

WEEE Deliverables as per the Work Plan for Objectives I and II

Background

Waste of Electronic and Electrical (WEEE) is defined according to the Jordanian Directive on Management, Transportation and Handling of Harmful and Hazardous Substances No: 24/2005 as substances that cannot be disposed of in the dumping sites designated for general waste, or into drainage networks, due to their hazardous characteristics and their harmful effects on the environment and life forms, and which require special means to treat and permanently dispose of. Jordan classifies WEEE as a hazardous waste according to the National Technical Committee, established by the Directive 24/2005 that manages and handles hazardous and harmful substance.

Neither the population, nor the private or public sectors give the required attention to waste minimization, recycling, or reuse though the efforts of private sector is a head of the government. Historically all national efforts of recycling all types of waste for the past twenty years are humble and have not lead into a concrete collection system in place in Jordan. Municipalities in Jordan are considering waste collection and disposal one of their important tasks and thus handing it over to the private sector that is potentially capable of putting in place a collection and a recycling system, will diminish their political power. Currently, waste in Jordan is all disposed off in landfills around the country. Incineration is only applied for medical waste though this is limited in volume. Waste minimization requires the Government's commitment to increase awareness amongst the urban population to manage waste more responsibly. Partial separation of useful materials in landfills and at points of generation is practiced in some parts of Jordan (National Agenda 2005). Nowadays, scavengers and scrapers travel frequently among waste collection containers (bins) looking for useful materials coupled with the deterioration of the economic situation in Jordan.

There is a rapidly increasing computer market in Jordan as a result of the government's policy to improve ICT and fight computer illiteracy. This policy is coupled with several governmental initiatives and programs among of which is Madrasaty, E-government, IT center for small and remote communities (number exceeded 20) a laptop to Each University Student, zero tax, drop of computer prices and market response to community needs through installments sell. Jordan is one of the pioneer Arab countries establishing e-government services. In 1999, Jordan became the first Arab country to establish an e-government strategy, called REACH. REACH is an initiative that emerged as an outcome of the country's policy to maximize its ability to compete on various fronts. One of its key objectives is to contribute to Jordan's economic and social development by providing access to e-government services and information to everyone in the country irrespective of location, economic status, computer skills or education.

Computers in specific are highly purchased having in mind that 37.3% (less than 15 years of age - DoS 2012) of the Jordanian population are students in schools (students in schools are estimated to be 1.580 million- DoS 2012) and universities. In addition, Jordanians are fond and culturally influenced by technology on the top of that are cellular (8.984 million- DoS 2012) and personal laptops. According to the Department of Statistics (2012) 57.4% of the Jordanian population own computers, excluding computers owned by private companies, universities, schools, commercial sector, stores, Jordan army with a percentage more or less

equal to the same percentage indicated above. This simply means that about 3.66 million computers are in the hands of Jordanians and a similar number is split among the other sectors of the community. If we take 2012 as the base year having in mind that the computer life is 2-3 years, then about 7.33 million computers are now about to become waste excluding the numbers that are imported for local use. Considering the average weight of computer is 3kg then Jordan in 2012 generated 21990 tons of computers' e-waste. One must not forget the current political volatile situation around Jordan that has brought a couple of millions from Syria and Iraq over the past couple of years with an estimate of population reaching about 10 million inhabitants (non official number). This increase in population will reflect on the overall situation of WEEE. Many Jordanians donated their home electrical appliances to Syrians and even for Egyptian (Blue collar labor force) and thus much of the electrical appliances used to be stored in houses ended in different hands and different people.

Moreover, the penetration rate of TVs in 2011 is 2.97 provided that the estimate weight of TV is 25 kg then in 2011 having in mind that the population for the same year is 6,249 there are 18559.5 tons of e-waste is present in the market (draft NIP update 2014). But one must admit that house appliances are rarely disposed of to garbage bins. They are stored in houses, sold to scrapers for low cost value and donated to needy people dwell the country (Jordanians, Syrians or Egyptians).

Disposal of household hazardous dry batteries has been and continues to be a major issue in Jordan. Until now no proper disposable techniques are introduced, nor are suitable policies and legislations in place apart from the fact that normal people are not aware of the danger associated with the random disposal of used dry batteries that have direct impact on the natural ecosystem (soil, water, air and biodiversity) and human health. The same applies to Fluorescent and compact lamps that are imported into the country with no boundaries as stated by one shop owners in Amman. Therefore, used lamps and dry batteries have no market at all and thus end in the garbage bins. There are no studies conducted in the country to follow the flow of neither lamps nor the possible impact that it will cause.

The national regulation represented by the Ministry of Industry and Commerce (MoIC) instruction 1 of 2012 opens the door for second hand EEE equipment imported into the country. This regulation allows for import of second hand EEE ranging from 3-6 years of age with 15% new spare parts of the original value of each equipment. The imported equipment for house or office users is either re-used, refurbished, contribute into the creation of a second hand market and finally could be channeled and exported outside the country for the parts that are not recyclable.

It is for sure that the growing quantity of WEEE has raised uncomfortable signals. The increasing market penetration and the high obsolescence rate in developing countries make WEEE one of the fastest waste streams (UNEP E-waste Report Vol. 1, 2007). In developed countries, e-waste equals 1% of total solid waste on an average and it is expected to grow to 2% by 2010. A simple calculation applying the same rate on Jordan would mean that Jordan has in its waste in the year 2011 (20248.3 tons) of WEEE (total waste generated in Jordan in 2011 for the three sectors household, economic enterprises and industrial cities), having in mind that Jordan population is 2024831.9 s for the year 2011 according to DoS department of statistics and if the percentage is 2% then the number is doubled to be 40496.6 tons. The Jordan government has identified communications and information technology (IT) as a major potential growth area for the economy. Jordan now (2012) has 8.984 million mobile

subscribers (ICT Statistics, URL). On the other side, the average lifespan of ICT equipment is decreasing rapidly. But these facts would not be problematic if WEEE would be disposed properly. Jordan is well recognized for using EEE with high rotation rate that means the volume of WEEE generated on the increase day after day.

There are national efforts initiated in the country preceded by the private sector and civil society represented by an in-organized sector such as the scavengers and scrapers who form the majority, the emergence of registered companies, and the recent efforts of the Ministry of Environment interpreted in the research and studies in addition to the national update of NIP-POPs currently ongoing activity, and the launch of a pilot of project to introduce a national pilot collection system addressing 4 types of WEEE: computers, cellular's, dry batteries and fluorescent lamps.

Less is known about international flows of e-waste. The most well-known result is the study of the UK International Council of Electronics Recyclers done for the Environment Ministry, which characterizes in some detail the flows out of the United Kingdom. They estimate that in 2003 160,000 metric tons of secondary and waste electronic equipment was exported. 133,000 tons of this was IT/telecoms equipment. In this category, 110,000 tons were declared exports and properly documented, while 23,000 tons were undeclared or grey-market exports going to non-OECD countries. While detailed breakdowns of exports per destination were not estimated, receiving regions include China, Dubai, Eastern Europe, Hong Kong, India and Jordan(Third Workshop on Material Cycles and Waste Management in Asia, National Institute of Environmental Sciences: Tsukuba, Japan (2005).

In conclusion, some national efforts initiated in the country preceded by the private sector represented by an in-organized sector such as the scavengers who form the majority, the emergence of registered companies, and the recent efforts of the Ministry of Environment interpreted in the research and studies in addition to the national update of NIP-POPs currently ongoing activity, and the launch of a pilot of project to introduce a national e-waste collection system focusing on four items: computers, cellular's, dry batteries and fluorescent lamps.

Activity I: Propose a mechanism through which the national hazardous waste dumping site of SWAQA is activated as a treatment and disposal site for all types of hazardous waste including e-waste and establish a monitoring mechanism for the site.

