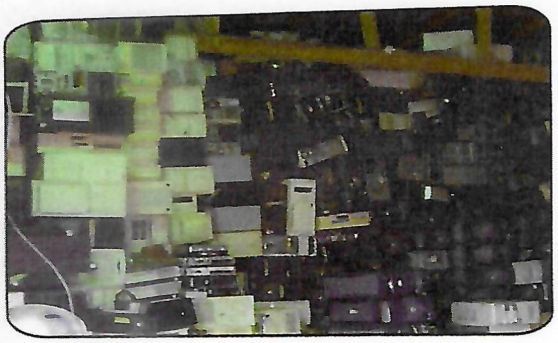
Proposal for the Control of Importation and Management of E-WASTE in Ghana



Green Advocacy Ghana

GreenAd

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P. O. Box SK482 Sakumono Estates, Tema. Tel/Fax +223 (0) 22 403275
e-mail:greenadghana@gmail.com

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Publisher's Name:
Green Advocacy Ghana

Address:
No. 6 Osiabour Plaza, Sakumono Estate, Tema, Ghana

Phone:
+233 24 322 3864/ +233 55 888 5302

Email:
info@greenadghana.com

Website:
https://greenadghana.com/

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LIST OF ACRONYMNS

CEPS	Customs Excise and Preventive Service
EPA	Environmental Protection Agency
GAEC	Ghana Atomic Energy Commission
GHS	Ghana Health Service
GPHA	Ghana Ports and Harbours Authority
ICT	Information and Communications Technology
GreenAd	Green Advocacy Ghana
MDAs	Ministries, Departments and Agencies
MEST	Ministry of Environment, Science and Technology
MMDAs	Metropolitan, Municipal and District Assemblies
NGOs	Non-Governmental Organizations
OLPC	One Laptop per Child
RPI	Radiation Protection Institute
SEA	Strategic Environmental Assessment

1.0 Background

The demand for electronic equipment, particularly computers in Ghana continues to grow by the day. The phenomenal demand is as a result of the increasing e-literacy and the common use of these gadgets in most offices, schools and other institutions, in line with current trends in the global electronic or computer and information age. The emergence of the information age has underscored the critical role that information, knowledge and technology can play in a nation's development and for global connectivity. The effective use of information and knowledge is crucial for rapid economic growth and socio-economic wellbeing of every nation, and the computer is at the heart of all this.

In 2003 Ghana formulated its policy on Information and Communications Technology (ICT) for accelerated development, which represents Ghana's vision on the subject. The premise of the policy is that Ghana's development process can be accelerated through the development and deployment of ICTs. In other words, Ghana's accelerated development within the emerging information and digital age will not be possible without an ICT-driven development agenda (i.e. information rich, knowledge-based and information-driven economy and society).

Among the specific objectives are the application of ICTs to support the modernization of the civic, public and social and health services, the implementation of electronic government and governance as well as electronic commerce and business. For instance, in line with the objective to promote an improved educational system where ICTs are widely deployed to facilitate the delivery of educational services at all levels, Ghana has initiated the One Laptop per Child (OLPC) programme in primary schools. The first consignment of 1,000 computers has been delivered for distribution to schools (Daily Graphic, June 2, 2009). In addition, another initiative dubbed Laptop for Household Project aimed at providing 150,000 affordable laptop computers and accessories to individual households has been launched (Ghanaian Times (page19), August 3, 2009).

Ghana, at the present does not manufacture computer equipment and accessories to support the realization of its ICT policy. They are therefore imported into the country. The reality however, is that though many Ghanaians are capable and desirous of using computers many cannot afford to purchase new computers. The level of demand has led to an alarming influx of the equipment into the country most of which are second-hand. A considerable portion of these imports are old, obsolete or of little or no utility function, and are no sooner declared and consigned as waste for disposal. Unfortunately for Ghana, no facility exists for managing the disposal of such e-waste, in spite of the existing large stocks and the ever-increasing high rate of generation of the waste. The policy direction on ICT and, demands of the current information and digital age are major drivers of high per capita e-equipment import and use, as well as e-waste generation in Ghana.

2.0 Problem Definition

The second-hand electronic import business is a highly booming informal economy. The sector enjoys a high patronage from all levels of societal spectrum in Ghana. In the unfortunate belief and indeed reality that people are unable to afford new computers, importers take undue advantage for brisk business in used and old fashioned computers discarded by their owners.

