マレーシア国
天然資源環境省環境局（DOE）

マレーシア国
マレーシアにおけるE-waste管理制度
構築支援プロジェクト（第２期）

プロジェクト事業完了報告書

平成30年5月
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独立行政法人
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1　プロジェクトの概要

1.1　プロジェクトの背景及び経緯

廃電気・電子機器廃棄物（以下、「E-waste」）は鉛、水銀、カドミウム等の有害物質を含有しており、これら E-waste の不適切な処理は土壌汚染や水質汚染等の環境問題の原因の一つである。他方、E-waste に含まれる有価物・希少金属は持続的資源の利用、物質循環の観点から重要であり、近年、E-waste のリサイクルは環境配慮及び持続的資源の利用から重要性が高まっている。

マレーシアでは、産業界から排出される E-waste の処理については「指定廃棄物に関する環境規則 2005（Environmental Quality(Scheduled Wastes) Regulations, 2005）」により管理され、回収や処理体制が整っている。一方、一般家庭からの E-waste の回収・リサイクル・システムは整備されていない状況にある。

そこで、日本の家電リサイクル法(2009 年改正)に基づく取り組み（拡大生産者責任、マニフェスト制度等、独自の制度等）を踏まえた上で、JICA では、マレーシアで 2011 年 9 月から 2013 年 3 月まで「廃電気・電子機器リサイクルプロジェクト」が実施された。同プロジェクトでは、マレーシアの一般家庭から発生する E-waste 回収モデルの開発を目標に、ペナン島で、同廃棄物回収のためのパイロット・プロジェクトが行われている。

さらに、当パイロット・プロジェクト終了後には、マレーシアを含む東南アジア地域への E-waste 管理に係る協力展開の可能性を検討するため、2013 年 9 月から 2014 年 8 月までの間、基礎情報収集・確認調査が JICA により実施された。同調査では、ペナン島のパイロット・プロジェクト終了後の状況をモニタリングするとともに得られた課題を分析し、他地域への協力の展開に向けた提言をまとめた。また、タイ、インドネシアの E-waste 管理の状況を把握し、マレーシアの経験のタイ及びインドネシアへの適用の可能性を検討した。

他方、同調査と並行して、マレーシア政府（天然資源環境省環境局（DOE））はペラック州、セランゴール州、ジョホール州、マラッカ州、クアラルンプール特別区で販売店との協力を通じてペナン島と同様の回収を実施してさらに知見を深め、マレーシアの現状に即した形での拡大生産者責任（Extended Producer Responsibility）制度の導入を含めた E-waste 管理に関する法制度化の検討を本格的に開始した。

DOE は、2014 年内に、E-waste 法案のコンセプト等をまとめた大綱（Framework）を最終化し、それに基づきリーガル文書である E-waste 管理規則案をまとめ、2015 年早々に、DOE 外の内閣法制局である Attorney General Chamber（総理府法制局）に提出する準備を開始した。また、法案コンセプト最終化の動きと並行して、リサイクル・コスト分析及びガイドライン策定に関して、必要な活動の準備も開始する計画であった。

そこで、JICA は、このマレーシアでの E-waste 法制化の動向の詳細を見極め、より当該国のニーズに沿った効果的な JICA の協力を検討するため、先に実施した情報収集・確認調査で見出された課題に加え、先方の法制度化に向けた方針や取り組み状況等に関して追加的な情報収集を行うことを目的として、2014 年 10 月より２回目の情報収集・確認調査を実施した。本調査により、マレーシア内での E-waste 規則の本格検討に当たり、必要となる制度の枠組み、工程表、さらに E-waste の種類ごとのリサイクル・コスト算出のための支出分析、適切なリサイクル費の設定、リサイクル基金の運営管理メカニズムの構築等に関し、DOE は必要なノウハウ及び経験を有しておらず対応に苦慮している状況が明らかとなった。

こうした背景より、マレーシア政府から本プロジェクトの要請が出され、2015 年 1 月に詳細計画策定調査を実施し、協力の枠組みについて DOE と協議の結果、合意し 2015 年 3 月 6 日に討議議事録（R/D：Record of Discussion）の締結に至った。本プロジェクトは、当 R/D

に基づき、2015 年 6 月より 2018 年 5 月まで実施されたものである。

1.2 プロジェクト名

マレーシアにおける E-waste 管理制度構築支援プロジェクト

1.3 プロジェクトの対象範囲

プロジェクトの対象範囲とした E-waste は、以下の 6 品目である。

- TV（ブラウン管型 TV 及びフラット型 TV を含む。）
- 冷蔵庫
- 洗濯機（衣類乾燥機も含む。）
- エアコン（一体型・分離型を含む。）
- パーソナル・コンピューター（デスクトップ型及びラップトップ型を含む。）
- 携帯電話（フィーチャーフォン、スマートフォン、タブレット PC を含む。）

1.4 実施期間

プロジェクト実施期間は、当初 2015 年 6 月～2017 年 12 月の 2 年 7 ヶ月とされていたが、その後、パイロット・プロジェクトの活動内容・範囲・期間の拡大に伴い、2018 年 6 月までの 3 年 1 ヶ月に延長された。

なお、本完了報告書は、全実施期間を含む活動報告である。

1.5 業務対象地域

プロジェクト開始当初は、マレーシア国内のマレーシア半島全域とされていたが、その後マレーシア全土を含むものとして、JICA とマレーシア国天然資源環境省との間で合意を結び、PDM 及び P/O を変更している。

1.6 上位目標

家庭由来の E-waste の持続的な収集及び環境上適正なリサイクルが実施されている。

1.7 プロジェクト目標

家庭由来の E-waste の持続的な回収と環境上適正なリサイクルを促進するために必要な政策、体制、システム等の制度が準備される。

1.8 相手国関係機関

1.8.1 カウンターパート(C/P)

マレーシア政府天然資源環境省環境局(DOE-NRE)

1.8.2 関係機関

当プロジェクトの主要活動の一つである各種ガイドライン（家庭系 E-waste の回収、リサイクル、レポーティング、リサイクル料金、基金管理組織の設置運営）の策定に向けて、天然資源環境省環境局（DOE/NRE）が設置した３つのタスクフォースにはそれぞれ以下の公共・民間組織からの代表者が関わっている。

タスクフォース	メンバーとなっている公共・民間組織
タスクフォース 1 (回収及びレポーティング・ガイドライン)	▪ 地方自治体（Kuala Lumpur, Shah Alam, Petaling Jaya, Subang Jaya, Putra Jaya） ▪ 都市住宅自治省廃棄物管理公社（JPSPN） ▪ クアラルンプール特別区廃棄物管理公社（PPSPPA） ▪ 廃棄物収集事業者（SWM, E. Idaman, Alam Flora） ▪ 家電製品小売事業者（Senheng Electric） ▪ マレーシア電気製品事業者協会（FOMEDA） ▪ 家電製品事業者協会（SWEDA） ▪ NGO（Tzu-Chi） ▪ マレーシア消費者協会（FOMCA） ▪ マレーシア小売業協会（MRA） ▪ マレーシア製造業協会（FMM） ▪ 大規模小売事業者（AEON） ▪ コンピューター・マルチメディア産業協会（PIKOM） ▪ マレーシア日本人商工会議所（JACTIM） ▪ 指定廃棄物リサイクル事業者協会（ANSWER）
タスクフォース 2 （リサイクル及びリサイクル料金ガイドライン）	▪ 貿易産業省（MITI） ▪ 財務省（MOF） ▪ 内国貿易・協同組合・消費者省（KPDNKK） ▪ マレーシア税関（JKDM） ▪ マレーシア投資開発庁（MIDA） ▪ エネルギー委員会（Energy Commission） ▪ サバ州環境委員会 ▪ マレーシア消費者協会（FOMCA） ▪ マレーシア製造業協会（FMM） ▪ コンピューター・マルチメディア産業協会（PIKOM） ▪ マレーシア日本人商工会議所（JACTIM） ▪ 指定廃棄物リサイクル事業者協会（ANSWER）
タスクフォース 3 （基金管理組織の設置運営に関するガイドライン）	▪ 財務省(MOF) ▪ 貿易産業省（MITI） ▪ マレーシア首相府経済企画庁（EPU）

1.8.3 受益者

直接受益者：家庭由来の E-waste 管理に関わる DOE（中央・地方）職員

間接受益者：家庭由来の E-waste 管理に係る全ての関係主体

1.9 期待される成果と活動概要

当プロジェクトにおける PDM に示されている成果は、プロジェクトの開始当初は、9 項目から構成されていたが、その後それぞれの活動を進めていく中で、パイロット・プロジェクトが当初の 1 件から 3 件に追加され、下表の網掛けの部分の成果項目が追加されている。

成果 1	家庭由来の E-waste のインベントリーが定期更新される仕組みが構築される
成果 2	家庭由来の E-waste の効果的な回収に関するガイドラインが策定される
成果 3	家庭由来の E-Waste の環境上適正なリサイクルに関するガイドラインが策定される
成果 4	家庭由来の E-waste を管理するためのレポーティング・システムに関するガイドラインが策定される
成果 5	家庭由来の E-waste の持続的な収集及び環境上適正なリサイクルのための料金に関するガイドラインが策定される
成果 6	リサイクル基金管理組織に関するガイドラインが策定される
成果 7	システムの実効性を確認し、回収及び料金に関するガイドラインへのフィードバックを得るための E-waste の回収に関するパイロット・プロジェクトが実施される
成果 8	システムの実効性を確認し、リサイクル及び料金に関するガイドラインへのフィードバックを得るための E-waste のリサイクルに関するパイロット・プロジェクトが実施される
成果 9	システムの実効性を確認し、レポーティング・ガイドラインへのフィードバックを得るための E-waste のレポーティングに関するパイロット・プロジェクトが実施される
成果 10	関係者（ステークホルダー）のための意識向上活動が実施される
成果 11	DOE 及び関係政府機関の持続的な家庭由来の E-Waste 管理能力が構築される

1.10 プロジェクトの目的

本業務は、マレーシア国における適正な E-waste 管理システムを実現していくための前提となる情報（インベントリー、フロー、事業者等の関係主体)、制度（法規制、ガイドライン)、意識（関係主体の意識啓発)、資金（公平な費用負担）に係る条件整備を整えることを目的とするものであり、これらが期待される成果をあげることにより、適正な E-waste 管理が、本業務終了後にマレーシア国の人々によって自立発展的に構築されることを目指すものである。

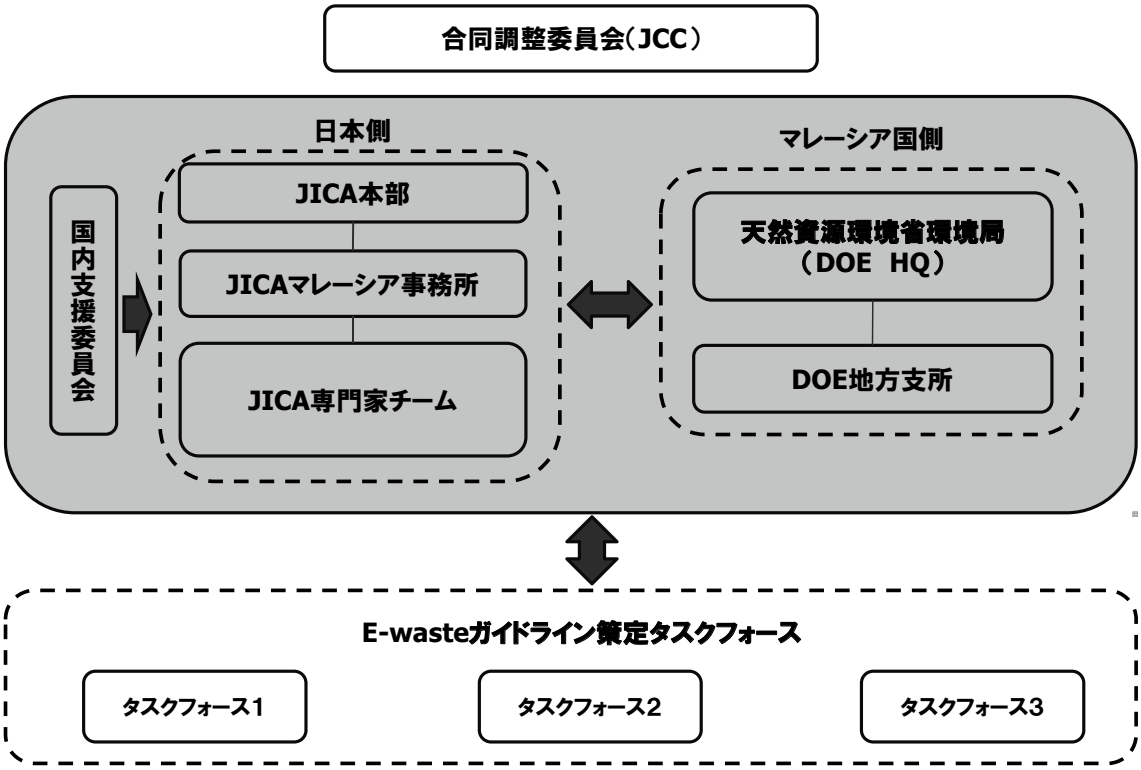
1.11 実施方針

以下の業務方針に基づき、本業務を遂行した。

基本方針 1.	PDM に基づくプロジェクトのマレーシア側との共同運営と柔軟性の確保
基本方針 2.	キャパシティ・ディベロップメントを重視したプロジェクトの実施
基本方針 3.	コンサルテーションプラットフォーム構築と多様なステークホルダーとの連携の推進
基本方針 4.	DOE 地方支所との連携による E-waste 管理の現場を重視した管理メカニズムの構築
基本方針 5.	国内支援体制を通じた E-waste の適正管理に係る知見・実務経験面でのインプット

1.12　実施体制

本業務は、以下の図に示す実施体制で実施した。



上図の JCC 及び C/P 機関、さらに本業務において独自に設置した組織の概要を以下に示す。

組織	概要
合同調整委員会（JCC）	本業務について承認された R/D 従って設置され、プロジェクト期間中に 2 度にわたり実施された。 **第 1 回 JCC（2015 年 9 月）** プロジェクトの実施計画（ワーク・プラン）に基づくプロジェクト活動内容に関する協議・確認が行われ、承認された。 **第 2 回 JCC（2018 年 4 月）** プロジェクトの活動結果及び最終成果について説明・協議が行われ、承認された。
タスクフォース	実施体制(機能・役割) 当プロジェクトの主要活動の一つである各種ガイドライン（家庭系 E-waste の回収、リサイクル、レポーティング、リサイクル料金、基金管理組織の設置運営）の策定に向けて、以下３つのタスクフォースを公共・民間の関係主体の代表者により組織し、個別ガイドラインの検討を行った。

<table>
<tr><th>組織</th><th>概要</th></tr>
<tr><td></td><td>
タスクフォース 1
(E-waste の回収及びレポーティング・ガイドラインの策定)
<table>
<tr><td>委員長</td><td>Puan Rosni Ismail (環境局許認可担当課長)</td></tr>
<tr><td>委員</td><td>小売業者
ショッピング・モール
NGO
一般廃棄物収集事業者
DOE 認定のリサイクル事業者
その他の収集・リサイクル事業者
地方自治体</td></tr>
<tr><td>機能・役割</td><td>E-waste 回収ガイドライン（案）の作成
E-waste 回収・リサイクルに係るレポーティング・ガイドライン（案）の作成</td></tr>
</table>
タスクフォース 2
(E-waste のリサイクル及び料金ガイドラインの策定)
<table>
<tr><td>委員長</td><td>Tuan Haji Rosli Zul (環境局開発・評価担当課長)</td></tr>
<tr><td>委員</td><td>DOE 認定のリサイクル事業者
家電製品の製造事業者・輸入業者の団体(JACTIM, FMM, PIKOM)
小売業者の団体(SWEDA)
一般廃棄物収集事業者</td></tr>
<tr><td>機能・役割</td><td>E-waste リサイクルガイドライン（案）の作成
E-waste リサイクルに係る料金ガイドライン（案）の作成</td></tr>
</table>
タスクフォース 3
(リサイクル料金の管理に係るガイドラインの策定)
<table>
<tr><td>委員長</td><td>Tuan Khiruddin Mohamad Idris (環境局水系・海洋課)</td></tr>
<tr><td>委員</td><td>経済企画庁(EPU)
財務省(MOF)
天然資源環境省(NRE)
貿易産業省（MITI）</td></tr>
<tr><td>機能・役割</td><td>リサイクル料金の管理に係るガイドライン（案）の作成</td></tr>
</table>
</td></tr>
</table>

2　活動内容

成果毎の活動内容及び結果を以下に示す。

2.1　成果１：家庭由来の E-waste のインベントリーが定期更新される仕組みが構築される

上記の成果の達成に向けて、以下の活動を実施した。

2.1.1　マレーシア半島における家庭由来の E-waste のインベントリー/フロー調査（活動 1-1 及び 1-2）

E-waste のインベントリー調査は、2015 年 9 月よりローカル・コンサルタントへの再委託を通じて開始され、2016 年 8 月に最終報告書のローカル･コンサルタントからの正式な受領を持って終了している。

当インベントリー調査は、E-waste に関係する主体から 1000 サンプルを抽出し、質問票に基づくインタビュー調査を通じて実施されている。抽出された 1000 サンプルは大きく 2 種類に分類される。一つは E-waste の排出源（家庭、オフィス、その他の施設）でありもう一つは、E-waste を受け取る側（回収、取引、リサイクル、処理・処分を行う事業者）である。

表 2-1：地域・分類別のインタビュー調査対象者数

地域	インタビュー調査対象者の分類				
	家庭	オフィス	施設	その他	ﾘｻｲｸﾗｰ
中部地域(Kuala Lumpur, Selangor, Putra/Cyber Jaya)	150	40	40	25	100
北部地域 (Kedah, Perak, Penang)	120	25	25	25	50
南部地域(Johor, Negeri Sembilan, Melaka)	120	25	25	25	25
東海岸部 (Kelantan, Terengganu, Pahang)	90	20	20	25	25
合計	480	110	110	100	200

調査に際しては、再委託先であるローカル・コンサルタントを通じて、調査員（インタビュアー）に対するトレーニングが実施され、これに基づき、インタビュー調査が実施された。

E-waste インベントリー調査に際して実施されたインタビュアーへのトレーニング

インタビュー調査の模様（オフィス及び家庭）

2.1.2　インベントリー/フロー調査結果

上述のローカル･コンサルタントによる調査を通じて把握された E-waste の現状は、以下の通りである。

(1)　家電製品の平均寿命（平均使用年数）

図 1 に示されているように、エアコン及び冷蔵庫が調査対象とした家電製品の中で最も平均寿命が長く、次いで洗濯機/乾燥機、TV の順となっている。これらと比較して PC 及び携帯電話の寿命は短い。また、都市部（urban）と村落地域（rural）では、村落地域において家電製品の利用年数が相対的に長いこともわかった。

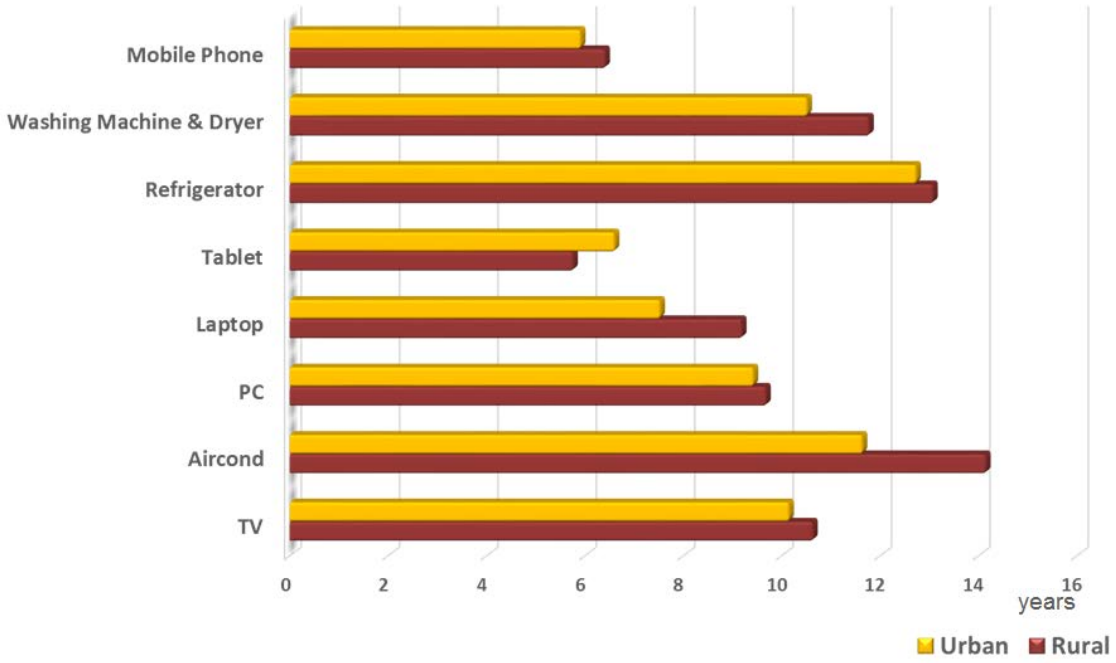


図 2-1：家電製品の都市部及び村落部における平均寿命（平均使用年数）

(2)　家庭による家電製品の保有状況

家庭による家電製品の保有数では、携帯電話が最も多く、世帯あたりの保有量が 4 台以上となっている一方、タブレット方の PC が世帯あたりの保有量が 1 台未満と最も少なくなっている。また、次頁の表 2 に示されているように、家庭による家電製品の保有状況は経済レベルにより大きく異なることもわかった。

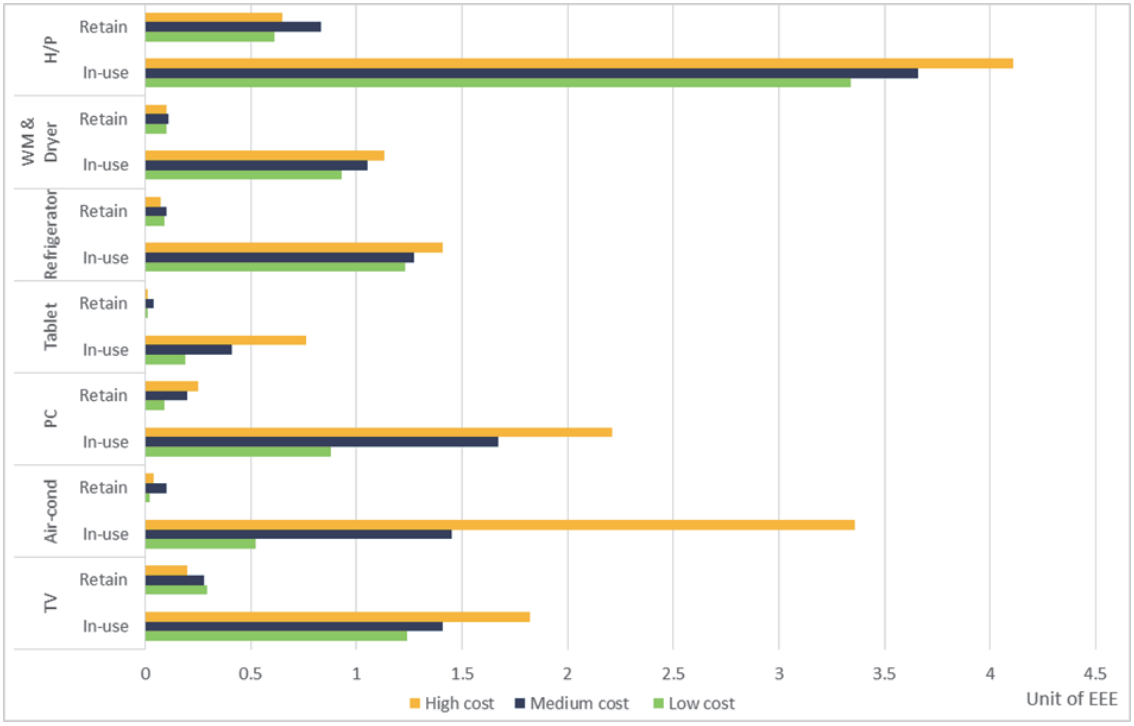


図 2-2：経済レベル（住居の経済的タイプ）別の家電製品の保有状況

(3)　E-waste の全体的な流れ（発生源からリサイクル・処分までのフロー）

以下の図に示されているように、マレーシア国における廃家電製品の流れは、多様である。インベントリー調査の結果によれば、廃家電製品の引き取り価格は、家電製品の修理事業者あるいは中古品販売業者に引き渡される場合に最も高額である一方、慈善団体やスクラップ事業者に無償で引き渡されるケースも少なくない。これは家電製品において使用されている資源の市場価格に大きく影響されているものと推測される。

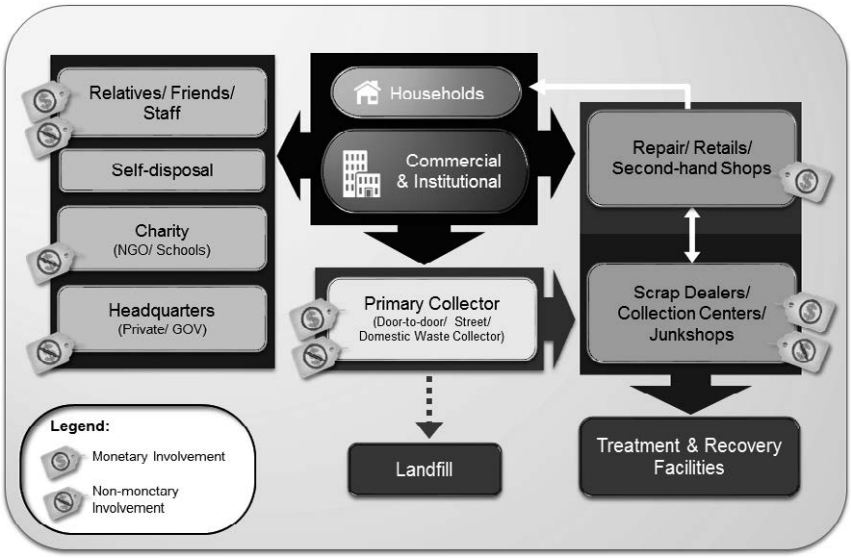


図 2-3：マレーシア国における E-waste のフロー

より詳細な調査結果については、添付資料 2 に示す。

(4) マレーシア国における家庭系 E-waste の現在及び将来の廃棄量推計

JICA 専門家チームは、上記の再委託調査に加えて、マレーシア国内外において入手可能な関連データを用いて、当プロジェクトの対象となっている家電製品 6 品目（テレビ、エアコン、冷蔵庫、洗濯機、パソコン、携帯電話）について、将来廃棄量を以下の方法により実施した。

(a) マレーシア国内の販売量データの収集

マレーシア国内における家電製品の販売量は、以下の方程式によって求めることができる。

国内販売量（台/年）＝国内製造台数（台/年）＋輸入台数（台/年）－輸出台数（台/年）

＊正確には、上記で求められた台数に、さらに**「国内在庫からの卸売台数」**を加える必要がある。

今回の将来推計については、マレーシア国内に家電製品毎の販売台数に係る統計が十分に蓄積されていないことから、以下に示す 6 品目に係る業界団体及び調査機関のデータに基づき、1985～2015 年の 20 年分の販売台数データを用いた。

- 電子情報技術産業協会（JEITA: Japan Electronics and Information Technology Industries Association）
- 日本電機工業会（JEMA: The Japan Electrical Manufacturers' Association）
- 日本冷凍空調工業会（JRAIA: The Japan Refrigeration and Air Conditioning Industry Association）
- Euromonitor International Ltd. (Consumer Asia)
- BMI Research

(b)　将来販売量の推計

2016 年～2025 年までの販売量推計については、①で収集した過去 20 年分の販売量データをもとに、以下の様な前提の下で、推計を行った。

- 各家電製品の普及限界を「保有率 80%」と設定し、これに達しているものについては、買い替え需要に相当する販売量が将来においても発生すると推定した。
- 保有率が 80%に達していないものについては、保有率 80%に達するまでは販売量が伸びるものと想定し、過去の販売量のトレンドに基づき、将来販売量を推計した。

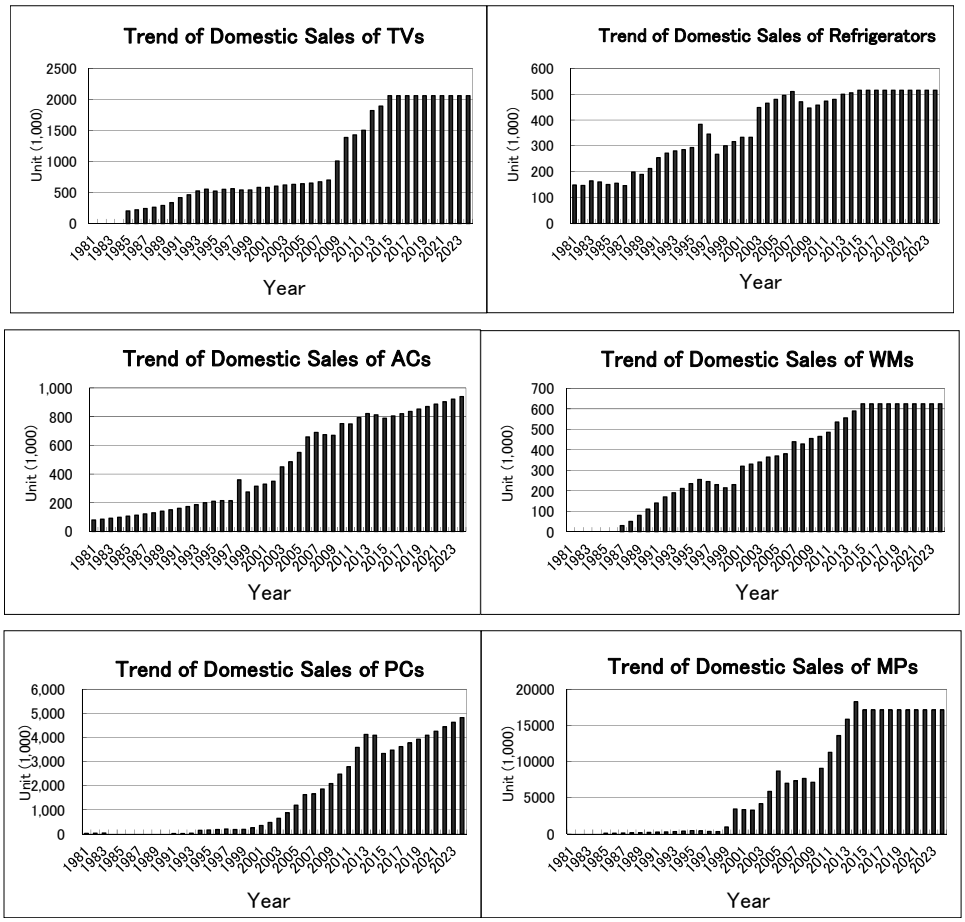


図 2-4：家電 6 品目の現在及び将来の販売量推計

(c)　各家電製品の現在及び将来廃棄量の推計

各年毎に販売・保有されている家電製品が、その後各年毎にどの程度の割合で使用済みとなり、廃棄されるか（残存率）について、アンケート調査に基づく使用年数データ及出荷台数と保有台数に係るデータの分析に基づき、ワイブル分布を活用して推計した。ワイブル分布は物質の時間に対する劣化現象や寿命を統計的に記述するために利用される確率分布であり、家電製品を含む各種機器の劣化・故障現象や寿命を統計的に記述するために、広く使用されている。

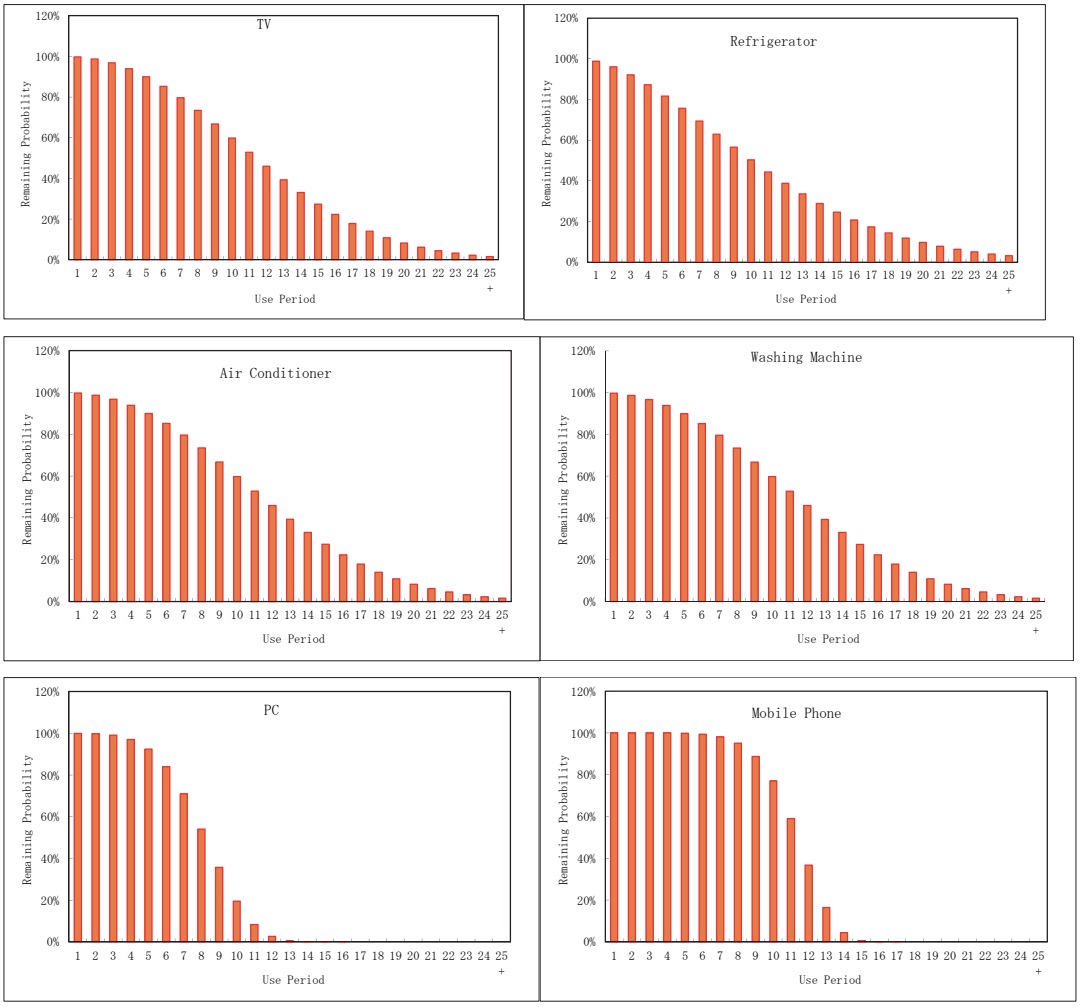


図 2-5：家電 6 品目の購入後の経年残存率推計

(d)　6 品目の現在及び将来廃棄量の推計

(b)及び(c)でえられた推計値をもとに、6 品目の現在及び将来の E-waste としての発生量の推計を行った。以下にその結果を示す。

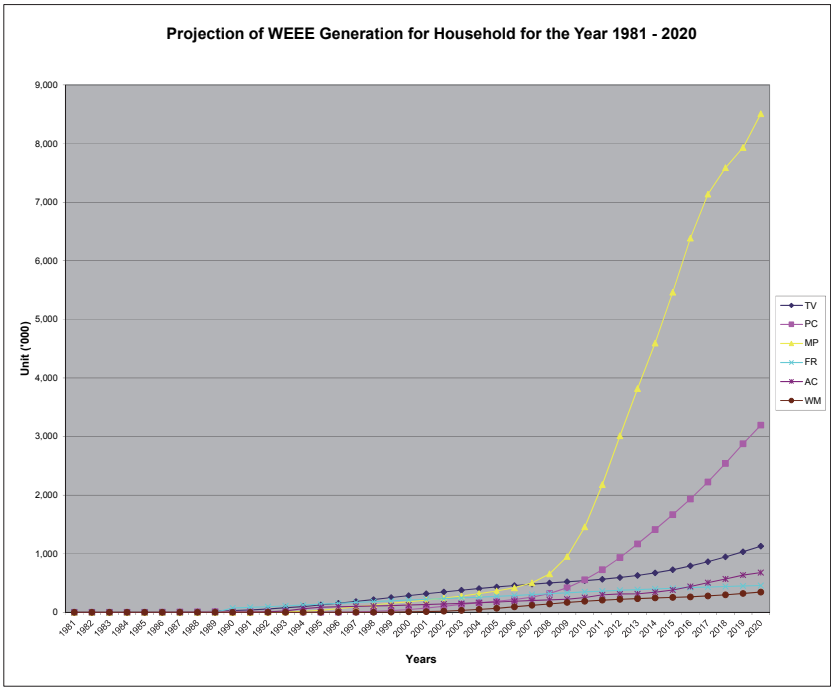


図 2-6：マレーシア国における E-waste6 品目の廃棄量推計（2016～2025 年）

上図に示されているように、今後さらに普及がさらに高まり、耐用年数（平均使用年数）が短いパーソナル・コンピューター及び携帯電話については、今後急速にその廃棄台数が増大する一方、その他既に一定の普及率に達成している他の 4 品目についても今後廃棄台数が増大することが予測されている（より具体的な廃棄台数については、添付資料 1 を参照のこと。）。

2.1.3 E-waste インベントリー・データベース及びデータ更新システムの構築（活動 1-3）

E-waste インベントリーを構築し、データを定期的に更新していくためには、更新に必要なデータを定期的に収集していくメカニズムを、関係主体との連携を通じて構築していく必要がある。

E-waste のインベントリーは、マレーシア国内にある「潜在的な E-waste の量」に基づき、将来の廃棄量を予測するためのデータベースと、毎年の「E-waste の収集・リサイクル実績」を蓄積するデータベースから構築される必要がある。この 2 つのデータが定期的に更新されることにより、将来的なリサイクル・ニーズとそれに対応した国内の収集・リサイクル・処理体制の構築をベースとする具体的な政策、戦略、計画の策定が可能となる。

これらのデータベースを確実に構築していくためには、下図に示されているように、該当するデータを有している関係主体、すなわち「潜在的な E-waste の量」については、家電製品の製造・輸入業者や輸出入管理を行っている税関からのデータ提供、「E-waste の収集・リサイクル実績」については、それを行っている収集・リサイクル事業者からのデータ提供が前提となる。

現在のところ、マレーシア国にはこのようなデータを持続的に収集するメカニズムが構築されていないことから、当プロジェクトでは、このデータ提供に関する義務を「E-waste のレポーティング・ガイドライン」の一部として、各関係主体について定めている。

今後、当プロジェクトで定めたレポーティング・ガイドラインに基づき、関係各主体からの情報・データ提供が持続的に実施されることにより、実際の実績データに基づくインベントリーの構築・更新及びそれに基づく将来の E-waste 発生量がより精度の高い形で推計することが可能になる。