SWAQA (originally started in 1989 with 800 donum expanded to 8500 Donum in 1998) is a designated facility 90 km south east of Amman for disposing of hazardous waste in Jordan in the absence of a national binding regulation and guidelines for handling and managing WEEE. Though, the Ministry of Environment has a couple of regulations that deal with hazardous wastes but it does not have a specific binding mechanism (legislation) and a management system that covers all cycle of WEEE. Companies generating hazardous waste are obliged to dispose of their waste to SWAQA through coordination with the Ministry of Environment. Companies pay to the Ministry of Environment 3-5% of the original purchase cost of the material to dispose. WEEE which is defined by the Ministry of Environment as hazardous waste is optional to dispose of in SWAQA management site after coordinating with the Ministry of Environment. SWAQA hazardous management site is noticed to be a storage facility run by the Ministry of Environment. The current practice in the site is as follows: the concerned company that has hazardous waste will write officially to the Ministry of Environment about the kind, quantity and the original cost of hazardous waste intended to dispose of. The Ministry of Environment / Department of Hazardous and Harmful Waste

will examine and review the company application technically and legally. In case there is a lack of information regarding the shipment, the MoENV will request the applicant company to complete the data required. A team from the Ministry of Environment / Department of Hazardous and Harmful Waste will organize and pay a physical testing visit for the shipment. The technical team would advise the company how to handle the shipment using the guiding principle of environmental sound management of WEEE issued by Basel Convention and in accordance with the following draft procedures developed by the Ministry of Environment:

1. Reduce the generation of WEEE as much as possible so that the owner can monitor the use and maintenance of equipment and only purchase what is needed.
2. Re-use the used EEE after being refurbished or donate to schools and other institutions in case it is needed, provided it is valid for use.
3. Recycle the equipment in the local market in case the technology by the company is available.
4. Keep reviewing the previous process of handling and managing WEEE to examine the presence of any weakness in the procedures so that it is overcome. Moreover, awareness raising is important at this point of the procedures.
5. Consider the methodology adopted by the manufacturer for re-use, refurbishing or recycling after being endorsed by the technical committee.
6. Comply with the national technical committee decisions and recommendations in relation to the technical methodologies considered and adopted.
7. In case the technical committee decided to dispose of the shipment in SWAQA site, then a date is identified for the transportation after all precautionary measures are considered such as the preparing, packing, defining the material in accordance with the instructions of management and tackling of hazardous waste, obtain the required fees according to the Ministry of Environment published instruction of rendering fee of the year 2014 followed once again by a physical testing on the date of transporting the shipment to make sure that all the technical requirements and conditions are fulfilled.
8. The WEEE is stored in a hanger designated for WEEE and its parts in SWAQA storage center in separate containers.

In an interview with Mr. Nacereldin, head of SWAQA treatment center of hazardous waste a couple of points could be noted:

1. The site that was established in 1989 with an area of 800 donum expanded to reach 8500 donum today as a dumping site is decided to activate in 1998 through the construction of internal roads and administration building, the establishment of landfill units and evaporative cells.
2. The actual operation and use of the site started in 1998.
3. In 2002 it was decided to turn the site into a treatment center during which an EIA study is conducted and recommended one of the three following means to operate:
 - a. Manage the site by the private sector.
 - b. Operate the site through the government.
 - c. Operate and manage the site through a public-private partnership using the BOT principle.
4. The actual reception of waste started in 2004.
5. In 2009 a tender was published on BOT basis with the condition to install an incinerator in GHABAWI and a financial closure, though a company was identified and selected the process stopped after two years.

6. The site does not binding procedures for consideration by the Ministry of Environment. The whole process is optional and the initiative of transporting and handling its hazardous and harmful waste comes from the company that needs to dispose of the waste. The majority of the wastes come from pharmaceutical companies who want to dispose of the waste to get back the purchase tax. The only legal and binding document is the instruction of fees obtained by the Ministry of Environment against providing its services for the year 2014 issued in accordance with the article 10 of the Hazardous and Harmful materials transportation and handling number 24 for the year 2005, with list of materials disposal per ton.
7. The procedures of disposing of any pharmaceuticals mainly in drug stores are done through a committee with representatives from the following departments: Income Tax, Audit Bureau, Food and Drug Corporation and the Ministry of Environment with the purpose to reduce the tax value. In addition the companies will get a manifest that the material is disposed of and thus the company can use the manifest to get the ISO certificate (this technique could be thought of as an incentive to encourage company to take the initiative of disposing of their WEEE).
8. The site in addition to the pharmaceutical valid or expired materials has a section for WEEE including computers and washing machines.
9. Deciding on whether the waste is hazardous is defined according the directive 24/2005 on trust basis without testing the material.
10. Unique applications in term of materials to dispose of are examined by the technical committee (formed in accordance with the directive 24/2005) with a legal mandate-obtain from the Ministry of Environment Website. For one time and other similar applications will be handled with the same manner without being examined once again by the technical committee.
11. There is a book keeping for the name of company's dispose of its waste in SWAQA.
12. Though the process is optional, but if the Ministry of Environment identify hazardous waste in a certain company, then the company will be penalized threefold as indicted in the in the service fees instructions of the Ministry of Environment of the year 2014.
13. The fees collected through the instructions are rendered into the Environment Fund with an estimate of an income generation of one million / year while the operation of the site is costing 150 thousand JD a year.
14. The site faces some difficulties as follows:
 - a. The site has no electricity. The administration office operates through solar units.
 - b. The cellular communication with the site is weak with the absence of an amplifying tower to the signal.
 - c. The site needs proper gardening and protection.
 - d. The current guards have not transport mean within the site with such a huge area of 8500 donum.
 - e. People looking after the site have no incentives or a hazard work fee.
 - f. No safety procedures for workers and site staff.
 - g. The center is under staffed.
15. Much of what has been stored in the past evaporated and the bags got bulged.
16. The other types of waste disposed in the site if we exclude the pharmaceutical that have a financial and image interest (this factor once again could be considered an incentive to drive WEEE generators to dispose of in the site). The 10-20% of the initiative taking of hazardous waste is driven also by the penalties received from the two corporations of Standards and Specifications and the Food and Drug.

17. No actual monitoring on industries generating hazardous waste by the Ministry of Environment is carried out on a regular basis in view of the fact that there is a directorate in charge of monitoring and inspection possibly due to lack of staff and expertise.

18. Mr. Nacerelddin suggests:

- a. Introducing a take back system.
- b. Establish a WEEE recycling and sorting unit in the site something that could be done on BOT basis.
- c. Similar action could be done regarding the dry batteries and fluorescent lamps.
- d. Buy an incinerator to handle the 90% of the waste which is pharmaceuticals in nature.
- e. Expand the landfill dumping units.
- f. Have the center administration offices based on the site after improving the conditions and providing the facilities needed to a decent life.
- g. Has no objection to private sector management of the center with an agreement with Ministry to get a certain income benefit out of the operation.

Based on the current analysis of SWAQA operation procedures and status the following is a suggested mechanism to activate the site through designating an area for WEEE management in the site:

- a. Enclose in the new upcoming WEEE legislation the following articles:
 1. SWAQA is considered a treatment and a disposal unit. This unit operates in term of financial cost on the MoENV instructions fee for rendering services of the year 2014.
 2. Generators of hazardous and harmful waste among of which is WEEE are granted a tax refund for the materials tranferred to SWAQA and a manifest, a recognition of the quantities transferred to the site to facilitate for the generator obtain an ISO certificate.
 3. Connect the site with the registry created as per the new WEEE regulation to monitor and verify the fate of EEE becoming WEEE in the country.
- b. Amend the MoEN instructions fee for rendering services of the year 2014 so that article 6 can read " The entity generating hazardous and harmful wastes" is responsible to notify the Ministry of Environemnt of the quantities they have and arrange for tranporting the waste to SWAQA provided that the cost of transportation is beard by the generator.
- c. The WEEE Management System in whole or in parts can run based on a public-private partnership and thus SWAQA could also be run utilizing this partnership including the establishment of treatment uits in SWAQA based on the BOT principle.
- d. The National Technical Committee is re-activated through the activation of its mandate as stated by article 4 of the Hazardous and Harful Managment and Handling Directive number 24 of 2005

- e. Later on a testing mechanism should be introduced as part of the Management System to examine the WEEE that could be part of the PPP or through a BOT principle.
- f. SWAQA site should be provided by an incinerator, expand the cells and improve the conditions of the site to operate properly. The Ministry of Environment will install an incinerator and the treatment unit on a BOT basis or through the PPP.
- g. As WEEE is define as a hazardous waste, then the activation of the directive 24 of 2005 on Harmful and Hazardous Materials Management and Handling will contribute into managing this new component of hazardous waste.
- h. The Ministry of Environment in addition to the proposed upcoming new WEEE legislation to activate the instructions of managing and handling hazardous waste for the year 2003 that tackles the generators, transporters, operators or owners of site facilities in which hazardous waste will be stored, treated and have its final disposal.