Apart from those who bring in the second-hand e-imports purely for business purposes, there are those who also bring in some as gifts, under the guise of helping some first and second cycle schools, etc. While the e-waste generation rate for the latter imports could be as high as 60% and above, that for the former is estimated to be over 30%. In spite of the high rate of e-waste generation (from the imports) that is consigned for disposal, a significant amount of cannibalization is undertaken by the importers to get a good number of the equipment to function.

The useful lifespan of the rehabilitated equipment rarely go beyond three years. In effect, the second-hand electronic imports to a large extent amount to 'e-dumping', in as much as a significant proportion ends up discarded as waste within a year or two of arrival. The rate of 'dumping' in Ghana is assuming a rather alarming proportion.

It is estimated that 20 to 50 million tonnes of e-waste is generated across the globe each year and 70 per cent of it is shipped in from countries all over Europe and North America landing in third world nations. About 75% of electronic items are known to be stored, mostly in houses, institutions/offices, warehouses, etc, due to uncertainty of how to manage it. They may commonly be mixed with household wastes, and get finally disposed of at refuse dumps/landfills.

Some initial surveys at the main dump sites in Ghana at Agbogbloshie and Galaway (in Accra)

revealed that some institutions bring for disposal truck-loads of e-waste either for free or for a token fee. The 'e-waste scavengers' also go around town soliciting for old e-waste to pick away. Operations at the dump sites include mainly burning to recover copper wire, and cleaning old vehicle batteries for export to China.

The burning process in particular releases toxic substances into the atmosphere with dire health consequences including acute damage to the lungs from inhalation of fumes of heavy metals such as lead and cadmium, and chronic health problems associated with mental retardation (in case of lead exposure in children, damage to blood cells, kidney damage and some cancers). The menace of e-waste and its adverse implications on health and the environment could be unimaginable.

Computer wastes that are land-filled are known to produce contaminated leachates which eventually pollute ground water. For example, Guiyu, Hong Kong, a thriving area of illegal e-waste recycling is facing acute water shortage due to the contamination of water resources. Acid sludge arising from melting computer chips, could lead to acid soil.

In an attempt to tackle the menace of 'e-dumping' there are proponents who favour the application of the Basel Convention. This convention on trans-boundary movement of hazardous wastes and their disposal establishes a framework of control on the movements of waste from developed to developing countries (adopted in March 21, 1989 but came into force May 5, 1992). Ghana ratified the Convention in 2005, but its provisions are not yet incorporated into a national legislation. The feasible application of the Basel Convention to control old e-imports to Ghana is, however,

considered highly doubtful by other proponents, unless with the intent of banning importation - an option with complex implications. For instance, the absence of second-hand computer-imports (through banning) will very likely negate the successful implementation of the policy on ICT. Without any special intervention, such as fiscal subsidy to make computers affordable, smuggling of the same second-hand computers across borders will become a common practice.

The present situation about 'e-dumping' and its menace can be attributed to the lack of an appropriate framework to regulate their importation, and the proper management of their disposal. The Ghana ICT policy for instance, makes no reference to the concerns about importation of old computers and related gadgets and their disposal on health and environment. It is also silent on the opportunity to collect computer wastes and required national capacity for recycling or proper disposal. Under the circumstance, e-waste dump sites are emerging uncontrollably and dangerously in many places.

3.0 Overall Goal, Objectives and Scope of Proposal

The development of the framework is expected to evolve from the implementation of this proposal. The framework is envisaged to have two components. The first component is on the need for regulations to control second-hand e-equipment importation. The second is the need for a system for the management of the disposal of e-waste in Ghana. The overall goal of the proposal therefore, is to lead to the development of measures for the control and regulation of importation of second-hand (used/old) e-gadgets/equipment on the one hand, and the acceptable procedures for managing the disposal of e-waste generated in Ghana, on the other.

The proposal is structured into two parts, with its implementation accordingly divided into two phases. The part one which involves the control of second-hand e-equipment importation has three main activities. The implementation of these activities will take about twelve (12) months and constitutes the phase 1 of the proposal. The phase two deals with the management of e-waste disposal. This phase has five (5) activities and will take eighteen (18) months to implement.

