with the exception that the Waigani Convention does include radioactive wastes, and applies only to the Pacific islands region. The Region's obligations under the Waigani Convention are similar to that under the Basel Convention. There are currently thirteen Pacific Region countries who are signatories to the Waigani Convention. As a Party to the Waigani Convention, these countries are obliged to (among other things):

- ban the importation of hazardous and radioactive wastes from outside the convention area;
- prohibit shipment to and from non-Parties, unless there is a special agreement;
- take measures to reduce the generation of hazardous wastes at source taking into account social, technological, and economic needs;

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[16]Basel Secretariat (2011). Article 1 of the Basel Convention.

- as far as possible, develop adequate treatment and disposal facilities for hazardous wastes; and
- follow established procedures for the trans-boundary movement of hazardous waste to other Parties for environmentally sound disposal.

Pacific Regional Solid Waste Management Strategy 2010–2015

The Pacific Regional Solid Waste Management Strategy 2010–2015 has a vision of *"A healthy and a socially, economically and environmentally sustainable Pacific for future generations"* through the adoption of cost-effective and self-sustaining solid waste management systems by Pacific Island Countries and Territories. The original strategy was formulated in 2005 and revised in 2009 to focus on integrated waste management (refuse, reduce, reuse, and recycling) with an emphasis on appropriate waste collection and disposal to achieve this goal. The strategy has also been simplified to include 9 key priority areas for solid waste management in the Pacific which include sustainable financing; adoption of integrated solid waste management including recycling; improved legislation; awareness, communication and education; capacity building; environmental monitoring; and improved medical waste management. E-waste management is not currently included in the regional strategy but is expected to be incorporated in the next revision.

WHO Regional Framework for Action for Occupational Health: 2011–2015

The WHO Regional Framework for Action for Occupational Health was developed through consultations with Member States held in 2009 and 2010 to guide the collaboration in occupational health between countries, WHO and collaborating centers and institutions. The Regional Framework for Action has five main areas of work, or objectives: (1) to devise and implement policy instruments on workers' health; (2) to protect and promote health at the workplace; (3) to improve performance of and access to occupational health services; (4) to provide and communicate evidence for action and practices; and (5) to incorporate workers' health into non-health policies and projects.

Summary of E-waste related conventions and protocols

Country	Basel Convention	Waigani Convention	Noumea Convention	Waste Management Strategy or Plan	National E-waste Policy or Plan
Australia	Y	Y	Y		Y
Cook Islands	Y	Y	Y	Draft	
FSM	Y	Y	Y	Draft	
Fiji		Y	Y	Y	
Kiribati	Y	Y		Draft	
Marshall Is	Y		Y	Draft	
Nauru	Y		Y	Draft	
New Zealand	Y	Y	Y		
Niue		Y		Draft	
Palau	Y	Not ratified		Y	
PNG	Y	Y	Y	Draft	
Samoa	Y	Y	Y	Draft	Draft
Solomon Is	Y	Y	Y	Y	
Tonga	Y	Y		Y	
Tuvalu		Y		Draft	
Vanuatu		Y		Draft	

Appendix 7

Trans-boundary movement of electronic waste in the Pacific: The Waigani Convention 1995

The Waigani Convention prohibits the importation of hazardous wastes into Pacific Island Developing Countries. This means that Pacific island countries should either develop facilities for processing electronic waste (E-waste) in-country or arrange transportation to countries with facilities for the environmentally sound management of the waste. No Pacific Island country currently has facilities for processing E-waste and given the relatively small volumes, it is unlikely that in-country facilities will ever be established. Even New Zealand and Australia with much large populations do not have all the facilities needed to fully recycle all the materials used in the construction of electronic equipment. However, New Zealand and Australia have been making efforts for some years to implement sound environmental practices for recycling E-waste. This includes manual disassembly and separation of the major components – metals including steel and copper, plastic casings, circuit boards, power supplies and the cathode ray tube (CRT). While some of these materials can be processed in-country, the remainder is sent to automated processing facilities in Asia or Europe for the final extraction of source materials.