SWAQA monitoring mechanism

Based on the review of the current status of the site, the following mechanism is proposed:

- a. The Ministry of Environment would activate the tasks of the National Technical Committee to activate article 4.b and 4.f to monitor the site.
- b. An amendment to the Directive 24 of 2005 to include into the national technical committee members from the Drug and Food Corporation and the Standard and Specification Corporation who have proved involvement in this matter monitoring and specifications meeting. This may also add to to include members of chambers of Commerce and Industry and the Ministry of Finance/ Central Supply Department.
- c. The Ministry of Environment through its Inspection and Monitoring Department develop an action plan and a timetable for monitoring SWAQA site and the articles that will address SWAQA in the new upcoming legislation of WEEE.
- d. A network of monitors are created within the Ministry of Environment with the main focal point is based in the Ministry and local focal points in each one of the cities in which a Directorate of Environment exist. The focal are making sure that the system if running and proper collection of WEEE is channeled into SWAQA being and classified as hazardous waste. Moreover, the Department of Monitoring and Inspection in the Ministry of Environment create a list of (book keeping registry) importers of both new and used and retailers and industries generating WEEE and then monitor their work to make sure that all WEEE is channeled into SWAQA or to any other treatment facility licensed by the Ministry.

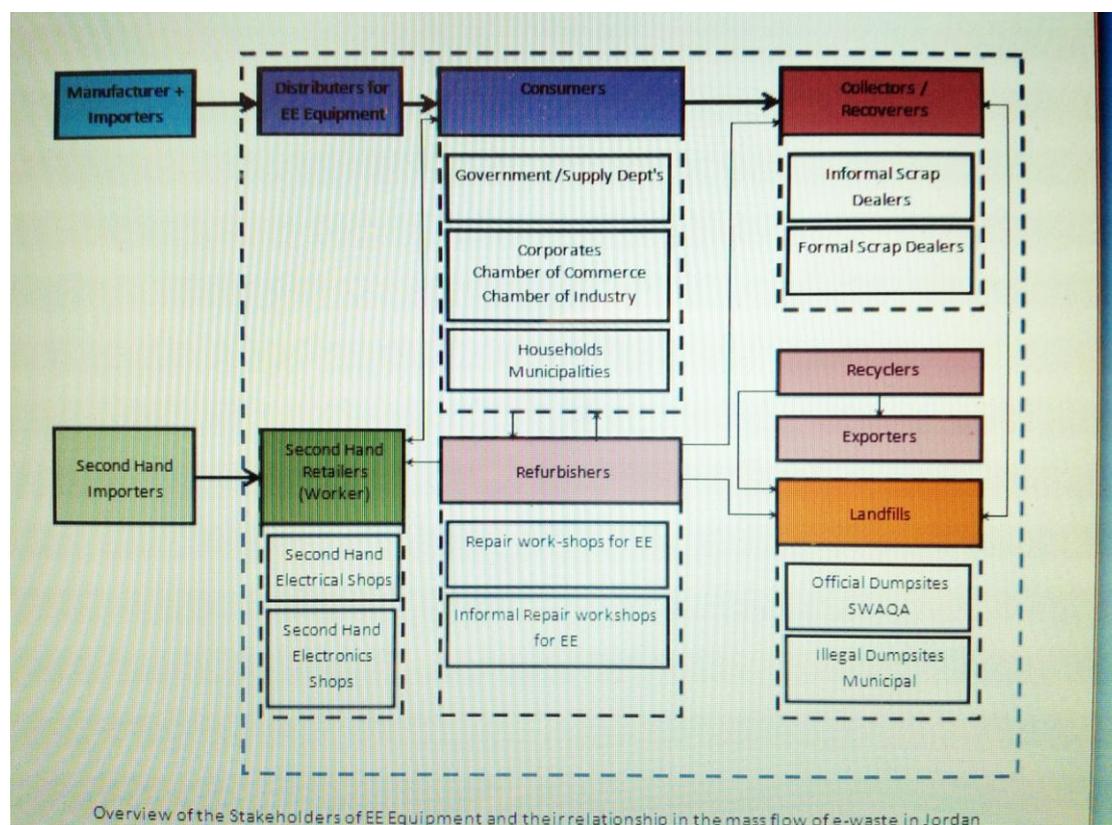
Activity II: Propose a collection (and possible recycling) technology and infrastructure suited to the WEEE volume generated and assess the local operational costs:

As per the household consumer behavior, WEEE collection channels in Jordan is not done through municipal collection sites or drop off at dustbins. In rare cases, one may find an individual consumer disposing of house appliances into the municipal collection containers. Individual household consumers either sell WEEE to the scrapers who are roaming in the streets calling for this type of service or they are stored in the houses. In other situations, some of the houses appliances are donated to other nationalities present in Jordan and to poor families. The only viable mechanism as per household consumer behavior under the

existing regulatory mechanism appears to be to capture WEEE at the point of generation. Since the majority of WEEE is generated by households prefer the best value of their WEEE, then we should not worry about the households WEEE provided collection facilities are setup in the major cities of Amman, Irbid and Zarqa linked to each one the Directorate of Environment in these cities with the take-back system in place. In addition, individual household can participate in the drop off event organized a couple of times yearly where individuals can sell their WEEE directly to recyclers or for refurbishers.

based on the proper understanding of the current system of handling and monitoring EEE in Jordan and the proposal of a new or updated one that will consider WEEE among the hazardous wastes, the following collection system is proposed:

Based on the review and current status of WEEE in the country and in accordance with the following diagram, the following WEEE system is suggested:



1. The Ministry of Environment encourages the creation and establishment of companies or coalition of companies and organizations on business basis, to be part of one or more of the whole process of collection, recycling, transportation, and treatment.
2. The company or the a coalition of companies once designated by the Mnistry of Environment, will be in charge of placing suitable containers for collection in the three different consumers premise based on the current initiative launched by the Ministry of Environment after reviewing the process. In the case of government

consumer, the main collection areas are the Central Department of Supply and its sections in the various ministries. The Coalition has to negotiate the Central Department of Supply (as usually an auction is used to sell the WEEE having in mind the environmental consideration as a factor to decide negotiating the price with the designated Coalition) on the prices of giving away the WEEE available in their stores. The Coalition will be in charge of coordinating with the Ministry of Environment for the details of testing and transporting the WEEE into SWAQA or any other treatment facility including the compliance to the regulation of fee service delivery published by the Ministry of Environment in 2014.