The 30-month implementation of the two phases of the proposal will constitute the pilot phase for the framework development. This pilot phase will concentrate on computers and related accessories. The purpose of the pilot phase is to serve as the exploratory, trial implementation and learning stage to enable a feasible extension of the experience to cover other electronic equipment. Thus, after the 30 months period, the pilot phase will be converted to a full-blown project to include the following e-equipment, among others:

1	Television sets	5	Fax machines	9	Stereos
2	Cell phones	6	Electric lamps	10	Fridges
3	Photocopiers	7	Audio equipment	11	Batteries
4	Printers	8	VCRs		

The objectives of the proposal are considered in two parts according to the phases of the proposal. The main objective of phase 1 is to prevent the indiscriminate importation of used e-equipment that is rendering Ghana a virtual e-waste dump-site. The main objective of phase 2 is to develop means

for the sound management of e-waste generated in Ghana. There are three and five specific objectives under phases 1 and 2 respectively.

The specific objectives for phase 1 include the following:

- To inventorize e-equipment imports, e-waste generation and environmental hazards;
- To assess the extent of exposure to humans in the areas of handling of e-waste;
- To make the ICT policy of Ghana environmentally sensitive and responsive; and
- To facilitate the development of regulations to check indiscriminate importation.

The specific objectives for phase 2 are as follow:

- To build capacity of selected technical persons and e-technicians to manage e-waste;
- To establish e-waste receiving centres for unusable/unserviceable e-equipment;
- To encourage and motivate individuals, institutions, etc in possession of old e-equipment to hand in at receiving centres;
- To manage the e-waste received at the centre; and
- To evolve measures for e-waste disposal (handle the hazardous, inert and the recyclable components).

4.0 Activities and Components of the Proposal

The two main components/ phases of the proposal are: the control of importation of e-gadgets through ICT policy revision leading to regulations; and measures for the management of e-waste in Ghana. A number of project activities are proposed under each of the two components. The detail activities are given below.

4.1 Phase 1 Activities: Control of second-hand e-equipment importation

The plan for the phase 1 activities commences with a number of surveys on e-equipment imports, e-waste generation and current hazardous disposal exposure risks. This is to provide relevant information, to enable revision of the Ghana ICT policy, which in turn will lend support to the development of regulations. The three main groups of activities under this phase to help regulate and control importation are as follows:

- Inventory of import sources and quantities (from 2000), e-waste generation and health and environment exposure risks;
- Mainstreaming environment into the Ghana ICT policy; and
- Development of regulations to control indiscriminate e-equipment importation

4.1.1 Inventory of imports, e-waste generation and exposure risks

The first group of activities in the phase 1 of the proposal involves surveys of the following:

- Importation of e-equipment (computers) at the ports of entry;
- Unserviceable e-equipment or e-waste generation in selected institutions (in Accra);
- Health exposure risk of the 'scavenging' population (in Accra); and
- Environmental contamination, especially by heavy metals (in Agbogbloshi, Accra);
- Socio-economic implications for the 'scavenging' population

The surveys will make information available on the quantities and main import sources of computers and accessories, through the import records at the main ports of entry. The survey on the rate of e-waste generation and quantities in storage will be conducted in a selected Ministries, Departments and Agencies (MDAs), and importers/dealers in used computers. The potential health risk to the population exposed to toxic fumes from the burning operations of e-waste to recover copper wire will be analyzed, as well as potential heavy metal contamination of the environment. An initial limited survey of the level of heavy metal contamination of the Agbogbloshi dumpsite neighbourhood in Accra was carried out on 8th May, 2009 (Appendix 2).

Once this proposal is implemented, the current scavenging population will be deprived of their source of economic livelihood, though hazardous. As part of the proposal, a survey of the population involved and the socio-economic implications of this change will be conducted and the appropriate alternative livelihood opportunities for that group explored and instituted.

4.1.2 Mainstreaming environment into the Ghana ICT policy

The second group of activities in phase 1 includes:

- Subjecting the Ghana ICT policy to a rapid strategic environmental assessment (SEA); and
- Revision of the ICT policy through stakeholder engagement

The proposed revision of the Ghana ICT for accelerated development policy is for the purpose of mainstreaming environment into the policy. This is to ensure the policy becomes environmentally sensitive and responsive, to the extent that explicit provision is made for managing ICT infrastructure and tools (mainly computers) from cradle to grave. This will be done by subjecting the existing policy to an SEA.

The SEA will among others define 'e-waste' (for proper use of the term in Ghana), and the range of e-equipment falling into this category. It will also explore the implications of relying on the Basel Convention to control e-waste; the feasibility of banning second-hand e-imports; and the option of introducing disposal tax for second-hand e-goods import.

The survey information in the first group of activities (in phase 1) will feed into the SEA process. A stakeholder group (from the relevant institutions and NGOs) will be formed to participate in the policy revision exercise, apart from involvement the SEA process. An SEA document of the national ICT policy and a revised ICT policy document will be the main output of these activities to be presented to the sector (lead) institutions.

