

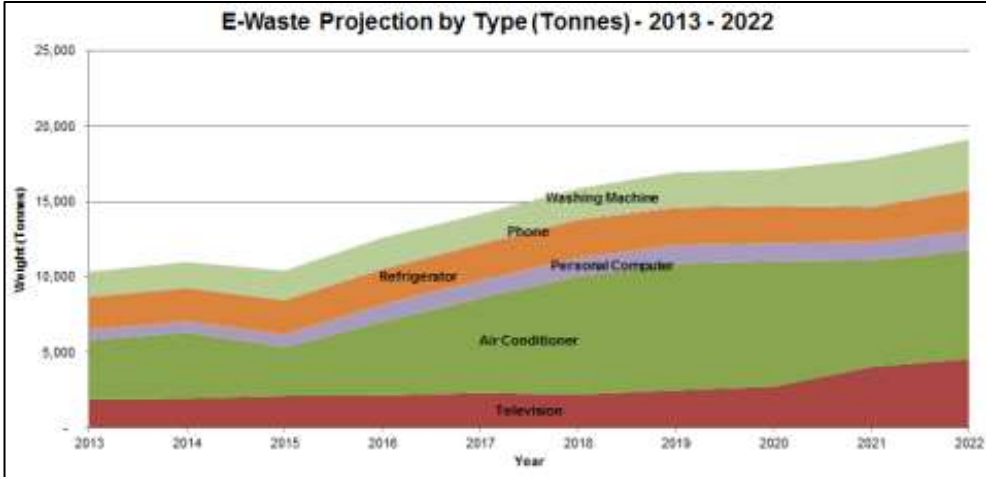


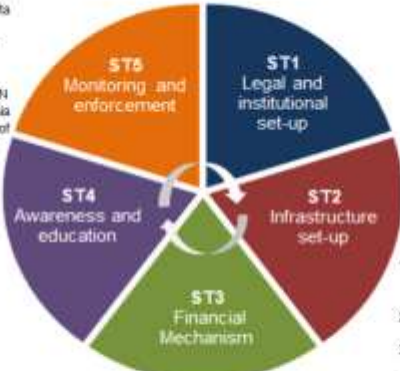
Executive Summary

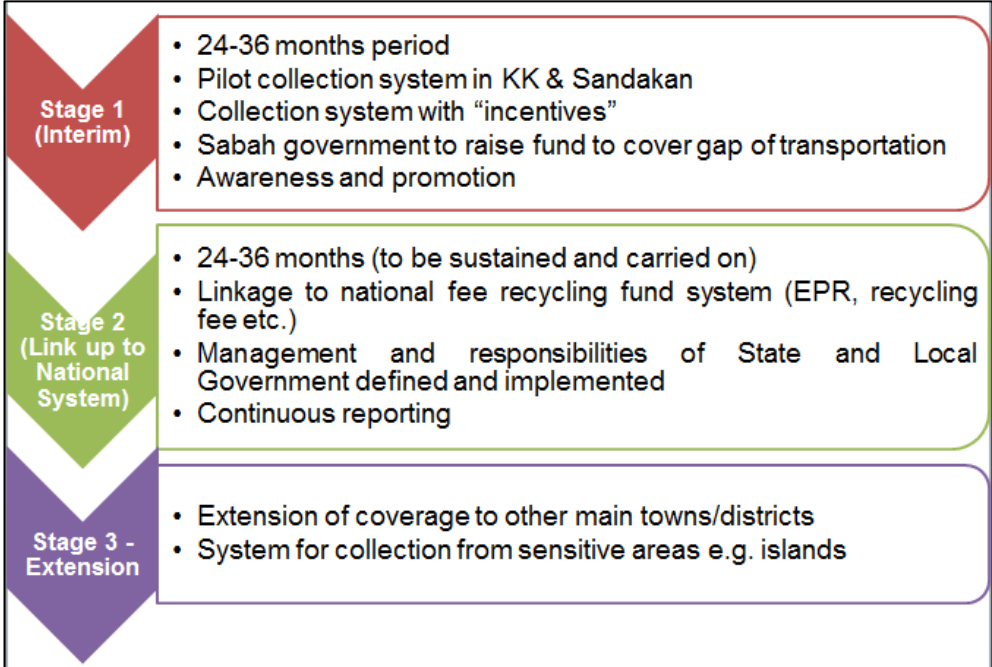
Item	Summary
Background	<p>Electrical and Electronic Waste (E-Waste) generated by domestic sector is fast growing with continuous technological advancement, affluent lifestyle and better living standards in Sabah. Examples of household consumer E-waste include scrap computers, televisions, refrigerators, washing machines, air-conditioning system.</p> <p>E-Waste, if not treated in a proper way, can give rise to a number of threats to the environment and human health. E-Waste containing chemicals and metals such as lead, cadmium, chromium, mercury, polyvinyl chlorides (PVC), brominated flame retardants and so forth can give rise to serious environment and health problems.</p> <p>On the other hand, a proper recovery system for E-Waste can conserve resources, minimise contamination issues and create business and job opportunities.</p> <div data-bbox="411 907 1390 1167" style="text-align: center;">  <p>The image contains three side-by-side photographs. The left photo shows a person in a green shirt sorting through a large pile of electronic waste in an informal recycling setting. The middle photo shows several broken electronic devices, including a television and a monitor, lying on the ground in a landfill. The right photo shows a body of water heavily polluted with plastic waste and other debris, illustrating environmental contamination.</p> </div> <p><i>Informal recycling, disposal to landfill and possible contamination to the environment</i></p>
Study Objectives	<p><u>Main Study Objective:</u> To develop an integrated E-waste management plan to ensure proper and holistic management of E-waste in Sabah</p> <p><u>Specific Study Objectives:</u></p> <ol style="list-style-type: none"> i. To establish an inventory of E-waste (generated and projected) in Sabah for the next 10 years (2013-2022), including the source, amount and types; ii. To study existing management of E-waste, including outlining any constraints and barriers in recovery; iii. To study the feasibility of developing facility(ies) for E-waste collection, recovery and disposal; iv. To formulate policy and assess the needs for specific regulation(s) and economic instruments for integrated E-waste management; v. To develop a practical strategy action plan in E-waste management for the State of Sabah; and vi. To develop programs in promoting education, awareness and training to key target groups in E-waste management.