3. The Coalition will refurbish, recover and recycle whatever is recyclable and export temporarily until a treatment unit in place. The Coalition is in charge of settling the value of WEEE with the consumers (government, corporate and households) and does the same thing when plan to transport and dump the remaining in the SWAQA site by paying the service fees according to the current regulation. All these cost are covered from the refurbishment, recovery, recycle and export of WEEE.
4. The Coalition will be in charge of coordinating and negotiating with the chamber of commerce and industries on the number of containers and take-back process. This may include the 16 chamber of commerce's and the 5 chamber of industries and certain selective distributors and /or retailers.
5. The Coalition will be in charge of placing containers in the Ministry of Environment, Directorate and offices premises in addition to selective municipalities at the beginning and ensure collection for the public drop off of WEEE.
6. The coalition will organize drop off special events during which the public can sell immediately WEEE to them and to interested parties and individuals.
7. The Coalition will be in a position to respond to request of corporate in case want to dispose off their collected WEEE on a door-to-door basis. This may also apply to government consumer.
8. A proper system of treatment will be negotiated and agreed with the Ministry of Environment to install in SWAQA considering the environmental sound management system indicated earlier through a diagram through a PPP or BOT.
9. The Ministry of Environment will facilitate and provide the full support to the Coalition to enable run the WEEE management system or part of it smoothly and with no difficulties'.
10. The Ministry of Environment will identify the specifications of the container to place in the collection centers and the transportation vehicle specifications as per the instructions of 2003 on managing and handling hazardous waste published by the Ministry.
11. All types of EEE whether new or used have to be registered in a book account including their weight one per each retailer who in turn is supposed to have a keeping book of consumers purchased the EEE. The dealers and the retailers have to report that on monthly basis to the Ministry of Environment which in turn will follow up and monitor the fate of these EEE after being transformed into WEEE.
12. The Ministry of Environment will have in place as per the regulation of WEEE a set of penalties for those not complying with this legislation.
13. The Ministry of Environment should be notified of 2nd hand import of EEE by the Ministry of Commerce and Industry where a prior approval is needed to ensure that Jordan is not becoming a destiny for WEEE, something need to be introduced into the import legislation after having a review meeting bringing the Ministry of Environment and the Ministry of Industry and Commerce together for negotiation (this action would require an amendment of the MoIC instruction 1 for the year 2012.

14. The Ministry of Environment should take the initiative to organize the scrapers sector through the creation of "Scrapers Association" with encouragement system. This association may form part of the forum or Coalition who will be in charge in part or in whole or through PPP of WEEE management as indicated above. No auctions whether from the government or corporate consumer is acceptable without having the "Scrapers Association" being involved or aware of the process through endorsement to organize and empower this sector.
15. Having the "Scrapers Association" and /or the a coalition of registered companies managing WEEE or part of its cycle means having collection centers in which individual consumers can approach them to get a value of their old product. In addition, the Ministry of Environment will negotiate with the managing company of WEEE (that will be in charge of collection, transportation, refurbishment, dismantling, recycling and treatment with the possibility of having all precious and toxic elements being processed in the final destination of the waste in which the treatment facility will be installed the financial benefit and return will be calculated).
16. The Ministry of Environment will enforce the proposed regulation and other related regulations in specific the one relates to the fees system of final disposal.

In the proposed regulation, the authorized WEEE recycler can collect from different collection point per each type of consumer, refurbish, recycle, recover transport WEEE to their recycling facility. WEEE from households can be routed through three different tracks: already existing municipal waste collection mechanism in place, selling directly to the authorized WEEE recyclers designated in the regulation and through the take back system by dropping off in the collection centers or participate in the drop off events.

The Ministry of Environment in collaboration with the Managing Association or Coalition of companies and association can identify additional place/ area as WEEE collection points. This place can serve as a place where consumers can get value of their old product. The introduction of the WEEE management system will be accompanied with public awareness campaign to collect WEEE at authorized collection facility and only give to authorized recycler for treatment and disposal.

The regulation will identify the criteria for the WEEE authorized recyclers/ dismantlers in Jordan. This will assist to divert WEEE from government and corporate using existing mechanism to authorized recycler. Books of WEEE account will be maintained at all the three types of collection facilities and match with authorized recycler's books. In case of mismatch, penalty provisions can be invoked on either party using appropriate legal instrument to discourage leakage of WEEE into informal sector in view of the fact that the research literature cites that the efficiency of WEEE collection system ranges from approximately 60% to even less than 30% even in the most efficient system functioning under EPR in EU. This indicates that leakages exist even in the most efficient system. In this context it should be noted that any penal provision highlighted above should be invoked only as a deterrent to prevent leakage.

As far as **the operational cost** producers of EEE are charged based on their registry a certain percentage that could 3-5% (according to the Ministry of Environment Instruction Fees in case it is transferred to SWAQA or to any other registered and accredited facility by the Ministry) of the original cost to allow for using this money to cover the operational cost of collection and transportation. This money is paid to the Ministry of Environment as fees. Recycling and refurbishing companies cost is covered through the profit made by these two processes.

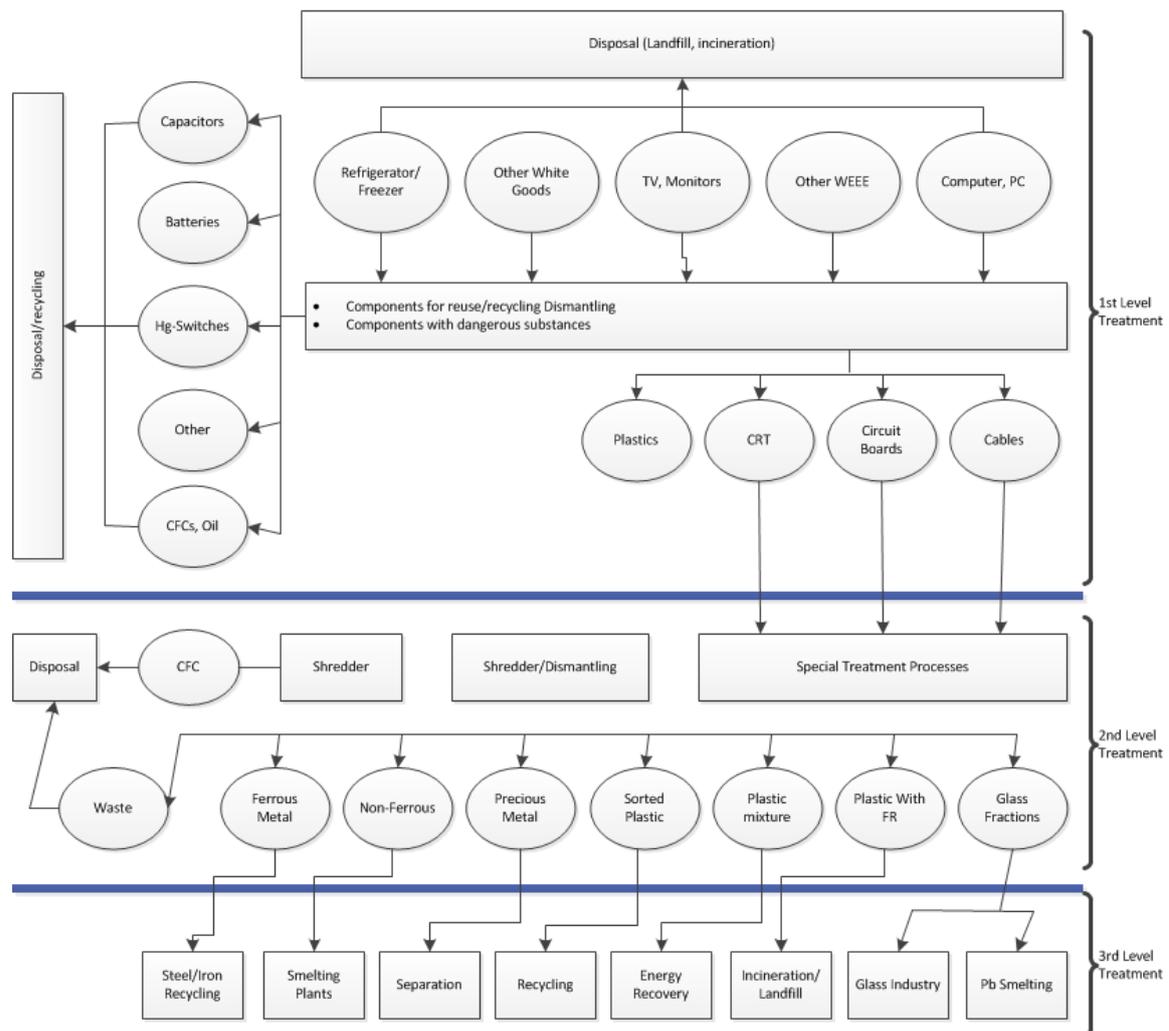
Proposed Treatment Technology

The proposed technology should consider having the input WEEE containing toxic materials such as TV, Refrigerator/washing machine and personal computers by removing all liquid and gases, dismantling manually the parts and segregate. All the operations are dry processes, which do not require use of water. The first step is to decontaminate WEEE and render it non-hazardous. This involves removal of all types of liquids and gases (if any) under negative pressure, and their recovery and storage. Further, all other hazardous WEEE residues are dismantled and segregated. These segregated hazardous WEEE fractions such as CFC, mercury (Hg), switches, CRT, batteries and capacitors are generated and the non-hazardous WEEE like plastic, circuit board and cable are decontaminated.