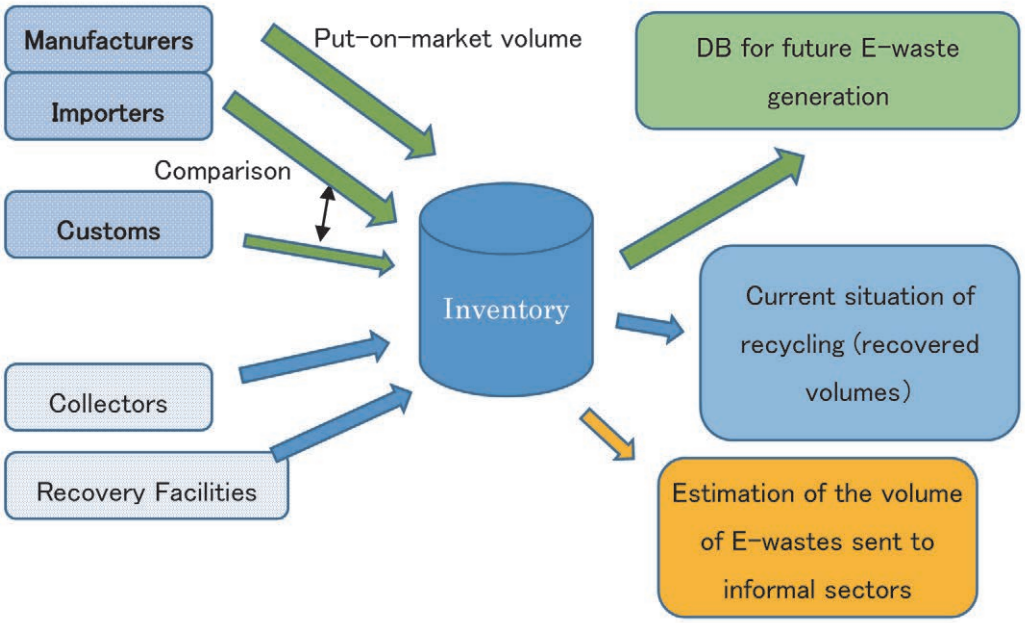


図 2-7：E-waste に関するデータの収集及びインベントリー更新メカニズム基本的枠組

2.1.4　蛍光灯、充電池、小型家電の回収の仕組みに関するグッドプラクティス調査(活動 1-4)

蛍光灯、充電池及び小型家電の回収及びリサイクル・処理システムに関するグッドプラクティスについては、わが国における法制度を含む全体的な枠組みと実際のグッドプラクティスを整理し、カウンターパートとの間での説明・協議に係るワークショップを実施した。

次いで、2016 年 1 月に実施した第 1 回国内研修では、経済産業省産業技術環境局リサイクル推進課より、我が国における小型家電リサイクルの制度的枠組みに係る詳細なレクチャーを受けるとともに、自治体が主導する我が国における小型家電リサイクルに仕組みについて、富山県を訪問し、同県の環境政策課廃棄物対策班へのヒアリング及び実際に回収・リサイクルを実施している事業者を訪問・視察するとともに意見交換を行った。

さらに、2016 年 11 月に DOE と JICA 専門家チームが共同で実施した「台湾調査」においては、製造・輸入事業者からの料金徴収によるリサイクル・処理システムを導入している蛍光灯について、関係機関との間の意見交換及びリサイクル施設の訪問・視察を実施した。(内容については、別添資料を参照のこと)。

2.1.5　蛍光灯及び充電池の適用可能な回収及びリサイクルの仕組みの提案（活動 1-5）

蛍光灯及び充電池の回収及びリサイクルの仕組みについては、原則として当プロジェクトで 6 品目を対象として導入しようとしているメカニズムに、将来的に組み入れることを念頭に置き、以下のアクションをとることが必要であることを提案した。

(1) 蛍光灯及び充電池の発生量データの収集に基づく、現在及び将来の発生量の推定

(2) 発生源における分別排出を原則とする回収システムの構築

(3) それぞれの品目の適正なリサイクル・処理基準の設定と、その達成に必要となる技術システム・モデルの構築

(4) (2)に基づくリサイクル費用の算定

(5) 費用負担のメカニズムの検討（製造・輸入業者負担を原則として、リサイクル料金の算定を行う。）

2.1.6 規制すべき小型家電の対象品目の特定（活動 1-6）

小型家電については、当プロジェクトの実施段階で、マ国側においてどのような品目を小型家電として指定するのかについての議論が進んでいなかったことから、我が国における「小型家電リサイクル法」を例に、どのような品目を対象に、そのリサイクル／処理について、どのような制度的枠組みが構築されているのかについて、専門家チームより説明を行った。

規制の対象とする小型家電の品目については、専門家チームとカウンターパートである DOE との協議の結果、マ国側で小型家電の発生及びリサイクル・処理状況に係るデータが、未整備であることから、そのような状況の中で、規制の対象とする品目を現段階で特定することは、極めて危険であるとの結論に達し、当面は以下の 18 品目を「小型家電」として指定し、規制の必要性を、個別物質の環境負荷ポテンシャル評価を踏まえて、マ国側において検討していくということで合意した。この指定は、我が国の「小型家電リサイクル法」において指定されている 28 品目より、マ国においてもその使用が普及しているものを中心に行った。

（検討対象とする小型家電品目）

① 電話機、ファクシミリ装置その他の有線通信機械器具

② ラジオ受信機

③ 映像用機械器具（デジタルカメラ、ビデオカメラ、DVD レコーダー/プレーヤー、カーナビ、カーTV 等）

④ 電気音響機械器具（デジタル・オーディオ・プレーヤー、ステレオセット等）

⑤ プリンターその他の印刷装置

⑥ ディスプレイその他の映像表示装置（プロジェクター）

⑦ 電動ミシン

⑧ 電動工具

⑨ 事務用電気機械器具（電卓、電子辞書、ワープロ等）

⑩ フィルム型カメラ

⑪ 台所用電気機械器具（電子炊飯器、電子レンジ等）

⑫ 衣料・衛生用の電気機械器具（電気アイロン、電気掃除機、ヘアドライヤー等）

⑬ 運動用電気機械器具

⑭ 園芸用電気機械器具

⑮ 電子/電気楽器

⑯ 電子・電動式玩具

⑰ 空調用電気機械器具（エアコンを除く。扇風機、送風機、除湿機等）

⑱ 電子/電動式計量・測定機械・器具（ヘルスメーター、血圧当測定器、電子体温計等）

2.2 成果 2：家庭由来の E-waste の効果的な回収に関するガイドラインが策定される

上記の成果の達成に向けて、以下の活動を実施した。

2.2.1 家庭由来の E-waste の一次回収を含む回収者の公式認可要件を準備する（活動 2-1）

日本を含む家電リサイクル制度を施行済みの他国における E-waste の回収者の認可要件及び、マレーシアにおける都市ごみ回収者の許可要件、工業由来の E-waste の回収許可要件等を参考として、家庭由来の E-waste の一次回収を含む回収者の公式許可要件を整理し、回収に関するガイドライン案としてまとめた。ガイドライン案に記載した公式許可要件は以下の通りである。

表 2-2：回収者の公式許可要件

項目	公式許可要件
引取り	・ 回収に関与する主体は DOE から許可を得ること ・ 排出者は DOE が許可を付与した主体にのみ引き渡すこと、等
保管及び取り扱い	・ 回収された対象品目の適切な保管 ・ 解体行為の禁止 ・ 品目別の保管時の注意点、等
引き渡し	・ 回収された対象品目を確実に DOE から許可された主体へ引き渡す責務 ・ 引き渡し時の横流しの禁止等の注意点 ・ 引き渡し品、量の報告義務、等

2.2.2 公式認可要件の実現可能性分析（活動 2-2）

2.2.1 で定めた回収事業者の許可要件を含む E-waste 回収ガイドライン（案）は、2018 年～2019 年に実施した「E-waste 回収パイロット・プロジェクト」において、その実現可能性の検討・分析を行った（詳細は「成果 7 : E-waste 回収に係るパイロット・プロジェクト」を参照のこと。）。

2.2.3 公式認可される要求事項に係る改善要素の特定とガイドラインへの反映（活動 2-3）

2.2.2 で実施したパイロット事業実施結果を踏まえ、ガイドラインの規定事項について、必要な追加・修正を行い、ガイドラインの最終化を行った。

2.2.4 E-waste の回収コスト分析のための回収システムの想定（活動 2-4 及び 2-5）

E-waste 回収システムについては、プロジェクト回収当初は、マレーシア全土に必要に応じて、回収拠点（回収センター）を新たに設置する必要性を念頭に置き、そのための調査を前提としていた。しかし、マ国においては、既に E-waste を含む資源回収を行い、かつ収集拠点を含む収集・輸送インフラ及びネットワークを有する回収事業者が十分存在することから、このような既存インフラを活用した回収システムを想定したコスト分析を行うこととした。E-waste の一次回収を担う事業者として想定したのは、以下の表に示す事業者である。

表 2-3：マ国において想定した一次回収事業者

分類	回収事業者	概要
資源回収 NGO	▪ Tzu Chi	▪ マレーシアで資源回収・リサイクルに最も積極的な NGO。マレーシア全土に拠点を有し、持続的に資源回収を実施

分類	回収事業者	概要
一般廃棄物収集業者	▪ Alam Flora ▪ SWM Environment ▪ E. Idaman	▪ マレーシア政府との間で、一般廃棄物収集に関するコンセッション契約を結び、マレー半島の北部、中部、南部の収集を分担する収集事業者
家電製品小売事業者	▪ Senheng ▪ TBM ▪ AEON	▪ マレーシア国で家電製品の小売を担う大手の小売事業者。全国的な拠点及び輸送を含むロジスティック・ネットワークを有する。

一方、収集後のリサイクル事業者までの二次収集については、現状では、上述の一次回収事業者によって輸送が行われる場合と、リサイクル事業者が一次収集事業者の収集拠点から自社のリサイクル施設まで輸送を行う場合がある。

回収コストの算定に係る前提条件としては、以下の実に示すようなルートで、E-waste の回収・輸送が行われると想定した。

図 2-8：E-waste の回収・輸送ルートの想定

上図の回収・輸送ルートの想定に基づく回収コスト算定における主な前提は、以下の通りである。

（マレーシア半島地域）

① マレーシア半島を北部、中部、南部に分類し、それぞれに E-waste の最終的な受け手となるリサイクル事業者を、既存の事業者のリサイクル施設をベースに想定。

② 平均 5 トントラックが 1 日 300km を走行し、E-waste の収集及びリサイクル事業者までの輸送を担うと想定し、コストを算出。

（サバ・サラワク地域）

① 地域内に E-waste のリサイクル事業者がいないことから、陸上・海上輸送により、E-waste をマレーシア半島のリサイクル施設まで収集・輸送することを想定。

② 海上輸送は、サバ・サラワクの主要 3 港から行われるものと想定。陸上輸送は、サバ・サラワク内及びマレーシア半島内でそれぞれ 300km の走行を 1 日当たり行うものと想定。

上記の想定に基づく収集・輸送コスト算定の詳細については、添付資料「リサイクル料金に係るガイドライン」に示している。

2.2.5 家庭由来の E-waste 回収に関するガイドラインの作成（活動 2-6）

活動 2-1～2-5 の成果を踏まえて、家庭系 E-waste 6 品目の「回収ガイドライン」を策定した。ガイドラインの策定に際しては、E-waste の回収に携わる回収事業者も含めた関係主体から構成されるタスクフォース 1 による会議を定期的に開催するとともに、数度に渡るワークショップやセミナーを通じて、ガイドラインの内容について、協議を実施し、2018 年 4 月に開催された最終のタスクフォース会議において、ガイドラインが承認され、最終化されている（ガイドラインの内容については、添付資料「家庭系 E-waste の回収ガイドライン」を参照。）。

2.3 成果 3：家庭由来の E-waste の環境上適正なリサイクルに関するガイドラインの策定

上記の成果の達成に向けて、以下の活動を実施した。

2.3.1 E-waste のリサイクル技術および環境汚染管理方法の調査（活動 3-1）

DOE（環境局）から E-waste リサイクル（リカバリー）の許可を得ているリサイクル事業者及び家電製品の修理・再生を行っているリペア事業者を対象に、現場視察を含むインタビュー調査を実施した。調査を通じた主な所見を以下に示す。

- リペアされた中古品には一定のニーズがあり、家庭由来の E-waste の一部が流れている。修理工程ではフロンの大気放出や残さの投棄等の環境上不適正な取り組みも見られる。実質野放しになっており、当局による規制は行き届かず今後もその状態は続くものと考えられる。
- 一部の PRF 施設は広範囲の集荷ネットワークを有しており、買い取りのメカニズムが機能すれば現在収集されているテレビ以外の品目の適正なリサイクルを行う施設による回収、リサイクルが進む可能性は高いと考えられる。
- 一部の FRF 施設は家庭由来の E-waste を処理しているが、独自の判断で処理を行っている。また、有用物のみ回収しその売却益に依存する経済原則で成り立つ範囲でのリサイクルを行っている。家庭由来の E-waste にはフロンや水銀、鉛等の有害物質が含まれているが、それらを適正に処理する技術は整備されておらず、またその整備、稼働費用も有用物の売却益では賄えないケースが多い。
- 家庭由来の E-waste の処理やそれに含まれる有害物質等を適正に処理する要件も整理されていない。また、リサイクルされる部品を定量的に評価する指標もなく、施設ごとに統一して評価する指標や方法もない。
- 複数の FRF 施設が家庭系の E-waste のリサイクル施設としての稼働が期待されるが、フロン、水銀含有部品の処理は独自の方法で行われている。一部は施設のリサイクル率を公表しているが、算定方法、根拠も曖昧である。
- 従って、環境上適正なリサイクルを評価する指標や有害物質を適正に処理する推進するための要件の整備が必要であると判断される。

2.3.2 環境上適正なリサイクル及び残渣の最終処分を推進する要件の特定（活動 3-2）

家庭系 E-waste のリサイクル・ガイドラインに含めるべき「環境上適正なリサイクル及び残渣処理・処分」の要件検討に当たり、日本、EU 及び台湾におけるこれらの要件の規定動向のレビューを行った。これを踏まえ、E-waste リサイクル・ガイドラインでは、以下の要件を具体的に規定することとした。

- 家庭系 E-waste リサイクル事業認可（Licensing）システムの導入
- 家庭系 E-waste における品目ごとの重点管理物質（Focused Materials）とその管理方法
- 家庭系 E-waste における品目ごとのリサイクル率達成目標
- リサイクル事業者による事業実績に係る報告義務と報告方法

2.3.3 家庭由来の E-waste の環境上適正なリサイクルのための要件に関するガイドライン作成（活動 3-3）

活動 3-1 及び 3-2 の成果を踏まえて、家庭系 E-waste 6 品目の「リサイクル・ガイドライン」を策定した。ガイドラインの策定に際しては、E-waste のリサイクルに携わるリサイクル事業者も含めた関係主体から構成されるタスクフォース 2 による会議を定期的に開催するとともに、数度に渡るワークショップやセミナーを実施し、ガイドラインの内容について、協議を行った。当ガイドラインは、2018 年 4 月に開催された最終のタスクフォース 2 会議において、承認され、最終化されている（ガイドラインの内容については、添付資料「家庭系 E-waste のリサイクル・ガイドライン」を参照。）。

2.4 成果 4：家庭由来の E-waste を管理するためのレポーティング・システムに関するガイドラインが策定される

上記の成果の達成に向けて、以下の活動を実施した。

2.4.1 他国で実施されているレポーティング方法の調査（活動 4-1）

家電リサイクルに関わるステークホルダーがそれぞれの報告するべきデータを明らかにし、使用する報告様式を確定するために、すでに家電リサイクルのスキームが構築されているヨーロッパや日本、台湾等におけるレポーティング方法を調査した。

2.4.2 報告するべきデータ及び使用するべき報告様式を特定する（活動 4-2）

上記の各国の事例及び台湾調査の結果に基づき、それぞれのステークホルダー（製造業者／輸入業者、小売店を含む回収事業者、リサイクラー）の報告すべきデータの特定を行った。その後、それらのデータ項目を網羅する形で使用するべき報告書式を作成した。

2.4.3 規則に従った EPR 料金及びリサイクル料金管理を実施するためのレポーティング・システムの特定（活動 4-3）

EPR 料金及びリサイクル料金は製造業者／輸入者がマレーシア国内において上市される製品の量（上市量）に応じて支払を行うことが規定されている。よって、料金管理を実施するためには、製造業者／輸入者の情報、マレーシア国内において上市される製品の情報、またそれら製品の廃棄に回る予測量、正規リサイクル業者によるリサイクル量などの情報を管理するレポーティング・システムが必要となる。そこで、当プロジェクトでは、ガイドラインの中で、このようなレポーティング・システムを 2.4.2 で示した報告書式について規定を行った。

2.4.4 家庭由来の E-waste を管理するためのレポーティング・システムに関するガイドラインの作成（活動 4-4）

活動 4-1～4-3 の成果を踏まえて、家庭系 E-waste 6 品目の「レポーティング・ガイドライン」を策定した。ガイドラインの策定に際しては、回収ガイドラインの作成も担当するタス

クフォース 1 による会議を定期的に開催するとともに、数度に渡るワークショップやセミナーを通じて、ガイドラインの内容について、協議を実施し、2018 年 4 月に開催された最終のタスクフォース会議において、ガイドラインが承認され、最終化されている（ガイドラインの内容については、添付資料「家庭系 E-waste のレポーティング・ガイドライン」を参照。）。

2.5 成果 5：家庭由来の E-waste の持続的な収集及び環境上適正なリサイクルのための料金に関するガイドラインの策定

上記の成果の達成に向けて、以下の活動を実施した。

2.5.1 家庭由来の E-waste の持続的な回収と環境上適正なリサイクルのために要するコストの分析（活動 5-1）

2.2.4 において想定した家庭系 E-waste の回収システムの想定及び 2.3 において作成した対象 6 品目ごとのリサイクル・ガイドラインに基づき、各品目の回収・リサイクル費用を分析・算定した。算定の手法及び算定結果については、添付資料の「家庭系 E-waste の料金ガイドライン」にその詳細を示している。

2.5.2 消費者によって支払われるリサイクル料金及び製造業者等によって支払われる EPR 料金の特定（活動 5-2）

プロジェクトの開始時には、2.5.1 において分析・算定を行った回収・リサイクル費用に基づき、このコスト負担を「消費者によって支払われるリサイクル料金」と「製造業者等によって支払われる EPR 料金」の二つの料金を通じて実施することが念頭に置かれていた。

しかし、当プロジェクトのカウンターパートである DOE 及び他の関係政府機関との協議を進める中で、リサイクル料金を直接負担させる手法は、現在のマレーシアの経済状況においては困難であるという意見が出され、検討の結果、この二つの料金を一体化させ、一次的に対象家電製品の製造・輸入業者からリサイクル料金として徴収することで、合意を得た。

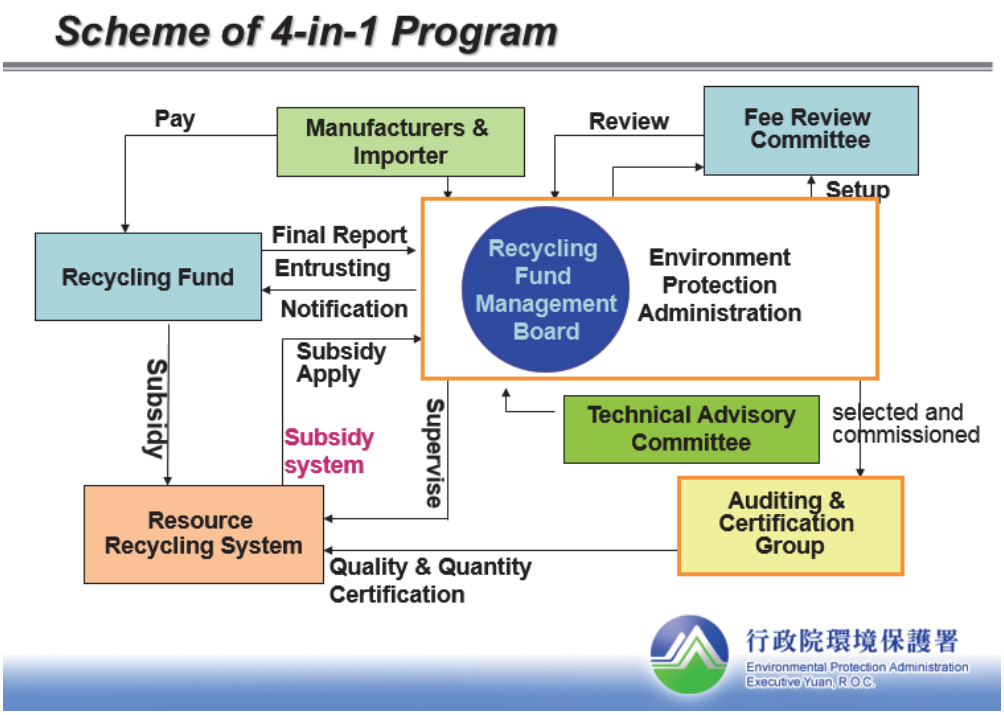
一方、リサイクル料金を負担する製造・輸入業者は、家電製品の販売時に、当該リサイクル料金の負担を購入者（消費者）に求めることは可能であるとした。

具体的なリサイクル料金の徴収メカニズムについては、添付資料の「家庭系 E-waste の料金ガイドライン」にその詳細を示している。

2.5.3 基金管理組織を制度化している他国における既存の家庭由来の E-waste の管理事例の調査（活動 5-3）

家庭由来の E-waste に含まれる有害物質の適正な処分費をメーカー等から徴収し、基金を立ち上げ、メカニズムを管理している事例としては、台湾の取り組みがある。台湾では下図に示すとおり、環境保護署（EPA：Environment Protection Administration）の基に基金管理委員会（Recycling Fund Management Board）が置かれ、主に以下の役割を担っている。

- メーカーから徴収されたリサイクル料金の管理
- ステークホルダーによる E-waste フローの管理
- リサイクル施設における適正なリサイクル実施状況の監査
- ステークホルダーの登録管理（フリーライダーの排除）



出典：台湾行政院環境保護署（EPA）Recycling Fund Management Board「Innovative Management　System of Resource Recycling　in Taiwan」

図 2-9：台湾における基金によるメカニズムの管理体制

なお、調査結果は、本プロジェクトにおいて設置されたタスクフォース会議にて参加者間で共有され、今後の検討課題が、以下の様に整理された。

表 2-4：台湾における実態とマレーシアへの示唆・検討課題

台湾の実態（調査にて把握）	マレーシアへの示唆と今後の検討課題
＜補助金額決定のしくみ＞ • 「費率審議委員会」があり、そこで回収率や資源価格、省エネ性能などを考慮して徴収金額と補助金額が決められている（草案はコンサルが作成）。 • 製造業者と輸入業者から徴収されたリサイクル費用のうち 20%は制度の管理運用費用として確保されている。（中国の制度ではこの部分の考慮が欠けており、致命的）	• E-waste 管理体系の中で徴収金額と補助金額を継続的に調整していく組織（基金管理委員会）の検討 • リサイクル施設における追加的な環境対応費用を積算するだけではなく、こういった制度運営に必要な組織やその運営維持費の検討が必要
＜監査方法＞ • 監査には認証団体から派遣されたスタッフが５，６名常駐して対応している。	• 虚偽報告を防ぐにはこれほどのマンパワーとコストを要することを認識する必要がある。 • その要否については検討が必要である。
＜監査項目＞ • 監査はまず、入庫した際の E-waste の状態（必要と規定された部品があるか、破損していないか）を確認、個数と重量を計測する。処理の間にも不正が起こらないよう、二次認証として指定された部品（主に有価性が高く横流しの懸念があるコンプレッサー等）の数量チェックが行われる。工場から出場するもの（資源物、廃棄物）はすべて記録される。	• 台湾では１台の単位で管理されているが、マレーシアでの台数、重量管理について検討する。今回見た工場はすべて補助金対象物のみを扱っていたため、データ管理が容易であるが、対象外の E-waste も処理する場合について検討しなければならない。

2.5.4　既存の家庭由来の E-waste に対する実施可能な対策方法の提案（活動 5-4）

2.5.3 における検討・協議結果を踏まえて、マレーシアにおいて設置すべき基金管理組織の基本的な枠組みを、以下の図に示すものとすることを提案した。

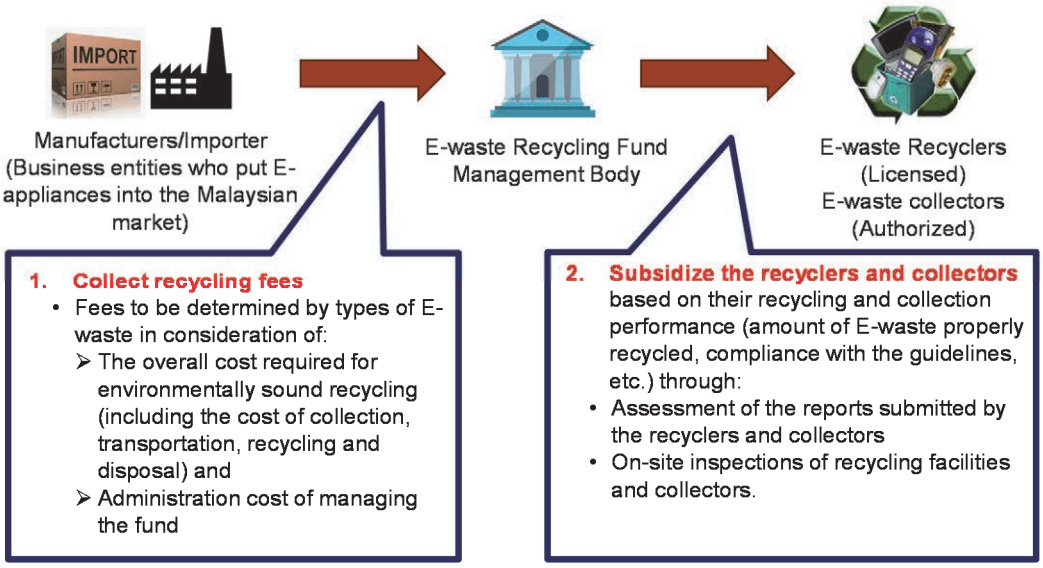


図 2-10：マレーシア国における基金管理組織の基本的枠組み

この提案に基づき、リサイクル基金管理組織のガイドライン策定に係る活動が成果 6 に係る活動として実施された。

2.5.5　家庭由来の E-waste の持続的な回収と環境上適正なリサイ クルのための料金管理に関するガイドラインの作成（活動 5-5）

活動 5-1～5-4 の成果を踏まえて、家庭系 E-waste 6 品目の「リサイクル料金に関するガイドライン」を策定した。ガイドラインの策定に際しては、リサイクル・ガイドラインの作成も担当するタスクフォース 2 による会議を定期的に開催するとともに、数度に渡るワークショップやセミナーを通じて、ガイドラインの内容について、協議を実施する一方、料金の一次負担者となる製造・輸入業者として、マレーシア国における家電製品販売シェアの 6 割以上を占める我が国の家電製品製造・輸入業者との間の協議を「日本人マレーシア商工会議所」の「リサイクル小委員会」の間でも定期的に開催し、協議・意見交換をしつつ、とりまとめている。

当ガイドラインは、2018 年 4 月に開催された最終のタスクフォース 2 会議において、ガ承認され、最終化されている（ガイドラインの内容については、添付資料「家庭系 E-waste の料金ガイドライン」を参照。）。

2.6　成果 6:リサイクル基金管理組織に関するガイドラインが策定される

上記の成果の達成に向けて、以下の活動を実施した。

2.6.1　基金管理機関の構築のための前提条件の調査（活動 6-1、活動 5-3 に同じ。）

日本、台湾及び EU におけるリサイクル料金を財源とする基金の管理・運用方法について調査・整理し、E-waste 全体のリサイクル・システムも含めて、相対的に比較することを目的として、カウンターパートとの間でワークショップを行った。

2.6.2 基金管理機関の基本的枠組みの構築（活動 6-2、活動 5-4 に同じ）

2.6.1 での調査を踏まえ、マレーシアにおいて設置すべき基金管理組織の基本的な枠組みを提案した。

2.6.3 基金管理機関に関するガイドラインの作成（活動 6-3）

活動 6-1 及び 6-2 の成果を踏まえて、家庭系 E-waste 6 品目の環境上適正な回収及びリサイクルを行うために必要な、リサイクル料金を原資とする「リサイクル基金」の設置に関するガイドライン」を策定した。ガイドラインの策定に際しては、マレーシア国政府内の関係政府機関の代表者から構成されるタスクフォース 3 を組織し、定期的な会合においてガイドラインの協議を行う一方、タスクフォース 1 及びタスクフォース 2 のメンバーとなっている公共・民間の関係主体との間でも同会議を通じて、情報交換・協議を行った。

当ガイドラインは、2018 年 4 月に開催された最終のタスクフォース 3 会議において、承認され、最終化されている（ガイドラインの内容については、添付資料「基金管理のガイドライン」を参照。）。

2.7 成果 7：E-waste 回収ガイドラインの実効性を確認し、ガイドラインへのフィードバックを得るためのパイロット・プロジェクトの実施

上記の成果の達成に向けて、以下の活動を実施した。

2.7.1 現在の E-waste のインフォーマル･セクターにおける流れと価格メカニズムの把握（活動 7-1）

(1) 家電製品の配送事業者へのヒアリング調査

これまでの調査から、E-waste の多くが、買い替え時の新品の配達時に回収されているが、回収された E-waste の多くが、配達時のドライバーによりジャンクショップ等のインフォーマル・リサイクラーに流れていると推定される。これを踏まえて、家電製品の小売事業者を対象にヒアリング調査を実施した。配達事業者が家庭への配達を行っている家電製品は、対象 6 品目中、TV、洗濯機、冷蔵庫の 3 品目であった（エアコンについては、据付業者が配送も併せて行うため、ここには含まれていない。PC 及び携帯電話は多くが店頭での引取となるため、配送業務は原則として生じない。）。

使用済み製品の新品購入時の引き取り及びその後の使用済み製品の取引に伴うお金のやりとりに係る調査結果は、以下の通りである。

① 消費者からの引き取り時の料金徴収

上記の 3 品目については、多くの場合、使用済み製品の引き取り時に配送事業者が料金徴収を行っていることがわかった。

表 2-5：使用済み家電製品の引き取り価格（新品の配送事業者による引取り）

No	Items	Fee Paid by Consumer to Delivery Workers (RM/pcs)
1	Television	RM 5- RM 10
2	Washing Machines	RM 5- RM 15
3	Refrigerators	RM 5- RM 20

② 引き取った使用済み製品の転売価格

配送事業者が消費者より引き取った使用済み製品の転売を行う場合、製品の状態に応じて、修理・中古品事業者とスクラップ事業者がその対象となる。その場合の転売価格に係る調査結果は、以下の通りである。

表 2-6：修理・中古品事業者への転売価格

No	Items	Selling Price by the Delivery Workers to repair shops / secondhand shops (RM/pcs)
1	Television	RM 30- RM 50
2	Washing Machines	RM 20- RM 50
3	Refrigerators	RM 50- RM 80

表 2-7：スクラップ事業者への転売価格

No	Items	Selling Price by the Delivery Workers to Informal Sector (RM/pcs)
1	Television	RM 2- RM 10
2	Washing Machines	RM 5- RM 20
3	Refrigerators	RM 5- RM 40

③ 配送事業者による使用済み製品の引取・転売による利益

配送事業者による利益は、以下の様に推定される。

表 2-8：配送事業者による利益の推定

No	Items	Range of Income Generated for the Delivery Workers (RM/pcs)
1	Television	RM 2- RM 50
2	Washing Machines	RM 5- RM 50
3	Refrigerators	RM 5- RM 80

引取を行った使用済み製品が、製品として再利用可能であるか否かによって、転売価格には大きな差が生じることになるが、スクラップ事業者に転売することによっても、一定の収入を上げていることがわかる。

(2) インフォーマル・セクターへのインタビュー調査

多くの家電製品が、スクラップ事業者に代表されるインフォーマル・セクターに流れていることを踏まえ、このようなスクラップ事業者に使用済み家電製品を転売しているトレーダーに対するインタビュー調査を行った。トレーダーの多くは、洗濯機・冷蔵庫の引取を以下の様な理由により行っていないと回答した。

- サイズが大きく、取り扱いが困難であり、貯蔵にスペースを要する。
- 輸送に要する費用が高額になる。
- 市場における引取価格が低く、利益率も低い。

その他の 4 品目（TV、エアコン、パソコン、携帯電話）については、家庭、小売事業者及び事業所を中心に引取を行っており、引き取ったこれらの製品のインフォーマル・セクターへの転売価格は、次の表に示す通りであった。

表 2-9：使用済み家電のインフォーマル・セクター（スクラップ事業者）への転売価格

Selling Prices (RM/pcs)	
Television	RM18.50
Air-conditioner	RM59.80
Computer	RM17.60
Handphone	RM2.00

上記の転売価格に含まれるトレーダーの利益の割合がどの程度のものであるかについての情報は入手できなかったものの、次の表に示すように利益率がどの程度あるかを想定することによって、どの程度の価格インセンティブが、インフォーマル・セクターへの使用済み家電製品のフローを防止するために必要かを検討する一つの指標となる。

表 2-10：転売による利益の想定

Items	Selling Price	Buying Prices			
		25%	50%	75%	100%
	RM/pcs				
Television	18.50	13.90	9.30	4.60	FOC
Air-conditioner	59.80	44.90	29.90	15.00	FOC
Computer	17.60	13.20	8.80	4.40	FOC
Handphone	2.00	1.50	1.00	0.50	FOC

2.7.2 E-waste 回収に係る社会実験（活動 7-2）

家庭系 E-waste 回収ガイドラインの実施可能性を検討するために、現在 E-waste を含む資源回収や廃棄物収集を担っている事業者の協力を得て、E-waste 回収に係る社会実験を 2017 年 10 月～2018 年 3 月までの 6 ヶ月に渡り実施した。

パイロット・プロジェクトの実施期間を通じて得られた、協力事業者の意見・提言は、ガイドラインの作成を担当するタスクフォース 1 会議において協議され、回収ガイドラインの追加・修正を行い、最終化されている（パイロット・プロジェクトの詳細については、別添資料「家庭系 E-waste 回収に係るパイロット・プロジェクトの概要と結果」を参照。）。

2.8 成果 8：システムの実効性を確認し、リサイクル及び料金に関するガイドラインへのフィードバックを得るための E-waste のリサイクルに関するパイロット・プロジェクトの実施

上記の成果の達成に向けて、以下の活動を実施した。

2.8.1 E-waste リサイクルにおける重点物質(focus materials)の取り扱い及びリサイクル率に関する現況の把握（活動 8-1）

E-waste のリサイクルに係るパイロット・プロジェクトは、主に以下の目的を達成するために実施された。

- 実行可能な品目毎のリサイクル率達成目標の設定
- 重点物質の適正な処理・処分に必要な基本工程の確立

この二つの目標を達成するため、マレーシア国における主要なリサイクル事業者 10 社の協力を得て、それぞれの事業者のリサイクル施設における解体・分別を含む「リサイク

ル・テスト」を実施した。

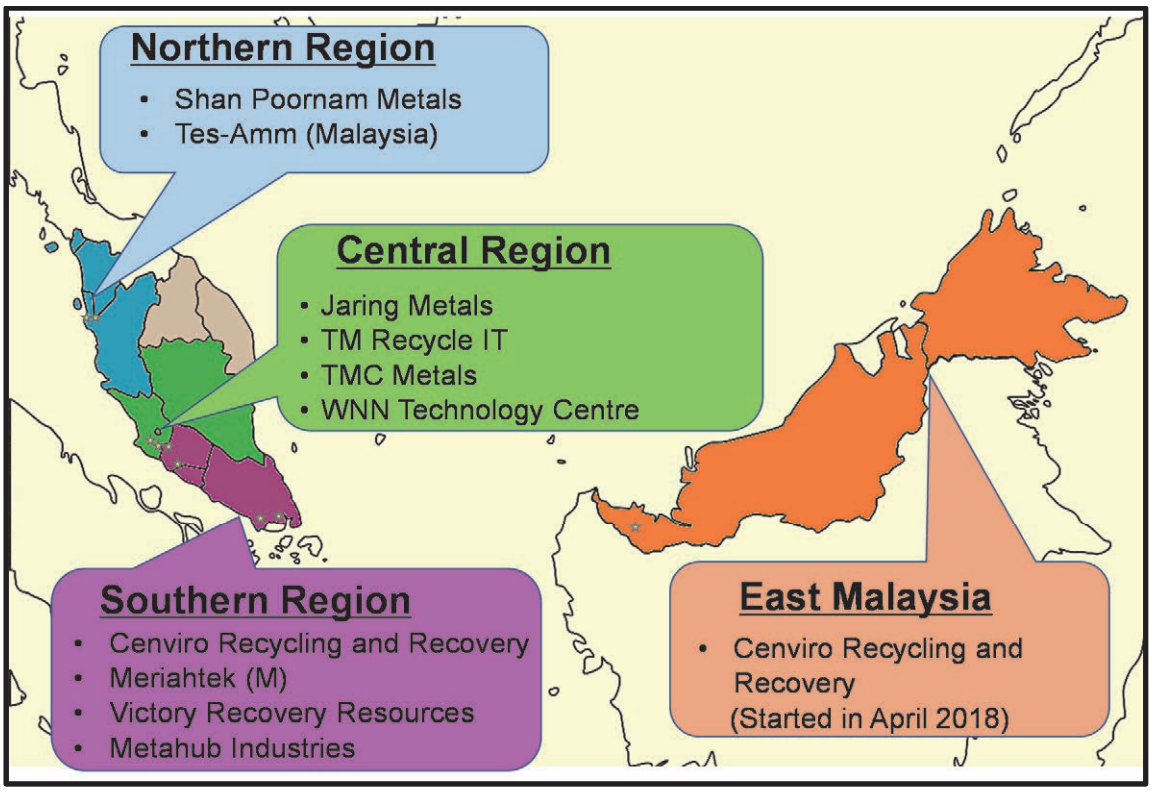


図 2-11：リサイクル・テストに参加したリサイクル事業者

リサイクル・テストの対象とした使用済み家電製品は、6 品目全体で 1000 台以上に及び、これらの解体・分別データをもとに、品目別の標準的なリサイクル工程及びリサイクル率達成目標が設定された。

表 2-11：リサイクル・テストの対象となった使用済み家電製品内訳

Item		Quantity (unit)
Television (TV)	CRT	110
	Flat Screen	90
Washing machine (currently top/front loading type combined)		31
Air-conditioning		25
Refrigerator		60
Desktop PC	CPU	118
	CRT monitor	120
	Flat screen	132
Notebook PC		137
Mobile phone	smart phone	115
	old type	85

(1)　リサイクル・テストの実施プロセス

リサイクル事業者 10 社を対象とした「リサイクル・テスト」は、以下のプロセスで実施された。

①　テストの対象とする使用済み家電製品及び解体ツール等の準備

JICA 専門家チームと DOE により、上記の 10 社を訪問し、テストの対象とする使用済み家電製品の種類、台数を協議・決定し、テストに必要な資機材・工具等が各事業者により準備された。