The challenge facing all countries in the Pacific is their remoteness from these major processing facilities and the cost of transporting E-waste. An option for PICs is to send their E-waste to New Zealand or Australia where it can be aggregated with other E-waste in sufficiently large volumes to ensure good recycling practices. In order to do this, PICs should establish an agreement with a recycler in Australia or New Zealand, and satisfy their own government as well as the government of the destination country that the E-waste will be safely recycled. The steps for achieving this are summarized below, with examples drawn from the Cook Islands eDay event in December 2010 where the E-waste was exported from Rarotonga to New Zealand:

1. *Letter of endorsement from relevant PIC authority*

   A letter needs to be sent from the competent authority in the PIC to the competent authority in the receiving country, endorsing the arrangements for the trans-boundary movement. A reason for the trans-boundary movement should be given, such as a lack of technical capacity and the necessary facilities to dispose of the E-waste in the PIC.

   > *Example:*
   >
   > *Cook Islands Competent Authority: National Environment Services*
   >
   > *New Zealand Competent Authority: Environment Protection Agency (from 1 July 2011)*

2. *Notification for trans-boundary movements/shipments of waste*

   The exporter and importer must jointly sign a *Notification document for trans-boundary movements/shipments of waste.* This details how and when the waste is to be shipped and by whom. It also provides details of how the waste is to be packaged and the final disposal/recovery operations. The waste is also classified according to internationally agreed waste identification codes. Once completed the notification form is submitted to the

competent authority of the importing country, who when satisfied, will issue a written consent to the movement. A guidance manual on these processes has been published by the OECD and is available at: http://www.oecd.org/dataoecd/57/1/42262259.pdf

E-waste Identification:

Basel Annex VIII: A1180, A1190

Y-code: Y20, Y21, Y22, Y23, Y26, Y29,Y31

H-code: H13

UN class: 9

Notification form can be downloaded from:

www.med.govt.nz/upload/20625/oecd-notification-form.pdf

3. Environmental contract between exporter and importer

A contract is required between the exporter and the importer, clearly setting out the respective responsibilities of the two parties. The contract must:

- be signed by authorised representatives of the exporter and the disposal/recovery facility
- specify the role of each party to the contract
- describe the waste, and the method of its disposal or recovery
- specify the quantity (or estimated quantity) of the waste
- specify who owns and takes responsibility for the waste, and when/to whom ownership and responsibility is transferred
- specify that the waste will be disposed of, or managed by, the disposal/recovery facility in an environmentally sound manner, and in accordance with all relevant rules and legislation
- specify that the exporter will take responsibility for the alternative treatment or return of the waste if it cannot be disposed of, or managed, in accordance with the terms of the contract.

Example:

Cook Islands Exporter: National Environment Services

New Zealand Importer: The eDay New Zealand Trust

4. Insurance

The Waigani Convention requires the exporter to take out "adequate insurance, bond or other guarantee" covering the trans-boundary movement, including the costs of returning the E-waste should the importer for any reason decline to accept the E-waste.

> *Example:*
>
> *For the Cook Islands eDay, Contractors Pollution Liability Insurance was secured from AHAC, Sydney through insurance broker Chartis. The cost was AUS$5000 for AUS$1,000,000 cover.*

5. Permit for import

The party accepting responsibility for importing the E-waste into the destination country must complete an application for hazardous waste import. The application requires the following supporting documents:

- Statement of reasons for import
- Copy of insurance policy covering shipment of E-waste
- Copy of contract between exporter and disposal/recovery facility

> *Example:*
>
> *The form used for hazardous waste imports into New Zealand can be downloaded from:*
>
> *(http://www.epa.govt.nz/Publications/Hazardous Waste Import Application Form.doc)*