Depending upon the type of WEEE, different types of bins/ cages should be identified. The collected WEEE in container will be lifted manually, through forklifts, placed into small trucks/ container carriers and transported from the collection facility to WEEE treatment facility of SWAQA or another treatment facility. The forklifts and trucks to lift containers are required for safe transport of WEEE from collection locations to recycling facility.

The following chart describes the anticipated environment sound system to use in managing and treating WEEE:

Environmental Sound Treatment (EST) Schemes for E-Waste



Level II: Households Consumers:

This part is treated in the main heading of activity II with other two main consumers of government and Corporate.

Level III: WEEE Transfer Stations:

At the pilot phase of WEEE management system that would include three cities: Amman, Irbid and Zarqa, three transfer stations will be established. These transfer stations will be created by a collection company or coalition of companies. The Ministry of Environment will monitor these stations. The transfer of bins from the collection points will be in the hand of the private sector. A team of monitors will be formed consisted of one focal per each collection station, transfer station, department of environment and linked to a main one in the Ministry of Environment. The monitors will decide on what is recyclable and what is not recyclable and thus need to go to final fate in SWAQA or any other approved treatment facility by the Ministry of Environment. The transfer stations may include an initial examination of the type of WEEE; sort them to recyclable and non recyclable.

Level IV: Transfer of WEEE to SWAQA site or any other treatment facility:

At this stage, one must talk about the type and specification of bins for collection, how each collection infrastructure should look like what? And then the transfer stations preparedness and its infrastructure, type of vehicles used for transporting e-waste among the collection points and the transfer stations and to their final destination in SWAQA. The instruction 2003 of Managing and Handling Hazardous and Harmful substances will apply for the collection, storage and for transportation including bins specifications.

Activity III: Formulate a national technical specification including a testing mechanism and a policy for importing used computers, into the country.

The current legislation of the Ministry of Industry and Commerce governs the import of electronic equipment. The import instruction 1 of 2012 of used or refurbished EEE is reviewed and thus the following comments are placed on this legislation as follows:

The technical specifications of importing used EEE are governed by the Standards and Specification Corporation as per the above import instruction which says that all EEE must comply with the national specification and the international accredited ones as stated in article 14 of these instructions. Therefore, the Ministry of Environment should have a say and be always be consulted to approve the entrance of used EEE. The import instruction required the following specifications:

1. All equipment must be ready for the immediate use on the Jordanian Electric Network with a voltage of 220-240 Volts without using any voltaic transformers. This means that we it is imported should not repaired or refurbished in Jordan; otherwise, then the purpose of import would be on business basis without having any consideration for the WEEE which are classified as hazardous waste. In other words, one may consider the import of used EEE is an import of hazardous waste into the country. Hence the import of all used or stock EEE must be approved by the Ministry of Environment. This would require the amendment of this legislation.
2. All refrigeration equipment including refrigerators, freezers, and Air conditioners must not contain ozone depleting substances harmful to the ozone layers in specific gas R12 supported with an approval from the Ministry of Environment.
3. All imported equipment shipment must be accompanied with new spare parts with 15% from the value of shipment for each kind of imported equipment.
4. All imported equipment must be supported with one of the following certificates and attached to the customs documents and papers as follows:
 - a. A certificate issued from one of the Jordanian refurbishing companies for second hand electrical equipment accredited by the Jordanian Specification and Standards Corporation and stamped by the Corporation states that the equipment are valid for immediate use. This item also needs to be modified so that all refurbishing companies need to be accredited by the Ministry of Environment in addition in addition to having the refurbished

company registered in the Ministry of Environment as the new upcoming regulation of WEEE.

b. A certificate issued by the manufacturing company or its accredited agent stamped in the original exporting country by the Chamber of Industry or Commerce or Jordanian Embassy or consulate in the exporting country states that this equipment is valid for immediate use at the moment of completing the custom procedures as per article 7. Attached to it is suggested to have information on how to dismantle and recycle the EEE after becoming WEEE.

b. Article 7 states that the age of imported equipment:

a. Second hand Photocopiers are allowed to import if not exceeding 4 years.

b. Refurbishing companies and industries for computers and laptops accredited by the Jordanian Standards and Specification Corporation to refurbish this equipment if its age is not exceeding 6 years. Added to this point, the Ministry of Environment should first have the Corporation registered in the Ministry and monitor the process of import including the approval to the shipment.

c. Domestic used and in stock electrical and / or office equipment if not exceeding 3 years. This item may need also to be modified to be not more than 2 years as the life shelves of EEE is decreasing. In addition this should require the approval of the Ministry of Environment.

2. The Ministry of Environment should accredit through registration companies that would test and verify the used and stock EEE based on the above mentioned specifications.
3. None branded EEE should be rejected and not allowed to enter the country.
4. Jordanian returnees after long stay abroad who are coming back home after 5 years of stay, their EEE need to be handled case by case to avoid having plenty of old staff of EEE as their number is huge exceeding 800 thousands and where all are entitled to have their furniture and EEE entering the country tax free.
5. Corporate such as hotels, hospitals, banks...etc who are benefiting from the Investment Law and thus enter tax exempted EEE must be monitored by the Ministry of Environment in coordination with the Department of Investment to avoid having the old staff pumped into the market and therefore, they have all to re-exported or sold the recycling and treatment facilities established in the free zone areas of Jordan.

Activity IV: Propose and develop a mechanism for implementation of “take back” program for WEEE.

End-of-Life (EoL) EEE have significant interest because they are a waste stream with unique combination of characteristics. First, they are increasing and expected to continue on this path. Second, WEEE contains materials that are considered toxic,

such as lead, mercury and cadmium, which have led to increased environmental concern about their improper disposal. Third, there are valuable materials in WEEE and recovery of these materials can alleviate mining and virgin materials. For instance a metric ton of personal computers contain more gold than that recovered from 17 tons of gold ore. Finally in many cases, the cost of recycling WEEE exceeds the revenues generated from the recovered materials. These are the reasons behind to create a system to collect and process WEEE, which is also known the Take-Back System.

The **Take-Back System Structure** is comprised of three main functions: collection, processing and system management. The four components of the system will work on achieving the goals and objectives of the WEEE system as follows: motivate the original equipment manufacturers or assessmblers to improve product recyclability, reduce the use of toxic materials and integrate these concepts in the design; prevent toxic materials from entering landfills or being incinerated; recover scrap materials from the products, thereby avoiding the environmental burdens associated with the production virgin material; ensure that WEEE is processed in an environmentally and sociably responsible manner; share responsibility among stakeholders; motivate consumers to hand in equipment; and create an efficient and sustainable collection system.