図 2-12：準備された使用済み家電製品と資機材・工具

②　使用済み家電製品のラベリングと計量

テストに先立ち、準備された使用済み家電製品は、1 台ごとに計量・記録されラベリングされた。



図 2-13：使用済み家電製品の計量と記録・保管

③　解体・分別実験（リサイクル・テスト）の実施

収集をしたそれぞれの使用済み家電製品について、製品毎に解体・分別作業を行った。



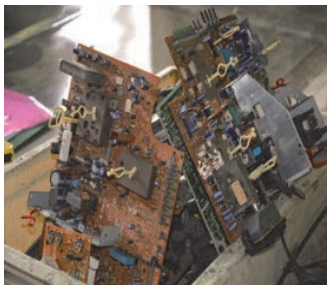



図 2-14：使用済み家電製品の解体・分別実験

④　解体・分別された部品・資源の計量及び記録

解体・分別された部品・資源は種類ごとに計量され、1 台毎に記録され、リサイクル率目標を設定する際の基本データとして活用された。



図 2-15：部品・資源の計量・記録

(2)　実験結果の分析とガイドラインへの反映

(1)で実施した実験結果の分析を踏まえ、品目別の標準的なリサイクル工程、重点管理物質の取り扱いルール及びリサイクル率達成目標が検討・決定され、ガイドラインに反映された（詳細については、別添資料「家庭系 E-waste のリサイクル・ガイドライン」を参照。）。

2.8.2　E-waste リサイクルのコスト分析（活動 8-2）

リサイクル事業者の協力に基づく「リサイクル・テスト」を行う一方で、それぞれのリサイクル事業者より、リサイクルに要する各種コスト・データを収集し、対象 6 品目に設定を行った「標準的なリサイクル工程」をベースに、リサイクル・コストの算定を行った（詳細については、別添資料「家庭系 E-waste の料金ガイドライン」を参照。）。

2.9　成果 9：：E-waste レポーティング・システムの実効性を確認し、ガイドラインへ のフィードバックを得るためのパイロット・プロジェクトの実施

上記の成果の達成に向けて、以下の活動を実施した。

2.9.1　マニフェストを活用した E-waste フロー管理に関するパイロット・プロジェクトの実施（活動 9-1）

E-waste の回収からリサイクルまでのフローにおけるインフォーマル・セクターへの E-waste の流出を防止するための手段として導入を提案している、マニフェスト・システムについて、関係する回収事業者及びリサイクル事業者の協力を得て、システムの試行を行うとともに、参加した各事業者より、運用面での課題等に関する意見聴取を行い、その結果を「レポーティング・ガイドラインに反映し、最終化を行った。

当パイロット・プロジェクトを通じて、事業者から寄せられた懸念事項及び、今後家庭系 E-waste の管理システムを進めていく上で課題として同定されたものとしては、以下の事項がある。

- 所在不明なブランド（製造業者）による製品に対するコスト負担
- 価値の高い部品・資源の中間段階での抜き取りによるリサイクル事業採算性の低下
- デスクトップ・コンピューターのモニターと CPU を二つで 1 ユニットと考えるのは実践的ではない。
- 品目の大きさ（容量や重量、馬力）等で分類するのは、困難である。

- 現在のリサイクル事業者の買取価格では、一部の E-waste の回収事業は採算が合わない。
- スクラップ事業者と比較して、政府による認定を受けているリサイクル事業者の買取価格が低い。

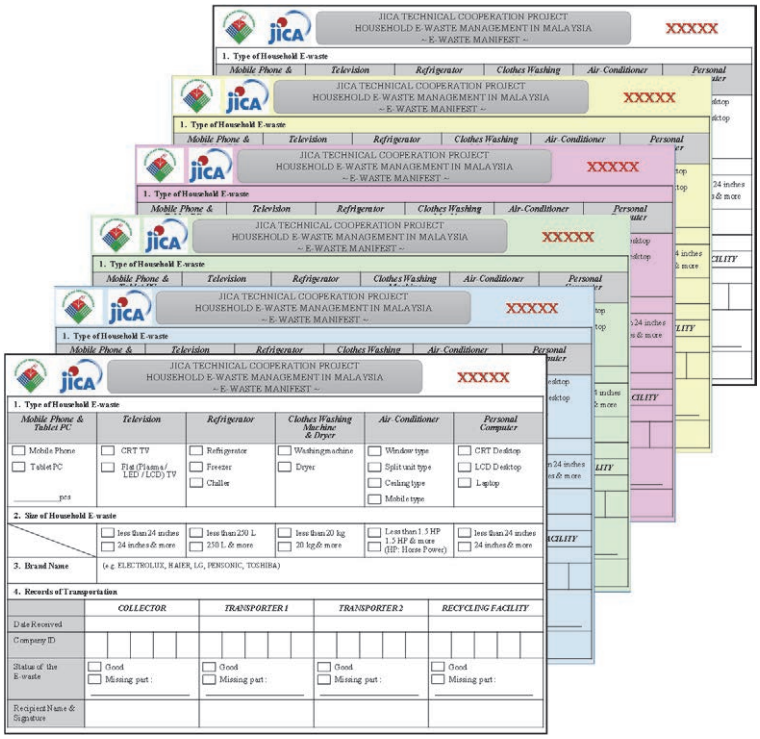


図 2-16：パイロット・プロジェクトにおいて使用されたマニフェスト・シート

（1 品につき、上述の 6 枚綴りのマニフェスト・シートが充当される。）

パイロット・プロジェクトの結果及び参加主体からのフィードバック内容は、「レポーティング・ガイドライン」作成を担当するタスクフォース会議において公表・協議され、それに基づき、レポーティング・ガイドラインの内容に追加・修正が加えられ、最終化された（パイロット・プロジェクトの詳細については、別添資料「E-waste 回収・レポーティングに係るパイロット事業の概要と評価」を参照。）。

2.9.2 市場データのレポーティングに関する試行（活動 9-2）

家電製品の市場データは、将来の家庭系 E-waste の発生量の推計に重要なデータであり、かつリサイクル料金設定のベースとなるデータでもある。これを踏まえて、プロジェクトでは、家電製品 6 品目の製造・輸入事業者による市場投入量データのレポーティング・フォームを作成し、マ国に家電製品を投入している事業者によるレポーティング及びフォームに対する意見聴取を実施した。この結果を踏まえて、事業者によるレポーティング方法及びレポーティング・フォームに追加・修正が加えられ、「レポーティング・ガイドライン」として最終化されている。

2.10　成果 10：関係者（ステークホルダー）のための意識向上活動が実施される

上記の成果の達成に向けて、以下の活動を実施した。

2.10.1　家庭由来の E-waste の適正な排出及びリサイクルへの理解を促進する住民啓発のツール開発（活動 10-1）

2015 年の 11 月 2 日に実施された当プロジェクトの「開始イベント(Launching Event)に併せ、JICA 専門家チームは、カウンターパートとの共同作業のもとで、家庭系 E-waste の発生源における適切な取り扱いを普及・浸透させるための「意識啓発ツール」を作成した。その一つが主に家庭を対象とした子供にも容易に理解できる内容から構成されている「リーフレット」である。

さらに、E-waste のリサイクルに関係する全ての主体を対象とする意識啓発用の「2016 年度カレンダー」を作成し、関係主体に対して無料配布した。このカレンダーは、E-waste の不適正な処理なもたらすリスクについて画像や図を活用してより詳細に説明するとともに、当プロジェクトが目指している「適正な家庭系 E-waste 管理」の将来像についても紹介しているものである。

これらの「意識啓発ツール」は、「プロジェクト開始イベント」に出席した全ての参加者に配布されるとともに、各州の DOE 事務所を通じて各関係主体にも配布されている。

また、カウンターパートである「天然資源環境省環境局（DOE/NRE）のウェブサイト上に当プロジェクトのホームページを構築し、プロジェクトの進捗状況や各種取り組みに関する情報をアップしている（URL: http://www.doe.gov.my/household-ewaste/）

<table>
<tr><td> 
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<tr><td>トップページ</td><td>プロジェクトの紹介</td></tr>
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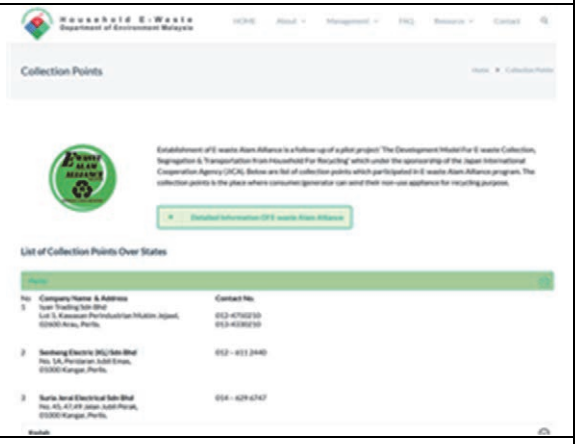
</td><td> 
</td></tr>
<tr><td>各ステークホルダーの役割について</td><td>収集ポイントの紹介</td></tr>
</table>

図 2-17：Household E-waste の HP の内容

さらに、DOE が参加する環境及び E-waste 関連イベントに際しての意識啓発ツールとして、廃家電製品に含まれている再利用・再資源化可能な部品や素材をビジュアルに示すために、解体された家電製品や、部品・素材等を示した展示物品を DOE とともに、作成した。

	
Household e-waste の解体部品展示	洗濯機（底部、上部、後面）、フラット TV
	
パソコン、オーディオ機器	洗濯機（本体、底部）

図 2-18：DOE と共同作製した展示物品

2.10.2 住民啓発活動計画の協議（活動 10-2）

当プロジェクトでは、プロジェクトの広報活動及び住民意識啓発活動計画について検討することを目的として、DOE の戦略広報課（Strategic Communication Division）と連携し、「意識啓発活動に関するワーキング・グループ」を設置し、現在活動計画について定期的に協議を行った。このワーキング・グループは、当プロジェクトで実施された各パイロット・プロジェクトにおける広報及び住民啓発ツールの開発や活動を担当した他、プロジェクト終了後の、啓発活動に関する協議を DOE 内のみならず、教育省その他の関係機関との間でも協議を行った。

2.10.3 DOE と JICA による住民啓発活動の共同実施（活動 10-3）

2.10.1 でも述べられているように、DOE が参加する環境及び E-waste 関連イベントに際しては、E-waste 専用のブースを設置し、共同で開発した意識啓発・広報ツールを活用した来場者への意識啓発を実施した。

また、小中学生用の E-waste に係る基礎教材となる「Give Us New Life」という E-waste の適正処理・リサイクルに係るショート・アニメーションを共同で作成し、基礎教材として、様々なメディアを通じて提供することとした。（ショート・アニメーションについては、添付資料を参照。）

2.11 成果 11：DOE 及び関係政府機関の持続的な家庭由来の E-Waste 管理能力が構築される

上記の成果の達成に向けて、以下の活動を実施した。

2.11.1 仕組みの継続的な改善のために、ステークホルダーによるコンサルテーションを維持するシステムの設置（活動 11-1）

当プロジェクトにおいては、E-waste 管理に係る各ガイドライン（回収、リサイクル、レポーティング、料金、基金設置）の作成に当たり、各関係主体による協議及び合意形成を図ることを目的に３つのタスクフォースを設置し、それらのメンバーとして、関係政府機関に加え、家電製品の製造・輸入事業者や E-waste の回収・リサイクル事業者の代表者を選定し、ガイドライン作成のプロセスから意見聴取及び協議を重ねてきた。

本タスクフォースは、当プロジェクト終了後も、「家庭系 E-waste 管理規則」の公布・施行に向けて、引き続き具体的な協議の場として継続される一方、当プロジェクトにおいてその設置を提案している「E-waste リサイクル基金」の諮問機関として、これらの関係主体から構成される２つの委員会の設置を提案しており、その具体的内容は「基金設置のガイドライン」に具体的に記述されている。

これらが具体的に機能することによって、関係主体との協議を進めながら、家庭系 E-waste 管理システムの維持・改善を持続的に行っていくための仕組みが維持される。

2.11.2 ステークホルダーとのコンサルテーション会議の実施（活動 11-2）

各ガイドラインの作成を目的に設置された３つのタスクフォースによる会議は、プロジェクト期間中に、定期的に開催され、その都度、ガイドラインの内容に係る協議を実施し、最終化されている。

2.11.3 家庭由来の E-waste 管理に従事する DOE スタッフのための人材育成プログラムの開発と実施（活動 11-3）

当プロジェクトの開始段階において、プロジェクト期間を通じた人材育成を図るためのプログラムに係る協議が、専門家チームと DOE スタッフの間で行われ、以下の様な内容から構成される人材育成プログラムをプロジェクト期間中に行うことが、合意され、実施された。

① 専門家チームによる日本及び他国の E-waste 管理実践例に係るセミナー

② マレーシア国における E-waste 管理の現況把握のためのフィールド・リサーチ

③ パイロット・プロジェクトにおける「リサイクル・テスト」の共同実施

④ ガイドライン作成に向けた各タスクフォースの運営

2.11.4 日本や他国の E-waste 管理の法的実践例に係る情報収集とセミナーを通じた普及（活動 11-4）

日本や他国の E-waste 管理の法的実践例については、これまでにカウンターパートである DOE のメンバーを会して一度、更に 2015 年 11 月に実施された当プロジェクトの開始イベントにおいて、セミナーを実施した（使用したセミナー資料については、別添資料に示す。）

2.11.5 DOE スタッフ及び関係政府機関スタッフのための、家庭由来の E-waste 管理に関する本邦研修の実施（活動 11-5）

当プロジェクトでは、プロジェクト期間中に 2 度にわたり本邦研修を実施している。以下はその概要である。

(1) 第 1 回本邦研修（2016 年 1 月 24 日～1 月 30 日）

① 研修員

研修員はマレーシア国天然資源・環境省の環境局（DOE：Department of Environment）所属の以下５名である。

氏名・性別	肩書き・DOE 内所属（仮訳）
Mr.ROSLI Zul	Senior Principal Assistant Director, Hazardous Substances Division
Mr.KHIRUDDIN Mohamad Idris	Senior Principal Assistant Director, Water & Marine Division
Ms.Fenny Wong Nyuk Yin	Principal Assistant Director, Hazardous Substances Division
Ms.ROSNI Ismail	Principal Assistant Director, Hazardous Substance Division
Ms.NOR IWANI Basri	Assistant Director, Hazardous Substances Division

② 研修内容

月日	研修場所・実施者・形態	研修内容や狙い
1/25	10:00-12:30 JICA 東京センター	▪ 規定ブリーフィング
	14:00-15:00 JICA 専門家チーム	▪ 研修内容（訪問先の法律における位置づけ、役割概要等）、達成目標について説明する。
	15:00-19:00 環境・ライフデザイン研究所 所長　高野氏　【講義１】	▪ 家電法の概要、特に関係者の役割のうち、メーカー責務（物理的責任）の実態、家電リサイクル施設（下流施設含む）管理、料金、データ報告等取り組み、管理会社の役目等を合わせて把握する。メーカー組織や管理会社によるメカニズムの管理、その他、EU や台湾型の管理方式についても情報提供する。
1/26	10:00-12:00 経済産業省　産業技術環境局 リサイクル推進課　課長補佐　武田氏 【講義２】	▪ 小電法の概要と中央政府が担う役割、法施行の一環として中央政府、地方自治体による取組について把握する。特に、以下にフォーカスをおく。 ▪ 法執行（指導・助言、報告徴収、立入検査等）の取組、業界団体（あれば）等との協力 ▪ 小電回収に係るガイドライン、リサイクル・システム構築実証事業の目的、実施状況及び先進事例の紹介と成功要因 ▪ 小電リサイクル法に係る審議会の対応方法（議題設定、関係者間の合意形成等）
	13:00-13:30 家電リサイクル法見直し検討会「中央環境審議会循環型社会部会家電リサイクル制度評価検討小委員会」の傍聴	▪ 家電法の定期的見直し時の会議開催の現場を見学し、コンサルテーション会議等を展開する上での参考とする。
	14:30-15:30 指定引き取り場所（岡山県貨物輸送東京主管支店トラックターミナル）【視察１】	▪ SY における料金、マニフェスト伝票管理、引き渡しにかかる取組の実態を把握する。
1/27	8:30-10:30 ハリタ金属射水リサイクルセンター　代表取締役　張田氏　【講義３】	▪ 小電リサイクル施設における小電受け入れ管理、処理状況について把握する。廃蛍光管も回収対象としているため処理状況を把握する。特に、自治体のボックス回収に受動的に依存せず一般廃棄物や資源物回収と併せて小電を行政と連携し広域的に回収する同社の取組実態について把握する。
	10:30-11:30 富山県生活環境文化部環境政策課廃棄物対策班　主任鳥山氏【講義４】	▪ 小型家電の広域的な回収取組の実態と課題について把握する。
	11:30-12:00 射水市小電回収関係ストック	▪ 小型家電の回収現場での実態を把握する。

月日	研修場所・実施者・形態	研修内容や狙い
	ヤード（射水市クリンピア）	
	13:30-17:00 ハリタ金属本社リサイクルセンター　【講義５】	▪ ４家電の受け入れ管理、処理状況と管理会社への報告（受け入れ、処理状況等）、行政との関係の実態について把握する。
1/28	9:30-12:00 経済産業省商務情報政策局情報通信機器課　リサイクル室　課長補佐 佐野氏　陶浪氏【講義６】	▪ 家電法の概要と中央政府が担う役割と民間（家製協や管理会社）との関係を通じたリサイクル活動の管理実態について把握する。加えて以下の点についても把握する。 ▪ 法施行の実務の一環として中央政府（又は地方事務所）においてどのような取組を実施しているか。特に法の施行状況のモニタリング、執行（勧告・命令・罰則、報告徴収・立入検査等）、業界団体等との協力 ▪ 家電法見直し会議の対応方法（議題設定、リサイクル料金設定の議論、関係者間の合意形成等） ▪ 二次電池リサイクルに係るメーカーの取組
	13:00-14:00 販売店による引き取り（ヤマダ電機新宿西口店）活動の実態把握【視察２】	▪ 料金、マニフェスト伝票管理、引き渡しにかかる取組実態
	14:30-17:00 家電製品協会　家電リサイクル券センター（RKC）　次長　飯村氏 センター長　杉田氏【講義７】	▪ 家電法に基づくメーカーの役割や家電リサイクル券や同センター（RKC）の役割、リサイクル料金、マニフェスト伝票データ管理、販売店、メーカーとの関係の実態について把握する。特に、以下にフォーカスをおく。 ▪ 家電リサイクル券の運用実態（データ管理、指定引き取り場所（SY）やリサイクル施設（RP）からの集約方法等） ▪ 家電リサイクル料金の管理 ▪ 行政への各種データの報告 ▪ 家電リサイクル券制度におけるメーカー、販売店、SY それぞれの取組
1/29	9:30-11:00 小規模販売店による廃家電引取の実態把握 清和電機 会長　小澤氏【視察３】	▪ 小規模店舗による引き取り、料金、マニフェスト伝票管理、引き渡しにかかる取組実態を把握する。
	13:00-15:30 研修報告会兼マレーシアに適用可能方策に係る討議（国内支援委員会委員も討議に参加）	▪ マレーシアに必要かつ適用可能な方策の検討、今後プロジェクトで留意すること、重点を置くべき取組等について議論する。研修成果の報告も合わせて実施する。

(2) 第 2 回研修（2017 年 7 月 30 日～8 月 5 日）

① 研修員

氏名・性別	肩書き・DOE 内所属（仮訳）
Mr. Mokthar Bin Abdul Majid	Director Deputy General (Operation) Department of Environment
Mr.ROSLI Zul	Senior Principal Assistant Director, Hazardous Substances Division (Taskforce 2 Chairperson)
Ms.Fenny Wong Nyuk Yin	Principal Assistant Director, Hazardous Substances Division (Taskforce 3 Chairperson)
Ms.ROSNI Ismail	Principal Assistant Director, Hazardous Substance Division (taskforce 1 Chairperson)
Ms. Cressida Karen Chung	Assistant Drector, Hazardous Substance Division
Ms.NOR IWANI Basri	Assistant Director, Hazardous Substances Division
Ms. Nor Azah Binti Masrom	Assistant Director, Hazardous Substances Division

② 研修内容

月日	研修場所・実施者・形態	研修内容や狙い
7/31	9:30-12:00 JICA 関西センター	規定ブリーフィング
	13:30-14:00 JICA 専門家チーム	オリエンテーション（研修目的、研修内容の説明）、プロジェクトの進捗説明。
	14:00-14:45 JICA 専門家チーム　古川氏【講義１】	家電リサイクル法の概要、特にメーカー責務（物理的責任）の実務的な実態、家電リサイクル施設の管理、料金、データ報告等を統括するメーカー主導の管理会社の役目、機能の実態も把握する。
	14:45-15:15 パナソニック　長濱氏【講義２】	マレーシアにおいて検討中の家庭系 E-waste 管理制度に対する示唆をメーカーの観点から得る。
	15：30-17:00　国内支援委員会の委員を交えた意見交換【討議１】	本プロジェクトの支援委員会の委員を交えて、マレーシアにて検討中の E-waste 管理制度について実施中のプロジェクト、政策の方向性等に係る意見交換を行う。それに先立ち、DOE 側からプロジェクトの進捗についての報告も得る。
8/1	10:00-12:00 大阪市による蛍光管回収拠点訪問　【視察１】	大阪市による廃蛍光管の回収の実態を把握するために以下の回収場所を訪問する。大阪市より廃蛍光管の回収に係る政策についての講義も得る。 • 大阪市環境局西北環境事業センター • 西淀川区役所
	13:30-15:00 蛍光管リサイクル施設訪問【視察２】	自治体により回収された廃蛍光管の搬入拠点を訪問し搬入後の処理の実態を把握する。
	15:30-17:00 二次電池回収及びリサイクル施設訪問【視察３】	小型家電等から分別された二次電池実態を把握する。なお、アジアを含む海外からの二次電池の輸入実態についても把握する。
8/2	11:00-17:00 平林金属　御津リサイクルファーム訪問　【視察４】	家電リサイクル施設における白物４家電の受け入れ管理、処理状況について把握する。合わせて処理工程より発生する処理物の管理（重量計測、報告等）実態について把握する。
8/3	10:00-10:30 平林金属　えこ便　並木町局【視察５】	小型家電を含む有用物の回収の取組を行う消費者向けの拠点（えこ便）の実態について把握する。
	11:00-11:30 平林金属　港工場【視察６】	プラスチック等の二次処理を行う同工場の処理実態について把握する。
	14:00-16:00 三菱マテリアル直島製錬所【視察７】	家電リサイクル施設による処理物（分別物）のひとつプリント基板の最終処理先である製錬所における処理物のサンプリング、リサイクルの実態を把握する。
8/4	10:00-11:30 研修報告会【討議】	マレーシアに必要かつ適用可能な方策の検討、今後プロジェクトで留意すること、重点を置くべき取組等について議論する。研修成果の報告も合わせて実施する。
	13:00-15:30 パナソニック エコテクノロジーセンター（PETEC）【視察８】	メーカーにより設立、運営されている家電リサイクル施設における処理実態について把握する。
	16:30-17:00 証書授与式	―

2.11.6 家庭由来の E-waste 管理のための法的枠組みを開発する近隣国関係者に対するマレーシア国での研修（Regional Workshop の開催）（活動 11-6）

2017 年 11 月 22 日～23 日の 2 日間に渡り、DOE と JICA の共催による「家庭系 E-waste 管理に係る地域ワークショップを開催し、タイ、インドネシア、ベトナム、フィリピン、シ

ンガポール、台湾の各国から、E-waste 管理に携わる政府関係者が参加し、各国の動向おける意見交換を行うとともに、マレーシア国におけるこれまでの取り組みを紹介した（ワークショップの詳細については、添付資料「家庭系 E-waste の Regional Workshop 概要」を参照。）。

2.11.7 家庭由来の E-waste 管理のために DOE スタッフにより使用される人材育成教材（研修教材を含む）の開発（活動 11-7）

今後の「家庭系 E-waste 管理規制」の施行に向けた DOE の中央/地方スタッフの人材育成を行うための教材をガイドラインの内容を中心に作成した（教材の内容については、添付資料「家庭系 E-waste に関する研修教材」を参照。）。

2.11.8 家庭由来の E-waste 管理のための研修教官の育成（活動 11-8）

当プロジェクトの開始当初よりプロジェクト活動を共同で実施してきた DOE の以下の 4 名のスタッフが、今後の「家庭系 E-waste 管理規制」の施行に向けて、DOE の中央/地方スタッフに対するトレーニングを行うトレーナーとして育成された。

氏名	所属及びトレーナー担当内容
Ms.Fenny Wong Nyuk Yin	Principal Assistant Director, Hazardous Substances Division (Taskforce 3 Chairperson) ▪ Training Program Leader (E-waste Policy Lecturer)
Ms. Cressida Karen Chung	Assistant Drector, Hazardous Substance Division ▪ Sub-leader (Recycling/fee guideline Lecturer)
Ms.NOR IWANI Basri	Assistant Director, Hazardous Substances Division ▪ Sub-leader (Collection/Reporting Lecturer)
Ms. Nor Azah Binti Masrom	Assistant Director, Hazardous Substances Division ▪ Sub-leader (Public Education/Awareness Raising Lecturer)

2.11.9 「家庭系 E-waste 管理規則」の施行に向けたアクション・ロードマップ（活動 11-9）

当プロジェクト終了後に、「家庭系 E-waste 管理規則」の施行に向けて DOE がとるべき行動に係るロードマップを、以下の通り作成し、提出した。

表 2-12：「家庭系 E-waste 管理システム」の施行に向けて必要なアクション

項目	必要なアクション
法規制の施行	▪ EQA の改正案の施行（EQA, E-waste management regulation と各種ガイドラインの法制度化に向けたマレーシア国内での承認手続き
回収ガイドラインの実施	▪ 回収事業者新規登録の開始（登録フォームの審査、登録証の発行、回収事業者データベースの構築） ▪ 登録事業者の監視・モニタリングの実施（現場監査を含む）
リサイクル･ガイドラインの実施	▪ 家庭系 E-waste リサイクル事業者の新規許認可の開始（リサイクル事業者による事業認可申請書の発行、審査、許認可証の発行、リサイクル事業者データベースの構築） ▪ リサイクル事業者の監視・モニタリングの実施（レポーティング審査、現場監査等）
リサイクル料金に係るガイドラインの実施	▪ 第 1 期リサイクル料金徴収費用及びリサイクル事業者への補助金の決定･承認・正式公布 ▪ リサイクル料金の徴収開始

項目	必要なアクション
レポーティング･ガイドラインの実施	▪ レポーティング・システムの構築（紙ベースあるいは電子レポーティング･システム） ➢ 製造･輸入事業者からの報告（上市量） ➢ 収集･リサイクル事業者からの報告（収集・リサイクル台数等） ▪ E-waste インベントリー・システムの運用（データベース管理、年次報告書の作成等）
基金管理ガイドラインの実施	▪ 基金管理組織の設置 ➢ 人材の任命（募集、審査、、確定） ➢ 役員の決定 ➢ 事業計画/財務計画の策定 ▪ 基金管理組織事務所の設置(銀行口座の開設等)
広報	▪ 家庭系 E-waste 管理システムの広報活動（パンフ、ビデオの作成、メディアを通じた広報等 ▪ 関係主体（消費者、製造業者、回収業者、リサイクラー、自治体、など）への説明会の開催（地方政府との連携）

3　プロジェクト実施運営上の課題・工夫・教訓

当プロジェクトは、従来の技術協力プロジェクトの典型であるハード面あるいは、移転するハード技術の適切な利用という意味でのハードの移転に係るプロジェクトではなく、「政策」、「法制度メカニズム」、「社会システムの構築」というソフト（知見、経験）の移転が中心となる極めてユニークな技術協力プロジェクトである、そのよう点からは、従来の技術協力プロジェクトにはない工夫が必要とされる一方、特有の課題や教訓も多く存在している。

以下では、当プロジェクト業務において実施してきたプロジェクト活動を通じて行ってきた工夫を可能な限り対象化するとともに、その中で得た教訓・課題について以下に示す。

3.1　基礎となる情報・データの不在という大きな課題

当プロジェクトの開始当初にぶつかった問題が、政策の立案や計画の策定において、ベースとなる現状に係る情報・データが十分に蓄積されていない点であった。情報の入手が困難であるインフォーマル・セクターによる E-waste の回収・リサイクル・処理量等の情報・データの入手の困難は予想されたものの、将来の E-waste 廃棄量推計のベースとなるマレーシア国内での家電製品の販売量あるいはそれに準ずるデータが、マレーシア国内で持続的に蓄積されていない（輸出入量や国内生産販売量等も含む。）ことは、政策や計画立案の基礎となる、将来における E-waste の適正なリサイクル・処理に向けて必要な対策の規模が推定できず、新たな家庭系 E-waste の管理メカニズムを構築する上で大きな障害となることが予測された。

この点で、まずはマレーシア国内における対象となる家電製品の保有状況を家庭及び事業所への 1000 サンプルを対象とするインタビュー調査で把握するとともに、マレーシア国内に家電製品を投入している製造・輸入事業者からのデータを定期的に入手するためのレポーティング・システムを構築することを、上記事業者との協議の下に検討し、次フェーズのパイロット・プロジェクトにおいて試行することが決定している。

このような政策・計画立案のベースとなるデータの不在は、多くの途上国で直面する課題であるが、その場合に重要となるのは、データベースの整備といったハード面の支援に加えて、より正確な情報・データを入手できる情報源を把握し、そこからの情報・データを入手するためのメカニズムを構築するため（そのためには、法規制等の改正等が必要となる場合もある。）の支援が不可欠である。専門家チームが、自身の調査によってその時点でのデータを入手したとしても、それを持続的に更新していく体制あるいは能力が構築されない限りは、そのデータは 1 回限りのものとなり、いずれは陳腐化していく。その点では、このような基礎情報・データの収集・利用メカニズムの構築に対する支援は、当プロジェクトのような技術協力において、より重要視されるべきものである。

3.2　「政策支援」、「法制度」、「社会システム構築」支援のノウハウとは

当プロジェクトは、従来のハード面での技術移転を中心とする技術協力ではなく、法制度整備や新たな社会システムの構築という、優れてソフトな技術移転を中心とするものである。

このような技術協力を行う際には、当然のことながら関連分野に係る法規制に係る制度面での知見や社会システムをどのように構築し、動かしていくかという社会工学（Social Engineering）的な知見が要求される一方で、どのようなプロセスで執行可能な法制度の制定及び社会システムの構築を行っていくかという点に関する知見・ノウハウも必要である。

その点では、当プロジェクトの専門家としてわが国の家電リサイクル法に基づく新たな

社会システム構築の現場に関与し、かつドイツでの家電リサイクルにも取り組んだ経験を有する団員を投入できたことは、極めて重要であった。

また、当プロジェクトの開始当初から、各種ガイドラインの策定を当事者であるマレーシア国側の公共・民間における関係主体をメンバーとする「タスクフォース」で実施したことも、新たに導入する法制度及び構築する社会システムを有効なものとするためには、これを支えるガイドラインの策定段階から関係主体を参加させ、相反する利害の調整や協議を通じて、合意形成を図るとともに、関係主体自身に当事者意識（新たなシステムに対する主人公としての意識・自覚）を醸成することが必要であるという認識からである。

このような形での技術協力のアプローチは、これまでの技術協力では見られなかったものであり、今回の技術協力を通じて、法制度の整備及び新たな社会システムの構築が図られ、新たな家庭系 E-waste 管理システムが動き始めれば、このような分野における技術支援の機会が今後他国においても広がる可能性が高まると推定されることから、今後実際の法規制の施行から、新たな社会システムの導入までのプロセスで、どのように支援を持続的に行っていくかは、当プロジェクトにおける重要な課題と認識している。

3.3 日本の知見･経験（ノウハウ）の有効性と限界

今回の技術協力プロジェクト要請の背景の一つは、既に独自の家電リサイクル･システムを関連法制度の導入に基づき構築し、運営してきているという知見・経験への期待であり、またその活用であることは確かである。

一方、わが国における知見・経験の活用とは、単純にわが国の制度や社会システムのコピーをマレーシア国において構築するということではなく、マレーシア国における法制度や社会システムの相違点、さらには社会・文化的な背景からくる「行為･行動規範」の相違を踏まえて、何が適用可能であるかを十分に踏まえながら、知見・経験の活用を図っていくことが必要となる。

このような知見・経験の柔軟な活用を図っていく上で、重要なポイントは、わが国における法制度や社会システムを対象化できる視点である。当プロジェクトでは、このような視点を専門家チーム及びカウンターパートが持つために、わが国のみならず他国における家電リサイクルに係る法制度及びシステムとの相対的比較を行う機会を多く設け、特にシステムの異なるわが国と台湾については実際に現地を訪問し、それぞれのシステムについて十分に認識をした上で、マレーシア国における家庭系 E-waste 管理の在り方をカウンターパート自身が判断できる素地を与えることができたのは有意義であったと考えている。

3.4 プロジェクト実施における柔軟性

全ての技術協力プロジェクトは、事前の現地における調査及び協議を通じて技術協力のスコープ及び内容を意味する PDM 及び P/O の合意に基づいて実施されている。当プロジェクトもその例外ではないが、その一方で、実際のプロジェクトの進行に伴い、新たな状況が生じてくることも多く、その際には PDM 及び P/O を変更し、状況に応じた協力スコープの拡大や変更も専門家チームには求められる。

当プロジェクトにおいても、当初は「レポーティング･ガイドライン」の実行可能性の検証を目的とするパイロット･プロジェクトのみが計画されていたが、タスクフォースでの議論を通じて、他のガイドラインの検証を行うためのパイロット･プロジェクトの必要性に関する認識が高まり、スコープを拡大し、他のガイドラインの検証を行うためのパイロット･プロジェクトを実施することが合意されている。

家庭系 E-waste の管理システムは、マレーシア国においても初めての試みであり、制度的枠組みが構築されれば黙っていても自動的に動くというものではなく、新たなシステムを

動かしていくための様々な活動を実際に進めていくことが必要である。この活動を確実に進めていくための具体的な支援の方法を検討することも、プロジェクト終了後の重要な課題である。

3.5 人材に係わる問題にどのように対処するのか

当プロジェクトも他の多くの技術協力プロジェクトと同様に、カウンターパート・メンバーの人事異動による影響を少なからず受けている。しかし、カウンターパートとなっている政府機関における人事異動は、日本も含めてどの国においても避け得ない事実であり、技術協力プロジェクトにおいては、これを予め見込んだ支援業務内容とすることが必要である。

この点で、当プロジェクトで組み込まれている「トレーニング･モジュール」とこれを活用した持続的なトレーニング･プログラムの構築は重要である。

具体的な「トレーニング･モジュール」というソフトの開発と、それに基づいて、持続的にカウンターパートを中心とする関係主体に対して実施する「トレーニング･プログラム」を導入することにより、人事異動があった場合にも、新たな人員に対してトレーニングを行うことによって、そのギャップを相当程度埋めることが可能になる。

4 上位目標の達成に向けての提言

当プロジェクトの目的である**「家庭由来の E-waste の持続的な回収と環境上適正なリサイクルを促進するために必要な政策、体制、システム等の制度が準備される。」**と上位目標である**「家庭由来の E-waste の持続的な収集及び環境上適正なリサイクルが実施されている。」**の間には、前章でも述べたようにギャップが存在する。実際の政策・体制・システムの整備の後に、その施行に向けた関係主体による様々なアクションが必要であり、それらのアクションがとられた後に、実際の施行が可能となるというのが実態である。

当プロジェクトにおいても、インベントリーの構築や各種ガイドラインの策定の後に、その具体的な施行に向けた準備として、前述の表 2-13 に掲げた様々な活動が必要となる。

マレーシア国側にとって初めての「家庭系 E-waste 管理」の新たな施行となる中で、書面としてのガイドラインのみで、カウンターパートにその実行を任せることのリスクは大きく、上記の施行に向けた準備活動についても、支援を実施することが、上位目標の達成には不可欠と考えられる。

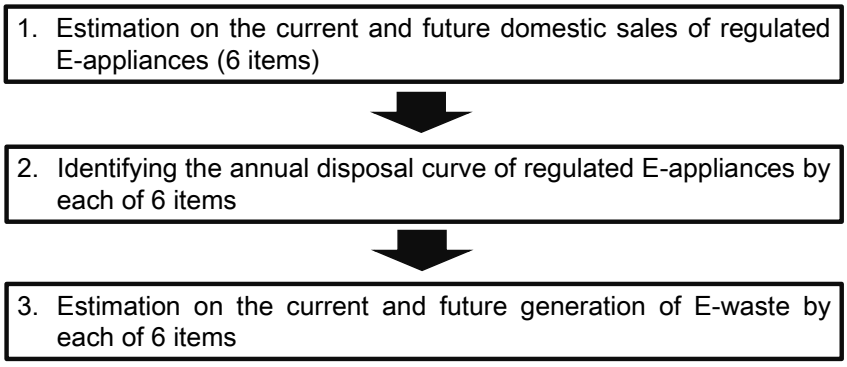
添付資料１

E-waste インベントリー・データベース

ANNEX 1: Scheduled E-waste Inventory Database

This scheduled E-waste inventory database consists of the following sets of data and parameters that are utilized for estimating the current and future generation of scheduled E-waste and their results.

The above estimation was conducted in accordance with the following steps.



1. Estimation on the current and future domestic sales of regulated E-appliances (6 items)

As the first step, the current and future domestic sales of regulated 6 (six) E-appliances were estimated based on the past sales data of each regulated E-appliance. The future sales of E-appliances were forecasted by applying statistical regression analysis while taking into account the upper limit of penetration rate of each regulated E-appliance. Since no complete data sets are readily available in Malaysia, the following data sources are utilized:

- JEMA: Japan Electrical Manufactures Association
- JEITA: Japan Electronics and Information Technology Industries Association)
- JRAIA: Japan Refrigeration and Air Conditioning Industry Association）
- Consumer Asia International
- Euromonitor
- BMI

The following tables and figures show the estimation results.