4.1.3 Development of regulations to control indiscriminate e-equipment importation

The third activity of phase 1 will involve an expert committee constituted to formulate draft guidelines for consideration by stakeholders into draft regulations, which will be used to control importation of second-hand e-equipment.

The expert committee comprising of about three persons will rely on the SEA output and the survey information to prepare the draft regulations and guidelines. These will then be subject to stakeholder workshops to solicit inputs and for consensus building on the regulations. The regulations will be presented to the appropriate ministry for further action and consent into law.

4.2 Phase 2 Activities: Measures for the management of e-waste disposal

The phase 2 of the proposal involves five key related activities that will lead eventually to the availability of capacity and facilities for handling e-waste professionally in Ghana. These include:

- Capacity building in e-waste management;
- Establishment of e-waste receiving centres;
- Awareness creation on e-waste and for handing them in;
- E-waste management operations at the receiving centres; and
- Disposal/re-cycling system for e-waste components

4.2.1 Capacity building in e-waste management

The capacity building activity is designed to provide opportunity for the technical training of trainers. A group of four (4) officers (middle-level professionals) will be trained in a relevant overseas country on e-waste management for up to a four-month period. The purpose of this training is to equip them sufficiently to be able to train a pool of local e-technicians. These trained e-technicians will be the ones to be engaged to organize, manage and operate the e-waste receiving centres. The trainers will provide oversight and supervisory services to the centres.

4.2.2 Establishment of e-waste receiving centres

An e-waste receiving centre will comprise of a piece of land - measuring about half an acre, strategically located in proximity to a landfill site - acquired for the construction of a number sheds and sanitary facilities. The receiving centres are expected to serve as the collection point of all old, unusable, unneeded e-gadgets. This is to avoid the uncontrolled emergence of e-dump sites, and the situation where people or institutions continue to hold on to e-waste stocks, or send them to domestic dump sites, because of the absence of properly designated places of disposal.

It is initially proposed to establish six (6) e-waste receiving centres in selected catchment areas in the pilot phase. These include Accra (2), Koforidua (1), Kumasi (1), Tema (1) and Sekondi-Takoradi (1). The underlying assumption is that these are the most computer use-active areas. The results from the phase 1 survey may, however, lead to variation in the selected centres. The actual location (siting) of the centres will be done in collaboration with the respective Metropolitan/Municipal Assemblies.

4.2.3 Awareness creation on e-waste and receiving centres

Information on the potential e-waste menace from the current hazardous practices to health and the environment will be prepared from the phase 1 survey activities. The justification to properly designate sites for receiving and properly managing this waste, as well as the location of the centres, the methods of collection and the incentive for handing them in will also be packaged. This will form the core of the awareness creation programme, which will be done through newspaper advertisements and radio announcements.

4.2.4 E-waste management operations at receiving centres

The e-waste receiving centres will be managed and operated by the e-technicians, supervised by their trainers. Two (2) e-technicians will be deployed at each receiving centre with supporting sub-skilled labourers. The received e-waste will be sorted and organized in the sheds. The e-waste management operations will involve dismantling and segregating the parts into three main groups by the e-technicians. The three segregated parts will be the hazardous, recyclable and inert components.

4.2.5 Disposal and re-cycling system for segregated e-waste components

This stage of activity concerns the proper handling of the segregated components. The hazardous parts comprise heavy metals and other substances that are known to be injurious to health and the

environment, but may potentially be re-used. The proposal will explore international partnership for the export of the hazardous components to a designated user. A mechanism for 'waste export' will be established.

A business opportunity will be explored for the sale of recyclable components such as hard plastics and other computer parts. Newspaper advertisements and radio announcements will be made to help identify prospective industries/companies for the supply of such parts. The component classified as inert (non-reactive or re-usable parts) will be assembled. A pressing mechanism will be used to reduce the volume and appropriately landfilled.

5.0 Stakeholder Institutions/Organisations and Roles

The proposal will be co-ordinated by Green Advocacy Ghana (GreenAd) and executed with the collaboration of the lead Ministries, Agencies and key stakeholders. These include the following:

- Environmental Protection Agency (EPA)
- Ministry of Environment, Science & Technology (MEST)
- Ministry of Communications
- Ministry of Trade and Industries
- Customs, Excise and Preventive Service (CEPS)
- Ghana Ports and Harbours Authority (GPHA)
- Ghana Health Service / Ministry of Health
- Radiation Protection Institute of GAEC
- Major dealers/importers of computers and accessories
- Telecommunication (mobile phone) companies
- Accra Metropolitan Assembly (AMA)
- The Blacksmith Institute and Hunter College (international collaborators)

The Appendix 1 shows scenes of some of the consultation meetings of the stakeholders on e-waste and this proposal.