The primary modes for accomplishing **collection** are: permanent drop-off facility, special drop-off events and door-to-door pick-up. The mechanism for accomplishing a mode depends on the stakeholder responsible for collection, which could be a government, corporate and households. A government entity includes the Ministry of Environment. The corporate could include the distributors/retailers, chamber of commerce and industries. A summary of typical collection mechanisms for three stakeholders are listed. The following table defines the typical collection mechanisms for various stakeholders:

Action / consumers	Government	Corporate	Households
Permanent drop-off location	Ministry of Environment, Directorates and offices	original equipment dealers, distributors retails stores, chamber of commerce, chamber of industries	Municipalities and Ministry of Environment, its directorates and offices
Special Drop-off Event	N/A	N/A	A one or two day event dedicated to generators dropping off WEEE at a location
Door-to-Door pick up	Direct pick up	Direct pick up	Direct pick up

The Permanent Drop-Off facility offer a location for consumers (mainly households) to drop-off WEEE year around. Permanent drop off facilities are associated with Ministry of Environment entities and municipalities. Corporate such as origin equipment dealers, distributors, retailers, chamber of commerce and industries locate a drop-off facility within their premises. Any permanent drop-off facility must be capable of storing some WEEE, because recyclers will rarely collect the WEEE on a daily basis.

The Special Drop-off Events are generally one- or two-day events dedicated to consumers (mainly households and corporate) dropping off WEEE at a location. They can be held at a temporary location (e.g., a parking lot) or a permanent facility. Publicity is a key component of maximizing the effectiveness of special events and it serves a dual purpose of increasing collection amounts and educating the public on WEEE recycling options. The Ministry of Environment will be in charge of authorizing companies to organize these special events.

The mechanism for **door-to-door pick-up** is highly dependent on the pick-up. This mechanism will be authorize by the Ministry of Environment to be arranged by a company / agency that will be delegated to carry out this task. Corporate have to arrange the direct pick and delivery to SWAQA or to any other treatment facility site through coordination with the Ministry of Environment.

The Ministry of Environment in Jordan will monitor the **take-back system** and will be responsible for coordinating and monitoring the actions of various stakeholders and enforcing the system rules and regulations. This system manager may be one of several different types of public or private entities. These responsibilities include collection fees, reimbursing collectors and processors, setting and enforcing treatment standards, enforcing sales bans on origin equipment manufacturers, who do not comply with take-back system laws and approving processors and collectors to take part in the system. The Ministry of Environment may delegate certain national agencies and thus be tasked with supervising a single take-back system for an entire region or multiple systems within a region.

The management of take-back schemes may be carried out by a **third party organization** (such as JOCYCLE or the Jordanian Scrapers Association), which provides the management and administration of a recycling program.

The Ministry of Environment will delegate on a competition basis of WEEE collection through a company, an association of scrapers or the coalition of both and many others (JOCYCLE or the Scrapper Association). The company will be in charge of the whole process including collection, transporting, storing and treatment in SWAQA site. The regulation of WEEE service Delivery **Fees** will apply on the company or coalition of companies. The Coalition will negotiate with the drop off centers generated by the consumers the price of payment against the WEEE. By doing so, then an impeded incentive system is introduced. The consumers (government, corporate and households) are selling directly their WEEE to the company or coalition of companies, and then the coalition is covering the cost of managing the whole system of introducing containers, transporting the WEEE and paying the

Ministry of Environment as per its regulation of fees service delivery. The coalition is also benefiting through the business created where carefully the marginal benefit and revenue is calculated for all people involved in the process to let the system be operational and functional in favor of all parties. The whole process should be facilitated and supported by the Ministry of Environment.

Level I: Institutional and corporate consumers (large consumers):

This part is handled and treated in the main heading of collection along with the three main consumers: household, corporate and government.

To meet **objective two** the following is proposed:

1. Activity I: Conduct a baseline study to assess the current legislation that is indirectly and directly related to e-waste management and develop WEEE specific legislation.

Jordan has taken some actions in the field of WEEE that justifies its national interest such as the issue of an environmental protection law 52 of 2006, the issue of a directive that handles and manages hazardous and harmful substances 24 of 2005, the instructions of managing and handling hazardous waste for the year 2003, the instructions of rendering fee by the Ministry of Environment for the services delivered of 2014 published as per article 10 of the directive 24 of 2005, the draft law on waste which considers WEEE and its management based on life cycle approach, the adoption of the national agenda and the production of the ministry of environment strategy plan, and finally ministry of environment new structure that includes the department of hazardous chemicals and wastes. In 2011, the Ministry of Environment assessed the current use of used and new computers in Jordan and thus had a proper overview on the situation including if available any illegal traffic business in this field.

Jordan is part of the Basel Convention and exerts responsible efforts to meet its commitments and obligations related to the convention and follow all guidance produced by the convention adopted by COPs and relevant Regional Centers e.g. BCRC-Cairo including guidance on WEEE and Nairobi declaration on WEEE also.

Jordan is a signatory state to many other international environmental treaties such as Stockholme and Minamata. As far as WEEE, Jordan has not developed until today WEEE management system. There is also no authentic statistical data available on the quantity of this WEEE (an inventory study). However, the MoENV just launched a WEEE pilot collection initiative.

The MoENV prohibits the introduction of any hazardous wastes into Jordan. Any person who violates this article shall be punished by a fine of not less than USD 30,000 or by imprisonment for not less than three years and not more than fifteen years, or both. MoENV considers refurbished computers and old batteries as hazardous. However, the import of second-hand computers is allowed, and the Royal Rangers, the country's environmental police, do not pay much attention to WEEE violators.

The issue of WEEE is not promoted adequately even amongst environmentalists. There is a lack of social responsibility and environmental awareness on this issue, and statistics are not available on how much WEEE is present in Jordan.

Jordan has no specific regulation that handles and manages WEEE. The Ministry of Environment has just a drafted National policy on WEEE. The national current regulation is called bylaws no. (24) Of 2005 which deals with the Management, Transportation and Handling of Harmful and Hazardous Substances, where article 7 states: "**Any entity (scrapers are not registered and thus the Ministry of Environment may not be able to chase) obtaining an authorization to deal with hazardous and harmful waste shall comply with the following: Provide the Ministry with regular reports regarding the types of hazardous and harmful substances it deals with as well as the chemical and physical characteristics, composition and quantities thereof** (this part need to be re-activated adding to this having a book account on those producing hazardous waste including WEEE which is defined as a hazardous waste). As far as importing and exporting of Hazardous waste, this matter is treated in the Environmental law 52/2006 in article 6 that states:

- Materials prohibited from being entered into the Kingdom shall be set by instructions issued by the Prime Ministry Cabinet upon the recommendation of the Minister.
- Hazardous waste is not permitted to enter Jordan. This waste shall be defined by virtue of instructions issued by the Prime Ministry Cabinet upon recommendation of the Minister.
- In the event of the discovery of hazardous waste entered into the Kingdom or the entry of any environmental pollutant in an illegal manner, the Ministry of Environment, in coordination with the concerned authorities, shall return the shipment to its origin at the expense of the party who entered it into the Kingdom and shall levy fines and recoup costs and losses suffered by the Kingdom.
- Any person violating the provisions of this Article shall be fined an amount of not less than (20,000) Twenty Thousand Dinars or by imprisonment for a period of not less than 3 years and not exceeding fifteen years, or both.

Also hazardous waste is regulated according to the directive number 24/2005 which states in its article 8: No person is permitted to carry out the following: Enter or import any harmful or hazardous wastes to the Jordanian territories, or the water or air thereof; or treat or bury such wastes therein; dump harmful and hazardous substances, their waste or any part thereof, in any part of the Kingdom's land, water or air; and export any such harmful and hazardous substance or hazardous waste, except upon the Minister's decision based on the National Technical Committee's recommendation, subject to the relevant international agreements.

The following is lists of regulations relate directly or indirectly to the issue of WEEE in the absence of a specific WEEE regulation:

1. Environment Protection Law 52 of 2006 that entitles the cabinet based on the Minister of Environment recommendation to identify the materials that are prohibited to enter into country including the prohibition of entry of any

hazardous waste and the return of any illegal hazardous waste entered into the country in coordination with the government authority and render the importer responsible for the return cost and any consequences to any cost or damages and penalties Jordan is exposed to due to this illegal entry.