(1) TV

Table 1: Estimated Domestic Sales of TV (Unit: 1,000)

Calendar Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Domestic Sales	200	220	240	260	290	335	415	460	523	552

Calendar Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Domestic Sales	520	550	560	540	540	580	580	600	620	630

Calendar Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Domestic Sales	640	650	670	700	1,005	1,385	1,428	1,502	1,819	1,891

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Domestic Sales	2,058	2,058	2,058	2,058	2,058	2,058	2,058	2,058	2,058	2,058

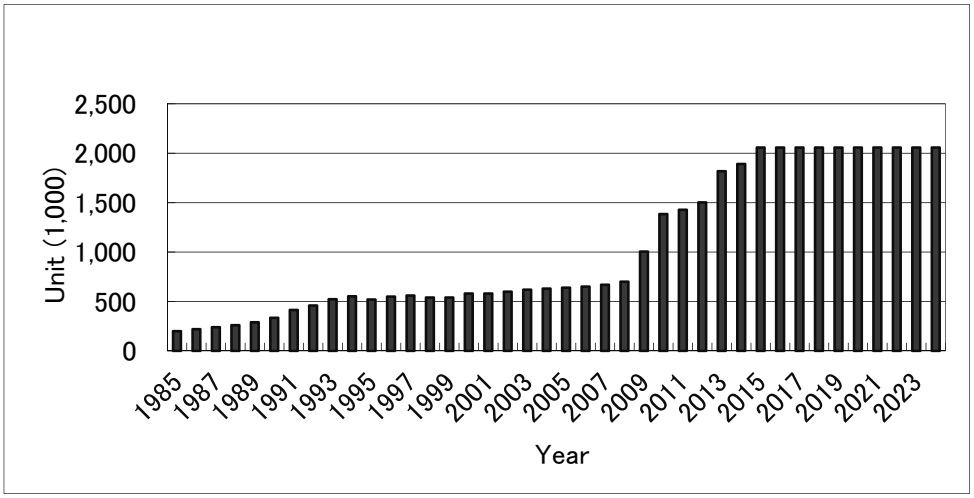


Figure 1: Current and Future domestic sales of TV

(2) Air Conditioner

Table 2: Estimated Domestic Sales of Air Conditioner (Unit: 1,000)

Calendar Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Domestic Sales	106	114	122	131	141	151	162	174	187	200

Calendar Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Domestic Sales	210	215	215	360	275	315	330	350	450	486

Calendar Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Domestic Sales	550	658	690	674	669	751	749	793	821	811

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Domestic Sales	789	804	820	836	852	869	886	903	921	939

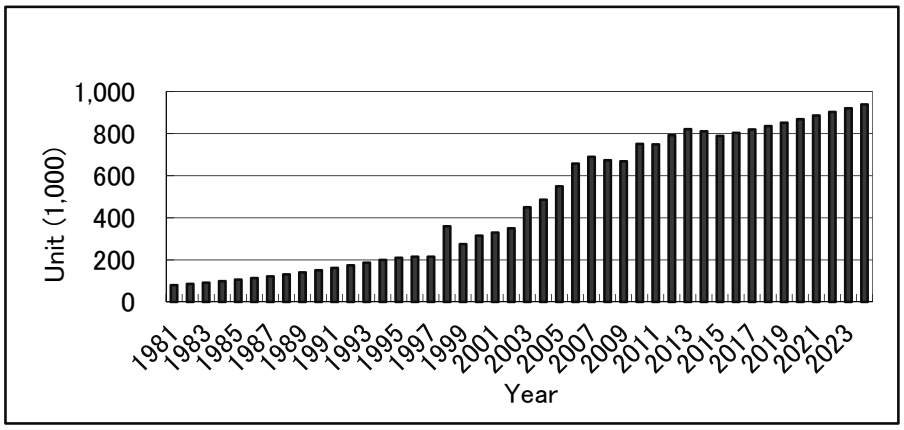


Figure 2: Current and Future domestic sales of Air Conditioner

(3) PC (Personal Computer)

Table 3: Estimated Domestic Sales of PC (Unit: 1,000)

Calendar Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Domestic Sales							20	20	33	151

Calendar Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Domestic Sales	166	183	200	178	189	257	349	474	644	875

Calendar Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Domestic Sales	1,190	1,623	1,660	1,862	2,086	2,481	2,785	3,587	4,122	4,084

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Domestic Sales	3,332	3,471	3,616	3,767	3,925	4,089	4,260	4,438	4,624	4,818

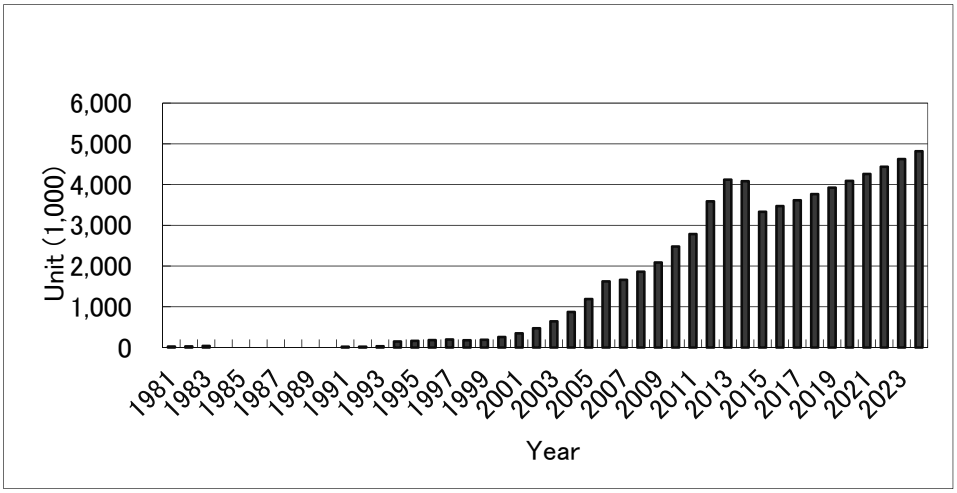


Figure 3: Current and Future domestic sales of PC

(4) Refrigerator

Table 4: Estimated Domestic Sales of Refrigerator (Unit: 1,000)

Calendar Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Domestic Sales	150	155	146	198	189	212	254	272	280	285

Calendar Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Domestic Sales	293	383	345	267	300	316	333	333	448	465

Calendar Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Domestic Sales	480	495	510	470	446	457	473	480	500	505

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Domestic Sales	515	515	515	515	515	515	515	515	515	515

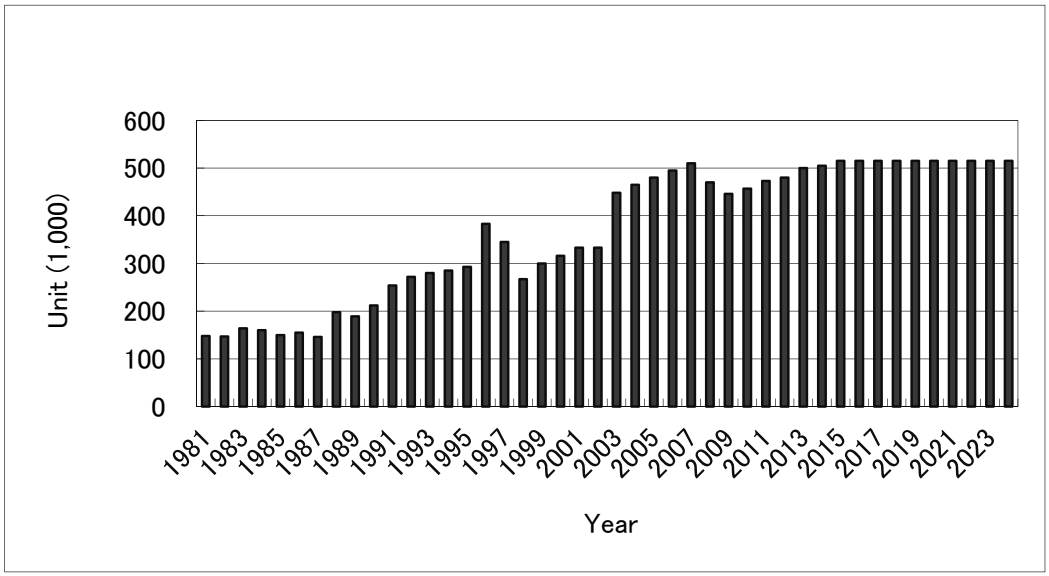


Figure 4: Current and Future domestic sales of Refrigerator

(5) Washing Machine

Table 5: Estimated Domestic Sales of Washing Machine

Calendar Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Domestic Sales			30	50	80	110	140	170	190	211

Calendar Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Domestic Sales	235	255	245	230	215	230	320	330	340	364

Calendar Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Domestic Sales	370	381	439	428	455	465	485	535	555	589

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Domestic Sales	625	625	625	625	625	625	625	625	625	625

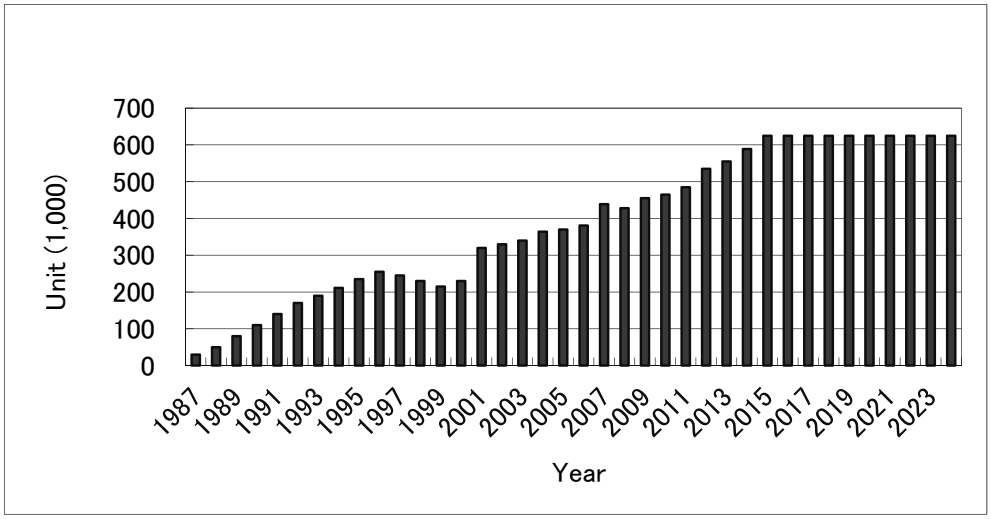


Figure 5: Current and Future domestic sales of Washing Machine

(6) Mobile Phone

Table 6: Estimated Domestic Sales of Mobile Phone

Calendar Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Domestic Sales			30	50	80	110	243	282	327	380

Calendar Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Domestic Sales	456	410	347	311	948	3,440	3,353	3,274	4,171	5,873

Calendar Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Domestic Sales	8,691	7,000	7,342	7,657	7,135	9,062	11,267	13,568	15,826	18,254

Calendar Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Domestic Sales	17,117	17,117	17,117	17,117	17,117	17,117	17,117	17,117	17,117	17,117

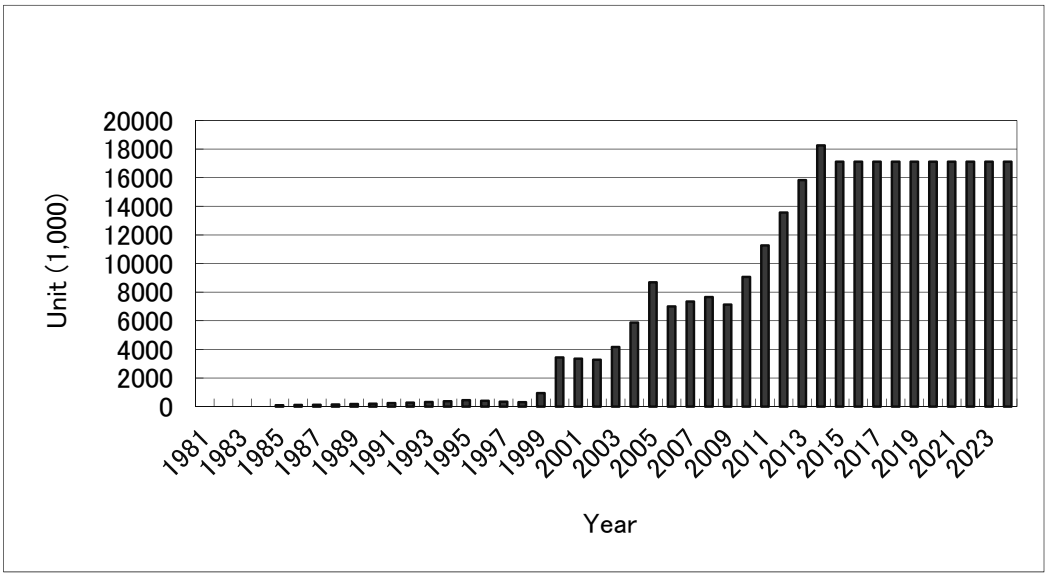


Figure 6: Current and Future domestic sales of Mobile Phone

2. Identifying the annual disposal curve of regulated E-appliances by each of 6 items

Based on the number of years used for each regulated E-appliance, that were collected from interview surveys to the users and past trend of E-waste generation in Malaysia, the annual disposal curve of regulated E-appliances was identified by applying the so-called Weibull Regression Model. These annual disposal curves identified for each regulated E-appliance item estimates disposal percentage of each item every consecutive year after its purchase and start utilization. The following figures represents the annual trend of the percentage of purchased E-appliance that are still in use for each regulated item (usually called as "survival rate").

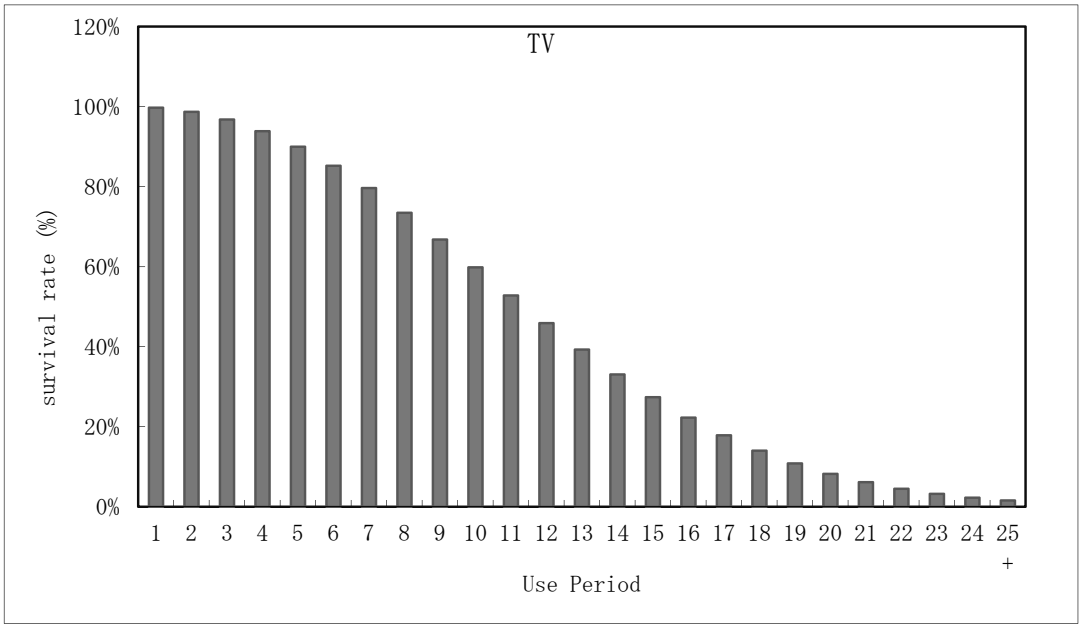


Figure 7: Estimated Annual trend of survival rate (TV)

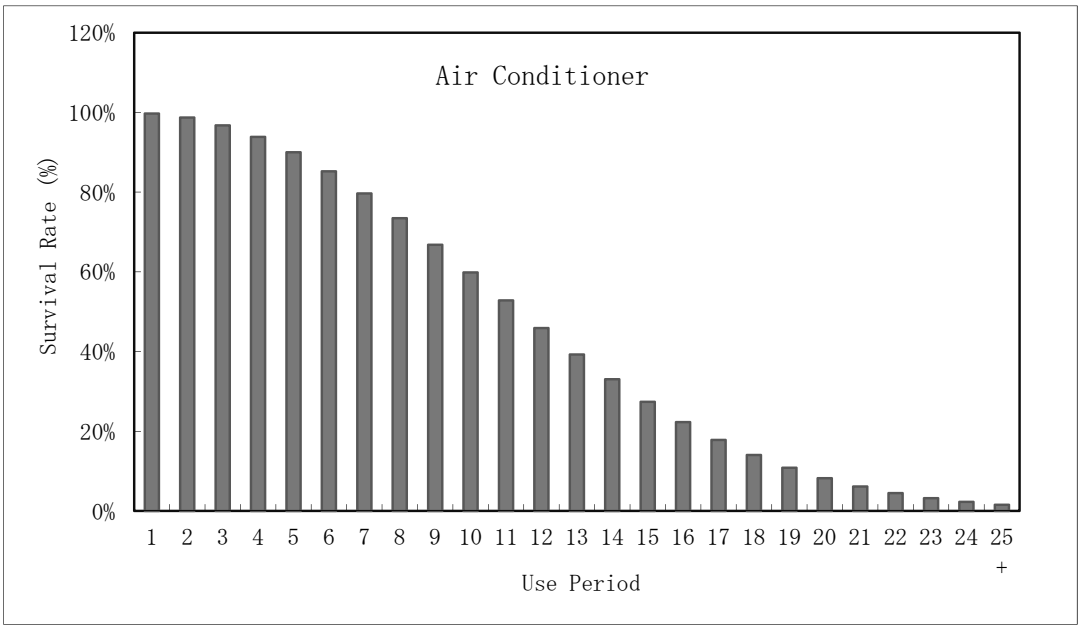


Figure 8: Estimated Annual trend of survival rate (Air Conditioner)

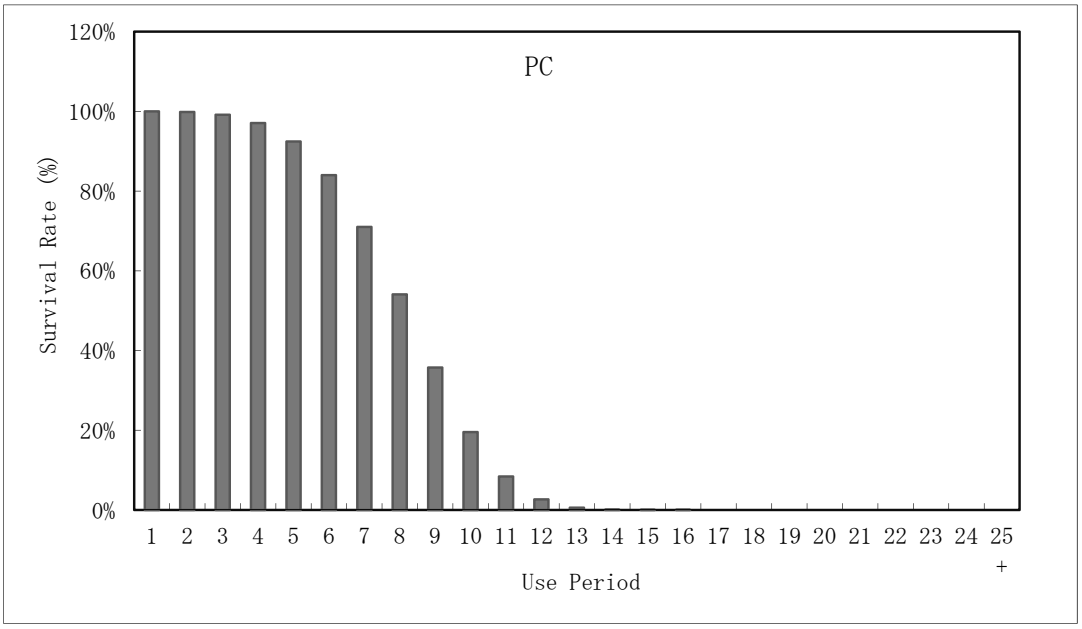


Figure 9: Estimated Annual trend of survival rate (PC)

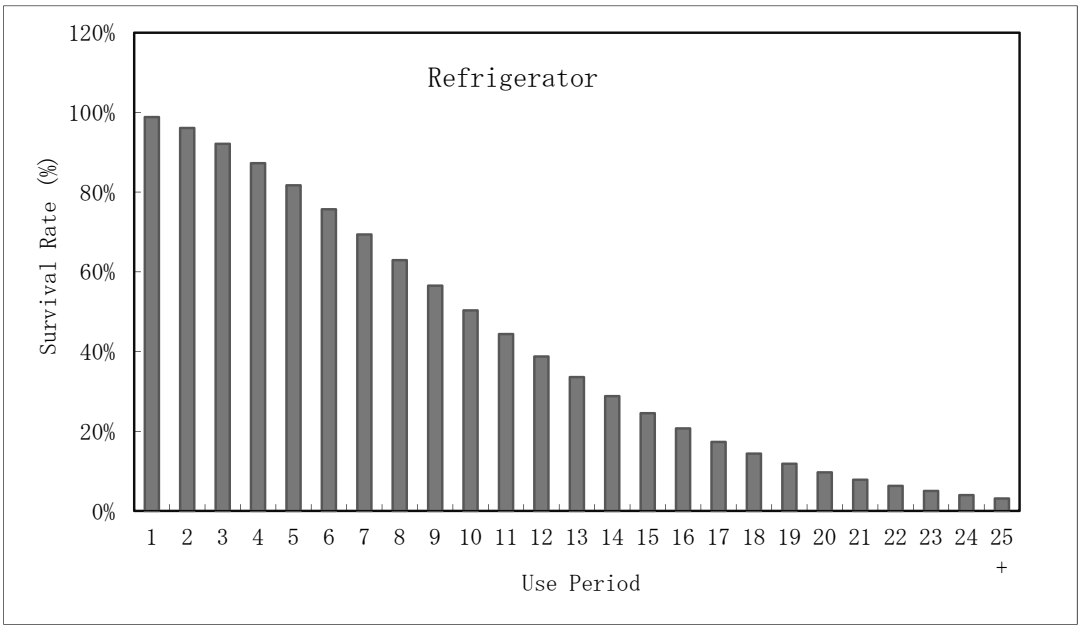


Figure 10: Estimated Annual trend of survival rate (Refrigerator)

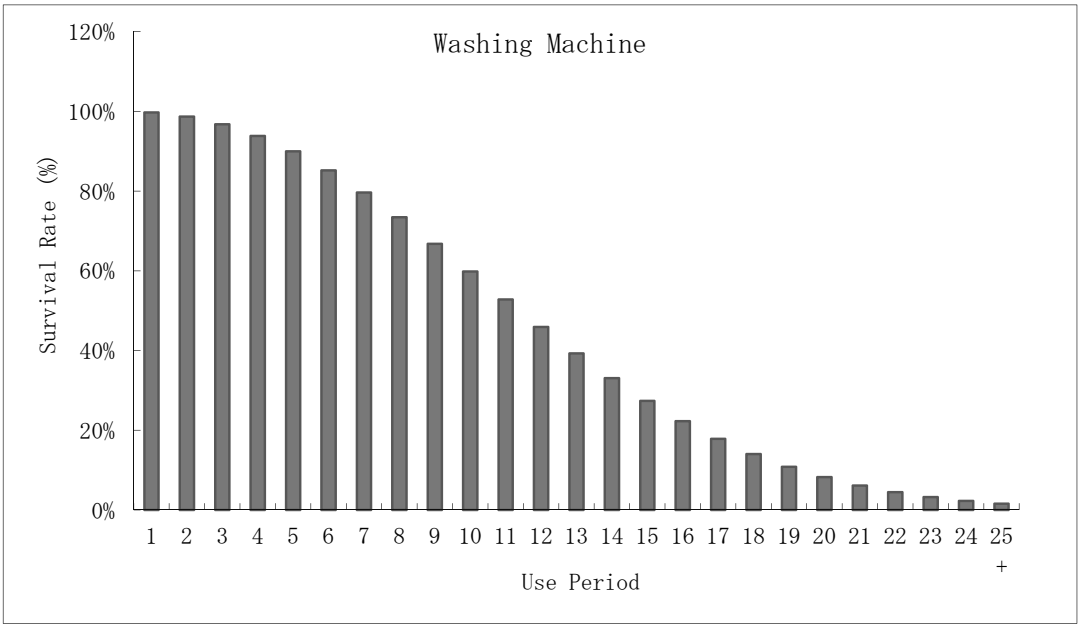


Figure 11: Estimated Annual trend of survival rate (Washing Machine)

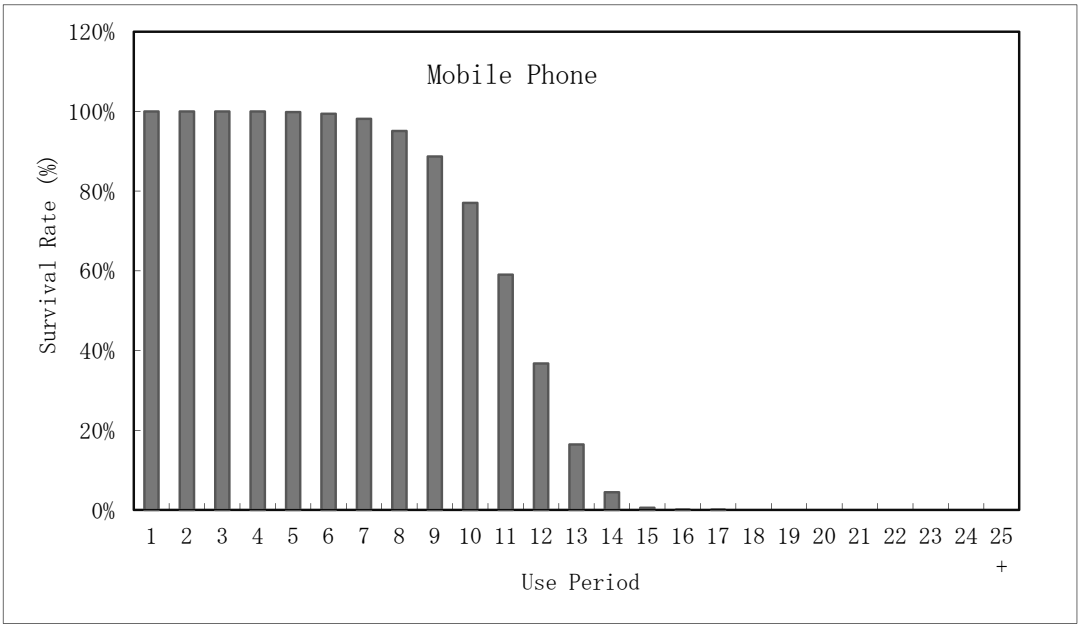


Figure 12: Estimated Annual trend of survival rate (Mobile Phone)

3. Estimation on the current and future generation of E-waste by each of 6 items

Based on the estimated domestic sales of regulated E-appliances and identified disposal curves for each E-appliance, the current and future generation of E-waste were estimated as shown in the following tables and figures.

Table 7: Estimated Generation of TV (Unit: 1,000)

Calendar Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Waste Generation	317	348	378	407	433	458	480	501	521	541

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Waste Generation	565	594	629	674	727	791	864	946	1,035	1,128

Calendar Year	2021	2022	2023	2024	2025
Waste Generation	1,224	1,320	1,413	1,503	1,587

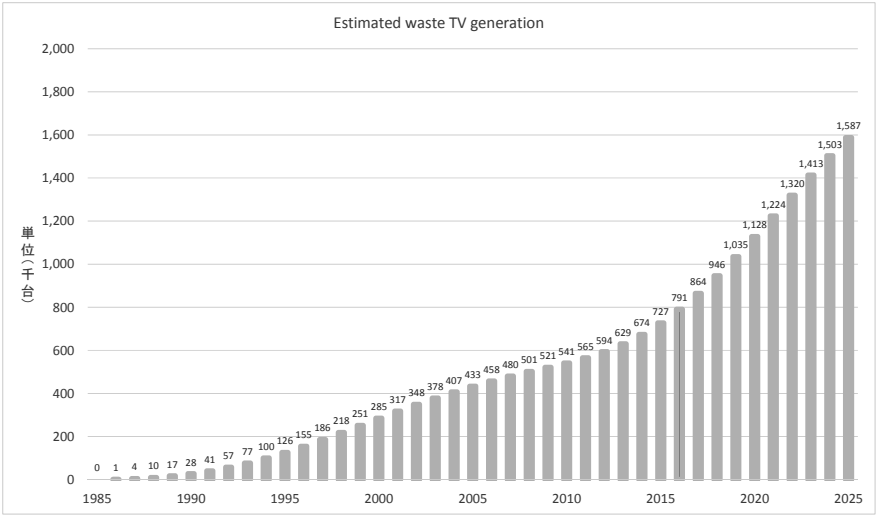


Figure 13: Estimated Generation (TV)

Table 8: Estimated Generation of Air Conditioner (Unit: 1,000)

Calendar Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Waste Generation	133	143	153	164	176	188	201	212	225	252

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Waste Generation	298	312	314	342	380	441	505	568	636	677

Calendar Year	2021	2022	2023	2024	2025
Waste Generation	685	697	733	765	789

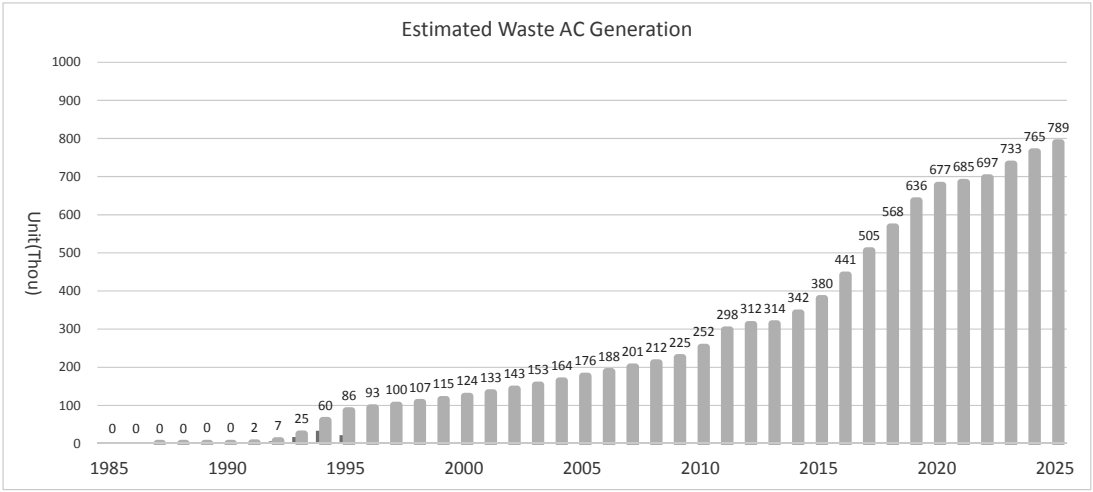


Figure 14: Estimated Generation (Air Conditioner)

Table 9: Estimated Generation of PC (Unit: 1,000)

Calendar Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Waste Generation	74	104	135	163	189	217	258	323	419	553

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Waste Generation	726	933	1,165	1,412	1,668	1,935	2,224	2,542	2,878	3,196

Calendar Year	2021	2022	2023	2024	2025
Waste Generation	3,452	3,611	3,678	3,696	3,725

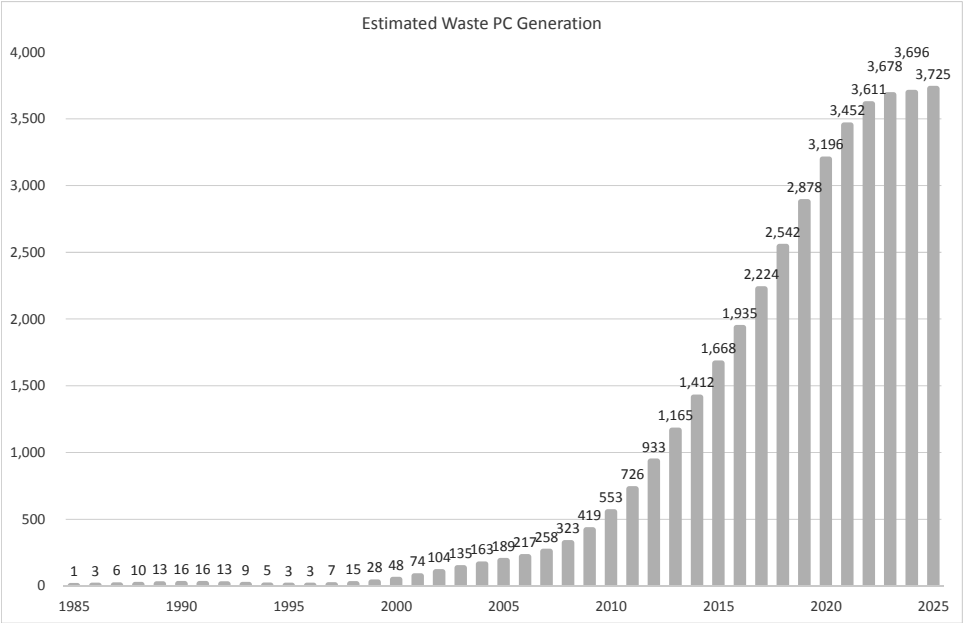


Figure 15: Estimated Generation (PC)

Table 10: Estimated Generation of Refrigerator (Unit: 1,000)

Calendar Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Waste Generation	223	235	246	259	272	287	303	319	335	349

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Waste Generation	363	375	388	399	411	421	431	441	450	458

Calendar Year	2021	2022	2023	2024	2025
Waste Generation	465	472	478	483	488

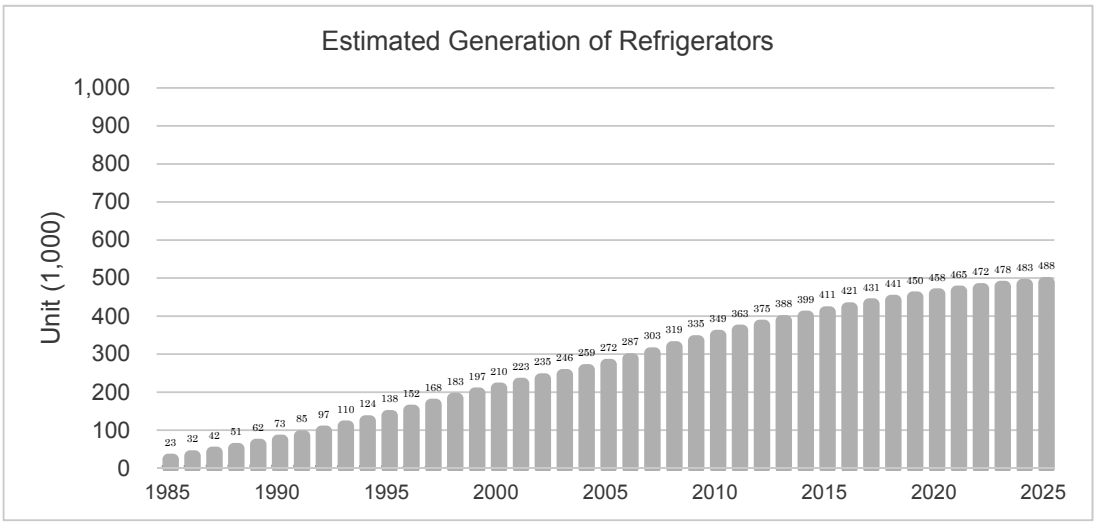


Figure 16: Estimated Generation (Refrigerator)

Table 11: Estimated Generation of Washing Machine (Unit: 1,000)

Calendar Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Waste Generation	12	20	32	49	69	93	118	144	167	189

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Waste Generation	207	222	234	244	253	264	279	299	322	345

Calendar Year	2021	2022	2023	2024	2025
Waste Generation	366	386	405	424	445

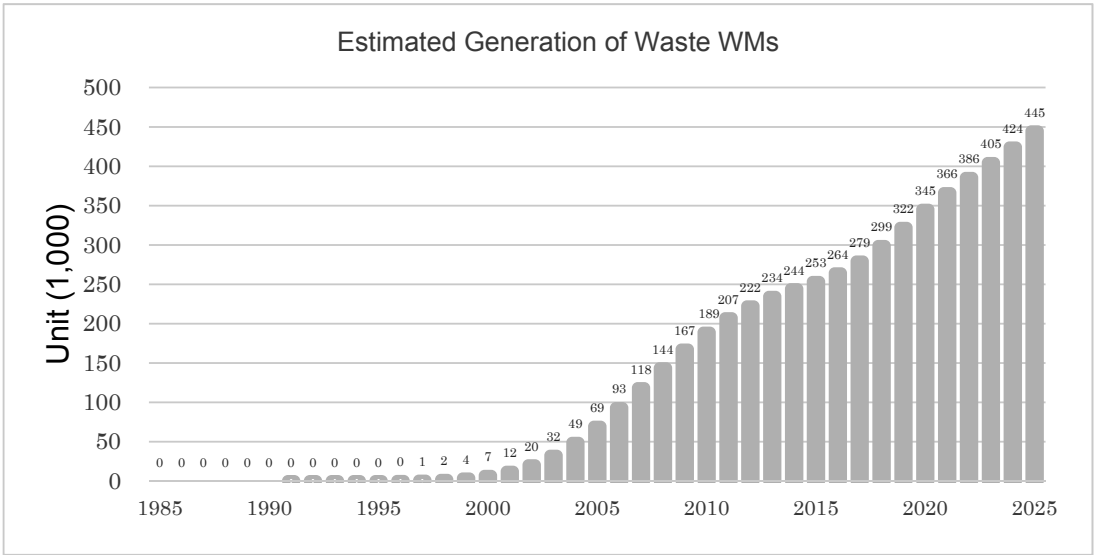


Figure 17: Estimated Generation (Washing Machine)

Table 12: Estimated Generation of Mobile Phone (Unit: 1,000)

Calendar Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Waste Generation	209	242	278	318	363	419	503	658	953	1,459

Calendar Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Waste Generation	2,181	3,014	3,820	4,597	5,464	6,386	7,137	7,589	7,932	8,510

Calendar Year	2021	2022	2023	2024	2025
Waste Generation	9,516	10,972	12,737	14,492	15,915

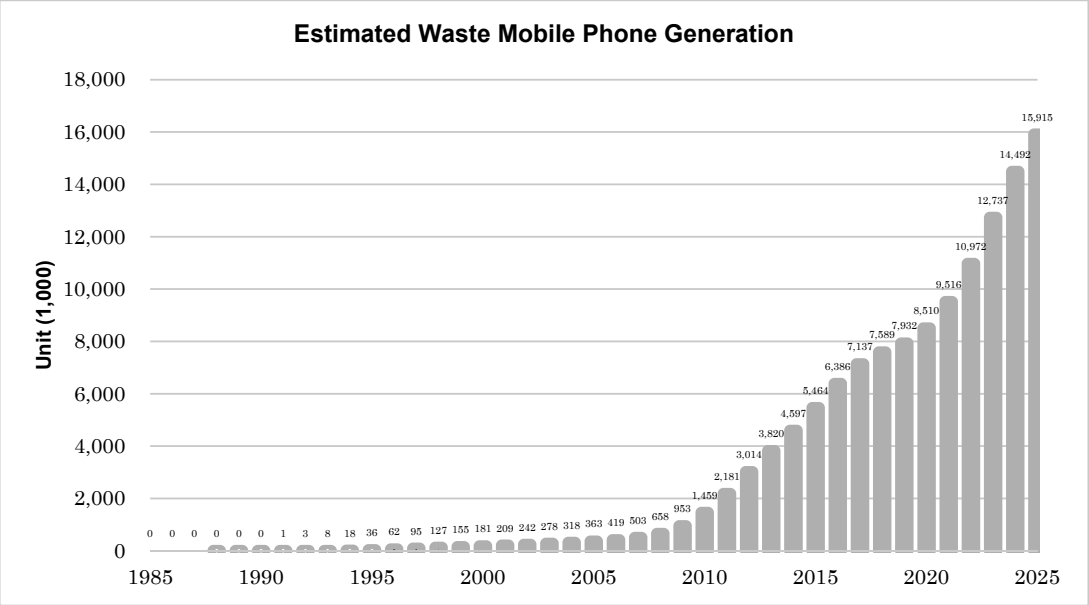
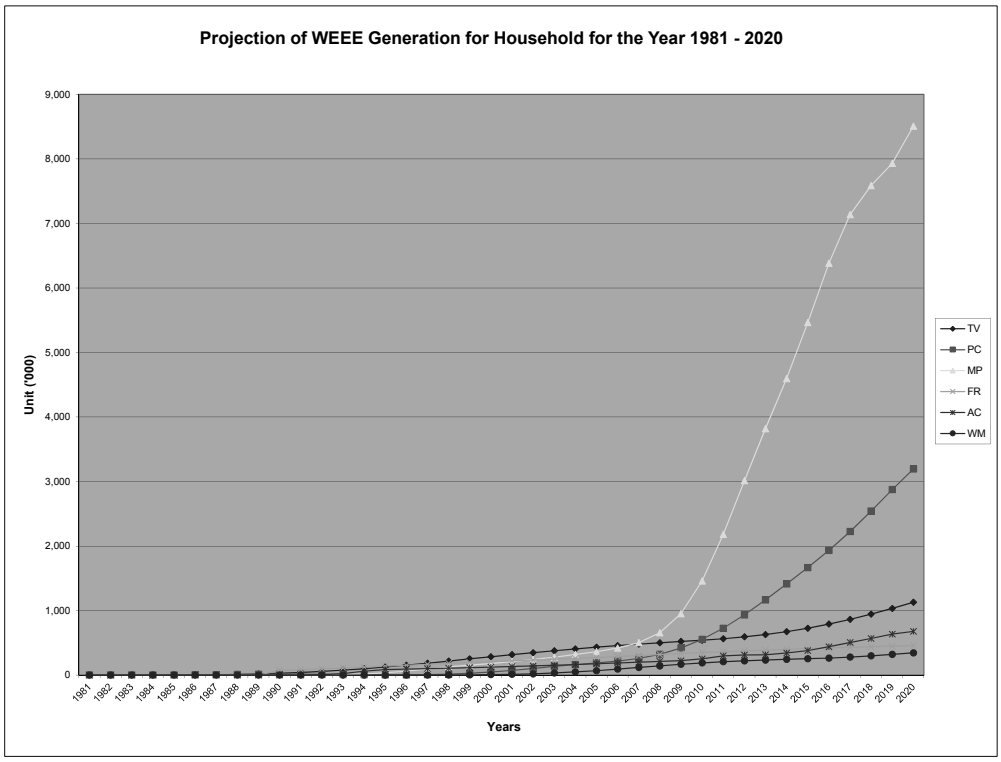


Figure 18: Estimated Generation (Mobile Phone)

4. Estimated Total E-waste Generation

Year	TV	PC	MP	FR	AC	WM
2001	317	74	209	223	133	12
2002	348	104	242	235	143	20
2003	378	135	278	246	153	32
2004	407	163	318	259	164	49
2005	433	189	363	272	176	69
2006	458	217	419	287	188	93
2007	480	258	503	303	201	118
2008	501	323	658	319	212	144
2009	521	419	953	335	225	167
2010	541	553	1,459	349	252	189
2011	565	726	2,181	363	298	207
2012	594	933	3,014	375	312	222
2013	629	1,165	3,820	388	314	234
2014	674	1,412	4,597	399	342	244
2015	727	1,668	5,464	411	380	253
2016	791	1,935	6,386	421	441	264
2017	864	2,224	7,137	431	505	279
2018	946	2,542	7,589	441	568	299
2019	1,035	2,878	7,932	450	636	322
2020	1,128	3,196	8,510	458	677	345
2021	1,224	3,452	9,516	465	685	366
2022	1,320	3,611	10,972	472	697	386
2023	1,413	3,678	12,737	478	733	405
2024	1,503	3,696	14,492	483	765	424
2025	1,587	3,725	15,915	488	789	445
Total	**20,940**	**39,472**	**126,351**	**10,887**	**10,711**	**5,604**



添付資料２

家庭系 E-waste の回収ガイドライン

GUIDELINE

Collection, Storage, Handling and Transportation of Scheduled E-waste in Malaysia

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Guideline

Collection, Storage, Handling and Transportation of Scheduled E-waste in Malaysia

1.0 INTRODUCTION

Electrical and electronic waste (commonly known as E-waste), is growing exponentially worldwide because of tremendous growth of demands on the use of electrical and electronic equipment. The disposal of E-waste is of big concern discussed at international arena, because of the nature of hazardousness of the waste and drastically increased volume of disposal in a globalized world.