5.1 Environmental Protection Agency

The Environmental Protection Agency (EPA) is the lead public regulatory institution for the protection of the environment in Ghana. As part of its statutory mandate, EPA plays a lead role in the management of hazardous substances, as well as controlling the generation, transportation and disposal of hazardous waste substances. EPA collaborates with both national and international agencies for the purpose of maintaining sound environmental quality.

5.2 Ministry of Environment, Science & Technology

The Ministry of Environment, Science and Technology has policy formulation mandate. This is to ensure the protection of the environment through the appropriate development and application of scientific and technological interventions.

5.3 Ghana Health Service (GHS)/Ministry of Health

The Ministry of Health is responsible for development and promotion of health in Ghana. Realizing the far-reaching role of environmental influences on health, current policy measures aim at

promoting healthy lifestyles and healthy environment. The Ghana Health Service being the major implementing arm of the ministry seeks to achieve this aim in partnership with all relevant stakeholder organizations - government and non-governmental.

5.4 Ministry of Communications

The Ministry of Communications is responsible for policy formulation relating to all aspects of communication in Ghana. The ministry has a leadership role in the promotion of the ICT policy for accelerated development and also related infrastructure development in Ghana.

5.5 Ministry of Trade and Industries

The Ministry of Trade and Industries has policy formulation mandate with respect to trade and industrial development. The ministry is also responsible for the implementation and monitoring of trade and industries (both internal and external), and the enforcement of standards in the sectors.

5.6 Customs, Excise and Preventive Service

The Customs, Excise and Preventive Service (CEPS) is the state organization responsible for the collection of custom and excise duties. CEPS facilities are stationed mainly at the ports of entry and strategic internal locations for the purposes of collection of duties.

5.7 Ghana Ports and Harbours Authority

The Ghana Ports and Harbours Authority is the public agency responsible for the governance, maintenance and operation of the sea ports of Ghana.

5.8 Radiation Protection Institute

The Radiation Protection Institute of the Ghana Atomic Energy Commission (GAEC) is responsible for the promotion of radiation safety by building adequate human resource in radiation technology and related waste safety in Ghana.

5.9 Green Advocacy Ghana

Green Advocacy Ghana (GreenAd) is an environmental Not-For-Profit Organization. GreenAd aims at upholding and enhancing the integrity of Ghana's environment, among others through partnership in research and data collation on the state of the environment; advocacy for sound environmental policies and practices (e.g. against indiscriminate second-hand e-gadgets importation); and dissemination of environmental information through newsletter publications.

5.10 Major Dealers in Computers and Accessories

The e-trade in Ghana is facilitated largely by importers and others assembling these gadgets. It is important that this sector (dealers) is taken into account and involved in any effort at regulation and related e-waste management. The following twelve companies are some of the major dealers (assembling and/or importing) computers and accessories in Ghana being invited to represent the sector and participate in the project: Atlantic Computers, Next Computers, IPMC, Tower Computers, DEON 2000, Oman Fofor and Omatek.

5.11 Telecommunication (Mobile Phone) Companies

The exponential growth in the telecommunication sector (e.g. mobile telephony and internet access) is also leading to the generation of enormous amount of e-waste, particularly batteries and handsets, computers, etc. The inclusion of the sector is therefore key to the effort at effective policy development, import regulation and management of e-waste. The main telecommunication operators invited on the project are: MTN, Vodafone, Milicom (Tigo), Zain and Kasapa.

5.12 Accra Metropolitan Assembly

The Metropolitan, Municipal and District Assemblies (MMDAs) are the planning authority and the statutory bodies with the mandate for waste management. Under normal circumstances therefore, e-waste management would be the responsibility of the Assemblies. Given the peculiar and specialised nature of e-waste however, the MMDAs are clearly incapable of handling the waste. The aspects of this proposal on setting up e-waste receiving centres and land-filling of inert components would require collaboration with the MMDAs. The Accra Metropolitan Assembly (AMA) is being invited to represent the MMDAs on the project.

5.13 Blacksmith Institute and Hunter College

The Blacksmith Institute and Hunter College of the USA have expressed specific interest in the human and environmental exposure assessment of heavy metal contamination of this proposal. The interest will cover funding, provision of equipment and personnel support. The proposal was discussed with two officials from the Institute and the College in May, 2009. An initial survey of level of heavy metal contamination was conducted at the Agbogbloshi site. The preliminary results are presented in Appendix 2.