Item	Summary
Key Outputs	<p>The main outputs of the study can be summarized in the diagram below:</p>  <ul style="list-style-type: none"> E-Waste Inventory <ul style="list-style-type: none"> Quantity & Type Projections Can be updated by EPD Existing Management and Constraints <ul style="list-style-type: none"> Current practice Who? Gaps / Constraints Opportunities Policy for Sabah E-Waste <ul style="list-style-type: none"> Directions Key principles Recommendations on support measures Strategy Action Plan <ul style="list-style-type: none"> Roles and responsibilities E-Waste management model Infrastructure feasibility Awareness Monitoring

E-Waste Inventory	<p>The study has established an inventory for the consumer (household) E-waste for the entire State of Sabah. A projection of the E-Waste from 2013-2022 was carried out and it is estimated around 8 million units of main E-waste categories (television, refrigerator, computer, washing machine, air-conditioner and phones) or equivalent to around 145,000 metric tonnes will be generated in Sabah. This translates to around 3.1 kg per person per year.</p>  <p style="text-align: center;">Projection of E-Waste in Sabah from 2013-2022</p>
-------------------	---

Item	Summary
Existing Management and Barriers	<p>Field surveys, workshops and meetings were carried out under the study to investigate the existing management of E-waste in Sabah. The current management of E-waste in Sabah is informal, involving a certain level of informal scrap metal recycling and also disposal to landfills and dumping sites.</p> <p>Some major barriers identified from the study are:</p> <ul style="list-style-type: none"> • Absence of a policy in E-waste management system; • Lack of clear responsibility allocation in E-waste management; • Lack of qualified personnel and equipment for dismantling E-waste; • Lack of knowledge on dismantling and recovery potential; and • Lack of approved E-waste recycling facilities in Sabah. High costs involving local collection and transportation; and shipping to Peninsular Malaysia.
Proposed Policy on E-Waste Management	<p>A proposed policy to guide the future integrated management of E-Waste in Sabah was formulated. The main aspects considered for the policy setting included:</p> <ul style="list-style-type: none"> - Compliance with international treaty such as Basel Conventions; - Compliance with all relevant national policies and regulations; - In line with national policy and directions on E-waste management; - Holistic management including full recovery and safe disposal; - Principles considered: Polluter Pays, Extended Producer Responsibility; and - Funding mechanism and use of economic instruments. <p>The policy statement is proposed to be:</p> <div style="background-color: #4a86e8; color: white; padding: 10px; border-radius: 15px; text-align: center;"> <p><i>“E-Waste in Sabah shall be managed systematically through the introduction of an integrated management system based on environmentally sound technologies, promotion of 3R (Reduce, Reuse and Recycle) and safe disposal of any residue. The system shall be based on shared responsibility approach to ensure lowest possible impacts on the environment and public health”</i></p> </div> <p>Considering the upcoming regulations and schemes to regulate consumer (household) E-Waste proposed by Department of Environment at Federal level, the policy calls for the linkage and adoption of the proposed principles and system proposed at national level in Sabah.</p>