2. Harmful and Hazardous Management, Handling and Transportation Directive for the year no 24 of 2005 of the Ministry of Environment. This directive established a technical multi-disciplinary multi-sect oral committee entitled to formulate instructions that identify the conditions, means and scientific methods of disposing of hazardous and harmful materials in addition to identifying the suitable sites for disposal and treatment.
3. Instructions of fees for services rendered by the Ministry of Environment for 2014 issued in accordance with article 10 of Directive 24 of 2014 of the Ministry of Environment.
4. Handling and managing hazardous waste instructions of 2003 of the Ministry of Environment that targets and applies on the hazardous waste producers, their transporter and on the operator of the site or the owners of the dumping site. The instructions contain special requirement to manage empty can, owners and operators of site specified for storage and treatment and the dispose of hazardous waste.
5. Prohibited and restricted hazardous waste instructions for the 2014 issued in accordance with the article 6/b of the Environment Protection Law 52/2006.
6. Instructions on the management of PCBs and all materials contaminated by PCBs of 2014 published in accordance with article 4.d of the Environment Protection Law 52 of 2006.
7. Instructions of environmental auditing for the year 2014 published in accordance to article 4.d of the environmental protection law 52 of 2006.
8. The minutes of meeting 64 of the year 2007 of the National Technical Committee on the collection, transporting and storing liquid batteries and marketing them.
9. Import Instructions no 1 of 2012 issued in accordance of article 15 of license of importing and exporting directive and its amendments 114/2004 issued in accordance with the Ministry of Industry and Commerce law of import and export and its amendments article 16 of the law 21 of 2001. The Ministry of Industry of Industry and Commerce (MoIC) instruction no 1 of 2012, modified article 14 controls the flow / import of second hand EEE with the involvement and help of additional government and private sector. The instructions are summarized as follow pertinent to the second hand of EEE:
 - a. Importing domestic electrical equipment and/or offices whether in stock, second hand or refurbished requires obtaining a onetime importing license from the MoIC fulfilling the following conditions:
 6. All electrical equipment must comply with the Jordanian and international accredited specifications.
 7. All equipment must be ready for the immediate use on the Jordanian Electric Network with a voltage of 220-240 without using any voltaic transformers.
 8. All refrigeration equipment including refrigerators, freezers, and Air conditioners must not contain ozone depleting substances harmful the ozone layers in specific gas R12 supported with an approval from the Ministry of Environment.

9. All imported equipment shipment must be accompanied with new spare parts equal to 15% from the value of shipment for each kind of imported equipment.
10. All imported equipment must be supported with one of the following certificates and attached to the customs documents and papers as follows:
 - a. A certificate issued from one of the Jordanian refurbishing companies for second hand electrical equipment accredited by the Jordanian Specification and Standards Corporation and stamped by the Corporation states that the equipment are valid for immediate use.
 - b. A certificate issued by the manufacturing company or its accredited agent stamped in the original exporting country by the Chamber of Industry or Commerce or Jordanian Embassy or consulate in the exporting country states that these equipment are valid for immediate use at the moment of completing the custom procedures as per article 7.
 - c. Article 7 states that the age of imported equipment:
 - a. Second hand Photocopiers are allowed to import if not exceeding 4 years.
 - b. Refurbishing companies and industries for computers and laptops accredited by the Jordanian Standards and Specification Corporation to refurbish this equipment if its age is not exceeding 6 years.
 - c. Domestic used and in stock electrical and / or office equipment if not exceeding 3 years.
10. Law of Municipalities and its amendments no 13 of 2011 that entitles the municipality the authority to collect, transport, dispose of and organize waste and refuse from houses and public shops.
11. Law of Water Authority and its amendments no 18 / 1988 that entitled the authority and responsibility of water and waste water, related projects and propose the national water policy.
12. The Law of ASEZA no 32 of 2000 and its amendments that authorizes ASEZA to protect the environment within its jurisdiction. In addition, the law authorizes ASEZA the authorities of the Ministry of Municipalities on its own territory and thus ASEZA became authorized of all types of waste type's collection including the hazardous one.
13. ASEZA environment protection directive no 21 / 2001 that prohibits the disposal of any kind of waste outside the designated area. In addition, it prohibits the handling of hazardous waste without permission. The directive recommended issuing instructions on handling solid and hazardous waste.
14. Directive of harm prevention and waste collection within the municipalities territories and its amendments no 1/1978 that prohibits any person except the municipality to transport waste and refuse from any place with the municipality without the mayor approval.
15. Directive of harm prevention and waste collection of Amman municipality territories no 83/2009 that prohibits any person to collect, transport, treat and

dispose of any waste in any premises located with the municipality territory with the Amman Mayor approval.

16. Instructions of monitoring the use of ODS and the equipment and apparatus that contain such substances for the year 2013. The instruction prohibited the construction of expansion in the construction of industrial establishment that still use ODS including the import or re-exporting of CFC's.
17. Directive of solid waste management no 27 for the year 2005.

Reading through the different type of legislations, one may come with the following conclusions:

1. The presence of many regulations that tackle and handle WEEE in the absence of one specific WEEE regulation that may mean an overlapping among these legislations.
2. The diversity of reference ministries in dealing with the matter of WEEE. Different reference ministries and authorities have different justification in looking at the EEE and thus a unification of reference need to be created realizing by all the different aspects of each EEE. Like for instance in the case of importing second EEE, the ministry of industry and commerce, the Corporation of Standards and Specifications, The Jordanian Consulate in the exporting country the accredited refurbished companies by the Corporation of Standards and Specifications, the Ministry of Environment. One may look at this whole process of importing second hand EEE as a process of importing hazardous waste into the country and thus is one of the mere concerns of the Ministry of Environment. The diversity of reference ministries and authorities is a point of entry for illegal import.
3. Jordan like it is always the case is still facing the issue of enforcing the national legislations. If the current legislations are not enforced, then the upcoming proposed legislation of WEEE may have the same destiny.
4. In view of the fact that Jordan is one country, still we can find replication of same laws in the Jordan Special Economic Zones Authority and her ASEZA is a factual case study. The same applies for the regulations of municipalities where we can find different laws for the Municipality of Amman from the rest of the country municipalities.
5. In view of the fact that Jordan has ratified the Basel Convention Agreement and comply with all it is articles, still we could see when we are allowing the import of WEEE which Jordan has classified as hazardous waste as if we are allowing the import of hazardous waste into the country and the same applies when we are allowing to export of WEEE outside Jordan without paying much attention to the content of these materials which are considered hazardous.
6. It should be noted that WEEE contents cross cuts with different hazardous wastes. Refrigerators contain ODS, computer casing mainly of CRTs contain flame retardants (one of the POPs pollutants), batteries contain mercury and other toxic substances. In other words, WEEE as an emerging issue crosscuts with several conventions such as Basel, Stockholm and Minamata.

Therefore, Jordan signed and ratified the conventions that deal with WEEE components. Jordan also pays much attention to the neighboring countries regulations and standards and sometimes takes them as is and apply them in its

regulatory system. The developed countries like EU, USA and England has developed WEEE specific regulation. Even developing countries such as India, Tanzania and Cambodia have developed their own specific WEEE. Therefore, Jordan will examine these regulations and tailor what is suitable for its economic situation and conclude instructions to handle and manage WEEE. The current situation of Jordan has strengths represented by the existence of relevant policies and legislation which support WEEE management; existence of environmental regulations and strategies which are specifically for WEEE management; existence of an institutional framework which can support WEEE management; existence of downstream market for some fractions of WEEE; the current practice of storing WEEE reduces the volumes being dumped illegally or in official dumpsites; existence of informal refurbishers/metal scrapers which extend the life of computers and other EEE, hence reduce volumes of illegal dumping; existence of informal collection system for metals and plastics which can be used to support WEEE management; existence of formal recycling industry for paper, metals and plastics which could absorb some of the WEEE fractions.