6.0 Proposal Implementation Plan

A Management Board to exercise the overall supervisory function will be constituted from the following institutions/organizations: MEST, Ministry of Communications, Ministry of Trade and Industries, EPA, CEPS, GPHA and GreenAd. The specific functions will include sourcing for funds and logistics, procurement of services, and direction and leadership on the policy and development of regulations aspects of the proposal.

The Management Board will exercise its role through an Implementation Committee (IC). The IC will be responsible for the day-to-day running of the project (based on detailed plan of action), questionnaire development, disbursement of funds, formation of sub-committees, monitoring of project activities and also serve as the link with the various stakeholder organizations and the Management Board. The following institutions/organizations will be represented on the IC: MEST, Ministry of Communications, Ministry of Trade and Industries, EPA, CEPS, GPHA, RPI, Ministry of Health/GHS, GreenAd, and a representative each of the major dealers in computers and mobile phone operators.

The tables 1 and 2 below show the implementation plans for the two phases of the proposal. The roles of the respective stakeholder institutions have been proposed. GreenAd will act as the overall coordinator and the secretariat to the project.

Table 1: Implementation plan - Control of second-hand e-equipment importation

No	Objective	Activity	Output	Duration (Month)	Institution Responsible
1	To take inventory of importation of e-gadgets (numbers and sources), rate of e-waste generation, and potential exposure risks (to humans and environment)	1.1 Survey of importation of computers and accessories and locally assembled ones since year 2000	Records of percentage country-imports of computers	1.5	CEPS EPA GreenAd
		1.2 Survey of unserviceable/e-waste generation (selected MDAs, institutions, repair and sale shops)	Records of e-waste stored and rate of generation	3.0	EPA GreenAd
		1.3 Human exposure assessment (of scavengers), other e-waste workers and children in vicinity of 'processing' and dump sites: i. Exposure history ii. Protocol development for IRB approval (including physical examination) iii. Biological monitoring of heavy metals in exposed and control population (Blood and urine sample testing)	Records of health status of exposed population, relative to a control population	2.5	GHS GreenAd
		1.4 Environmental surveys of the dump sites and the scavenging population	Records of heavy metal pollution of dump sites, drains & nearby homes	1.5	
		1.5 Socio-economic survey of the neighbourhood of the dump sites	Records of socio-economic status of the affected people	1.5	
2	To make the ICT policy of Ghana environmentally sensitive and responsive	2.1 Engage consultants to conduct a rapid SEA of Ghana's ICT policy (involvement of EPA SEA Unit)	An SEA document on the national ICT policy	3.5	Min. of Trade and Industries Min of Comm. EPA GreenAd
		2.2 A committee to lead a process of ICT policy revision through stakeholder workshops	Revised ICT policy document to (Minister)	2.5	
3	To facilitate the development of regulations to prevent indiscriminate importation	3.1 Expert committee to prepare regulatory framework and guidelines for importation of e-gadgets	Draft regulatory framework and guidelines for importation of e-gadgets in Ghana	3.5	Min. of Trade and Industries Min of Comm. EPA GreenAd
		3.2 Organize stakeholder workshops for input on the proposed regulations			

Table 2: Implementation plan ï Measures for the management of e-waste disposal

	Objective	**Activity**	**Output**	**Duration (Month)**	**Institutions Responsible**
1	To build capacity of officers and e-technicians for e-waste management	1.1 Organize international training programme (training of trainers) for selected officers on e-waste management	4 officers trained in e-waste management	3.5	EPA RPI GreenAd
		1.2 Organize training workshops for selected e-technicians	12 e-technicians trained	3.0	
2	To establish receiving centres for unusable / un-serviceable e-gadgets (e-waste)	Acquire sheds for storage of received e-waste	6 receiving centres established	2.0	EPA \MEST GPHA MMDAs GreenAd
3	To create awareness and motivate individuals, institutions, etc to hand in at receiving centres	3.1 Newspaper and radio advertisements of e-waste receiving centres	90 Newspaper adverts and 90 Radio announcements	10.0	Min of Comm. Min of Trade & Industries GreenAd
		3.2 Provide incentives (transport fare) for individuals, institutions, etc. that hand in e-waste			
4	To manage the e-waste received at the centre	To receive, dismantle, segregate the hazardous, recyclable and inert components at the centres	Constituents of the e-waste segregated	10.0	RPI EPA GreenAd
5	To evolve measures for e-waste disposal (handling the hazardous, inert and the recyclable components)	5.1 Newspaper adverts on availability of the recyclable components for sale	30 Newspaper adverts & 30 radio announcements	4.0	Min of Comm GreenAd
		5.2 Explore international collaboration for export of hazardous components and establish mechanism for export	International partnership and mechanism for export of waste established	10.0	EPA Min of Trade & Industries GreenAd
		5.3 Locate suitable land fill facility, reduce the volume of the inert component (by compressing) and landfill	Pressing mechanism and landfill site found and used	10.0	Metropolitan and Municipal Assemblies EPA GreenAd