Item	Summary
<p>Strategic Action Plan</p>	<p>Based on the strategic thrusts of the proposed policy, a set of action plans consisting five main categories were drawn and this can be summarized in the diagram below:</p>  <p>The diagram is a circular flow chart with five segments, each representing a strategic thrust (ST1 to ST5). The segments are: ST1 (Legal and institutional set-up), ST2 (Infrastructure set-up), ST3 (Financial Mechanism), ST4 (Awareness and education), and ST5 (Monitoring and enforcement). Arrows indicate a clockwise flow between the segments. Each segment is accompanied by a list of specific action items.</p> <ul style="list-style-type: none"> ST1: Legal and institutional set-up <ol style="list-style-type: none"> To establish an E-waste management committee Identification and confirmation of E-Waste Type To finalize relevant stakeholders for E-waste management and detail out roles and responsibilities of relevant stakeholders To formulate, update and implement E-waste policy To fine tune the E-waste collection system amongst Government agencies in Sabah To set-up an appropriate regulatory and institutional framework at the state and local level ST2: Infrastructure set-up <ol style="list-style-type: none"> To set up, test run, and refine the E-waste collection system in Kota Kinabalu & Sandakan (Stage 1) To link up with national recycling fund system (Stage 2) To expand the E-waste collection system to other cities in Sabah (Stage 3) Review potential of a partial recovery facilities Review the needs and feasibility of integrated schedule waste management system Research and development of E-waste processing and recovery technologies ST3: Financial Mechanism <ol style="list-style-type: none"> Application for financial assistance from potential sponsors (e.g. NAMA) To indicate funding required for e-waste management activities by respective stakeholders in the budget cycle proposals To identify and follow up on potential funding sources and technical support for e-waste management To link up with national recycling fund system ST4: Awareness and education <ol style="list-style-type: none"> To organize E-waste awareness raising activities To organize E-waste collection drives To set up E-Waste website To monitor and disseminate e-waste awareness materials Awareness Training on E-waste handling Capacity building for local experts ST5: Monitoring and enforcement <ol style="list-style-type: none"> To develop an E-waste data management system To conduct on the job training for relevant stakeholders on the E-waste data management system Routine ongoing environmental monitoring Enforcement of relevant regulations Annual national reporting and audit Explore links and connections to DOE's ECH Link up with Chemistry Department, Malaysia and UMS on relevant studies on toxicity of air, soil, water sources in Sabah
<p>Legal and Institutional Set Up</p>	<p>The study recommends that the main regulation on prohibitions, transportation and recycling to be governed by federal laws while the control of local issues such as collection points to be regulated using local government by-laws.</p> <p>The Ministry of Tourism, Culture and Environment is proposed as the lead agency on policy, awareness and linkages to national system while the Ministry of Local Government and Housing shall be the lead for the physical implementation. Roles and responsibilities of other stakeholders have also been identified and recommended.</p>
<p>Economic Analysis of Management Options</p>	<p>The study performed an economic assessment of three possible options:</p> <ul style="list-style-type: none"> • <i>Option 1 (collection): Collect and ship out to a facility in Peninsular Malaysia</i> • <i>Option 2 (partial recovery) : Collect, partial dismantle and ship out to Peninsular Malaysia</i> • <i>Option 3 (full recovery) : Collect, dismantle and recover in Sabah</i> <p>Preliminary estimates indicate that Option 1 provides the best option in view of the small quantity of E-wastes collected initially and minimum investments in facilities and treatment costs. It is proposed that Option 1 is implemented in the short term of 1-3 years while the potential of Option 2 can be reviewed year 3 onwards. There are further opportunities to reduce the costs of Option 1 by enhancing the efficiency of collection rates, reducing the cost of shipment and maximizing the space per container. For Option 3, due to the low</p>

Item	Summary
	<p>volume and high capital and operating cost, it is not likely to be feasible unless implemented as part of a full scale regional scheduled waste treatment facility in Sabah (not existing and requires detail feasibility assessment).</p>
Way Forward	<p>The setting up of a formal E-waste management system in Sabah is proposed to be staged according to the following timeline:</p>  <p>Stage 1 (Interim)</p> <ul style="list-style-type: none"> • 24-36 months period • Pilot collection system in KK & Sandakan • Collection system with “incentives” • Sabah government to raise fund to cover gap of transportation • Awareness and promotion <p>Stage 2 (Link up to National System)</p> <ul style="list-style-type: none"> • 24-36 months (to be sustained and carried on) • Linkage to national fee recycling fund system (EPR, recycling fee etc.) • Management and responsibilities of State and Local Government defined and implemented • Continuous reporting <p>Stage 3 - Extension</p> <ul style="list-style-type: none"> • Extension of coverage to other main towns/districts • System for collection from sensitive areas e.g. islands <p>For Stage 1, a financial gap of approximately RM 6.5 million was identified to enable the collection and transportation of E-waste to Peninsular Malaysia. Apart from federal and state funding, the study has also identified future funding opportunity through an international climate change funding under NAMA (National Appropriate Mitigation Action) mechanism.</p>