Note:

"E-waste" referred to SW110 as stipulated in the First Schedule of EQ (Scheduled Waste) Regulations 2005.

"Electrical and electronic equipment "means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in First Schedule of the regulations;

Improper handling of E-waste poses high risk of pollution, health impacts and causes incidents of illegal disposal. The lack of proper environmental precaution measures in E-waste management could cause enormous environmental issues such as release of chlorofluorocarbon (CFC) gases that cause ozone depletion, global warming and contaminations from other hazardous/toxic substances.

In Malaysia, E-waste is generally divided into two main types by generation sources, i.e. E-waste generated from the industrial sectors, and E-waste generated from the non-industrial sectors, mainly households, commercial and institutional entities.

E-waste from industrial sector is categorized as Scheduled Wastes under the Code SW110, First Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005. The categories of E-waste defined under this coding are only covering E-waste generated from the industrial sectors, including electrical and electronic industries, as well as other industrial generators.

The management of E-waste generated from non-industrial sectors, especially household and other entities such as commercial and institutional is now regulated under a newly enacted regulation known as the Environmental

Quality (Scheduled E-Waste) Regulations 20XX, which defines scheduled E-wastes under Code HSW, including HSW100, which is specifically for targeted categories of scheduled E-waste.

Note:

"Scheduled electrical and electronic equipment waste" or "Scheduled E-waste" means discarded electrical and electronic equipment falling within the categories of waste in the first schedule, which are generated from household, commercial, industrial, institutional entities, and any other sources;

Scheduled E-waste requires a different management system as compared to the E-waste generated from the industrial sector, particularly from the financial perspective where significant costs are required for collection and transportation of the Scheduled E-waste, as well as to comply with the proper environmental precaution standards. Therefore, Scheduled E-waste shall only be processed or treated by specific scheduled E-waste recycling facilities, which are licensed by the DOE.

This Guideline shall be read together with the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 20XX.

2.0 ABOUT THE GUIDELINE

Under the framework of the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 20XX, it is emphasized that all the scheduled E-waste shall be channeled, collected and delivered through a formal or authorized flow of stakeholders to the final destination of proper treatment, and recycling with environmentally sound system. Each respective stakeholder has their roles and responsibilities, and the costs involved for the entire system shall be shared among all the stakeholders.

This Guideline provides a list of requirements for the users, who are directly involved in specific activities dealing with Scheduled E-waste, particularly on the activities of storage, handling, collection and transportation of Scheduled E-waste. It is aimed to provide guidance to the stakeholders for effective compliance of the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 20XX.

The main categories of Scheduled E-waste covered under this Guideline are the list of E-waste under the First Schedule of the Environmental Quality (Scheduled E-Waste) Regulations 20XX including (a) cloth washing / drying machine, (b) refrigerator / freezer / chiller, (c) air-conditioner, (d) computer, (e) television and (f) mobile phone / tablet PC. In a long run, it also includes other Scheduled E-wastes such as E-waste of small appliances (e.g. CD players, hair dryers, microwave ovens, etc.)

The users of this Guideline shall always refer to the Environmental Quality (Scheduled E-Waste) Regulations 20XX as the main document of this Guideline to ensure complete understanding of the entire requirements under the regulations, as well as the clauses of the Environmental Quality Act (1974) as the main Act.

Detailed elaborations on the types of activities that are subject to this Guideline are explained in Section 2.1, while Section 2.2 elaborates the definitions and categories of stakeholders subject to the requirements stipulated in this Guideline.

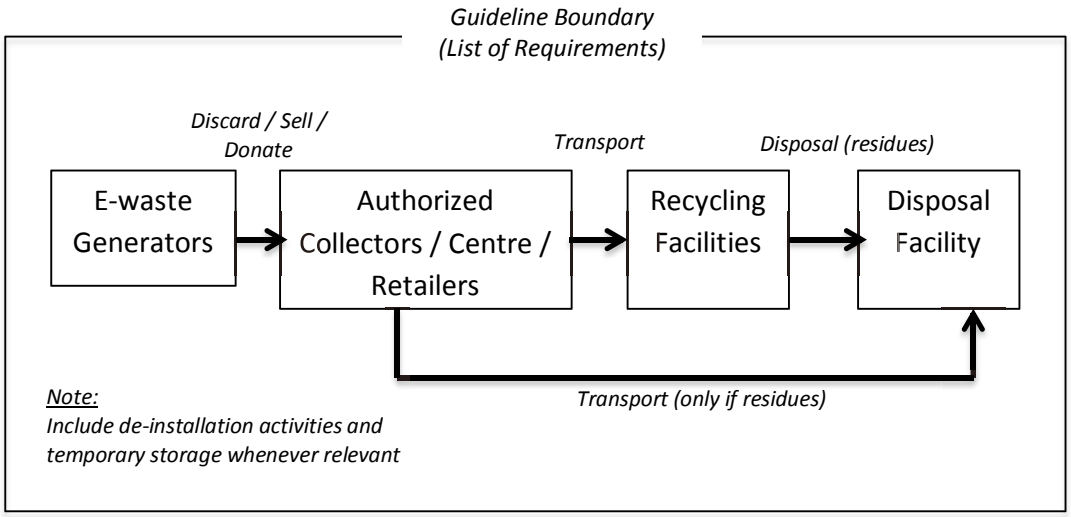
2.1 Scopes of the Guideline

This Guideline shall apply to all stakeholders of activities as described below, whether it is an individual person, company, organization or any other entities:

Activities	Descriptions
Collecting / donating / buying / selling	• Donating / giving away, discarding and selling Scheduled E-waste by any generators from households, commercial, institutional and any other sources to another party who receives, buys or collects for specific purposes. • Buying Scheduled E-waste from any generators from households, commercial and institutional sources at prices agreed upon both the buyer and generator/seller. • Receiving / collecting Scheduled E-waste from any generators from households, commercial and institutional sources for free without any payment involved. • Selling Scheduled E-waste received / collected / purchased from any generators from households, commercial and institutional sources, to another buyers for specific purposes.
Temporary storage	• Temporary storage of Scheduled E-waste generated / received / collected / purchased from any generators from households, commercial, institutional or any other sources.
Handling activities	• Any handling activity on Scheduled E-waste generated / received / collected / purchased from any generators before the subsequent activities or destinations, such as segregation, dismantling or cleaning etc. • Activities of de-installation of Scheduled E-waste particularly air-conditioners that contain refrigerants and refrigerant oils.

	• Handling activity excludes repairing processes by repair shops of electrical and electronic appliances received from the customers. Nevertheless, Scheduled E-waste generated from any repair shop shall be subject to the requirements of this Guideline.
Transportation / transfer	• Transporting or transferring of E-waste generated / received / collected / purchased from any generators to the next destinations, such as another buyer or receiving point, recycling or disposal facilities.

In general, the scope of the Guideline cover the entire activity flow of the Scheduled E-waste from generation points (including de-installation activity if relevant), via collection and transportation (including temporary storage if relevant) till the boundary of the final receiving points whether it is a recycling or disposal facility. The scope falling within the boundary of the Guideline are illustrated as shown below:



Scopes of the Guideline

2.2 Descriptions of Stakeholders

The users of this Guideline are expected to be all relevant stakeholders who are involved in the activities elaborated within the Guideline scope boundary, generally the authorized collection centers, collectors, retailers, scheduled E-waste recycling facilities, as well as some other stakeholders who are authorized and carrying out the same activities.

Descriptions of different categories of stakeholders who are commonly involved in the activities subject to this Guideline are listed but not limited to the following:

Stakeholders		Descriptions
Authorized Collection Centers / Collectors	*Concessionaire companies*	Waste management companies awarded concessionaires by the National Solid Waste Management Department (JPSPN) or sub-contractors, for collection of household solid waste, including Scheduled E-waste collection on specific schedule at selected States in the country.
	Local Authorities / other government agencies	Local governments, any other government agencies and their sub-contractors who possibly operate collection centers to collect recyclable materials, including Scheduled E-waste, as well as collection campaigns organized on *ad hoc* basis.
	Institutions / universities / colleges / schools	Universities, colleges, schools, hospitals and any other public or private institutions that carry out collection of Scheduled E-waste.
	Private companies (contractors, recyclable buyers, traders, middlemen etc.)	Private recyclers or buyers who are buying recyclable materials including Scheduled E-waste from any sellers. The activities are market-driven, profit-oriented and it could involve several levels of transactions from smaller to larger scale stakeholders.
	Non-Governmental Organizations (NGO)	Registered organizations that operate collection centers to collect recyclable materials, including Scheduled E-waste, as well as carry out collection campaigns on *ad hoc* basis normally at community levels, for fund raising or charity purpose.
	Charity Organizations / Non-profit Organizations (NPO)	
	Charity Organizations	
Authorized Retailers	*Retailers*	Any retailer whether individual shop, franchise companies, brand dealers / distributors or department stores in malls that are selling new electrical and electronic appliances to the consumers, and collect Scheduled E-waste from the consumer premises, or brought in to the retailer premises.
	Brand dealers / distributors	
	Hypermarkets / malls	

Repair / Secondhand Shops	*Repair shops*	Shops that are carrying out business to repair or refurbish damaged electrical and electronic appliances. Appliances that are non-repairable and becomes Scheduled E-waste are subject to the requirements of the Guideline.
	Secondhand shops	Shops that are playing same roles as retailers but selling used electrical and electronic appliances for the consumers.
Authorized Recycling Facility	*Scheduled E-Waste Recycling Facility*	Facilities that are licensed by the DOE to specifically receive Scheduled E-waste from authorized sources, and carry out recycling process of Scheduled E-waste.
Others	*Installer / de-installer*	Individuals or companies that are offering services to maintain, service, install and de-install of electrical and electronic appliances. De-installation is commonly applicable for air-conditioner in particular.
	Maintenance / service companies	

2.3 Categories of Targeted Scheduled E-waste

The target categories of Scheduled E-waste subject to this Guideline are basically the 6 main categories of E-waste specified in the First Schedule of the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations XXXX, excluding the small appliances, fluorescent lamps and rechargeable batteries. The 6 main categories of Scheduled E-waste are listed as follows with the sub-categories:

No	Categories	Sub-categories
1	Televisions	CRT Televisions  
		Flat Televisions (Plasma, LCD, LED)  
2	Air-conditioners	Window Units  
		Split units  Ceiling Unit 
		Mobile units   

3	Computers	LCD Desktop CRT Desktop 
		Laptop 
4	Refrigerators	Refrigerators 
		Freezers 
		Chillers 

5	Washing / Dryer machines	Washing machines 
		Cloth Dryers 
6	Mobile phones and Tablet PCs	Mobile phones 
		Tablet PCs 

3.0 THE LEGAL FRAMEWORKS OF SCHEDULE E-WASTE MANAGEMENT

Scheduled E-waste management is regulated under the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations XXXX, which emphasizes the concept of "shared responsibilities" among the stakeholders, with implementation of the principle of Extended Producer's Responsibility (EPR).

The principle of EPR is the main feature of E-waste management framework in Malaysia, wherein the producers of electrical and electronic appliances have the responsibility to ensure proper management of the E-waste after the 'end of life' of the products. Under the EPR, producers are also entrusted with the responsibility to finance and organize a system to meet the costs involved in overall management of the E-waste in an environmentally sound manner.

In general, the entire legal framework of the Scheduled E-waste management is confined to 3 main flows, which are summarized below:

E-waste Flow	Determines the right channel of Scheduled E-waste is collected from generation points to authorized collection centers, collectors, retailers, and finally the Scheduled E-waste recycling facilities or final disposal. Proper E-waste flow prohibits the Scheduled E-waste to enter into informal sectors, by authorizing only the formal collection channels within the formal system boundary.
Fee Flow	Determines how the recycling fee (known as contribution under the EQA) is collected and channeled to a fund management entity (known as Recycling Contribution Management Body - RCMB), for various purposes of disbursements to ensure functionality of the entire system. Proper fee flow ensures the overall costs required for proper management of Scheduled E-waste is secured and shared among the stakeholders.
Reporting Flow	Determines the information / data flow through proper reporting by relevant stakeholders, with the use of manifest forms. Proper reporting flow avoids leaking of E-waste into the informal sectors, and ensures that proper data is captured for determination of total recycling fee to be received by relevant stakeholders. Proper data management is also crucial for future planning and improvement of the system in a long run.

Detailed elaborations of the regulatory framework of Scheduled E-waste management by each of the 3 main flows are described in the following sections.

3.1 Scheduled E-waste Flow

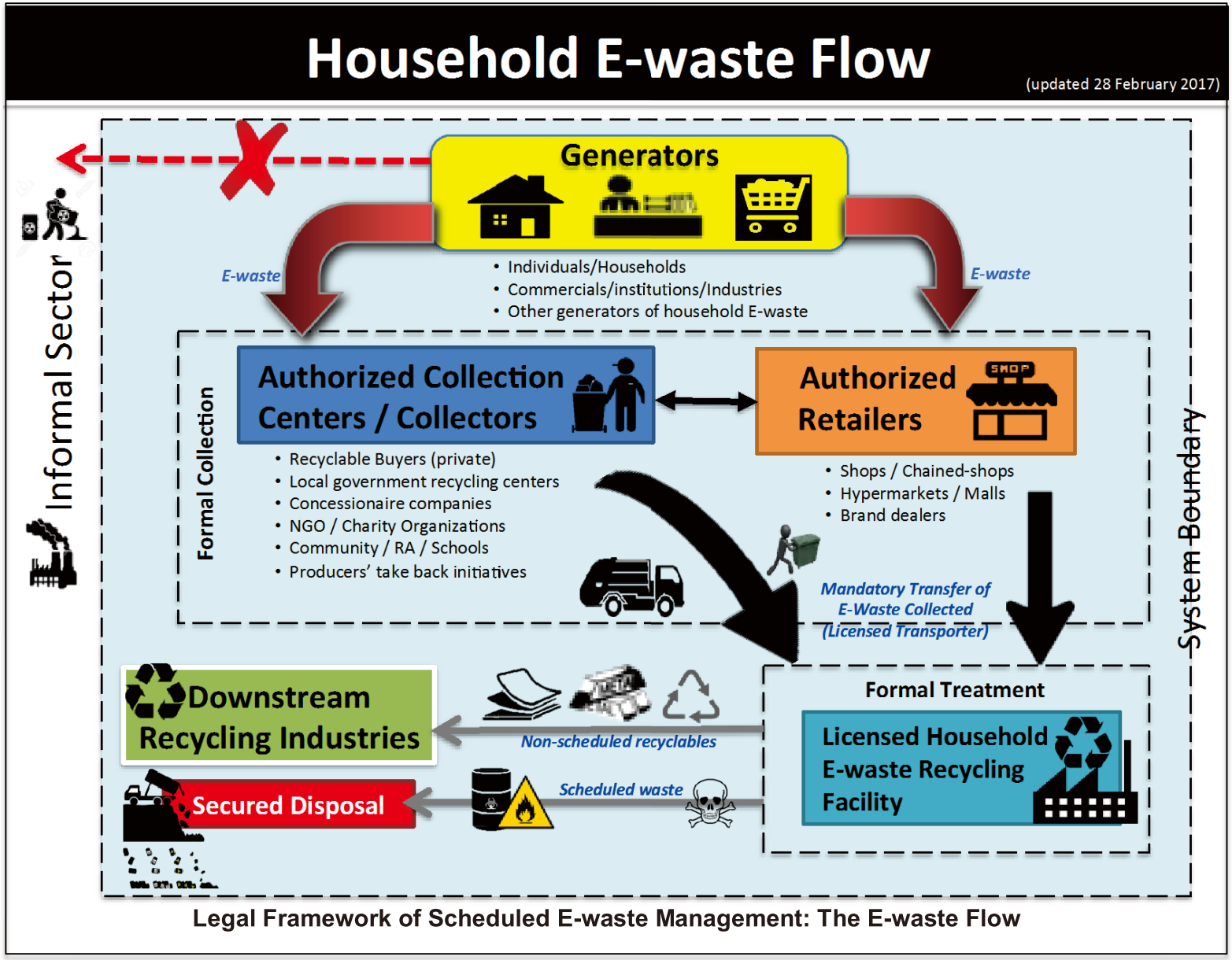
The generators for Scheduled E-waste cover not only limited to households, but also any other entities such as commercial, institutions and industries that use the same categories of electrical and electronic appliances. Examples of non-household generators include offices, commercial shops, malls, universities, schools, industries and any other generation sources, as long as the categories of targeted Scheduled E-waste specified in Section 2.3 are generated.

Under the new framework of the regulations, all generators of Scheduled E-waste are required to discharge their Scheduled E-waste to the authorized receiving points by the DOE as formal collection channels, which could be a retailer shop, recycling center, NGO or charity collection, concessionaire company or local government collection, or any other authorized premises. The Scheduled E-waste can be sold, donated, given or discarded with or without monetary incentives subject to the market demands. Any flow of Scheduled E-waste from generators to un-authorized receiving points is illegal and prohibited.

The collected Scheduled E-waste by the authorized collection points will be channeled to Scheduled E-waste recycling facility licensed by the DOE, to ensure proper treatment and recycling of the Scheduled E-waste in an environmentally sound manner. In case where the authorized collection points are not able to channel the collected Scheduled E-waste directly to the licensed facility due to logistic or any other factors such as small retailers, the collected Scheduled E-waste shall be delivered to another authorized collection point that has capability to channel the E-waste in a larger quantity.

The licensed Scheduled E-waste recycling facility is strictly prohibited from receiving Scheduled E-waste from any unauthorized sources. These licensed facilities shall fulfill the technical and legal requirements set by the DOE to efficiently process the Scheduled E-waste received (Refer to Recycling Guideline), in which the recyclable materials be sold to downstream recyclers, precious materials be recovered and residue waste be disposed off to licensed scheduled waste disposal facility either for secure landfill or other treatment.

Under the regulatory framework, the Scheduled E-waste is expected to flow from the generation points into proper recycling system within the system boundary. The generators shall understand and be responsible for the entire flow of the Scheduled E-waste that they have generated, to ensure that the Scheduled E-waste is collected or purchased or received by only authorized collection points including retailers, and channeled to license facility for proper recycling. Any outflow of Scheduled E-waste from the regulated system boundary to informal sectors will be considered illegal and should be strictly prohibited.



Legal Framework of Scheduled E-waste Management: The E-waste Flow

3.2 Fees Flow

It is important to understand that recycling of Scheduled E-waste does not always yield revenues but it involves significant costs particularly when taken into consideration the logistic costs and environmental protection costs such as destruction of chlorofluorocarbon (CFC) gases, various pollution control measures, as well as treatment and disposal of hazardous substances. The overall costs required to ensure that the Scheduled E-waste is properly channeled and processed in an environmentally sound manner shall be shared among the stakeholders, including the manufacturers and importers of electrical and electronic appliances, generators (consumers / users), retailers, authorized collection points, as well as end receiving points, i.e. the licensed E-waste recycling facility.

Under the new regulatory framework, the concept of “Shared Responsibility” is applied. The manufacturers and importers are obliged to pay recycling fee upon introduction of their products into the markets. The recycling fee collected will be channeled to the Recycling Contribution Management Body (RCMB) directly.

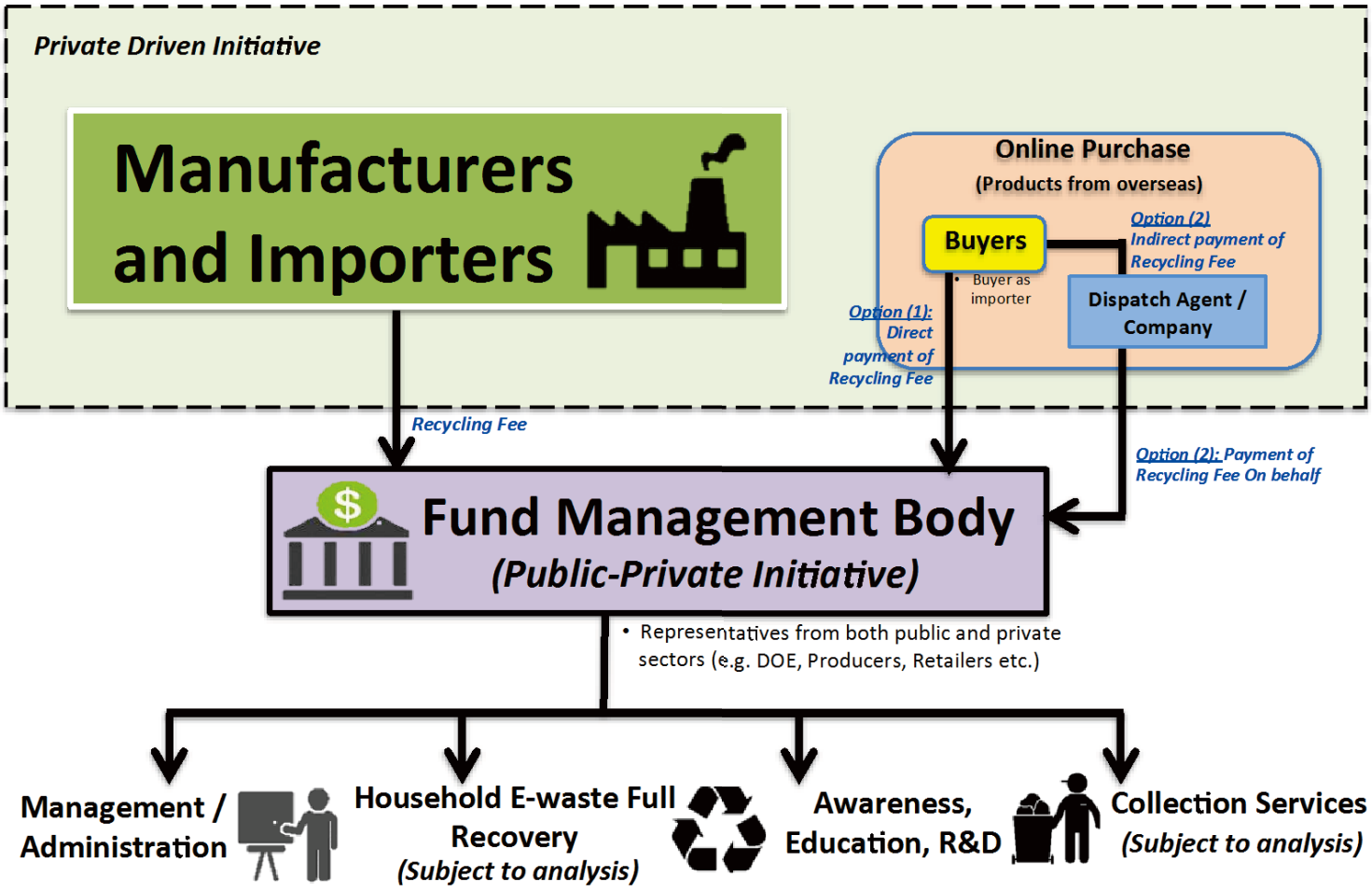
In case of online or internet purchase of the regulated products by the buyers / consumers without any direct involvement of manufacturer or importer, the buyers / consumers are obliged to pay the recycling fees.

The recycling fees paid by the manufacturers, importers or the consumers for the case of online purchase will be the main source of fund, which will be used to subsidize necessary activities of the licensed Scheduled E-waste recycling facilities, authorized collection centers, authorized retailers and other possible stakeholders involved, which will be determined by the FMB. In general, the recycling fee collected will be used to cover not only possible subsidies for activities of collection and recycling facilities, but also administration of the FMB as well as necessary awareness and education events.

The recycling fee for different items of targeted Scheduled E-waste will be different subject to various factors involved in collection and recycling of the items. Details of fee structures to be paid by the manufacturers and importers by each category of targeted Scheduled E-waste are described in Recycling Fee Guideline.

Recycling Fee Flow

(updated 28 February 2017)



Legal Framework of Scheduled E-waste Management: The Recycling Fee Flow

3.3 Reporting Flow

Proper reporting system is an essential tool to monitor and ensure proper Scheduled E-waste flow and recycling fee flow as elaborated in Section 3.1 and 3.2 above.

In order to determine the recycling fee to be paid by the manufacturers, importers, as well as consumer for the case of online purchase, the following reporting needs to be carried out:

a) Manufacturers and Importers – to report the quantity of the regulated electrical and electronic appliances introduced into the Malaysia market, whether it is locally manufactured, assembled, or imported.
b) Custom Department – to provide data on the importation of regulated electrical and electronic appliances directly by the consumers.

Information reported by the manufacturers, importers and Custom Department will be the fundamental for the FMB to determine the amount of recycling fees to be collected.

On the other hand, in order to ensure proper flow of the Scheduled E-waste within the system boundary from generation points to the final receiving points, reporting by relevant stakeholders by manifest system is required. The manifest system comprises 6-ply of consignment notes, which shall be filled out and kept by respective stakeholders following the methods as detailed in Reporting Guideline. Some brief explanations on the reporting flow under the new regulatory framework are shown below:

a) The authorized collection centers and retailers shall report each collected Scheduled E-waste by using the manifest form, to ensure each Scheduled E-waste is delivered to the right destination, i.e. the licensed Scheduled E-waste recycling facilities.

b) In case a licensed transporter is used, the authorized collection centers and retailers shall make sure that the manifest forms flow along with the transportation to the licensed facilities.

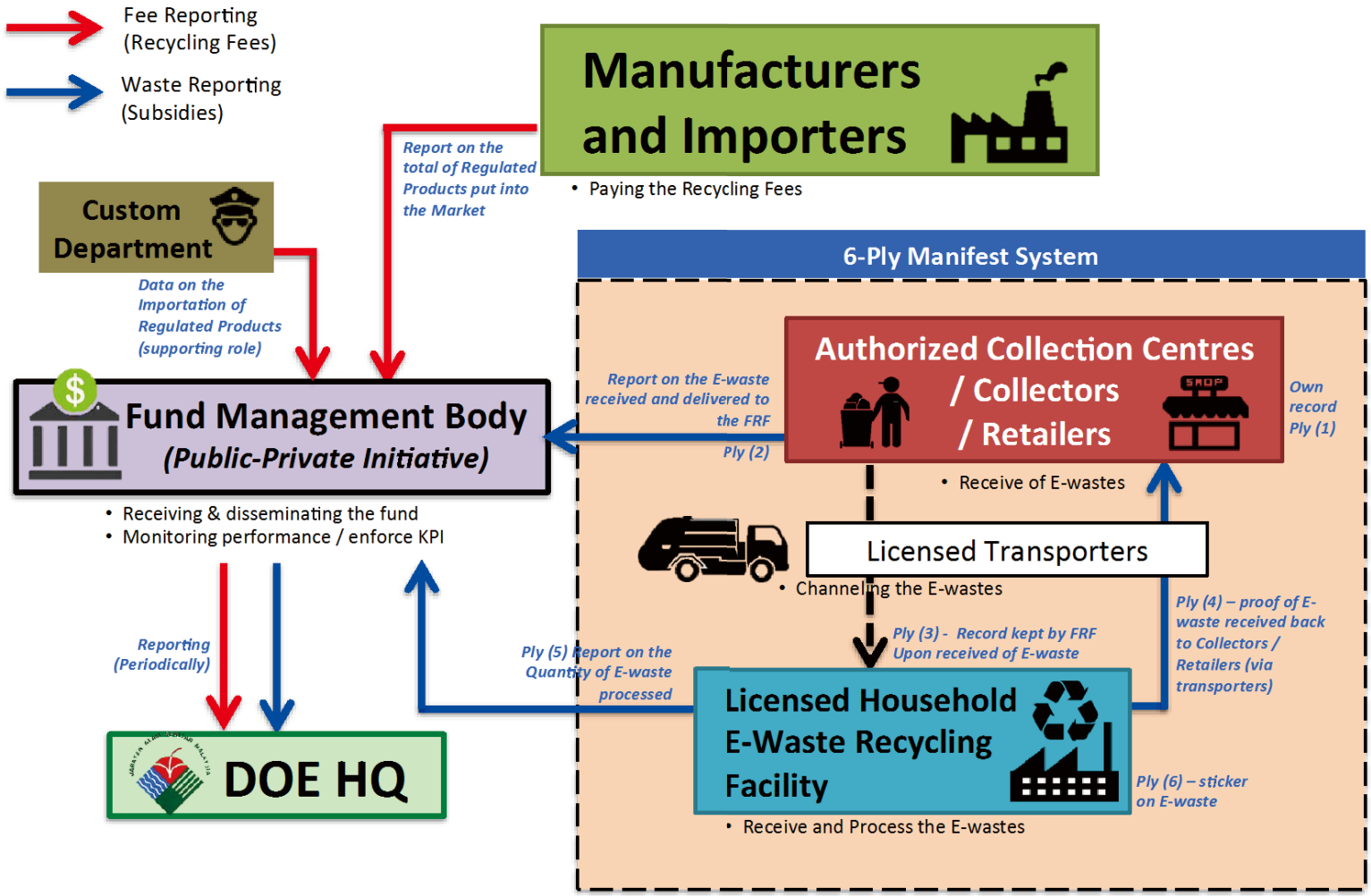
c) The licensed Scheduled E-waste recycling facilities shall only receive Scheduled E-waste from authorized sources, with clear manifest forms attached.

d) The authorized collection centers, retailers and licensed Scheduled E-waste recycling facilities shall report the number of Scheduled E-waste collected or received to the FMB in order to justify if any subsidy is required.

In general, the manifest system ensures all the collected Scheduled E-wastes are channeled to the right destination for proper recycling. Proper reporting flow serves as monitoring tool to ensure effective implementation of the entire system within the regulated boundary.

Reporting Flow

(updated 28 February 2017)



Legal Framework of Scheduled E-waste Management: The Reporting Flow

4.0 REQUIREMENTS FOR COLLECTION, STORAGE, HANDLING AND TRANSPORTATION

In general, the Environmental Quality (Scheduled E-Waste) Regulations 20XX outlines the responsibilities of different stakeholders throughout the entire flow of Scheduled E-waste management from generation to final destinations whether it is a disposal site or a recycling facility. Any person who contravenes the regulations shall be guilty of an offence and shall be liable to a fine or to a term of imprisonment for a period as stipulated in the Regulations.

This Guideline focuses particularly on the stakeholders involved in activities from the generation points to the authorized receivers who are possibly a collection center, collector, and retailer in terms of Scheduled E-waste handling, storage, collection and transportation. It is to ensure that the Scheduled E-waste is managed in a manner that is not creating nuisance, leakage and effectively channeled to the final destinations.

4.1 Purchase, Receive and Collect

Any individual person, company, organization or any other entities that receive, purchase, collect Scheduled E-waste shall take note of the following:

a) The Scheduled E-waste generators [as defined in the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 20XX are legally allowed to give away, donate, discard, sell the Scheduled E-waste to only collection centers, collectors, retailers, who are authorized by the DOE.

b) The Scheduled E-waste generators shall give away, donate, discard, sell the Scheduled E-waste in a complete set or incomplete set (Refer to Section 2.3), with the following requirements:

Television	Complete set - no dismantling of any part is allowed.
Air-conditioner	Complete set - no dismantling of any part is allowed, release of refrigerants is strictly prohibited.
Cloth Washing Machine / Dryer	Complete set - no dismantling of any part is allowed.
Refrigerator / freezer / chiller	Complete set - no dismantling of any part is allowed, release of refrigerant are strictly prohibited.
Computer	Complete or incomplete set - Small extent of dismantling may happen such as removal of the hard disk or CD-ROM. Further dismantling is not allowed.
Mobile phone / tablet PCs	Complete set - no dismantling of any part is allowed.

c) Any stakeholders who are involved in the activities of Scheduled E-waste collection, whether to purchase, to collect or receive for free shall obtain written authorization from the DOE. Application for authorization shall be done by filling out the specific form.

d) The authorized stakeholders are responsible to notify the public that they are authorized by DOE on Scheduled E-waste collection, and inform about the service provided with regard to Scheduled E-waste (such as receive of Scheduled E-waste, provide collection service of Scheduled E-waste upon request etc.)

e) The authorized stakeholders are obliged to receive, purchase, collect Scheduled E-waste irrespective of any brand, when and where the original item brought for disposal was originally produced.

f) The authorized stakeholders are obliged to receive / collect Scheduled E-waste in a complete set or incomplete set as listed in 4.1(c). Any deviation from the list could also be collected / received but it shall be clearly reported following the Reporting Guideline.

g) The Scheduled E-waste generators have the right to know the destination of the E-waste that they have given away, discarded, donated or sold, to ensure that the Scheduled E-waste ends up at dedicated destinations for proper recycling or disposal.

h) For de-installation of air-conditioner in particular, the generators shall use capable de-installer or company with certified technicians to ensure proper de-installation processes to avoid leaking or release of the refrigerants into the environment [Refer to the Environmental Quality (Refrigerant Management) Regulations, 1999].

4.2 On-site Storage / Handling

As a general guide, proper storage and handling of Scheduled E-waste generated includes the following important measures to be taken into considerations:

a) Proper segregation of Scheduled E-waste, particularly important to avoid mixing the Scheduled E-waste with any other categories of waste such as scheduled waste or residual solid waste;

b) Selection of appropriate and durable Scheduled E-waste storage container types with right capacities for different categories of Scheduled E-waste generated;

c) Appropriate selection of Scheduled E-waste storage areas, whether to be in a container or directly on the ground. The storage areas shall be shaded from direct sunlight and avoid exposure to rainfall to prevent possible fire risk of lithium batteries contained in the Scheduled E-waste.

d) Proper usage of the storage container, to avoid overloading, spillage and improper storage of the container.

Examples of Proper Storage Containers for Segregated Scheduled E-waste

e) Proper labeling of the storage areas, subject to the labeling specification and requirements.

f) In case if lithium batteries are removed from the Scheduled E-waste, all lithium batteries shall be placed into a separate plastic or wooden container, and handled with care to avoid potential fire risk during transportation. Do not store lithium batteries in any metal containers.

Special Note: for Lithium Batteries Storage

- ✓ *All lithium batteries are subject to the EQA (Scheduled Waste) Regulations 2005, under code SW103.*
- ✓ *Special care shall be taken to ensure lithium batteries are not exposed to any flammable environment / wet condition.*
- ✓ *Lithium batteries can release toxic material if crushed or broken or opened, large quantities shall be stored in an isolated area.*
- ✓ *Lithium batteries shall be stored in a secure, cool, well-ventilated, dry environment, without direct sunlight.*
- ✓ *Temperature shall be kept below 25^{o}C at all time.*
- ✓ *Seal both the terminal (+) and (-) of the lithium batteries with tapes before storage.*
- ✓ *The storage area shall have access to a fire extinguisher or other extinguisher designed for metallic fires.*

- ✓ *Storage areas shall be clearly identified as a Lithium Battery storage area.*
- ✓ *Do not load or transport the lithium batteries if the package or container is found damaged.*

← Example of Label

g) Further dismantling of the Scheduled E-waste other than the requirements as specified in Section 4.1(c) is strictly prohibited at any stage of handling and storage, which is subject to occupational safety and health concerns.

Dismantling Activity of Scheduled E-waste is Prohibited

Special Notes for Repair Shops:

- ✓ *Dismantling of Scheduled appliances shall be carried out in accordance to the general code of practice, without creating any pollution and nuisance to the surrounding environment.*
- ✓ *Dismantled parts of E-waste that needs to be disposed shall comply with the EQA (Scheduled Waste) Regulations 2015, including the lithium batteries / button batteries which are listed in the First Schedule as SW103.*
- ✓ *Appliances that cannot be repaired and need to be disposed in a complete set shall comply with the EQA (Scheduled E-Waste) Regulations 20XX.*

h) The Scheduled E-waste shall be stored in a way to ensure it does not hold water in order to prevent the potential for mosquito breeding.

i) In order to carry out all the above effectively, sufficient information / education shall be made available to relevant workers / staff / officers on site, who are directly dealing with the Scheduled E-waste (Refer to Section 4.5 on Other Requirements).