7.0 Proposal Implementation Budget

The tables 3, 4 and 5 below show the proposed implementation budget amounting to $313,850.

Table 3: Implementation plan - Control of second-hand e-equipment importation

No	Activity	Cost Area	Description	Cost ($)
1.0 Inventory	1.1 Survey of e-gadgets importation	Questionnaire development and administration (including printing and reporting)	2 persons @ 100 per day for 20 days	***4,000***
		Transport	1 vehicle @ $120 for 10 days	***1,200***
	1.2 Survey of selected MDAs, institutions, etc	Questionnaire development and administration (including printing and reporting)	3 persons @ 100 per day for 20 days	***6,000***
		Transport	1 vehicle @ $120 for 15 days	***1,800***
	1.3 Human exposure survey and biological monitoring	Protocol development for IRB approval (including questionnaire development), physical examination (e.g. chronic effects of lead, chest manifestations of metal fume inhalation) Blood & urine sample testing from 100 scavenging, nearby residents and control population, (including printing and report preparation)		***18,000***
	1.4 Environmental monitoring	Heavy metal monitoring (analysis) at dump sites, drains and nearby homes		***8,000***
	1.5 Socio-economic survey	Questionnaire development and administration (including printing and report preparation)	3 persons @ 100 per day for 20 days	***6,000***
		Transport	1 vehicle @ $120 for 15 days	***1,800***
2.0 SEA of ICT Policy	2.1 Conduct a rapid SEA of Ghana's ICT policy	Engagement of SEA experts	1 Expert @ 400 for 40 days	***16,000***
		SEA Assistants	1 assistant@300 for 20 days	***6,000***
		Transport, Secretarial / Report preparation, communication, etc		***4,000***
		Stakeholder consultation meetings	25 participants @ $ 30 for 5 meetings/ workshops	***3,750***
	2.2 ICT policy revision (stakeholder) workshops	Expert fee for ICT policy revision	2 Experts @ $ 200 for 10 days	***4,000***
		Stakeholder consultation meetings/secretarial services	25 participants @ $ 30 for 5 meetings/ workshops	***3,750***
3.0 Development of regulations /guidelines	3.1 Expert committee to prepare regulations	Expert committee fee for development of regulations	2 Experts @ 400 for 30 days	***24,000***
	3.2 Stakeholder workshops for input on the proposed regulations	Stakeholder consultation meetings/secretarial services	25 participants @ $ 30 for 5 meetings/workshop	***3,750***
Total				***112,050***

Table 4: Implementation plan - Control of second-hand e-equipment importation

No	Activity	Cost Area	Description	Cost ($)
1.0 Capacity building	1.1 International training programme (for selected officers) on e-waste management	Per diem for officers	4 officers @ $ 300 per officer for 20 days	***24,000***
		Tickets for officers	4 officers @ $ 2000 per officer	***8000***
	1.2 Local training workshops for selected e-technicians	Training workshop	12 trainees @ $ 30 per head for 30 days	***10,800***
		Per diem for trainers	3 trainers @ $ 100 per trainer for 30 days	***9,000***
2.0 Establishment of receiving centres	2.1 Acquire sheds for storage of received e-waste	Acquire piece of land	6 sheds@ $ 8,000 per shed	***48,000***
3.0 Awareness creation on e-waste and receiving centres	3.1 Newspaper and radio advertisements of e-waste receiving centres	Newspaper and radio adverts	90 newspaper adverts @ $ 100 per advert	***9,000***
			90 radio announcements @ $ 200 per announcement	***18,000***
	3.2 Incentives - individuals, institutions, etc. that hand in e-waste			***6,000***
4.0 E-waste management operations at receiving centres	4.1 To receive, dismantle, segregate the hazardous, recyclable and inert components at the centres	Allowance for e-technicians	2 technicians @ $ 300 per month for 10 months for six receiving centres.	***18,000***
		Supporting sub-skilled labourers	2 Labourers @ $150 per month for 10 months per centre	***9,000***
5.0 Disposal of segregated e-waste components	5.1 Newspaper adverts on availability of the recyclable components for sale	Newspaper & radio adverts	40 newspaper adverts @ $ 100 per advert	***4,000***
			40 radio announcements @ $ 200 per announcement	***8,000***
	5.2 Seek international collaboration (for export of hazardous components)			-
	5.3 Land fill facility for inert component			***10,000***
Total				***181,800***