6. Container weights

E-waste is usually transported between countries in 20' or 40' shipping containers. Equipment should first be stacked on pallets and shrink-wrapped to ensure pallets can be moved easily without any equipment becoming dislodged. Small items such as cables, mice, keyboards, etc are generally packed in tonne bags (like large wool bales). Pallets and the tonne bags can then be forklifted into the shipping containers. Pallets can be stacked on top of each other (noting that the aggregate height should be less than 2.35m, the inside height of a typical shipping container). A well-packed container should hold up to 20 pallets/tonne bags. The weight of E-waste in a fully packed container is typically 6–7 tonnes.

Containers, when packed and sealed, should be weighed, and a weighbridge docket obtained. This will record the weight of the container and contents; the tare (empty) weight of the container is stamped on the outside of the container and can be subtracted from the weighbridge docket to provide a net weight for the contents. Some Pacific island countries may not have facilities for weighing containers before shipment, in which case they should be weighed on arrival in the destination country before de-vanning (unloading the container).

> *Example:*
>
> *No weighbridge facilities were available in Rarotonga for Cook Islands eDay 2010. The containers were weighed in Auckland before delivery to the de-vanning agent (Go Logistics).*

7. Fumigation

Countries such as New Zealand require that many imported goods be fumigated to prevent the introduction of unwanted pests or diseases. This is definitely a requirement whenever wooden pallets are used and is likely to be required for imported E-waste. Some animals could be living inside the E-waste undetected, especially when equipment has been stored for some time. Pacific island countries should take responsibility for fumigating containers before shipment but where this is not possible, it is acceptable to fumigate on arrival.

> *Example:*
>
> *For the Cook Islands eDay 2010, containers were fumigated before leaving Rarotonga, but on arrival in New Zealand, there was evidence that some creatures survived this experience and the containers were re-fumigated.*

8. Movement document for trans-boundary movements/shipments of waste

When the containers are ready for shipping, a *Movement Document for trans-boundary movements/ shipments of waste* is to be completed and signed by the exporter. This document has similar information to the Notification document, but is used to track the waste to final disposal. On receipt into the destination country, the movement document is signed by the importer and finally by the recycler. This completes the chain of custody through to the recycler.

> *Movement document can be downloaded from:*
>
> *www.med.govt.nz/upload/20625/oecd-**movement**-form.doc*

9. Customs clearance

E-waste arriving in the destination country will require customs clearance and it is normal to appoint a customs agent to undertake this work. For New Zealand, Customs require an assessment of the value of the waste in order to assess how much goods and services tax is payable. While the overall value of the E-waste is likely to be negative, i.e. recyclers will be charging for recycling, rather than purchasing, a nominal value has to be assigned for GST assessment purposes.

> *Example:*
>
> *For the Cook Islands eDay E-waste, a nominal 'value' of $500 per container was declared for customs purposes.*

10. MAF inspection

Imported goods to New Zealand, as for many other countries, require inspection by the Ministry of Agriculture and Fisheries (MAF) or a MAF-authorised agent to prevent the introduction of unwanted pests.

> *Example:*
>
> *The Cook Islands eDay E-waste was transported from the wharf to a MAF-approved transition facility where the inspection was carried out when the shipping containers were de-vanned (unloaded). The E-waste was then re-packed into domestic containers for transport to the recycler.*

11. Recycling reporting

When all the materials are recycled, the recycler provides a certificate of destruction (this should record the aggregate weight of product recycled and itemise the weights of materials recovered), and signs off the *Movement document for trans-boundary movements/ shipments of waste*. This document is then returned to the competent authority that issued the import permit. Recyclers should also disclose the downstream destination and use of the recycled materials.

> *Example:*
>
> *From the 1st July 2011, certificates of destruction for wastes entering New Zealand are returned with the completed trans-boundary movement form to the Environment Protection Agency (NZ), previously the Ministry of Economic Development.*