In addition to the above, some specific requirements by each category of Scheduled E-waste targeted in this Guideline are elaborated as follows:

No	Categories	Precautions
1	Television	✓ Televisions shall be handled with care because the CRT glass is fragile and contains lead, which is highly hazardous to human health and the environment. ✓ When stacking the televisions together during storage, separate flat screen televisions and CRT television for easy storage and saving of space. ✓ Separate the televisions by types and sizes will also ease the works of documentation especially in reporting using the manifest forms (Refer to Reporting Guideline).
2	Refrigerator / Freezer / chiller	✓ Refrigerant in the refrigerator / freezer shall not be released into the air at all time. ✓ Used refrigerant shall be pumped and stored in a refrigerant gas cylinder. ✓ The compressor of the refrigerator / freezer shall be intact without any dismantling, and carefully handled to avoid leaking of refrigerant and lubricant oil. ✓ The insulation foam of the refrigerator / freezer contains CFC and shall not be dismantled at all time. ✓ The plastic compartments / shelves in the refrigerator / freezer may be taken out by the generator, which is acceptable but no further dismantling activity is allowed. ✓ Separate the refrigerators / freezers / chiller by types and sizes will also ease the works of documentation especially in reporting using the manifest forms (Refer to Reporting Guideline).
3	Cloth Washing / Dryer Machine	✓ Some cloth dryer or washing machine may contain glass, which is fragile and shall be handled with care to avoid possible occupational hazards to the workers. ✓ Separate the washing machine / cloth dryer by types and sizes will also ease the works of documentation especially in reporting using the manifest forms (Refer to Reporting Guideline).

4	Air-conditioner	✓ Air-conditioner shall be de-installed with special care by certified persons to ensure that the refrigerant contained in the air-conditioner is not released into the atmosphere. ✓ Used refrigerant shall be pumped and stored in a refrigerant gas cylinder. ✓ The handling and treatment of used refrigerants shall be in compliance with the relevant regulations. ✓ Separate the air-conditioner by types and sizes will also ease the works of documentation especially in reporting using the manifest forms (Refer to Reporting Guideline).
5	Computer	✓ Computers contain lithium battery and/or button battery that shall be handled with care. ✓ Computer monitors shall be handled with care because the CRT glass is fragile and contains lead, which is highly hazardous to human health and the environment. ✓ When stacking the computer monitors together during storage, separate flat screen and CRT screen for easy storage and saving of space. ✓ Complete or incomplete set of computer refers to mainly the monitor and the CPU unit, excluding other peripherals such as keyboard, speaker, mouse and charger. ✓ Some parts of the computer may be taken out by the generators such as hard disks and ram, which is acceptable but no further dismantling of computer CPU is allowed. ✓ Separate the computers by types and sizes will also ease the works of documentation especially in reporting using the manifest forms (Refer to Reporting Guideline).
6	Mobile phone / Tablet PC	✓ Complete set of mobile phone and tablet PC includes or without the lithium battery, excluding the charger and other peripherals. ✓ Mobile phones contain lithium battery that shall be handled with care. ✓ All the mobile phones and tablet PC collected can be mixed and placed together in a plastic or wooden container.

Mobile Phone Battery

Power Bank

Lithium and Button Batteries Shall be Handled with Care

4.3 Transportation / Transfer

Transportation or transfer of Scheduled E-waste is generally carried out either by commercial and non-commercial stakeholders. Commercial stakeholders include recyclers, concessionaire companies, retailers, industries and any other private commercial entities; non-commercial stakeholders include the local authorities, NGO, community based organizations, institutions such as schools and universities, as well as individual.

Transportation of Scheduled E-waste by any stakeholder shall obtain prior authorization by the DOE, through application by using the Form as enclosed in the Appendix (Refer to Section 5.0). Some stakeholders may apply for exemption of registration to the Director-General of DOE, subject to deviation details and conditions.

Prior to transportation of any Scheduled E-waste, it is a basic requirement that each item of the Scheduled E-waste shall be properly recorded / documented by using the manifest form of the DOE as part of the reporting requirements (refer to Section 4.4 on Reporting Responsibility).

The following requirements shall be applied for all transportation / transfer activities of Scheduled E-waste:

a) Individual generators are allowed to use own vehicle to transport only own Scheduled E-waste to any authorized collection center / collector / retailer / recycling facility.

b) Proper label to be placed at the back of the vehicle during transportation, which is visible and readable by the road users at the distance of 30m away, with the following wordings (except for personal vehicle of individual generators; and collection vehicles of the Concessionaire companies which are subject to labeling requirements of the JPSPN):

> Please report in case of emergency to:
> Department of Environment HQ: 1-800-88-2727 (24 jam)
> Department of Environment XX State: XXXXXXXXX

c) The Scheduled E-waste shall be placed on the vehicle in an appropriate manner. Avoid overloading at all time and the transported Scheduled E-waste loads shall be fully covered (such as using canvas or plastic sheets) to avoid falling off of the Scheduled E-waste from the vehicle during transportation.

d) The flow or destination of Scheduled E-waste is strictly controlled and shall be transported only to authorized/licensed destinations, including any authorized collection centers, collectors, retailers or any licensed recycling facilities.

e) Any dismantling activity of the Scheduled E-waste is strictly prohibited by the transporter workers.

f) Temporary storage of the Scheduled E-waste is strictly prohibited by the transporter. The transported Scheduled E-waste shall be delivered to the destinations as soon as possible.

g) In the case of falling off of Scheduled E-waste from the vehicle during transportation routes, the transporter company or authorized company / organization shall take immediate action to carry out any necessary clean-up activities under their own costs. A report of the incident shall be made to the DOE immediately.

In addition to the above, the transportation / transfer of Scheduled E-waste is generally also subject to reporting requirements, which is further elaborated in Section 4.4 of the Guideline.

4.4 Reporting Responsibility

The authorized collectors, collection centers, retailers, transporters, recycling facilities and any other relevant stakeholders who are involved in the activities specified in Section 2.1 of the Guideline are also subject to do reporting, following the reporting requirements as stipulated in the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 20XX.

Detailed requirements of reporting responsibilities by different stakeholders shall refer to the Guideline on Reporting Requirements.

4.5 Other Requirements

In addition to the above, some additional requirements from other aspects of the handling of Scheduled E-waste are summarized as follows:

(a) Training of Workers (Subject to DOE decision whether to delete)

The authorized collectors, collection centers, retailers, transporters, recycling facilities and any other relevant stakeholders who are involved in the activities specified in Section 2.1 and 2.2 of the Guideline, shall ensure that all the workers are well trained by a competent personnel in performing the jobs. The competent person shall attend training courses provided by the DOE or endorsed training providers by the DOE on relevant topics from time to time.

(b) Health and Safety

The authorized collectors, collection centers, retailers, transporters, recycling facilities and any other relevant stakeholders who are involved in the activities specified in Section 2.1 and 2.2 of the Guideline, shall ensure that all necessary health and safety measures are taken into consideration in conducting the activities, such as using the personal protective and safety equipment (safety cone, jacket and signboard etc.). All activities carried out shall be in accordance to the requirements, following the Regulations under the Occupational Safety and Health Act 1994 (Act 514).

(c) Emergency Response Plan

The authorized collectors, collection centers, retailers, transporters, Scheduled E-waste recycling facilities and any other relevant stakeholders who are involved in the activities specified in Section 2.1 and 2.2 of the Guideline, shall prepare an Emergency Response Plan (ERP), for the activities carried out. The ERP shall be updated from time to time and made available for inspection by the DOE whenever required.

5.0 AUTHORIZATION / REGISTRATION PROCEDURES (THIS CHAPTER WILL BE SUBJECT TO DOE DECISION ON HOW TO DO THE AUTHORIZATION)

Under the legal framework of the Environmental Quality (Scheduled E-Waste) Regulations 20XX, only authorized stakeholders are legally allowed to deal with Scheduled E-waste, throughout the entire process from generation to final destination whether a recycling facility or disposal site.

5.1 Eligibility

The applicant for authorization or registration is only applicable to company (with registration of ROC), association or society (with registration of ROS) as well as any government agencies (Local, State or Central).

Any individual or sole proprietor, who is interested or involved in the activities of collection, storage, handling and transportation of Scheduled E-waste, shall engage any registered or authorized stakeholders for carrying out the activities.

5.2 Application Procedures

The application for authorization or registration shall undergo the following official procedures:

a) Submit the application Form as attached in the Appendix, addressed to:

   Director-General
   Department of Environment (DOE)
   Level 1, Podium 2 Wisma Sumber Asli,
   Persiaran Perdana, Precint 4,
   62574 Putrajaya

b) Submit supporting documents (refer to Section 5.3) and receipt of processing fee, within 14 days from the submission date of the application form.

c) Submit any additional documents requested by the DOE (if applicable).

d) Pay processing fee as specify in Section 5.4.

e) The applicant shall be notified on the status of application within 14 days from the date of submission of all required documents.

f) Each applicant shall renew the registration / authorization on annual basis, with update of the information if relevant, by using the Form as attached in the Appendix.

5.3 Supporting Documents

The applicant shall submit two copies each of the supporting documents required include:

i. Bank statement for latest 3 months, showing account balance of not less than RM30,000.00, or any proof of "kemudahan kredit" or combination of both not less than RM30,000.00.

ii. Existing contract / agreement or any other documents (e.g. memorandum of understanding (MOU) with licensed facilities receiving Scheduled E-waste (if relevant).

iii. Description of operational plan for storage, handling, collection and transportation of Scheduled E-waste.

iv. Any other permits, licenses, approvals by other relevant authorities such as the permit by the Royal Police of Malaysia (PDRM); licensed by the National Solid Waste Management Department (JPSPN) and Solid Waste and Public Cleansing Management Corporation (SWCorp); approval by the Local Authorities etc.

v. Any additional supporting documents as requested by the DOE (e.g. the proof of the storage capability).

5.4 Fees (Refer to EQA – legal binding)

Each application shall pay processing fee of RM100 (One hundred Ringgit Malaysia) to the DOE.

Each successful applicant registered / authorized by the DOE shall pay RM100 (One hundred Ringgit Malaysia) annual fee, to be renewed on yearly basis.

Both the processing and annual fees are not refundable.

5.5 Deviation of Requirements

All players involved in any activity in dealing with the Scheduled E-waste shall be registered and authorized by the Director-General of the DOE. In case if any deviation of requirements as specified in this Guidelines is applicable, written application shall be made to the Director-General of the DOE for special exemption of approval for deviation of requirements.

6.0 SUMMARY OF THE GUIDELINE

This Guideline focuses particularly all the activities involved in handling, storage, collection and transportation of Scheduled E-waste management from the generation points to the authorized receivers. It is to ensure that the Scheduled E-waste is handled in a manner that is not creating nuisance, leakage and pollution to the environment, and effectively channeled to the licensed facilities for recycling and disposal in an environmentally sound manner.

The roles and responsibilities of all relevant stakeholders are stipulated in this Guideline, which is summarized in the Table as follows:

No	Stakeholders	Summary of Responsibilities
1	Generators	✓ Give / donate / sell / discard complete set or incomplete set of Scheduled E-waste only to authorized collectors or collectors or retailers. ✓ No further dismantling of Scheduled E-waste is allowed. ✓ Be responsible on the Scheduled E-waste generated; make sure it ends up at licensed facilities for proper recycling. ✓ Strictly no channeling of Scheduled E-waste to the informal sectors.
2	Collectors / Collection Centers	✓ Obliged to be registered / authorized by DOE on the collection of Scheduled E-waste. ✓ Notify the public that they are “Authorized” by the DOE. ✓ Inform the public what kind of services offered with regards to Scheduled E-waste collection. ✓ Receive Scheduled E-waste only in complete set or partially complete set (as shown in Section 4.1). ✓ Further dismantling of the Scheduled E-waste is not allowed. ✓ Proper storage of Scheduled E-waste under shade, no exposure to direct sunlight and rainfall. ✓ Separation of lithium batteries and button batteries from the Scheduled E-waste is allowed (if applicable), store the lithium batteries and button batteries separately in containers, at dry cool place; subject to requirements of SW103 under the EQA (Scheduled Waste) Regulations 2005.
3	Retailers	

		✓ Proper labeling at collection / storage areas. ✓ Beware of creating mosquito breeding ground in E-waste storage area. ✓ Deliver the collected Scheduled E-waste only to other authorized premises or licensed recycling facilities / only use authorized transporter. ✓ Fulfill reporting requirement (refer to the requirements in Reporting Guideline). ✓ Fulfill other requirements such as workers competencies (refer to Section 4.5).
4	Transporters	✓ Obliged to be registered / authorized by DOE on the transportation of Scheduled E-waste. ✓ Transport of collected Scheduled E-waste following all the SPAD requirements. ✓ Avoid overload; make sure Scheduled E-waste transported is fully covered. ✓ Temporary storage not allowed. ✓ Further dismantling of the Scheduled E-waste is not allowed. ✓ Proper labeling at the transport vehicle. ✓ Deliver the Scheduled E-waste only to authorized premises or licensed recycling facilities. ✓ Fulfill reporting requirement (refer to the requirements in Reporting Guideline). ✓ Fulfill other requirements such as workers competencies (refer to Section 4.5).
5	Repair shops	✓ Conduct the dismantling activities following general code of practices. ✓ Ensure no release of refrigerants into the atmosphere from the appliances (if applicable). ✓ Collected refrigerant shall be handled in accordance to the EQA (Refrigerant Management) Regulations. ✓ All separated lithium batteries and button batteries shall be stored in containers, at dry cool place; subject to requirements of SW103 under the EQA (Scheduled Waste) Regulations 2005. ✓ Comply with EQA (Scheduled Waste) Regulations 2005 for dismantled parts of E-waste.

		✓ Comply with EQA (Scheduled E-Waste) Regulations 20XX for complete set of Scheduled E-waste. ✓ Proper storage of Scheduled E-waste under shade, no exposure to direct sunlight and rainfall ✓ Beware of creating mosquito breeding ground in E-waste storage area. ✓ Proper labeling at storage areas. ✓ Fulfill reporting requirement (refer to the requirements in Reporting Guideline). ✓ Fulfill other requirements such as workers competencies (refer to Section 4.5).
6	De-installers (Air-cond)	✓ Ensure de-installation of air-conditioner is carried out with no release of refrigerants into the atmosphere. ✓ Collected refrigerant shall be handled in accordance to the EQA (Refrigerant Management) Regulations. ✓ Dismantling of the Scheduled E-waste is not allowed. ✓ Fulfill reporting requirement (refer to the requirements in Reporting Guideline). ✓ Fulfill other requirements such as workers competencies (refer to Section 4.5).
7	Licensed Recycling Facility	✓ Receive Scheduled E-waste only from authorized collection centers / collectors / retailers. ✓ Trading of Scheduled E-waste among different licensed recycling facilities is allowed. ✓ Fulfill reporting requirement (refer to the requirements in Reporting Guideline). ✓ Carry out recycling and disposal of Scheduled E-waste in an environmentally sound manner (refer to the requirements in Recycling Guideline). ✓ Fulfill other requirements such as workers competencies (refer to Section 4.5).

With respective roles and responsibilities played by different stakeholders, this Guideline aims to:

- Avoid improper handling and management of Scheduled E-waste by the informal sectors.
- Prevent adverse impacts to the environmental and human health caused by improper dismantling activities.
  - No release of harmful refrigerants into the atmosphere
  - No inhale of harmful gasses from illegal burning
  - No leakage of contaminants / wastewater
  - No illegal dumping of unwanted residues
  - No injury of workers due to improper dismantling
  - No chronic health impacts to the workers
- Ensure effective resource recovery of Scheduled E-waste by competent / qualified stakeholders.
  - Effective recycling of recyclable materials such as plastics, irons, coppers, zinc etc.
  - Effective recovery of precious metals such as gold, platinum, silver etc.
- Ensure efficient pollution control and proper waste disposal
  - Proper disposal of residues to licensed facilities

Recycle your E-waste Responsibly!!

APPENDICES

APPENDIX A

Form XX – Application for Registration / Authorization for Scheduled E-waste Collection and Transportation

General Information

Applicant name: ____David Lim Ah Beng_____ contact number: __012-3456789____

Company name: ____E-waste Transport Sdn Bhd_____ Co. Reg. No. __1234567-W___

Address: _____No. 123, Jalan Satu Dua Tiga, Taman Empat Lima Enam,_____

_____Taman ABC, 44500 Shah Alam, Selangor _____

Contact: ___03-4567890_ (Tel) __03-4567891_ (Fax) _ewastetransport@gmail.com_ (Email)

Category of business:
- ☐ Retailers / dealers ☐ Collectors / Collection Centers
- ☐ Local government / other government agencies
- ■ Transport / Logistic Company
- ☐ Others (Pls specify: _____)

Application Details:

a) Information on the vehicle to be registered / authorized:

No	Vehicle Type	Capacity (tonnes)	Plate Number
1	Nissan XXX loader	1-tonne	ABC 1234
2	Toyota XXX truck	2-tonne	WEE 2345
3	Tata XXX lorry	5-tonne	WAA 6789
4			
5			

Note: Submit in separate sheet of paper if not sufficient

b) Types of Scheduled E-waste to be collected and transported (Tick more than one if applicable):

No	Types	Tick
1	Washing machine / Dryer	X
2	Television	X
3	Air-conditioner	

No	Types	Tick
4	Refrigerator	X
5	Computer	X
6	Mobile phone	

Note: Only the above 6 categories of Scheduled E-waste are subjected to the Regulations

c) Contract with licensed Scheduled E-waste recycling facility (if available):

No.	Name of Facility	Contract Validity
1	Jaring Metals Industry Sdn Bhd (Shah Alam)	June 2015 – June 2018
2	Meriahtek Sdn Bhd (Melaka)	May 2015 – May 2020
3		

Note: Only the facilities licensed by the DOE are allowed to receive collected Scheduled E-waste

Payment Details:

a) Registration fee: RMXXX.00 per company (First time only)

b) Authorization for vehicle registered: RMXX.00 per vehicle per year

No	Fee types	Total (RM)
1	Company registration	XXX.00
2	Vehicle number - ____3_____ x RMXX.00 per vehicle per year	XX.00
Total Amount Payable (RM)		XXX.00

Remarks:
Please make payment by cheque under the name of "RECYCLING CONTRIBUTION MANAGEMENT BODY" or transfer into the bank account: MAYBANK, 1234-5678-9000 (Please provide transfer reference number for tracking)

Note:

Please provide photocopy (one copy each) of the following documents along with the submission of the Application Form:

- ✓ *Identity Card of the Applicant*
- ✓ *Company Registration Certificate and Form 49*
- ✓ *Vehicles' registration cards*
- ✓ *Contract with the Licensed Scheduled E-waste recycling facility*
- ✓ *Other supporting document (if relevant)*

I, the undersigned, hereby acknowledge that all the information provided above is true, and XXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXXXXXX.

Signature:

_____
Name: David Lim Ah Beng
Position: Managing Director
Company name: E-waste Transport Sdn Bhd (Co. Reg. 1234567-W)

Date: 28th April 2016

APPENDIX B

Form – Application for Renewal of Registration / Authorization for Scheduled E-waste Collection and Transportation

General Information

Applicant name: ____David Lim Ah Beng_____ contact number: __012-3456789____

Company name: ____E-waste Transport Sdn Bhd_____ Company ID. __HHEW001___

Address: _____No. 123, Jalan Satu Dua Tiga, Taman Empat Lima Enam,_____

_____Taman ABC, 44500 Shah Alam, Selangor _____

Contact: ___03-4567890_ (Tel) __03-4567891_ (Fax) _ewastetransport@gmail.com_ (Email)

Category of business:
- ☐ Retailers / dealers ☐ Collectors / Collection Centers
- ☐ Local government / other government agencies
- ■ Transport / Logistic Company
- ☐ Others (Pls specify: _____)

Any registered information to be changed / updated?

☐ YES (Please update below) ■ NO (Proceed to payment details)

Update of Information:

a) Information on the vehicle to be registered / authorized:

No	Vehicle Type	Capacity (tonnes)	Plate Number
1			
2			
3			
4			
5			

Note: Submit in separate sheet of paper if not sufficient

b) Types of Scheduled E-waste to be collected and transported (Tick more than one if applicable):

No	Types	Tick
1	Washing machine / Dryer	
2	Television	
3	Air-conditioner	

No	Types	Tick
4	Refrigerator	
5	Computer	
6	Mobile phone	

Note: Only the above 6 categories of Scheduled E-waste are subjected to the Regulations

c) Contract with licensed Scheduled E-waste recycling facility (if available):

No.	Name of Facility	Contract Validity
1		
2		
3		

Note: Only the facilities licensed by the DOE are allowed to receive collected Scheduled E-waste

Payment Details:

a) Authorization for vehicle registered: RMXX.00 per vehicle per year

No	Fee types	Total (RM)
1	Vehicle number - ____3_____ x RMXX.00 per vehicle per year	XX.00
Total Amount Payable (RM)		XXX.00

Remarks:
Please make payment by cheque under the name of "RECYCLING CONTRIBUTION MANAGEMENT BODY" or transfer into the bank account: MAYBANK, 1234-5678-9000 (Please provide transfer reference number for tracking)

I, the undersigned, hereby acknowledge that all the information provided above is true, and XXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXXXXXX.

Signature:

_____
Name: David Lim Ah Beng
Position: Managing Director
Company name: E-waste Transport Sdn Bhd (ID: HHEW-001)

Date: 28th April 2016

APPENDIX C

Form – Application for Deviation of Requirements for Scheduled E-waste Collection and Transportation

General Information

Applicant name: ____David Lim Ah Beng_____ contact number: __012-3456789____

Company name: ____E-waste Transport Sdn Bhd_____ Company ID. __HHEW001___

Address: _____No. 123, Jalan Satu Dua Tiga, Taman Empat Lima Enam,_____

_____Taman ABC, 44500 Shah Alam, Selangor _____

Contact: ___03-4567890_ (Tel) __03-4567891_ (Fax) _ewastetransport@gmail.com_ (Email)

Category of business:
- ☐ Retailers / dealers ☐ Collectors / Collection Centers
- ☐ Local government / other government agencies
- ■ Transport / Logistic Company
- ☐ Others (Pls specify: _____)

Application Details:

Please elaborate types of deviation needed, justifications and countermeasures to be taken:

No	Deviations	Justifications	Countermeasures
1	Need to carry out dismantling of televisions and computer monitors	Because XXXXXXXXXXXXX	All dismantled parts will be handled in accordance to EQA (Scheduled waste) Regulations. XXXXXXXXXXXXX
2			

3			
4			

Note: Submit in separate sheet of paper if not sufficient

Note:

No deviation of requirement is allowed until written approval is obtained from the Department of Environment (DOE) with specific terns and conditions given, subject to the types of deviations applied.

I, the undersigned, hereby acknowledge that all the information provided above is true, and XXXXXXXXXXX XXXXXXXXXXXXXXXX XXXXXXXXXXXX.

Signature:

_____

Name: David Lim Ah Beng
Position: Managing Director
Company name: E-waste Transport Sdn Bhd (ID: HHEW-001)

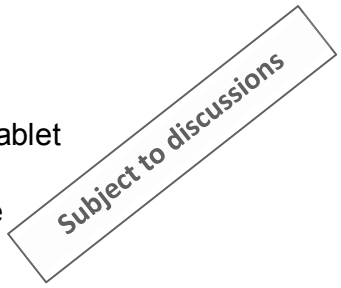
Date: 28th April 2016

APPENDIX D

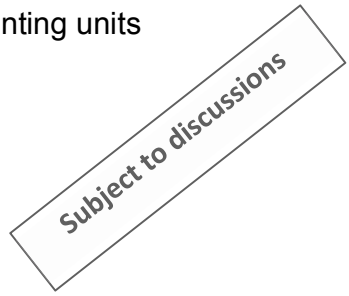
List of Scheduled E-Waste in the First Schedule of the Environmental Quality Act (Scheduled E-Waste) Regulations, 20XX

First Schedule

HSW_100	Electronic and Electrical Equipment *Definitions*
HSW_101	Air-Conditioner *Definitions*
HSW_102	Washing Machine / Cloth Dryer *Definitions*
HSW_103	Refrigerator / Freezer *Definitions*
HSW_104	Television *Definitions*
HSW_105	Computer / Tablet *Definitions*
HSW_106	Mobile Phone *Definitions*

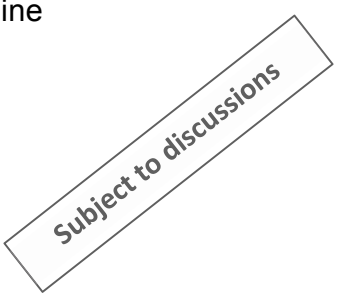


HSW_200	Small Electrical and Electronic Appliances *Definitions*
HSW_201	Printers and other printing units *Definitions*
HSW_202	Vacuum Cleaner *Definitions*
HSW_203	Hair Dryer *Definitions*
HSW_204	Scanners *Definitions*
HSW_205	Video Camera / Digital Camera / Recorder *Definitions*
HSW_206	DVD Player *Definitions*
HSW_207	Portable Music Player *Definitions*
HSW_208	Game Machine



Definitions

HSW_209	Telephone / Fax Machine *Definitions*
HSW_210	Car Navigator / GPS *Definitions*
HSW_211	Radio / Audio players *Definitions*
HSW_212	Rice Cooker *Definitions*
HSW_213	Microwave Oven / other ovens *Definitions*
HSW_214	More to add on *Definitions*



HSW_300	More to be added in the Future *Definitions*
HSW_400	More to be added in the Future *Definitions*
HSW_500	More to be added in the Future *Definitions*

APPENDIX E

List of Authorized Collectors / Transporters / Retailers / Other Collection Points

APPENDIX F

List of Licensed E-waste Full Recovery Facilities Under the Existing EQA (Scheduled Waste) Regulations

1	**CENTURY SURF SDN BHD (PLOT 157A)**	**FACILITI**:
	PLOT 157A, LORONG PERINDUSTRIAN BUKIT MINYAK 7, BUKIT MERTAJAM , PULAU PINANG	Kemudahan Pemerolehan Penuh Luar Tapak
	State: PULAU PINANG	
	Phone:012 4111 882	
	Fax:04 626 6002	
2	**DD WORLD CORPORATION SDN BHD (FOMERLY KNOWN AS QUANTUM REFIN**	**FACILITI**:
	PLOT 75, JALAN PERINDUSTRIAN BUKIT MINYAK TAMAN PERINDUSTRIAN BUKIT MINYAK , BUKIT MERTAJAM , PULAU PINANG	Kemudahan Pemerolehan Penuh Luar Tapak
	State: PULAU PINANG	
	Phone:04-5015577	
	Fax:04-5015575	
3	**EGA RECYCLING SDN. BHD. (FULL RECOVERY) (NSU)**	**FACILITI**:
	LOT 29, JALAN PERMATA 1/1,ARAB MALAYSIAN INDUSTRIAL PARK , NILAI , NEGERI SEMBILAN	Kemudahan Pemerolehan Penuh Luar Tapak
	State: NEGERI SEMBILAN	
	Phone:06-7998229	
	Fax:06-7646425	
4	**KRUBONG RECOVERY SDN. BHD.**	**FACILITI**:
	(2625 & 2630) PT.1671 & PT 1676,KAWASAN PERINDUSTRIAN KRUBONG , MELAKA , MELAKA	Kemudahan Pemerolehan Penuh Luar Tapak
	State: MELAKA	
	Phone:06-3352519	
	Fax:06-3352520	
5	**MERIAHTEK (M) SDN. BHD.**	**FACILITI**:
	NO 1, JALAN TTC 30, LOT 4827, 4828, 4831 & 4832, TAMAN TEKNOLOGI CHENG,MUKIM CHENG , MELAKA , MELAKA	Kemudahan Pemerolehan Penuh Luar Tapak
	State: MELAKA	
	Phone:06 - 3365211	
	Fax:06 - 3365201	
6	**ALH INDUSTRIES SDN BHD (SW110)**	**FACILITI**:
	LOT 7832, 7833, 7834, 7835, JALAN BATU TIGA, BUKIT CHERAKAH , SHAH ALAM , SELANGOR	Pemerolehan Kembali Luar Tapak
	State: SELANGOR	
	Phone:03-78469967	
	Fax:03-78464967	

7	**BENCHMARK VISTA SDN. BHD.(LOT NO. 6,SOLOK SULTAN HISHAMUDDIN**	**FACILITI**:
	LOT NO. 6, SOLOK SULTAN HISHAMUDDIN 7, BANDAR SULTAN SULAIMAN, SELAT KLANG UTARA, , PELABUHAN KELANG , SELANGOR	Pemerolehan Kembali Luar Tapak
	State: SELANGOR	
	Phone:03-31766357	
	Fax:03-31767357	
8	**CHEMALAYA SDN BHD**	**FACILITI**:
	Plo 128 Jalan Rimba 3 Tanjung Langsat Industri Complex , PASIR GUDANG , JOHOR	Pemerolehan Kembali Luar Tapak
	State: JOHOR	
	Phone:07-6522064	
	Fax:07-6522070	
9	**CYCLE TREND INDUSTRIES SDN. BHD. (BUKIT MINYAK)**	**FACILITI**:
	NO. 1001, PLOT 209b, JALAN PERINDUSTRIAN BUKIT MINYAK KAWASAN PERINDUSTRIAN BUKIT MINYAK, , BUKIT MERTAJAM , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-507 8089	
	Fax:04-508 0861	
10	**DNS WASTE MANAGEMENT SDN.BHD.**	**FACILITI**:
	LOT 880, BLOCK 237 KNLD, KOTA SENTOSA INDUSTRIAL PARK, JALAN BATU KITANG 93250 KUCHING , KUCHING , SARAWAK	Pemerolehan Kembali Luar Tapak
	State: SARAWAK	
	Phone:016-8639991	
	Fax:082-687252	
11	**ESTALCO SDN BHD**	**FACILITI**:
	PLO 616 JALAN MIEL 1, JALAN KELULI 9, KAWASAN PERINDUSTRIAN MEIL 4 , PASIR GUDANG , JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:07-2552888	
	Fax:07-2552333	
12	**HI-TECH FULL RECOVERY (M) SDN BHD**	**FACILITI**:
	Lot 4169, No 14, Lorong Perusahaan 3, Kaw Ind. Padang Meha, Kedah , ALOR SETAR , KEDAH	Pemerolehan Kembali Luar Tapak
	State:KEDAH	
	Phone:	
	Fax:04-4853032	

13	**HYDRO METAL (M) SDN BHD**	**FACILITI**:
	PLO 59, JALAN PERAK 1, KAWASAN PERINDUSTRIAN PASIR GUDANG, 81700, PASIR GUDANG , PASIR GUDANG , JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:07-2521896	
	Fax:07-2529882	
14	**Infinity Recovery Sdn. Bhd.**	**FACILITI**:
	NO. 2, JALAN CENDERAI 24,TAMAN PERINDUSTRIAN KOTA PUTERI, MASAI, JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:07-3866080	
	Fax:	
15	**JARING METAL INDUSTRI SB**	**FACILITI**:
	NO 10 JALAN IKS JURU JAYA 14100 SIMPANG AMPAT, SIMPANG AMPAT(P) , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:	
	Fax:	
16	**JARING METAL INDUSTRIES SDN BHD (NO.7, SHAH ALAM SELATAN 2)**	**FACILITI**:
	NO.7, JALAN SUNGAI KAYU ARA 32/37 TAMAN BERJAYA, SEKSYEN 32 , SHAH ALAM , SELANGOR	Pemerolehan Kembali Luar Tapak
	State: SELANGOR	
	Phone:	
	Fax:	
17	**KHT RECYCLE SDN BHD**	**FACILITI**:
	PTD 34286 JALAN WAWASAN 8 KAW. PER. SRI GADING , SERI GADING , JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:	
	Fax:	
18	**KUALITI KITAR ALAM SDN. BHD.**	**FACILITI**:
	LOT H.S. (D) 20487 P.T. 3292 LDG TANAH MERAH A3 DIVISION MK JIMAH , PORT DICKSON , NEGERI SEMBILAN	Pemerolehan Kembali Luar Tapak
	State: NEGERI SEMBILAN	
	Phone: 066662000	
	Fax: 066662010	
19	**LIMA JAYA PAPER TRADING SDN. BHD.**	**FACILITI**:
	NO. 643, JALAN IDAMAN 3/9, TAMAN DESA IDAMAN, , SENAI , JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:	
	Fax:	

20	**MATSUDA SANGYO (MALAYSIA) SDN. BHD.**	**FACILITI**:
	PT 511, LOT 62773 (PLOT B), PERSIARAN HULU SELANGOR, SEKSYEN 26, SHAH ALAM , SELANGOR	Pemerolehan Kembali Luar Tapak
	State: SELANGOR	
	Phone:03-81910162	
21	**METAHUB INDUSTRIES SDN.BHD.**	**FACILITI**:
	LOT 2247 & 2248, JLN SEELONG JAYA 8, SEELONG JAYA, SENAI , JOHOR	Pemerolehan Kembali Luar Tapak
	State: JOHOR	
	Phone:	
	Fax:	
22	**METAL RECOVERY INDUSTRIES SDN BHD (KLANG UTARA)**	**FACILITI**:
	LOT 6251-B, BATU 5 1/2, JALAN KAPAR, KLANG , SELANGOR	Pemerolehan Kembali Luar Tapak
	State: SELANGOR	
	Phone: 03-32906988	
	Fax: 03-32906922	
23	**MING ENGINEERING PLASTIC SDN BHD**	**FACILITI**:
	PLOT 71, LORONG PERINDUSTRIAN BUKIT MINYAK 14, BUKIT MERTAJAM, P. PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone: 04-508 4557	
	Fax: 04-508 6557	
24	**PETROMINE (M) SDN BHD (LOT 25)**	**FACILITI**:
	LOT 300735, NO 25, KAWASAN PERINDUSTRIAN GOPENG, FASA 3, 31600 GOPENG, IPOH, PERAK	Pemerolehan Kembali Luar Tapak
	State: PERAK	
	Phone:	
25	**PREFERENCE MEGACYCLE SDN. BHD. (PLOT 80A)**	**FACILITI**:
	PLOT 80A, LORONG PERINDUSTRIAN BUKIT MINYAK 16 KAWASAN PERINDUSTRIAN BUKIT MINYAK, BUKIT MERTAJAM , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-5086027	
	Fax:04-5076027	
26	**RECLAIMTEK (M) SDN. BHD.**	**FACILITI**:
	PLOT 88A, JALAN PERINDUSTRIAN BUKIT MINYAK KAWASAN PERINDUSTRIAN BUKIT MINYAK , BUKIT MERTAJAM , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-5088571	
	Fax:04-5088577	

27	**SHAN POORNAM METALS SDN. BHD.**	**FACILITI**:
	PLOT 34 (NO. 1479), LORONG PERUSAHAAN MAJU 6 KAWASAN PERUSAHAAN PERAI, FASA 4, PERAI , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-5084841	
	Fax:04-5084843	
28	**SMC TECHNOLOGY SDN BHD**	**FACILITI**:
	PLO 31, JLN PERINDUSTRIAN PONTIAN, PONTIAN, JOHOR	Pemerolehan Kembali Luar Tapak
	State: JOHOR	
	Phone:07-6862088	
	Fax:07-6862066	
29	**SUN SOON YIK RECYCLE PLASTIC & METAL SDN. BHD.**	**FACILITI**:
	LOT 137249 & 137250 HALAL PERUSAHAAN MENGLEMBU 16, IPOH, PERAK	Pemerolehan Kembali Luar Tapak
	State: PERAK	
	Phone:05-2829321	
	Fax:	
30	**SYP RECOVERY & RECYCLING SDN. BHD.**	**FACILITI**:
	LOT 2833-2834, KAWASAN PERINDUSTRIAN BUKIT RAMBAI, MUKIM TANJUNG MINYAK, MELAKA, MELAKA, MELAKA	Pemerolehan Kembali Luar Tapak
	State: MELAKA	
	Phone:06 - 351471	
	Fax:06 - 3515199	
31	**TES-AMM (MALAYSIA) SDN. BHD.**	**FACILITI**:
	NO 2005, TINGKAT PERUSAHAAN 1 KAWASAN PERUSAHAAN PERAI, PERAI , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-3991896	
	Fax:04-3993221	
32	**TWINKLE METAL (M) SDN. BHD.**	**FACILITI**:
	No 1449, Lorong Perusahaan Maju 8, Plot 96, kawasan Perusahaan Prai 4, PERAI, P.PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-5084557	
	Fax:04-5086557	
33	**VICTORY RECOVERY SDN. BHD.**	**FACILITI**:
	LOT 2211, 2212, 2213 & 2214, 2215,2216 JALAN PK 11 KAWASAN PERINDUSTRIAN KRUBONG, KERUBONG , MELAKA	Pemerolehan Kembali Luar Tapak
	State: MELAKA	
	Phone:06 - 3345336	
	Fax:06 - 3344589	

34	**VITA RECYCLE SDN BHD**	**FACILITI**:
	LOT 1227, BLOK 8, DEMAK LAUT INDUSTRIAL PARK, PHASE 11 A, JALAN BAKO, 93050 KUCHING SARAWAK , KUCHING , SARAWAK	Pemerolehan Kembali Luar Tapak
	State: SARAWAK	
	Phone:082-450031	
	Fax:082-573136	
35	**XANTARA SDN BHD (PYDT BT)**	**FACILITI**:
	LOT NO. 3992 & 3993, NO. 21 & 22 LORONG 3/1 KAWASAN PERINDUSTRIAN SENAWANG , SENAWANG , NEGERI SEMBILAN	Pemerolehan Kembali Luar Tapak
	State: NEGERI SEMBILAN	
	Phone:06-6751548	
	Fax:06-6794931	

APPENDIX G

List of Other Partners (E-waste Alam Alliance Partners) (Updated XXXXX)

State	No	Company Name	Address	Contact
PERLIS	1	Iyan Trading Sdn Bhd	Lot 5, Kawasan Perindustrian Mukim Jejawi, 02600 Arau, Perlis.	012-4750210
	2	Senheng Electric (KL) Sdn Bhd	No. 1A, Persiaran Jubli Emas, 01000 Kangar, Perlis.	012 – 611 2440
	3	Suria Jerai Electrical Sdn Bhd	No. 45, 47,49 Jalan Jubli Perak, 01000 Kangar, Perlis.	014 – 629 6747
KEDAH	1	Pen Green Global Trading	Sungai Petani, Kedah Darul Aman	019 – 458 1595
	2	Senheng Electric (KL) Sdn Bhd	2&2A, 3&3A, Pekan Simpang Kuala off Lebuh Raya Sultan Abdul Halim, 05400 Alor Setar, Kedah	012 – 658 1695
	3	Senheng Electric (KL) Sdn Bhd	34, Pekan Jitra 3, 06000 Jitra, Kedah	012 – 404 1044
	4	Senheng Electric (KL) Sdn Bhd	207 & 208, Jalan Legenda 7, Legenda Heights, 08000 Sungai Petani, Kedah	012 – 658 1784
	5	Senheng Electric (KL) Sdn Bhd	Lot No. F10 & F11, First Floor, Tesco Sungai Petani Mutiara No. 368, Jalan Bakar Arang, 08000 Sungai Petani, Kedah	012 – 657 9365
	6	Senheng Electric (KL) Sdn Bhd	Lot No. F1, First Floor, Tesco Mergong, No. 1 Lebuhraya Sultanah Bahiyah, 05100 Alor Setar, Kedah	012 – 493 1404
PENANG	1	MSV Metal (M) Sdn Bhd	No. 3675, Jalan Permatang Pauh, 13400 Butterworth, Penang.	04 – 323 4306
	2	ICT Komtar (Venice Gateway Sdn Bhd)	Unit No. 1B & 1D, 1.01-4.01, Komtar, Jalan Penang, 10000 Penang	04 – 250 8662
	3	Northern Electronics Services	Blok A-G-08, Lebuh Nangka 1, Taman Desa Damai, 14000 Bukit Mertajam, Penang	019 – 412 3392
	4	Ex Tech Enterprise	146, 4th Floor, Bukit Jambul Complex, Jalan Rumbia 11900 Bayan Lepas, Penang	04 – 643 5312
	5	Yayasan Humanistik	No. 58, Lorong Tambun Indah 10, Taman Tambun Indah, 14100 Simpang Ampat, Penang.	016 – 543 6077
	6	Senheng Electric (KL) Sdn Bhd (SenQ)	S23 Second Floor, Sunway Carnival Mall, 3068, Jalan Todak, Pusat Bandar, 13700 Seberang Jaya, Penang	04 – 390 0040
	7	Senheng Electric (KL) Sdn Bhd	No. 112, 114, 116 Jalan Raja Uda, Pusat Perniagaan Raja Uda, 12300 Butterworth, Penang.	04 – 323 5040