Table 5: Supervision of Implementation ï Management Board and Implementation Committee

No	Description of Activities/Functions	Cost ($)
1.0 Implementation Committee	Secretariat/office space and facilities/equipment, documentation and distribution, organizing and holding and servicing meetings, communication/coordination, transportation, etc	**10,000**
2.0 Management Board	Launching of project, inspection visits, reception (for stakeholders and visitors, including international partners), publication of new policy, etc	**10,000**
Total		**20,000**

APPENDIX 1

Consultation meetings with the various stakeholders

Radiation Protection Institute, GAEC

Ministry of Trade & Industries

Ministry of Communications

Ghana Ports & Harbours Authority

Environmental Protection Agency

Ministry of Environment, Science & Technology

APPENDIX 2

Initial Survey of Heavy Metal Contamination of Soil (Agbogbloshi nearbourhood)

In early May 2009, a team from the Blacksmith Institute (New York, USA) visited Accra, Ghana to investigate the structure of the Used Lead Acid Battery (ULAB) recycling efforts with a specific focus on adverse environmental health consequences. The team was also accompanied by GreenAd officials (namely Dr Edith Clarke and Y Amoyaw-Osei) to the Agbogbloshi dump site (near a play ground), where surveys on potential heavy metal contamination of the environment was conducted. This was an initial exercise to assess the potential effects of e-waste disposal (mainly through burning) on the neighbouring environment. The soil analysis was done using Blacksmith's X-Ray Fluorescence Heavy Metals Detector (model Innov-X Alpha). The initial results (not yet analyzed) are presented below.

Agbobloshie XRF Readings May 7 2009

Reading	Pb	Ti	Mn	Fe	Co	Cu	Zn	Rb	Sr		Zr	Mo	Sn	Sb	I	Ba	Pb
1	782	43111	678	97794	1946	498	2914	24	93		157	<LOD	<LOD	<LOD	NA	<LOD	782
2	1005	32262	<LOD	335308	4036	1998	4800	80	158		149	40	<LOD	<LOD	NA	<LOD	1005
3	995	21718	734	168953	3063	2028	2395	52	96		138	28	<LOD	430	NA	2839	995
4	1218	22748	<LOD	179907	2063	1361	4814	65	199		156	<LOD	330	290	NA	<LOD	1218
5	1056	19728	643	49854	901	1752	2834	46	662		215	<LOD	<LOD	479	NA	2565	1056
6	<LOD	4365	<LOD	341	<LOD	<LOD	<LOD	12	31		41	40	<LOD	<LOD	NA	<LOD	<LOD
7	882	16213	849	105961	1288	1290	2827	44	123		178	<LOD	<LOD	<LOD	NA	<LOD	882

Agbobloshie XRF Readings May 8 2009

Reading	Ti	Mn	Fe	Co	Cu	Zn	Se	Rb	Sr	Zr	Mo	Sn	Sb	Pb	
2	<LOD	715	6722	279	169	390	<LOD	17	81	47	<LOD	<LOD	<LOD	342	neighborhd Agbo1
3	<LOD	<LOD	4318	231	59	250	<LOD	12	30	208	<LOD	<LOD	<LOD	170	neighborhd Agbo2
4	<LOD	<LOD	6497	<LOD	327	245	<LOD	88	57	135	<LOD	<LOD	173	413	neighborhd Agbo3
5	<LOD	1035	91456	<LOD	3677	3385	<LOD	26	135	163	22	264	208	4662	footballfield1
6	<LOD	543	97078	1438	9201	2549	<LOD	41	147	144	<LOD	<LOD	<LOD	3174	football field2
9	5973	739	174149	1987	12587	6051	<LOD	111	106	80	25	1796	803	9424	ewaste burning
10	3475	<LOD	12639	<LOD	29935	3444	67	784	108	103	<LOD	1363	3558	6050	middle of site

The Highlighted columns represent GPS points on the below satellite image of the Agbogbloshi market