However the current situation in Jordan is facing several weaknesses: poor data records on imported products as new and second hand are not distinguished (review of the importing instruction of the Ministry of Industry and Commerce); absence of reliable data on existing dealers of computers and IT equipment from the authorities; absence of reliable data on stocks and WEEE generation from the stakeholders; lack of disposal facilities for hazardous wastes; Lack of proper recycling activities for WEEE; Lack of specific policy on WEEE management; Weak enforcement of legislation; Lack of public awareness on WEEE and its potential risks to the environment and human health; Lack of infrastructure for formal collection and recycling of WEEE; illegal dumping of WEEE such as burning and burying could lead to environmental pollution as well as pose risks to human health; uncontrolled informal activities of WEEE management which pose health risks to the people involved and the nearby community; and Illegal disposal of WEEE in official municipal dumpsites by mixing WEEE with other municipal wastes

Activity II: Identify all stakeholders who will implement the regulation or will be influenced by the implementation of the new regulation.

Jordan has in place the basic institutions needed to initiate an action in the field of managing and controlling WEEE. The Ministry of environment was established in the year 2003 with the mandate to protect the natural and human environment and which seeks to maintain and improve the quality of Jordan's environment, conserve natural resources and contribute to sustainable development through policies, legislation, strategies, monitoring and enforcement and by mainstreaming environmental concepts into all national development plans. These actions are strengthened through the Ministry of Environment strategic objectives.

The Ministry of Environment (MoENV) drafted a policy to manage hazardous waste that entails the reduction of wastes, use the least toxics, use the recycled ones and import materials that are able to recycle and or reuse. The MoENV governs waste in general through a couple of legislations among of which is the environment protection law 52/2006,

the directive 24 of 2005 on management, transportation and handling of harmful and hazardous substances, solid waste bylaws, medical waste management instructions, hazardous wastes management instructions, liquid acid batteries requirement and used oil regulation .

The MoENV Executive Plan to implement the ministry strategy 2007-2010, had emphasized on the solid waste management and recycling through the reduction of waste generation at source, develop areas of recycling and reuse a comprehensive integrated system, improve the disposal of solid waste in environmentally sound manner, establish the treatment center of hazardous and medical wastes in SWAQA and GHABAWI, increase the percentage of medical wastes treated, establish and enforce a documentation and information system for hazardous, medical and solid waste, complete the set of legislations to manage hazardous and medical wastes, develop and execute a national program to manage electronic wastes and implement the international conventions relate to hazardous and medical wastes.

The Ministry of Environment has additional directorates and national committees that are established as per the environment protection law such as the Directorate of Licensing and Guidance, Central Licensing Committee, Environmental Impact Assessment (EIA) committee, and Directorate of Hazard substances and Waste Management.

Headed by the Ministry of Environment, a national committee is formed as per the harmful and hazardous waste bylaws number 24/2005 called «the National Technical Committee for Harmful and Hazardous Chemicals Management". This national committee is in charge of setting up national policies to manage hazardous and toxic materials among of which is the WEEE. This committee is comprised of 14 governmental, private, academic and non-governmental institutions. Experts are invited to this committee based on a request.

The Royal Administration for the Protection of Environment (Environmental Police Department) is the executive arm of the Ministry of Environment in enforcing law though it is administrative link to the Police Department General Director.

The Ministry of ICT (MoICT) works to ensure that ICT resources are exploited in the most efficient way and expanding community understanding, application and use of ICT to drive for social inclusion and to help bridge the digital gap; enhance the legal and institutional environment for a competitive market that rewards innovation and yields products and services, strengthening and championing the competitive position of the ICT sector domestically, regionally and internationally and attract local, foreign direct investments.

The Ministry of Industry and Trade is another important player as it is the Ministry that oversees and monitors the country imports. According to law number 18 for the year 1998, the Ministry is responsible for regulating the industry by type, classifying it, registering it according to an internal regulation, and preparing the programs and studies that work on developing the industry and increasing its competitiveness. The Ministry also regulates the internal and external trade, monitoring it, and preparing the studies and the agreements that protect the interest of the country and the citizen.

Headed by the Minister of Industry and Trade, the Jordan Institution for Standards and Specifications is involved in protecting human's health, safety, and rights as well as the environment. This is done through the development and adoption of certain specifications

and standards. It targets in its services, industrial, trade, agricultural and service sectors, governmental and semi-governmental organizations, civic societies and non-governmental organizations, scientific, research and academic institutions and citizens and any other person involved in a transaction with Jordan Institution for Standards and Specifications. The Institutional objectives are the continual improvement for the quality of services and products provided by the institution, in order to enhance confidence in national products; ensuring the compliance of local and imported products to technical regulations and other related technical documents and contributing in improving the environmental and health situation in Jordan

The Greater Amman Municipality (GAM) is an important stakeholder of waste management in Jordan. GAM is well experienced and supported with adequate funds to set up as a model for other municipalities in the country. GAM handles more than 2500 tons of domestic waste daily. GAM has a very well organized dumping site managed by a French company in which a corner is allocated for medical waste. GAM collects waste from Amman and transport to GHABAWI site 25 km south east of Amman where the French company handles management and dumping (sanitary landfill). GAM has taken steps in collaboration with the Ministry of Environment to establish a collection system for WEEE. Some Ads were seen in the newspapers. At the moment no action is done in the field of WEEE rather than being collected with the normal domestic waste once they are thrown in the bins if not collected by the informal collectors or in many instances by the GAM waste collecting compressor staff (they are possible informal collectors).

At the level of the private sector, **Jordan Chamber of Commerce** and the other additional 15 chambers of commerce are showing high interest in WEEE issue. Their main job until now is restricted into protecting their members' rights. This implies that all downstream vendors (retail sellers) are registered in the chambers. As it was indicated earlier about 437 downstream vendors of computers and their spare parts are registered in these chambers where the majority is concentrated in Amman. During the National Assessment Study of e-waste 2011 in one of its activities, it was said that NOKIA distributor in Amman is now receiving back the damaged cell phones, a step that could be considered by other distributors or even thought of through Jordan Chamber of Commerce for future WEEE collection of out of date electronic and electrical equipment. This step is actually a take-back system by Nokia company that could be generalized.

Jordan has also adopted its **National Action Plan** – the National Agenda in the year 2006 to improve the socio-economic and environmental status. The country is witnessing business oriented individual initiatives some visible others are not who have realized the cash value of recycling of computers. The BCRC-Cairo, UNEP, CEDARE and international organizations such as MEPI and European Commission are interested in conducting studies and or funding such initiatives.

Additional stakeholders involved with the issue of WEEE is the Chamber of Industry and a couple of NGOs. Land and Human to Advocate Progress (LHAP), a national NGO, implemented two regional projects on e-waste in 2009 and 2010 and continue to work on this matter through its membership to the International POPs Elimination Network (IPEN). Jordan Environment Society(JES) another national NGOs which has started long time in the matter of collection and sorting of waste in general. It has for many year a running project of paper collection.

Private sector is entering the field of WEEE where now you can see companies such as JOCYCLE that recycle WEEE. In addition, additional companies are mentioned in the import legislation 1 of 2012 that are entitled to accredit import used and stock EEE.

Jordan has the institutional infrastructure in the public, private and civil society. The efforts need to be organized and a partnership between private and public sector needs to be strengthened especially the recent endorsement of the new law of PPP of 2014.

Activity III: Formulate a national policy that defines the responsibilities and obligations of all stakeholders.

Attached in a separate document

Activity IV: Propose draft legislation for E-waste in compliance with international standards and national circumstances.

Attached in a separate document

Activity V: Create an incentive system through which formal and informal WEEE sectors are integrated in the national system.

An informal incentive system is already in place. The informal system is reflected in the WEEE regulation to become formal and binding.