PENANG	8	Senheng Electric (KL) Sdn Bhd	Tesco Bukit Mertajam Jalan Rozhan, Pusat Perniagaan Seri Impian, Bukit Mertajam, Penang.	012 – 658 1596
	9	Senheng Electric (KL) Sdn Bhd	Fortune Court, 288 B-1-10 & 11 Ground Floor, Jalan Thean Teik, Farlim, 11500 Penang.	04 – 829 4140
	10	Senheng Electric (KL) Sdn Bhd (SenQ)	Gurney Plaza, 170-07-08, Plaza Gurney, Persiaran Gurney, 10250 Penang.	04 – 229 4040
	11	Senheng Electric (KL) Sdn Bhd (SenQ)	Queensbay Mall 2F-07, second Floor, Queensbay Mall 100, Persiaran Bayan Indah, Sungai Nibong, 11900 Bayan Lepas, Penang.	04 – 641 1052
	12	Senheng Electric (KL) Sdn Bhd	Tesco Tg Pinang Lot No. F4, F5 & F6, 1st Floor, Kawasan Tebusguna Bandar Tg Pinang, Jalan Tg Tokong, Jalan Seri Tg Pinang, Daerah Timur Laut, 10470 Penang.	04 – 890 4370
	13	Senheng Electric (KL) Sdn Bhd	Bukit Jambul No. 12J, 12K & 12L, Jalan Tun Dr. Awang G27, Bukit Jambul, 11900 Penang.	04 – 646 3040
	14	Pusat Pengumpulan Kitar Semula	No. 7, Tingkat Binjai 20, Taman sri Rambai, 14000 Bukit Mertajam	012-4857789
PERAK	1	Enviro Metal Sdn Bhd	No. 85, Pt 38902, Hala Perusahaan Menglembu 15, Kawasan Perindustrian Menglembu, 31450 Ipoh, Perak	05 – 282 6003
	2	Senheng Electric (KL) Sdn Bhd	No. 9 & 9A, 11 & 11A, 13 & 13A, Jalan Pengkalan Utama 1, Taman Pengkalan Utama 31650 Ipoh, Perak	012 – 484 9440
	3	Senheng Electric (KL) Sdn Bhd	431 & 432, Jalan Silibin, Taman Seri Tahan, 30100 Ipoh, Perak	012 – 658 1482
	4	Senheng Electric (KL) Sdn Bhd	No. 505 – 507, Jalan Pasir Puteh, Pasir Puteh, 31650 Ipoh, Perak	012 – 657 9034
	5	Senheng Electric (KL) Sdn Bhd	40 – 42, Lebuh Medan Ipoh, Bandar Baru Medan Ipoh, 31400 Ipoh, Perak	012 – 658 1649
	6	Senheng Electric (KL) Sdn Bhd	No. 1-3, Jalan Medan Taiping, Medan Taiping, 34000 Perak	012 – 658 1624
	7	Senheng Electric (KL) Sdn Bhd	No. 13,15,17,19 Ground Floor, Jalan Kamunting, 34600 Taiping, Perak	012 – 658 8635
	8	Senheng Electric (KL) Sdn Bhd	No. 11A, 15, Jalan Keli, Taman Damai, 34200 Parit Buntar, Perak	012 – 657 9602
SELANGOR	1	Shan Poornam Metals (Selangor) Sdn Bhd	No. 1, Jalan Pendamar 27/90, Seksyen 27, Shaha Alam, 40400 Shah Alam, Selangor	012 – 483 9211
	2	Tan Boon Ming Sdn Bhd	Shah Alam No. 37 & 39, Jalan Mewah 25/63, Taman Sri Muda, 40400 Shah Alam, Selangor	03 – 5121 4122

	3	Senheng Electric (KL) Sdn Bhd	Sri Kembangan No.7, Jalan 7/3A, Kawasan Perindustrian Seri Kembangan, 43000 Serdang, Selangor	012 – 658 2654
	4	Senheng Electric (KL) Sdn Bhd	Shah Alam No. 2A-Jalan 31/54, Kota Kemuning, 40460 Shah Alam	012 – 658 2749
	5	Senheng Electric (KL) Sdn Bhd	Batu Caves No. 10, Jalan Industri Batu Caves 1/1, Taman Perindustrian Batu Caves, 68100 Batu Caves	012 – 703 1440
	6	Senheng Electric (KL) Sdn Bhd	No. 105, Jalan Pelabur B 23/B, Section 23, 40300 Shah Alam, Selangor	012 – 658 0697
	7	Senheng Electric (KL) Sdn Bhd	21, Jalan USJ 10/1F, 47620 UEP Subang Jaya,Selangor	012 – 658 1450
	8	Senheng Electric (KL) Sdn Bhd	1012 & 1014, Jalan Meru, 41050 Klang, Selangor	012 – 658 0957
	9	Senheng Electric (KL) Sdn Bhd	No. 39-G, 39-I, 40-G & 40-I, Jalan Nautika U20/A, Sekyen U20, Pusat Komersil TSB, 40160 Shah Alam, Selangor	012 – 695 4840
	10	Senheng Electric (KL) Sdn Bhd	127, 129 Jalan Sultan Abdul Samad, 42700 Banting, Selangor	012 – 658 0961
	11	Senheng Electric (KL) Sdn Bhd	No. 9 & 11, Jalan SBBC 3, Sungai Besar, Business Centre, 45300 Sungai Besar, Selangor	012 – 337 3440
	12	Senheng Electric (KL) Sdn Bhd	Lot No. F36, F37, F38 & F39, Giant Hypermarket Bandar Kinrara Lot 449, Jalan BK 5A/1, Bandar Kinrara, 47100 Puchong, Selangor	012 – 268 1040
	13	Senheng Electric (KL) Sdn Bhd	Lot F.08, 1st Floor Selayang Mall Shopping Centre, Jalan S U 9, Taman Selayang Utama, 68100 Batu Caves, Selangor	03 – 9285 4544
	14	Senheng Electric (KL) Sdn Bhd	Lot No LG 25A, Lower Ground Floor, Alamanda Putrajaya Shopping Centre, Jalan Alamanda, Precinct 1, 62000 Putrajaya	012 – 657 9745
SELANGOR	15	Senheng Electric (KL) Sdn Bhd	No. 53, 55 & 57, Jalan Bandar Rawang 2, 48000 Rawang, Selangor Darul Ehsan	012 – 658 1264
	16	Senheng Electric (KL) Sdn Bhd	7G & 8G, Plaza Citra, Jalan Citra, Kajang, 43000 Kajang	012 – 657 9721
	17	Senheng Electric (KL) Sdn Bhd	Lot 465 & 493, Mukim of Cheras, Jalan Balokong, 43200 Batu 11 Cheras, Selangor	03 – 9285 4555
	18	Senheng Electric (KL) Sdn Bhd	35 & 36G, Jalan Medan PB4, Seksyen 9 Pusat Bandar Baru Bangi, 43650 Selangor	012 – 631 1040
	19	Senheng Electric (KL) Sdn Bhd	F14 & F15 Giant Hypermarket, Kelana Jaya Jalan SS6/12, 47301 Petaling Jaya.	012 – 658 0854
	20	Senheng Electric (KL) Sdn Bhd	Lot 3F-18A, 3F-23A and F-25, 3rd Floor SACC Mall, Precint 1.1 & Precint 1.2, Jalan Perbadanan 14/9, Seksyen 14, 40000 Shah Alam.	012 – 658 1094

	21	Senheng Electric (KL) Sdn Bhd	Lot F23-23A, IOI Mall, Batu 9, Jalan Puchong, Bandar Puchong Jaya, 47100 Selangor	012 – 658 0715
	22	Senheng Electric (KL) Sdn Bhd	No 29C, 29D, 29E, Jalan Dinar G U3/G, Taman Subang Perdana, Seksyen U3, 41050 Shah Alam, Selangor	012 – 694 2440
KL	1	Tan Boon Ming Sdn Bhd	Jalan Klang Lama PS-1, Taman Evergreen,Batu 4, Jalan Klang Lama,58100 Kuala Lumpur	03 – 7983 2020
	2	Tan Boon Ming Sdn Bhd	Bangsar Village Unit No. LG-6, Lower Ground Floor, Jalan Telawi Satu, Bangsar Baru, 59100 Kuala Lumpur	03 – 2287 4818 /4819
	3	Tan Boon Ming Sdn Bhd	Cheras Furniture City Lot No. 51449, Block A1 & A2, Batu 5/12, Jalan Cheras, 56100 Kuala Lumpur	03 – 9132 1975
	4	Tan Boon Ming Sdn Bhd	KL Festival City Lot No. F-27, First Floor, Jalan Taman Ibu Kota, Taman Danau Kota, Setapak , 53300 K. Lumpur	03 – 4131 6263
	5	Senheng Electric (KL) Sdn Bhd	Lot L2-7, Level 2, Cheras Leisure Mall, Jalan Manis 6, Taman Segar Cheras, 56100 Kuala Lumpur	012 – 658 0734
	6	Senheng Electric (KL) Sdn Bhd	Lot No. F1, F2, F3, First Floor, Hartamas Shopping Centre 60, Jalan Sri Hartamas 1, Sri Hartamas, 50480 Kuala Lumpur	012 – 657 9350
	7	Senheng Electric (KL) Sdn Bhd	40 & 40-1, 42&42-1, Block C, Vista Magna, Batu 7, Jln Kepong, Kepong, 52100 Kuala Lumpur	012 – 658 0794
KL	8	Senheng Electric (KL) Sdn Bhd	LG 8, Parkson Grand, The Mall, 100 Putra Place, Jalan Putra, 50350 Kuala Lumpur	012 – 658 0287
	9	Senheng Electric (KL) Sdn Bhd	36-38, Jalan Pandan 2/1, Pandan Jaya, 55100 Cheras, Kuala Lumpur	012 – 658 0197
	10	Senheng Electric (KL) Sdn Bhd	171 & 173, Jalan Sarjana, Taman Connaught, off Jalan Cheras, 56000 Kuala Lumpur	012 – 658 0276
	11	Senheng Electric (KL) Sdn Bhd	Lot F49 & F50, First Floor, AEON AU2 Shopping Centre No.6, Jalan Taman Setiawan (Jln 37/56), AU2 Taman Keramat, 54200 Kuala Lumpur	012 – 618 5440
	12	Senheng Electric (KL) Sdn Bhd	Diamond Square No. 15 & 17, Jalan 2/50, Jalan Gombak, BT 3 1/2 Setapak, 53000 Kuala Lumpur	012 – 658 0542
	13	Senheng Electric (KL) Sdn Bhd	55 & 57, Jalan Radin Bagus, Sri Petaling, 57000 Kuala Lumpur	012 – 658 1462
	14	Senheng Electric (KL) Sdn Bhd	61-63, Jalan 46A/26, Rampai Town Centre, 53300 K. Lumpur	012 – 658 0571
	15	Senheng Electric (KL) Sdn Bhd	No. 15-0 & 13A-0 (Ground Floor), Platinum Walk, No. 2, Jalan Langkawi, Setapak, 53000 Lake City, KL	012 – 659 4404

MELAKA	1	Senheng Electric (KL) Sdn Bhd	NO 105-107 Jalan PM2, Taman Perindustrian Merdeka, Batu Berendam 75350 Melaka	012 – 658 3251
	2	Senheng Electric (KL) Sdn Bhd	16-18, Jalan Seri Mangga 1/2, Taman Seri Mangga, 75250 Melaka	012 – 657 9457
	3	Senheng Electric (KL) Sdn Bhd	No. 43, 43-1 & 43-2, Jalan BBP 1, Taman Bt Berendam Putra, 75350 Melaka	012 – 657 9465
	4	Senheng Electric (KL) Sdn Bhd	No. G-3 & 1-3, (PT7711, 7712 & 7713), Mukim Cheng, Jalan Cheng Perdana 1/1, Taman Desa Cheng Perdana 1, Cheng, 75250 Melaka	012 – 657 9325
JOHOR	1	Shan Poornam Metals (Johor) Sdn Bhd	No. 39, Jalan Murni 4, Taman Perindustrian Murni Senai, 81400 Senai, Johor	07 – 590 9863
	2	Green Future Enterprise	No.6, Jalan Keembong 27, Taman Johor Jaya, 81100 Johor Bahru	
	3	DST Solution Sdn Bhd	L3-35, 36, 37, Level 3 Danga City Mall , Jalan Tun Razak, 80000 Johor Bahru	07-221 0976
	4	Senheng Electric (KL) Sdn Bhd	LOT AT09, Giant Hypermarket, Jalan Masai Lama, Plentong, 81750 Johor Baru, Johor	017-7978977
	5	Senheng Electric (KL) Sdn Bhd	L2-036 Sutera Mall, No. 1 Jalan Sutera Tanjung 8/4, Taman Sutera Utama, 81300 Skudai, Johor Bahru.	012 – 728 8404
JOHOR	6	Senheng Electric (KL) Sdn Bhd	No. 63, 64, 65, Jalan Sejambak 14, Taman Bukit Dahlia, 81750 Pasir Gudang, Johor	012 – 524 0409
	7	Senheng Electric (KL) Sdn Bhd	No. 1, Jalan Sultan, 86000 Kluang, Johor	012 – 657 9654
	8	Senheng Electric (KL) Sdn Bhd	No. 16, 16A, 18,18A, 20, 20A, Jalan Setia 7/18, Taman Setia Indah, 81100 Johor Bahru	012 – 658 8171
	9	Senheng Electric (KL) Sdn Bhd	Lot No. M21 & M22, Tesco Kulai, No. 52 Taman Desamas, Batu 22½ Jalan Kulai – Air Hitam, 81000 Kulai, Johor	012 – 740 2440
	10	Senheng Electric (KL) Sdn Bhd	No. 12 (Ground Floor) & No. 13 (Ground & First Floor), Jalan Susur 2/1 Taman Utama, Bandar Baru, 85000 Segamat, Johor	012 – 681 6040
	11	Senheng Electric (KL) Sdn Bhd	Lot F01, First Floor, Jusco Tebrau City Shopping Centre, No. 1, Jalan desa Tebrau, Taman Desa Tebrau, 81100 Johor Bahru	012 – 657 9415
	12	Senheng Electric (KL) Sdn Bhd	Lot No. 1.61, First Floor, 303B, Jalan Kluang, 83000 Batu Pahat, Johor	012 – 658 3462
PAHANG	1	Senheng Electric (KL) Sdn Bhd	No. 90, 91 & 92, Jalan Tengku Ismail, 28000 Temerloh, Pahang	012 – 658 2415
	2	Senheng Electric (KL) Sdn Bhd	S-19, S-20 & S-21 (Tgkt Bawah), & C-21 (Tgkt Atas), Jalan Benom, Bandar Baru, Jerantut, Pahang.	012 – 658 2495

	3	Senheng Electric (KL) Sdn Bhd	B102, B104, B106, B108, Jalan Tun Ismail, Sri Dagangan Kuantan, 25000 Kuanatan	012 – 658 2395
	4	Senheng Electric (KL) Sdn Bhd	Ground Floor B897, 899, 901, Jalan Bukit Ubi, 25000 Kuantan	012 – 981 0443
	5	Senheng Electric (KL) Sdn Bhd	No. 34, Jalan 1M 3/3, Mahkota Industrial Park, Bandar Baru Indera Mahkota, 25200 Kuantan	012 – 658 3076
NEGERI SEMBILAN	1	Senheng Electric (KL) Sdn Bhd	1F-29-30, 1st Floor Seremban Palm Mall, Jalan Toman 1, Kemayan Square, 70200 Seremban, Negeri Sembilan	06 – 765 6322
	2	Senheng Electric (KL) Sdn Bhd	F21 &F22, Tesco Seremban 2, PT2374, Pekan Bukit Kepayang, Daerah Seremban, 70300 Negeri Sembilan	012 – 657 7885
	3	Senheng Electric (KL) Sdn Bhd	1st Floor 31, Jusco Seremban 2 Shopping Centre, 112 Persiaran S2 B1 Seremban 2, 70300 Seremban	012 – 657 9516
	4	Senheng Electric (KL) Sdn Bhd	Lot 12176 & 12177, Jalan BBN 1/1F, Putra Point, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan	012 – 658 2591
TERENGGANU	1	Senheng Electric (KL) Sdn Bhd	1049-I, G/Floor, Wisma Ladang, Jalan Sultan Sulaiman, 20000 Kuala Terengganu	012 – 658 2534
	2	Senheng Electric (KL) Sdn Bhd	Lot-9941/9942 Sura Gat, Business Centre, Jalan Yahaya Ahmad, 23000 Dungun, Terengganu	012 – 658 2514
	3	Senheng Electric (KL) Sdn Bhd	PT 11268 (G), Tingkat 1129 (G), Tingkat 1 & 2, Taman Cukai Utama, Jalan Kubang Kurus, 24000 Kemaman, Terengganu	012 – 658 2436
KELANTAN	1	Senheng Electric (KL) Sdn Bhd	1857-8, Paya Bemban, Jalan Hospital, 15400 Kota Bahru, Kelantan	012 – 981 2440
	2	Senheng Electric (KL) Sdn Bhd	Lot 678, Jalan Kampung Teluk Panji, 16100 Kota Bahru, Kelantan	012 – 981 2440
	3	Senheng Electric (KL) Sdn Bhd	L/341, T/B Kedai Jalan Padang Garong, Bnagunan MBSB, 15000 Kota Bahru, Kelantan	
	4	Senheng Electric (KL) Sdn Bhd	Lot 243, Jalan Hospital, 17500 Tanah Merah, Kelantan	012 – 658 0291
	5	Senheng Electric (KL) Sdn Bhd	PT1607 & PT 1608 (Ground Floor), Jalan KK 6, Bandar Baru Kubang Kerian, 16150 Kota Bharu, Kelantan	012 – 985 7440
	6	Senheng Electric (KL) Sdn Bhd	Lot 41A & 1.61A, 1st Floor, 1-888 KB Mall Jalan Hamzah, 15050 Kota Bharu, Kelantan	012 – 658 2584

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添付資料３

家庭系 E-waste のレポーティング･ガイドライン

GUIDELINE

Reporting for Management of Scheduled E-wastes in Malaysia

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Guideline

Reporting for Management of Scheduled E-wastes in Malaysia

1.0 INTRODUCTION

Electrical and electronic waste (commonly known as E-waste), is growing exponentially worldwide because of tremendous growth of demands on the use of electrical and electronic equipment. The disposal of E-waste is of big concern discussed at international arena, because of the nature of hazardousness of the waste and drastically increased volume of disposal in a globalized world.

Note:

"E-waste" referred to SW110 as stipulated in the First Schedule of EQ (Scheduled Waste) Regulations 2005.

"Electrical and electronic equipment "means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in First Schedule of the regulations;

Improper handling of E-waste poses high risk of pollution, health impacts and causes incidents of illegal disposal. The lack of proper environmental precaution measures in E-waste management could cause enormous environmental issues such as release of chlorofluorocarbon (CFC) gases that cause ozone depletion, global warming and contaminations from other hazardous/toxic substances.

In Malaysia, E-waste is generally divided into two main types by generation sources, i.e. E-waste generated from the industrial sectors, and E-waste generated from the non-industrial sectors, mainly households, commercial and institutional entities.

E-waste from industrial sector is categorized as Scheduled Wastes under the Code SW110, First Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005. The categories of E-waste defined under this coding are only covering E-waste generated from the industrial sectors, including electrical and electronic industries, as well as other industrial generators.

The management of E-waste generated from non-industrial sectors, especially household and other entities such as commercial and institutional is now regulated under a newly enacted regulation known as the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulation 20XX, which defines scheduled E-wastes under Code HSW, including HSW100, which is specifically for targeted categories of scheduled E-waste.

Note:

"Scheduled electrical and electronic equipment waste" or "Scheduled E-waste" means discarded electrical and electronic equipment falling within the categories of waste in the first schedule, which are generated from household, commercial, industrial, institutional entities, and any other sources;

Scheduled E-waste requires a different management system as compared to the E-waste generated from the industrial sector, particularly from the financial perspective where significant costs are required for collection and transportation of the Scheduled E-waste, as well as to comply with the proper environmental precaution standards. Therefore, Scheduled E-waste shall only be processed or treated by specific scheduled E-waste recycling facilities, which are licensed by the DOE.

This Guideline shall be read together with the Environmental Quality (Scheduled E-Waste) Regulations 20XX.

2.0 ABOUT THE GUIDELINE

Under the framework of the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 20XX, it is emphasized that all the scheduled E-waste shall be channeled, collected and delivered through a formal or authorized flow of stakeholders to the final destination of proper treatment, and recycling with environmentally sound system. Each respective stakeholder has their roles and responsibilities, and the costs involved for the entire system shall be shared among all the stakeholders.

This Guideline provide list of reporting requirements for the users, who are directly involved in specific activities dealing with electrical and electronic equipment and the Scheduled E-waste. It is aimed to provide guidance to the players for effective compliance of the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 20XX.

The main categories of Scheduled E-waste covered under this Guideline are the list of E-waste under the First Schedule of the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 20XX include (a) cloth washing / drying machine, (b) refrigerator / freezer / chiller, (c) air-conditioner, (d) computer, (e) television and (f) mobile phone / tablet PC. In

a long run, it also includes other Scheduled E-wastes such as E-waste of small appliances (e.g. CD players, hair dryers, microwave ovens, etc.)

The users of this guideline shall always refer to the Environmental Quality (Scheduled Electrical and Electronic Equipment Waste) Regulations 20XX as the main document of this Guideline to ensure complete understanding of the entire requirements under the regulations, as well as the clauses of the Environmental Quality Act (1974) as the Mother Act.

Detailed elaborations on the types of activities that are subject to this Guideline are explained in Section 2.1 below, while Section 2.2 elaborates the definitions and categories of respective players subject to the requirements stipulated in this Guideline.

2.1 Scope of the Guideline

This Guideline shall apply to all players of activities as described below, whether it is an individual person, company, organization or any other entities:

Activities	Descriptions
Manufacturing / Importing of EEEs	• Manufacturing of Electric and Electronic Equipment (EEE), which falls within 2.3 Categories of Targeted Scheduled E-wastes at the end of its life. • Importing of EEE, which falls within 2.3 Categories of Targeted Scheduled E-wastes at the end of its life, also includes Internet sales and on-line business from oversea.
Putting on the market of EEEs	• Putting on the market of new EEE, which falls within 2.3 Categories of Targeted Scheduled E-wastes at the end of its life.
Collecting / donating / buying / selling	• Donating / giving away, discarding and selling Scheduled E-waste by any generators from households, commercial, institutional and any other sources to another party who receives, buys or collects for specific purposes. • Buying Scheduled E-waste from any generators from households, commercial and institutional sources at prices agreed upon both the buyer and generator/seller. • Receiving / collecting Scheduled E-waste from any generators from households, commercial and institutional sources for free without any payment involved. • Selling Scheduled E-waste received / collected / purchased from any generators from households, commercial and institutional sources, to another

	buyers for specific purposes.
Temporary storage	• Temporary storage of Scheduled E-waste generated / received / collected / purchased from any generators from households, commercial, institutional or any other sources.
Handling activities	• Any handling activity on Scheduled E-waste generated / received / collected / purchased from any generators before the subsequent activities or destinations, such as segregation, dismantling or cleaning etc. • Activities of de-installation of Scheduled E-waste particularly air-conditioners that contain refrigerants and refrigerant oils. • Handling activity excludes repairing processes by repair shops of electrical and electronic appliances received from the customers. Nevertheless, Scheduled E-waste generated from any repair shop shall be subject to the requirements of this Guideline.
Transportation / transfer	• Transporting or transferring of E-waste generated / received / collected / purchased from any generators to the next destinations, such as another buyer or receiving point, recycling or disposal facilities.
Recycling of Scheduled E-wastes	• Sorting, segregation and dismantling according to the Environment Quality (Scheduled E-wastes) Regulations. • Recovery facility shall treat hazardous materials in environmentally sound manner.
Final disposal	• Final disposal of residues generated from recycling process.

In general, the scope of this Guideline cover the entire activity flow of the Scheduled E-waste from collection and transportation till recycling or disposal activities. In addition, the scope of this Guideline also covers manufacturing and sales activities of Electric and Electronic Equipment for fee reporting purpose.

2.2 Descriptions of Stakeholders

The users of this Guideline are expected to be all relevant stakeholders who are involved in the activities elaborated within the Guidelines scope boundary, generally the approved collectors, scheduled E-waste recycling facilities, as well as manufacturers/importers who reports the Put-on-market volume of Electric and Electronic Equipment for the fee reporting.

Descriptions of different categories of stakeholders who are commonly involved in the activities subject to this Guideline are listed but not limited to the following:

Player Categories		**Descriptions**
Manufacturers		Manufacturers of targeted Electric and Electronic Equipment, who pay Recycling Fee to the Fund management Body.
Importers		Importers of targeted Electric and Electronic Equipment, who pay Recycling Fee to the Fund management Body.
Approved Collectors	*Concessionaire companies*	Waste management companies awarded concessionaires by the National Solid Waste Management Department (JPSPN) or sub-contractors, for collection of household solid waste, including Scheduled E-waste collection on specific schedule at selected States in the country.
	Local Authorities / other government agencies	Local governments, any other government agencies and their sub-contractors who possibly operate collection centers to collect recyclable materials, including Scheduled E-waste, as well as collection campaigns organized on *ad hoc* basis.
	Institutions / universities / collages / schools	Universities, colleges, schools, hospitals and any other public or private institutions that carry out collection of Scheduled E-waste.
	Private companies (contractors, recyclable buyers, traders, middlemen etc.)	Private recyclers or buyers who are buying recyclable materials including Scheduled E-waste from any sellers. The activities are market-driven, profit-oriented and it could involve several levels of transactions from smaller to larger scale stakeholders.
	Non-Governmental Organizations (NGO)	Registered organizations that operate collection centers to collect recyclable materials, including Scheduled E-waste, as well as carry out collection campaigns on *ad hoc* basis normally at community levels, for fund raising or charity purpose.
	Charity Organizations / Non-profit Organizations (NPO)	
	Charity Organizations	

Authorized Retailers	*Retailers*	Any retailer whether individual shop, franchise companies, brand dealers / distributors or department stores in malls that are selling new electrical and electronic appliances to the consumers, and collect Scheduled E-waste from the consumer premises, or brought in to the retailer premises.
	Brand dealers / distributors	
	Hypermarkets / malls	
Repair / Secondhand Shops	*Repair shops*	Shops that are carrying out business to repair or refurbish damaged electrical and electronic appliances. Appliances that are non-repairable and becomes Scheduled E-waste are subject to the requirements of the Guideline.
	Secondhand shops	Shops that are playing same roles as retailers but selling used electrical and electronic appliances for the consumers.
Licensed Recycling Facility	*Scheduled E-waste Recycling Facility*	Facilities that are licensed by the DOE to specifically receive Scheduled E-waste from authorized sources, and carry out recycling process of Scheduled E-waste.
Others	*Installer / de-installer*	Individuals or companies that are offering services to maintain, service, install and de-install of electrical and electronic appliances. De-installation is commonly applicable for air-conditioner in particular.
	Maintenance / service companies	

2.3 Categories of Targeted Scheduled E-waste

The target categories of Scheduled E-waste subject to this Guideline are basically the 6 main categories of E-waste specified in the First Schedule of the Environmental Quality (Scheduled E-Waste) Regulations 20XX, excluding the small appliances, fluorescent lamps and rechargeable batteries. The 6 main categories of Scheduled E-waste are listed as follows with the sub-categories:

No	Categories	Sub-categories
1	Televisions	CRT Televisions 
		Flat Televisions (Plasma, LCD, LED) 
2	Air-conditioners	Window Units 
		Split units Ceiling Unit 
		Mobile units 

3	Computers	LCD Desktop CRT Desktop 
		Laptop 
4	Refrigerators	Refrigerators 
		Freezers 
		Chillers 

5	Washing / Dryer machines	Washing machines 
		Cloth Dryers 
6	Mobile phones and Tablet PCs	Mobile phones 
		Tablet PCs 

3.0 THE LEGAL FRAMEWORKS OF SCHEDULE E-WASTE MANAGEMENT

Scheduled E-waste management is regulated under the Environmental Quality (Scheduled E-Waste) Regulations 20XX, which emphasizes the concept of "shared responsibilities" among the stakeholders, with implementation of the principle of Extended Producer's Responsibility (EPR).

The principle of EPR is the main feature of E-waste management framework in Malaysia, wherein the producers of electrical and electronic appliances have the responsibility to ensure proper management of the E-waste after the 'end of life' of the products. Under the EPR, producers are also entrusted with the responsibility to finance and organize a system to meet the costs involved in overall management of the E-waste in an environmentally sound manner.

In general, the entire legal framework of the Scheduled E-waste management is confined to 3 main flows, which are summarized below:

E-waste Flow	Determines the right channel of Scheduled E-waste is collected from generation points to authorized collection centers, collectors, retailers, and finally the Scheduled E-waste recycling facilities or final disposal. Proper E-waste flow prohibits the Scheduled E-waste to enter into informal sectors, by authorizing only the formal collection channels within the formal system boundary.
Fee Flow	Determines how the recycling fee (known as contribution under the EQA) is collected and channeled to a fund management entity (known as Recycling Contribution Management Body - RCMB), for various purposes of disbursements to ensure functionality of the entire system. Proper fee flow ensures the overall costs required for proper management of Scheduled E-waste is secured and shared among the stakeholders.
Reporting Flow	Determines the information / data flow through proper reporting by relevant stakeholders, with the use of manifest forms. Proper reporting flow avoids leaking of E-waste into the informal sectors, and ensures that proper data is captured for determination of total recycling fee to be received by relevant stakeholders. Proper data management is also crucial for future planning and improvement of the system in a long run.

Detailed elaborations of the regulatory framework of Scheduled E-waste management by each of the 3 main flows are described in the following sections.

3.1 Scheduled E-waste Flow

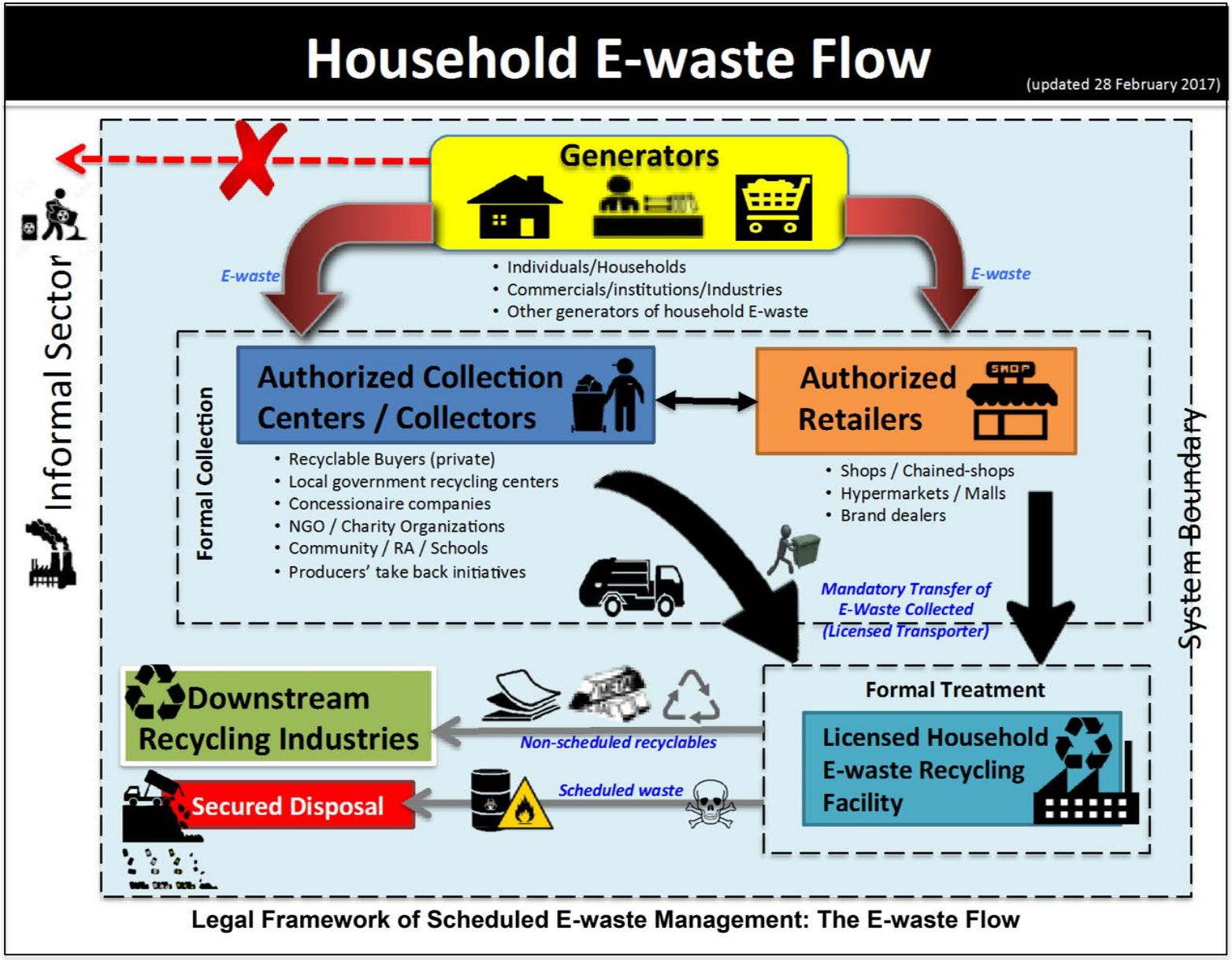
The generators for Scheduled E-waste cover not only limited to households, but also any other entities such as commercial, institutions and industries that use the same categories of electrical and electronic appliances. Examples of non-household generators include offices, commercial shops, malls, universities, schools, industries and any other generation sources, as long as the categories of targeted Scheduled E-waste specified in Section 2.3 are generated.

Under the new framework of the regulations, all generators of Scheduled E-waste are required to discharge their Scheduled E-waste to the authorized receiving points by the DOE as formal collection channels, which could be a retailer shop, recycling center, NGO or charity collection, concessionaire company or local government collection, or any other authorized premises. The Scheduled E-waste can be sold, donated, given or discarded with or without monetary incentives subject to the market demands. Any flow of Scheduled E-waste from generators to un-authorized receiving points is illegal and prohibited.

The collected Scheduled E-waste by the authorized collection points will be channeled to Scheduled E-waste recycling facility licensed by the DOE, to ensure proper treatment and recycling of the Scheduled E-waste in an environmentally sound manner. In case where the authorized collection points are not able to channel the collected Scheduled E-waste directly to the licensed facility due to logistic or any other factors such as small retailers, the collected Scheduled E-waste shall be delivered to another authorized collection point that has capability to channel the E-waste in a larger quantity.

The licensed Scheduled E-waste recycling facility is strictly prohibited from receiving Scheduled E-waste from any unauthorized sources. These licensed facilities shall fulfill the technical and legal requirements set by the DOE to efficiently process the Scheduled E-waste received (Refer to Recycling Guideline), in which the recyclable materials be sold to downstream recyclers, precious materials be recovered and residue waste be disposed of to licensed scheduled waste disposal facility either for secure landfill or other treatment.

Under the regulatory framework, the Scheduled E-waste is expected to flow from the generation points into proper recycling system within the system boundary. The generators shall understand and be responsible for the entire flow of the Scheduled E-waste that they have generated, to ensure that the Scheduled E-waste is collected or purchased or received by only authorized collection points including retailers, and channeled to license facility for proper recycling. Any outflow of Scheduled E-waste from the regulated system boundary to informal sectors will be considered illegal and should be strictly prohibited.



Legal Framework of Scheduled E-waste Management: The E-waste Flow

3.2 Fees Flow

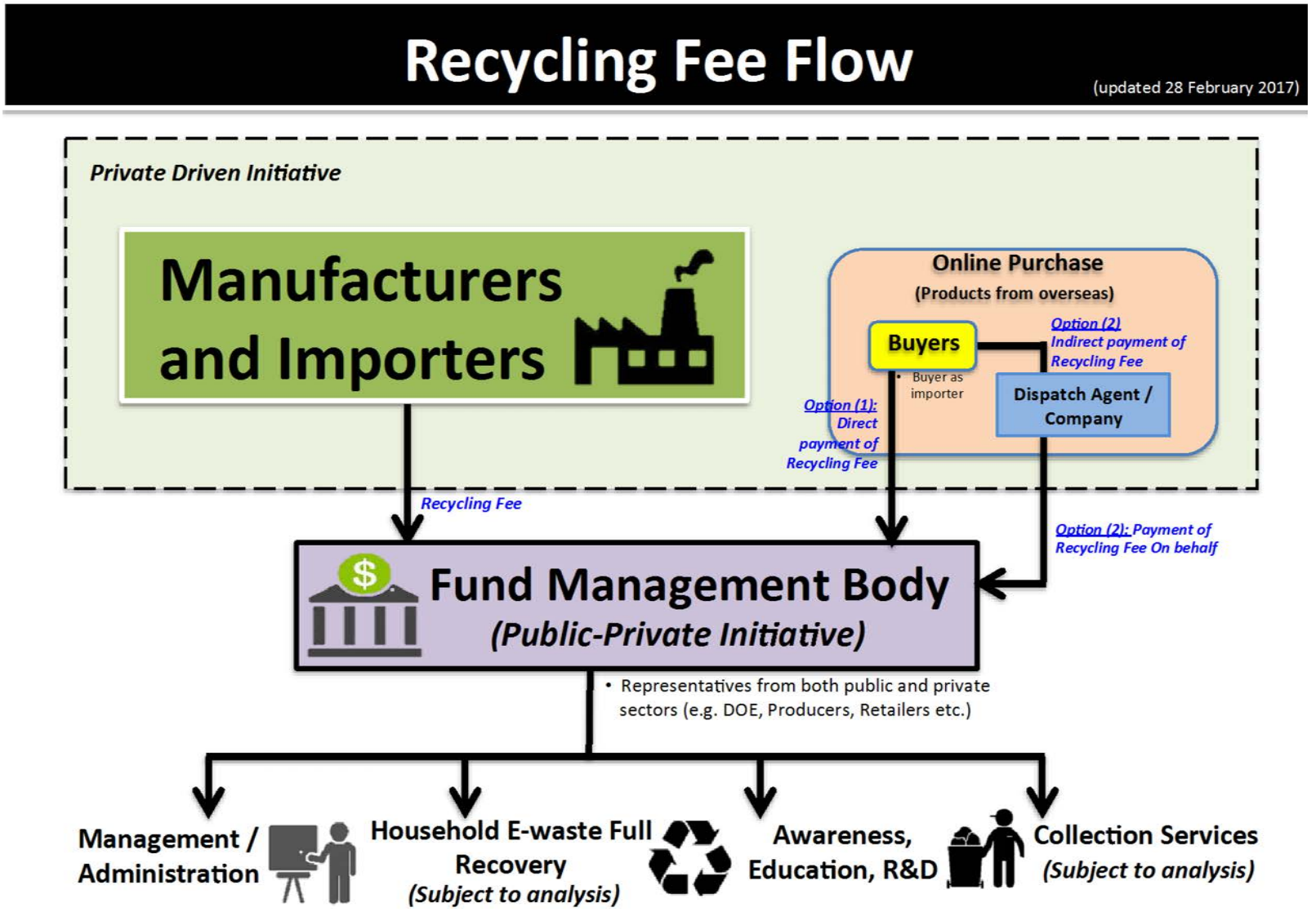
It is important to understand that recycling of Scheduled E-waste does not always yield revenues but it involves significant costs particularly when taken into consideration the logistic costs and environmental protection costs such as destruction of chlorofluorocarbon (CFC) gases, various pollution control measures, as well as treatment and disposal of hazardous substances. The overall costs required to ensure that the Scheduled E-waste is properly channeled and processed in an environmentally sound manner shall be shared among the stakeholders, including the manufacturers and importers of electrical and electronic appliances, generators (consumers / users), retailers, authorized collection points, as well as end receiving points, i.e. the licensed E-waste recycling facility.

Under the new regulatory framework, the concept of “Shared Responsibility” is applied. The manufacturers and importers are obliged to pay recycling fee upon introduction of their products into the markets. The recycling fee collected will be channeled to the Recycling Contribution Management Body (RCMB) directly.

In case of online or internet purchase of the regulated products by the buyers / consumers without any direct involvement of manufacturer or importer, the buyers / consumers are obliged to pay the recycling fees.

The recycling fees paid by the manufacturers, importers or the consumers for the case of online purchase will be the main source of fund, which will be used to subsidize necessary activities of the licensed Scheduled E-waste recycling facilities, authorized collection centers, authorized retailers and other possible stakeholders involved, which will be determined by the FMB. In general, the recycling fee collected will be used to cover not only possible subsidies for activities of collection and recycling facilities, but also administration of the FMB as well as necessary awareness and education events.

The recycling fee for different items of targeted Scheduled E-waste will be different subject to various factors involved in collection and recycling of the items. Details of fee structures to be paid by the manufacturers and importers by each category of targeted Scheduled E-waste are described in Recycling Fee Guideline.



Legal Framework of Scheduled E-waste Management: The Recycling Fee Flow

3.3 Reporting Flow

Proper reporting system is an essential tool to monitor and ensure proper Scheduled E-waste flow and recycling fee flow as elaborated in Section 3.1 and 3.2 above.

In order to determine the recycling fee to be paid by the manufacturers, importers, as well as consumer for the case of online purchase, the following reporting needs to be carried out:

a) Manufacturers and Importers – to report the quantity of the regulated electrical and electronic appliances introduced into the Malaysia market, whether it is locally manufactured, assembled, or imported.
b) Custom Department – to provide data on the importation of regulated electrical and electronic appliances directly by the consumers.

Information reported by the manufacturers, importers and Custom Department will be the fundamental for the FMB to determine the amount of recycling fees to be collected.

On the other hand, in order to ensure proper flow of the Scheduled E-waste within the system boundary from generation points to the final receiving points, reporting by relevant stakeholders by manifest system is required. The manifest system comprises 6-ply of consignment notes, which shall be filled out and kept by respective stakeholders following the methods as detailed in this Guideline. Some brief explanations on the reporting flow under the new regulatory framework are shown below:

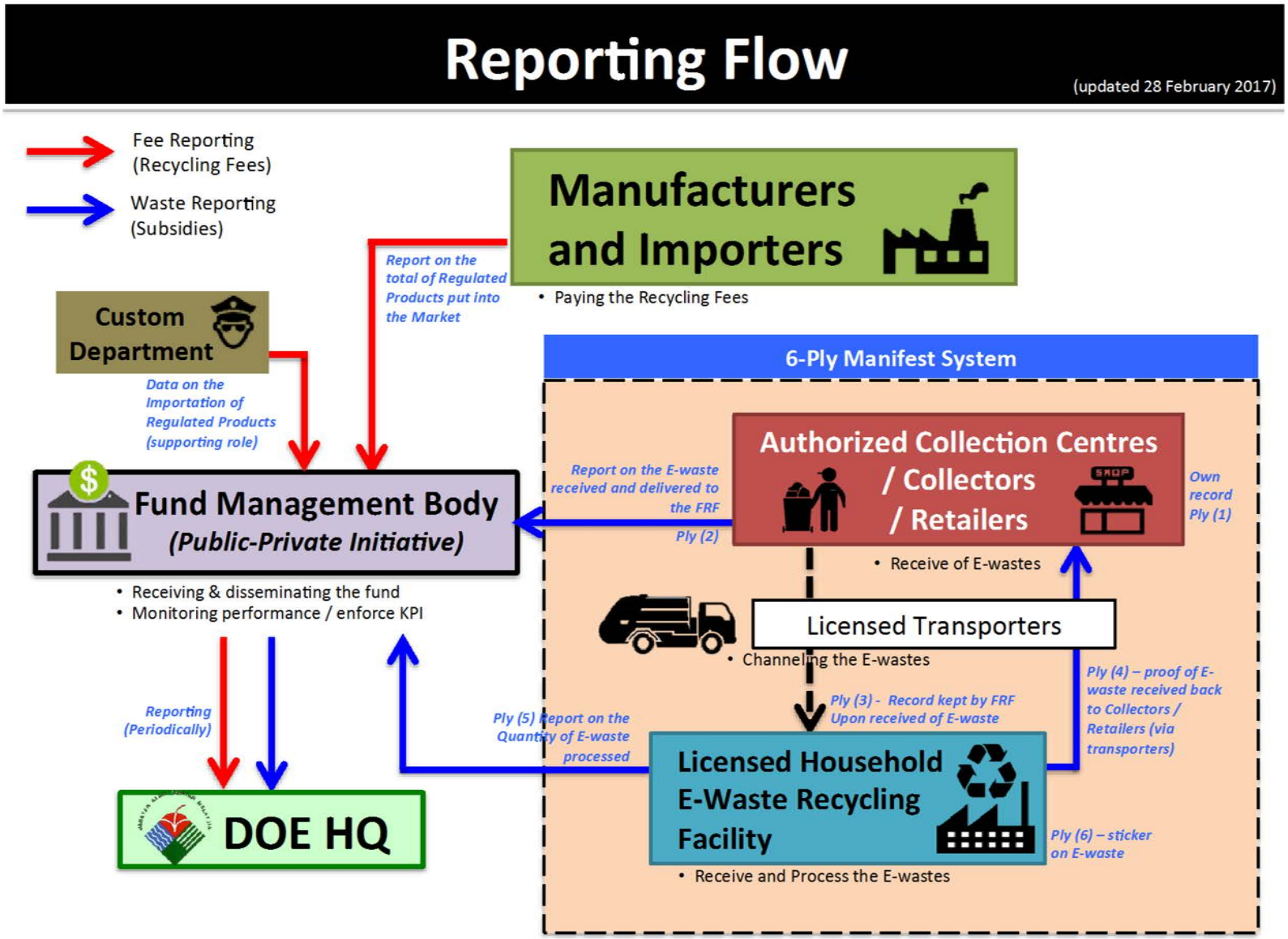
a) The authorized collection centers and retailers shall report each collected Scheduled E-waste by using the manifest form, to ensure each Scheduled E-waste is delivered to the right destination, i.e. the licensed Scheduled E-waste recycling facilities.

b) In case a licensed transporter is used, the authorized collection centers and retailers shall make sure that the manifest forms flow along with the transportation to the licensed facilities.

c) The licensed Scheduled E-waste recycling facilities shall only receive Scheduled E-waste from authorized sources, with clear manifest forms attached.

d) The authorized collection centers, retailers and licensed Scheduled E-waste recycling facilities shall report the number of Scheduled E-waste collected or received to the FMB in order to justify if any subsidy is required.

In general, the manifest system ensures all the collected Scheduled E-wastes are channeled to the right destination for proper recycling. Proper reporting flow serves as monitoring tool to ensure effective implementation of the entire system within the regulated boundary.



Legal Framework of Scheduled E-waste Management: The Reporting Flow

4.0 REPORTING BY THE STAKEHOLDERS

The stakeholders under the Environmental Quality (Scheduled E-Waste) Regulations 20XX have responsibility to report relative information. Required information for each stakeholder is described in details below.

4.1 Reporting by Collectors, Transporters and Recycling facilities using Manifest system

The proper movement of Scheduled E-wastes are managed by the manifest, which collectors, transporters and recycling facilities pass from one to another along with the Scheduled E-wastes.

Items on the Manifest are shown in the table below; collectors, transporters and recycling facilities need to fill them out for each unit of Scheduled E-waste, except for mobile phones and tablet PCs.

Items	Explanation	Filled out by
Manifest ID Number	Unique numbering	Printed from the beginning
Scheduled E-waste type	e.g. Washing machine / flat screen television	Collectors
Brand name	Manufacturer's name	Collectors
Size	e.g. 20kg capacity / 40 inches screen	Collectors
Status of the Scheduled E-waste	Whether any parts are missing at the time of reception.	Collectors Transporters Recycling Facilities
Transferring Date	Date of transferring E-waste	Collectors
Collector's Company Name/ID		Collectors
Collector's signature		Collectors
Transferring Date	Date of transferring E-waste	Collectors
Transporter's Company Name / ID	e.g. ABC Transport Enterprise (ID: XXXXX)	Collectors
Transporter's signature		Transporters
Recycling Facility Name / ID	e.g. XYZ Recycling Facility (ID: YYYYY)	Collectors or transporters
RF's signature		Recycling Facilities
RF's receiving Date	Date of receiving E-waste	Recycling Facilities

See the form of manifest in the Appendix A (Form 01).

4.1.1 Reporting Procedure with manifest

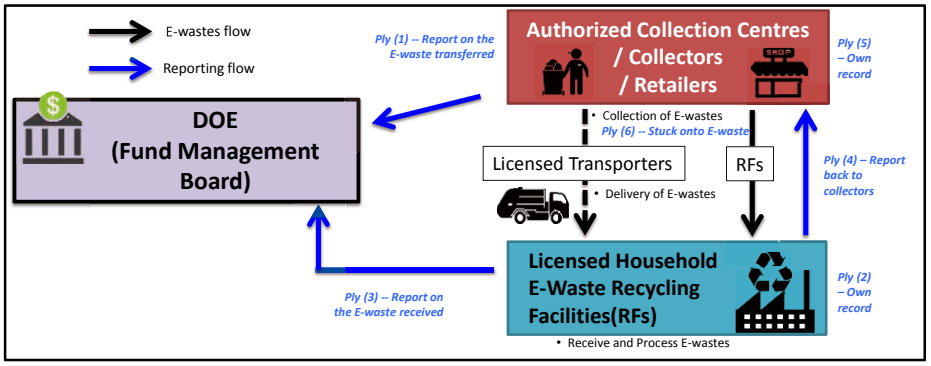
One manifest comprises 6 sheets of carbon copies, and will be assigned to one item of E-waste, except for mobile phones and tablet PCs. When collectors, transporters and recycling facilities receive E-waste, they keep one copy of manifest each. When transferring process has been completed, a

copy of manifest will be sent to Fund Management Body (FMB) to verify proper conduct at each step.

a) Collectors fill out a manifest, keep one carbon copy of the manifest, send one copy to FMB (frequency will be later determined), and then attach the remaining manifest to a Scheduled E-waste. When Collectors attach the manifest, check the status of the Scheduled E-waste whether any part is missing. If the Scheduled E-waste is missing some part, fill in the status on the Manifest. When the Scheduled E-waste is transported, collectors fill in transferring date and transporter or Recycling Facility name (or ID), and hand over the Scheduled E-waste to transporters or Recycling Facility if transports directly to the recycling facility.

b) If transporters are used, transporters shall check the status of the Scheduled E-waste whether any part is missing at the time of reception. If the Scheduled E-waste is missing some part, fill in the status on the Manifest. Transporters also need to fill in Recycling Facility name (or ID) on the manifest. Transporters keep one carbon copy, and then transport E-waste to a recycling facility.

c) When Recycling Facilities receive Scheduled E-wastes, recycling facilities shall check the status of the Scheduled E-waste whether any part is missing at the time of reception. If the Scheduled E-waste is missing some part, fill in the status on the Manifest. Recycling facilities keep one carbon copy for own records, send one carbon copy to FMB to confirm the reception of the Scheduled E-waste (frequency will be later determined).



Flow of Manifest Form

4.1.2 Filing copies of the Manifest

Each sheet of Manifest will be filed and kept by appropriate entities in the system. Below is the summary of manifest filing.

Ply no.	Movement	Filed and kept by
1	White paper: from collector to FMB	FMB
2	Blue paper: recycling facility own copy	Recycling Facilities
3	Green paper: from recycling facility to FMB	FMB
4	Pink paper: from recycling facility to collector	Collector
5	Yellow paper: collector own copy	Collector
6	White sticker: stick on to the E-waste by collector	Recycling Facilities

4.1.3 Periodical Verification by FMB

FMB will periodically verify the movement of Scheduled E-wastes by cross-checking Manifest numbers. FMB will compare the sheet number 1 and 3 to verify proper transportation of Scheduled E-wastes that will be the basis for paying collection subsidy to collectors.

4.2 Reporting by the Manufacturers / Importers

Manufacturers and Importers mainly have two types of reporting responsibilities. The first type of reporting is providing information on hazardous contents of EEEs for proper treatment; the second type is providing information on sales volume in order to determine the recycling fee.

a) As Environmental Quality (Scheduled E-Waste) Regulation 20XX states: “Every manufacturer or importer shall provide information to the Director General on the method of dismantling of their electrical and electronic equipment and the components that contain hazardous substances in their electrical and electronic equipment,” Manufacturers and Importers of EEEs have responsibility to report information of hazardous substances or items in their product to DOE in order for recycling facilities to properly and safely treat these products. The list of hazardous substances or items within EEEs can be found as focused materials in the Recycling Guideline. Manufacturers and importers may choose to use their own reporting formats; however, they must keep in mind that their report is useful to those who recycle their products. The list of information needed to report is below:

Items	Explanations
Type of EEEs	6 targeted categories of EEEs
EEEs product information	Information, such as product model, product number or production period, to identify targeted EEEs.
Information of hazardous substances or items within EEEs	Manufacturers / Importers shall show components which contains hazardous substance.
Recommended method to remove components which contains hazardous substances	Manufacturers should show how to safely disassemble EEEs in order to remove components which contains hazardous substances.

Manufacturers and Importers shall provide this information in the following ways:

For the products manufactured or imported in the past, manufacturers and importers may report this information in a summarized manner, not necessary to report each product individually. Manufacturers and importers also may report in collective way, meaning that a representative of several manufacturers may report for their members. If manufacturers or importers choose to do so, they must clearly present the information provided is for which manufacturers' which specific product.

For the newly manufactured or imported products, manufacturers and importers report to DOE whenever they manufacture or import a product that contains hazardous substances or items in a way unlike those similar products in the past. This information will be used to update the list of focused materials in the future.

b) Manufacturers and Importers of EEEs also have responsibility to report their put-on-market volume of the targeted items for the payment of Recycling fee to FMB. The list of information needed to report is below:

Items	Explanations
Reporting frequency	Twice a year (Subject to discussion)
Reporting moment	Record information at the time of shipment from the factories.
Type of EEEs	6 targeted categories of EEEs, as well as the sub-categories and sizes (Subject to discussion)
Quantity of EEEs	Quantity of targeted items of EEEs that have been introduced to the Malaysian market in one reporting period. Also, quantity of items that have been returned.

The form of manufacturers / importers put-on-market reporting is shown in Appendix B (Form 02).

4.3 Reporting by the Retailers

Retailers have one type of reporting responsibilities that is providing information on collection of E-wastes.

a) Retailers of EEEs have responsibility to report information of received Scheduled E-waste to FMB as collectors. The report should be filed in

the form of a manifest in order for all the stakeholders to keep track of every Scheduled E-waste from collection points to final receiving points. The reporting requirements of retailers of EEEs as collectors are described in the Section 4.1 of this Guideline.

4.4 Reporting by the Collectors

Collectors of Scheduled E-waste have responsibility to report information of received Scheduled E-waste to FMB. The report should be filed in the form of a manifest in order for all the stakeholders to keep track of every Scheduled E-waste from collection points to final receiving points. The reporting requirements of collectors are described in the Section 4.1 of this Guideline.

4.5 Reporting by the Scheduled E-waste Recycling Facilities

Recycling Facilities mainly have three types of reporting responsibilities. The first type of reporting is providing information on reception of Scheduled E-waste; the second type is providing information on recycling; the third type is providing information on residual wastes generated from processing received Scheduled E-waste.

a) Recycling Facilities of Scheduled E-waste have responsibility to report information of received Scheduled E-waste to FMB. The report should be filed in the form of a manifest in order for all the stakeholders to keep track of every Scheduled E-waste from collection points to final receiving points. The reporting requirements of Recycling Facilities are described in the Section 4.1 of this Guideline. Recycling Facilities of Scheduled E-waste also have responsibility to report daily reception of Scheduled E-waste to FMB. The list of information needed to report is below:

Items	Explanations
Reporting frequency	Every month
Reporting moment	Record information at the time of receiving E-waste from collectors or transporters.
Types of Scheduled E-waste	6 targeted categories of Scheduled E-waste
Quantity Scheduled E-waste received	Quantity of targeted items of Scheduled E-waste that have been received with each truck.
Transporter's information	License plate number of the truck and transporting company name

The form of Recycling Facilities' reception of E-waste report is shown in Appendix C (Form 03).

b) Recycling Facilities of Scheduled E-waste also have responsibility to report information of recovered materials from processing Scheduled E-wastes to FMB. This reporting is necessary to ensure proper material balance of E-waste recycling. The list of information needed to report is below:

Items	Explanations
Reporting frequency	Every month
Reporting moment	Record information at the time of shipping recovered materials from the processing lines.
Time and date	Time and date of shipping out recovered materials.
Type of recovered materials	Materials recovered from E-wastes, such as iron, copper, aluminum, glass, plastics, and etc.
Quantity of recovered materials	Quantity of materials that is loaded in a truck
Destination of the recovered materials	Enterprises, where the recovered materials are sent to.
Transporter's information	License plate number of the truck and transporting company name.

The forms of Recycling Facilities' report on recovered materials are shown in Appendix C (Form 04 and 05).

c) Recycling Facilities of Scheduled E-waste also have responsibility to report information of residual wastes generated from processing Scheduled E-wastes to FMB. This reporting is necessary to ensure proper final disposal of Scheduled E-waste. Any generation of scheduled waste should be reported to DOE by eSWIS. The list of information needed to report is below:

Items	Explanations
Reporting frequency	Every month
Reporting moment	Record information at the time of shipping residual wastes from the processing lines.
Time and date	Date of shipping out residual wastes.
Description of waste	Names of the residual wastes, such as fluorescent powder, lead-containing glass, and etc.
Quantities of wastes	Quantities of residual wastes from processing of Scheduled E-waste.
Destination of the residual waste	Authorized final disposal facilities, where the residual wastes are sent to.
Transporter's information	License plate number of the truck and transporting company name

The forms of Recycling Facilities' report on residual wastes are shown in Appendix C (Form 06, 07 and 08).

d) Recycling Facilities of Scheduled E-waste also have responsibility to report information of processing of received Scheduled E-waste to FMB in order to claim for the recycling subsidy. The list of information needed to report is below:

Items	Explanations
Reporting frequency	Every month
Reporting moment	Record information at the time of receiving, processing and shipping Scheduled E-waste, recovered materials or residual wastes.
Type of Scheduled E-waste	6 targeted categories of Scheduled E-waste, as well as the sub-categories (Subject to discussion).
Quantity of processed Scheduled E-waste	Quantity of targeted items of Scheduled E-waste that have been received in one reporting period.
Quantities of recovered materials	Quantities of recovered materials from Scheduled E-waste, such as plastics, irons, ferocious metals, glass, and etc.
Quantities of wastes generated	Quantities of wastes generated from processing Scheduled E-waste.

The form of Recycling Facilities' recycling report is shown in Appendix C (Form 09, 10 and 11).

APPENDICES

APPENDIX A

Form 01 – Manifest of Received Scheduled E-waste

XXXXX

1. Type of Scheduled E-waste					
Mobile Phone & Tablet PC	***Television & PC monitor***	***Refrigerator***	***Clothes Washing Machine & Dryer***	***Air-Conditioner***	***Personal Computer***
☐ Mobile Phone ☐ Tablet PC _____pcs	☐ CRT TV/monitor ☐ Flat (Plasma / LED / LCD) TV/monitor	☐ Refrigerator ☐ Freezer ☐ Chiller	☐ Washing machine ☐ Dryer	☐ Window type ☐ Split unit type ☐ Ceiling type ☐ Mobile type	☐ Desktop tower ☐ Laptop
2. Size of Scheduled E-waste					
	☐ less than 24 inches ☐ 24 inches & more	☐ less than 250 L ☐ 250 L & more	☐ less than 20 kg ☐ 20 kg & more	☐ Less than 1.5 HP ☐ 1.5 HP & more (HP: Horse Power)	☐ less than 24 inches ☐ 24 inches & more
3. Brand Name	(e.g. ELECTROLUX, HAIER, LG, PENSONIC, TOSHIBA)				☐ Unknown

4. Records of Transportation				
	COLLECTOR	***TRANSPORTER 1***	***TRANSPORTER 2***	***RECYCLING FACILITY***
Date Received				
Company ID				
Status of the E-waste	☐ Good ☐ Missing part : _____	☐ Good ☐ Missing part : _____	☐ Good ☐ Missing part : _____	☐ Good ☐ Missing part : _____
Recipient Name & Signature				

APPENDIX B

Form 02 – Reporting Form of EEEs Introduced to the Malaysian Market by Manufacturers and Importers

Reporting Period (From MM/YY to MM/YY):							
Name of Manufacturer or Importer							
Address							
Phone number							
E mail address							
Contact person							
Amount of EEEs introduced to the market							
Item	Subcategories	Amount produced in Malaysia (pieces) (a)	Amount imported (pieces) (b)	Amount exported (pieces) (c)	Amount returned (pieces) (d)	Amount introduced to the market (pieces) (a+b−c−d)	Remarks (Referring Document number)
Air Conditioner							
Washing Machine / Cloth Dryer							
Refrigerator / Freezer							
Television							
Computer							
Mobile Phone /Tablet PC							
Person in Charge(Signature): Date(DD/MM/YY):							

APPENDIX C

Form 03 – Reporting Form of Recycling by Recycling Facilities (Daily Recording Table for Receiving Scheduled E-waste)

Name of the RF	XYZ Recycling Bhd.						
Date(DD/MM/YY)	DD/MM/YY						
Time of Entrance	Description of E-waste	Truck's license place No.	Truck's company name	Weight at entrance (kg) (1)	Weight at exit (kg) (2)	Net Weight(kg) (3)=(1) – (2)	Remarks
Person in Charge(Signature): Date(DD/MM/YY):							

Form 04 – Reporting Form of Recycling by Recycling Facilities (Daily Recording Table for Shipping Recovered Materials from Recycling Facilities)

Name of the RF	XYZ Recycling Bhd.				
Date(DD/MM/YY)	DD/MM/YY				
Time of Exiting	Description of Recovered Materials	Weight(kg)	Destination	Truck's license place No.	Truck's company name
Person in Charge(Signature): Date(DD/MM/YY):					

Form 05 – Reporting Form of Recycling by Recycling Facilities (Recording Table for Monthly Movement of Materials)

Name of the RF	XYZ Recycling Bhd.						
Date(DD/MM/YY)	DD/MM/YY						
Type of Recovered Materials	From previous month (1)	Amount generated this month (2)	outgoing amount (3)	Amount at the end of month (4)	Verification (5) = ((1)+(2)-(3))	Difference (6) = (5) − (4)	Remarks
Person in Charge(Signature): Date(DD/MM/YY):							

Form 06 – Reporting Form of Recycling by Recycling Facilities (Daily Recording Table for Shipping Waste from Recycling Facilities)

Name of the RF	XYZ Recycling Bhd.				
Date(DD/MM/YY)	DD/MM/YY				
Time of Exiting	Description of waste	Weight(kg)	Destination	Truck's license place No.	Truck's company name
Person in Charge(Signature): Date(DD/MM/YY):					

Form 07 – Reporting Form of Recycling by Recycling Facilities (Recording Table for Monthly Movement of Wastes)

Name of the RF	XYZ Recycling Bhd.							
Date(DD/MM/YY)	DD/MM/YY							
Type of Waste	Description of waste	From previous month (1)	Amount generated this month (2)	Outgoing amount (3)	Amount at the end of month (4)	Verification (5) = ((1)+(2) − (3))	Difference (6) = (5) − (4)	Remarks
Person in Charge(Signature): Date(DD/MM/YY):								

Form 08 – Reporting Form of Recycling by Recycling Facilities (Recording Table for Monthly Recovery of Focused Materials)

Name of the RF	XYZ Recycling Bhd.			
Reporting Period	From 01/MM/YY to DD/MM/YY			
Items	Focused Materials	Weight recovered (kg)	Method of Treatment/Disposal	Destination(Full Recovery Facilities or Oversea)
TV(CRT)	CRT monitor			
	Printed circuit board			
	Capacitor (old type)			
	Plasma display			
TV(Flat Screen)	Printed circuit board			
	Florescent tube			
	Liquid crystal display			
	Plasma display			
Refrigerator	Refrigerant (in compressor)			
	Foaming agent for heat insulating material			
	Printed circuit board			
Air Conditioner	Refrigerant			
	Printed circuit board			
	Capacitor (old type)			
Washing Machine/Dryer	Refrigerant (heat pump type dehumidifier or dryer)			
	Printed circuit board			
	Capacitor (old type)			
Personal Computer(PC) CRT	Printed circuit board			
	CRT monitor			
Personal Computer(PC) Flat Screen monitor	Printed circuit board			
	Florescent tube			
	Liquid crystal display			
	Plasma display monitor			
Personal Computer(PC) Tower Unit	Printed circuit board			
	Rechargeable battery			
	Button batteries			
Personal Computer(PC) Notebook	Printed circuit board			
	Florescent tube			
	Liquid crystal display			
	Rechargeable battery			
	Button batteries			
Mobile Phone/Tablet PC	Printed circuit board			
	Rechargeable battery			
	Button batteries			
	Florescent tube			
	Liquid crystal display			
Person in Charge(Signature): Date(DD/MM/YY):				

Form 09 – Reporting Form of Recycling by Recycling Facilities (Monthly Recording Table for WEEE Recycling)

Name of the RF	XYZ Recycling Bhd.			
Reporting Period	From 01/MM/YY to DD/MM/YY			
Items	Amount received (pieces)	Weight received (kg)	Amount processed (pieces)	Weight processed (kg)
TV(CRT)				
TV(Flat Screen)				
Refrigerator				
Air Conditioner				
Washing Machine/Dryer				
Personal Computer(PC) CRT monitor				
Personal Computer(PC) Flat Screen monitor				
Personal Computer(PC) Tower Unit				
Personal Computer(PC) Notebook				
Mobile Phone/Tablet PC				
Person in Charge(Signature): Date(DD/MM/YY):				

Form 10 – Reporting form of Recycling by Recycling Facilities (Recording Table for Monthly Material Balance)

Reporting Period	From 01/MM/YY to DD/MM/YY			
Name of RF	XYZ Recycling Bhd.			
Address of RF				
Phone number				
Contact person				
Amount of WEEEs processed				
Item	Subcategories	Amount processed (piece)	Amount processed (kg)	Remarks
TV				
Refrigerator				
Washing Machine				
Air Conditioner				
PC				
Mobile Phone				
	Total			
Amount of recovered materials (kg)				
	Total			
Amount of waste generated (kg)				
	Total			
Person in Charge(Signature): Date(DD/MM/YY):				

Form 11 – Reporting form of Recycling by Recycling Facilities (Recording Table to Calculate Monthly Recycling Rate)

Reporting Period	From 01/MM/YY to DD/MM/YY			
Name of RF	XYZ Recycling Bhd.			
Item	Subcategories	Weight (kg)	Destinations	Recycling Rate(%)
TV(CRT)	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
TV(Flat Screen)	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Refrigerator	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Air Conditioner	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Washing Machine/Dryer	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Personal Computer(PC) CRT monitor	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Personal Computer(PC) Flat Screen monitor	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Personal Computer(PC) Tower Unit	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Personal Computer(PC) Notebook	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Mobile Phone/Tablet PC	Metals	(a)		(a+b+c) / (a+b+c+d) x100=
	Plastics	(b)		
	Other recyclable materials	(c)		
	Residues	(d)		
Person in Charge(Signature): Date(DD/MM/YY):				

APPENDIX D

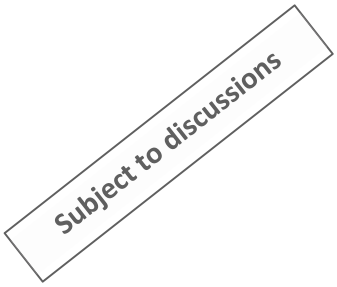
List of Scheduled E-waste in the First Schedule of the Environmental Quality Act (Scheduled Electrical and Electronic Equipment Waste) Regulations, XXXX

First Schedule

HSW_100	Electronic and Electrical Equipment Waste *Definitions*
HSW_101	Air-Conditioner *Definitions*
HSW_102	Washing Machine / Cloth Dryer *Definitions*
HSW_103	Refrigerator / Freezer *Definitions*
HSW_104	Television *Definitions*
HSW_105	Computer / Tablet *Definitions*
HSW_106	Mobile Phone *Definitions*
HSW_200	Small Electrical and Electronic Appliances Waste *Definitions*
HSW_201	Printers and other printing units *Definitions*
HSW_202	Vacuum Cleaner *Definitions*
HSW_203	Hair Dryer *Definitions*
HSW_204	Scanners *Definitions*
HSW_205	Video Camera / Digital Camera / Recorder *Definitions*
HSW_206	DVD Player *Definitions*
HSW_207	Portable Music Player *Definitions*
HSW_208	Game Machine *Definitions*
HSW_209	Telephone / Fax Machine

Definitions

HSW_210	Car Navigator / GPS *Definitions*
HSW_211	Radio / Audio players *Definitions*
HSW_212	Rice Cooker *Definitions*
HSW_213	Microwave Oven / other ovens *Definitions*
HSW_214	More to add on *Definitions*



HSW_300	More to be added in the Future *Definitions*
HSW_400	More to be added in the Future *Definitions*
HSW_500	More to be added in the Future *Definitions*

APPENDIX E

List of Authorized Collectors / Transporters / Retailers / Other Collection Points

APPENDIX F

List of Licensed E-waste Full Recovery Facilities Under the Existing EQA (Scheduled Waste) Regulations

1	**CENTURY SURF SDN BHD (PLOT 157A)**	**FACILITI**:
	PLOT 157A, LORONG PERINDUSTRIAN BUKIT MINYAK 7, BUKIT MERTAJAM , PULAU PINANG	Kemudahan Pemerolehan Penuh Luar Tapak
	State: PULAU PINANG	
	Phone:012 4111 882	
	Fax:04 626 6002	
2	**DD WORLD CORPORATION SDN BHD (FOMERLY KNOWN AS QUANTUM REFIN**	**FACILITI**:
	PLOT 75, JALAN PERINDUSTRIAN BUKIT MINYAK TAMAN PERINDUSTRIAN BUKIT MINYAK , BUKIT MERTAJAM , PULAU PINANG	Kemudahan Pemerolehan Penuh Luar Tapak
	State: PULAU PINANG	
	Phone:04-5015577	
	Fax:04-5015575	
3	**EGA RECYCLING SDN. BHD. (FULL RECOVERY) (NSU)**	**FACILITI**:
	LOT 29, JALAN PERMATA 1/1,ARAB MALAYSIAN INDUSTRIAL PARK , NILAI , NEGERI SEMBILAN	Kemudahan Pemerolehan Penuh Luar Tapak
	State: NEGERI SEMBILAN	
	Phone:06-7998229	
	Fax:06-7646425	
4	**KRUBONG RECOVERY SDN. BHD.**	**FACILITI**:
	(2625 & 2630) PT.1671 & PT 1676,KAWASAN PERINDUSTRIAN KRUBONG , MELAKA , MELAKA	Kemudahan Pemerolehan Penuh Luar Tapak
	State: MELAKA	
	Phone:06-3352519	
	Fax:06-3352520	
5	**MERIAHTEK (M) SDN. BHD.**	**FACILITI**:
	NO 1, JALAN TTC 30, LOT 4827, 4828, 4831 & 4832, TAMAN TEKNOLOGI CHENG,MUKIM CHENG , MELAKA , MELAKA	Kemudahan Pemerolehan Penuh Luar Tapak
	State: MELAKA	
	Phone:06 - 3365211	
	Fax:06 - 3365201	
6	**ALH INDUSTRIES SDN BHD (SW110)**	**FACILITI**:
	LOT 7832, 7833, 7834, 7835, JALAN BATU TIGA, BUKIT CHERAKAH , SHAH ALAM , SELANGOR	Pemerolehan Kembali Luar Tapak
	State: SELANGOR	
	Phone:03-78469967	
	Fax:03-78464967	

7	**BENCHMARK VISTA SDN. BHD.(LOT NO. 6,SOLOK SULTAN HISHAMUDDIN**	**FACILITI**:
	LOT NO. 6, SOLOK SULTAN HISHAMUDDIN 7, BANDAR SULTAN SULAIMAN, SELAT KLANG UTARA, , PELABUHAN KELANG , SELANGOR	Pemerolehan Kembali Luar Tapak
	State: SELANGOR	
	Phone:03-31766357	
	Fax:03-31767357	
8	**CHEMALAYA SDN BHD**	**FACILITI**:
	Plo 128 Jalan Rimba 3 Tanjung Langsat Industri Complex , PASIR GUDANG , JOHOR	Pemerolehan Kembali Luar Tapak
	State: JOHOR	
	Phone:07-6522064	
	Fax:07-6522070	
9	**CYCLE TREND INDUSTRIES SDN. BHD. (BUKIT MINYAK)**	**FACILITI**:
	NO. 1001, PLOT 209b, JALAN PERINDUSTRIAN BUKIT MINYAK KAWASAN PERINDUSTRIAN BUKIT MINYAK, , BUKIT MERTAJAM , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-507 8089	
	Fax:04-508 0861	
10	**DNS WASTE MANAGEMENT SDN.BHD.**	**FACILITI**:
	LOT 880, BLOCK 237 KNLD, KOTA SENTOSA INDUSTRIAL PARK, JALAN BATU KITANG 93250 KUCHING , KUCHING , SARAWAK	Pemerolehan Kembali Luar Tapak
	State: SARAWAK	
	Phone:016-8639991	
	Fax:082-687252	
11	**ESTALCO SDN BHD**	**FACILITI**:
	PLO 616 JALAN MIEL 1, JALAN KELULI 9, KAWASAN PERINDUSTRIAN MEIL 4 , PASIR GUDANG , JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:07-2552888	
	Fax:07-2552333	
12	**HI-TECH FULL RECOVERY (M) SDN BHD**	**FACILITI**:
	Lot 4169, No 14, Lorong Perusahaan 3, Kaw Ind. Padang Meha, Kedah , ALOR SETAR , KEDAH	Pemerolehan Kembali Luar Tapak
	State:KEDAH	
	Phone:	
	Fax:04-4853032	

13	**HYDRO METAL (M) SDN BHD**	**FACILITI**:
	PLO 59, JALAN PERAK 1, KAWASAN PERINDUSTRIAN PASIR GUDANG, 81700, PASIR GUDANG , PASIR GUDANG , JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:07-2521896	
	Fax:07-2529882	
14	**Infinity Recovery Sdn. Bhd.**	**FACILITI**:
	NO. 2, JALAN CENDERAI 24,TAMAN PERINDUSTRIAN KOTA PUTERI, MASAI, JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:07-3866080	
	Fax:	
15	**JARING METAL INDUSTRI SB**	**FACILITI**:
	NO 10 JALAN IKS JURU JAYA 14100 SIMPANG AMPAT, SIMPANG AMPAT(P) , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State:PULAU PINANG	
	Phone:	
	Fax:	
16	**JARING METAL INDUSTRIES SDN BHD (NO.7, SHAH ALAM SELATAN 2)**	**FACILITI**:
	NO.7, JALAN SUNGAI KAYU ARA 32/37 TAMAN BERJAYA, SEKSYEN 32 , SHAH ALAM , SELANGOR	Pemerolehan Kembali Luar Tapak
	State:SELANGOR	
	Phone:	
	Fax:	
17	**KHT RECYCLE SDN BHD**	**FACILITI**:
	PTD 34286 JALAN WAWASAN 8 KAW. PER. SRI GADING , SERI GADING , JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:	
	Fax:	
18	**KUALITI KITAR ALAM SDN. BHD.**	**FACILITI**:
	LOT H.S. (D) 20487 P.T. 3292 LDG TANAH MERAH A3 DIVISION MK JIMAH , PORT DICKSON , NEGERI SEMBILAN	Pemerolehan Kembali Luar Tapak
	State:NEGERI SEMBILAN	
	Phone: 066662000	
	Fax: 066662010	
19	**LIMA JAYA PAPER TRADING SDN. BHD.**	**FACILITI**:
	NO. 643, JALAN IDAMAN 3/9, TAMAN DESA IDAMAN, , SENAI , JOHOR	Pemerolehan Kembali Luar Tapak
	State:JOHOR	
	Phone:	
	Fax:	

20	**MATSUDA SANGYO (MALAYSIA) SDN. BHD.**	**FACILITI**:
	PT 511, LOT 62773 (PLOT B), PERSIARAN HULU SELANGOR, SEKSYEN 26, SHAH ALAM , SELANGOR	Pemerolehan Kembali Luar Tapak
	State: SELANGOR	
	Phone:03-81910162	
21	**METAHUB INDUSTRIES SDN.BHD.**	**FACILITI**:
	LOT 2247 & 2248, JLN SEELONG JAYA 8, SEELONG JAYA, SENAI , JOHOR	Pemerolehan Kembali Luar Tapak
	State: JOHOR	
	Phone:	
	Fax:	
22	**METAL RECOVERY INDUSTRIES SDN BHD (KLANG UTARA)**	**FACILITI**:
	LOT 6251-B, BATU 5 1/2, JALAN KAPAR, KLANG , SELANGOR	Pemerolehan Kembali Luar Tapak
	State: SELANGOR	
	Phone: 03-32906988	
	Fax: 03-32906922	
23	**MING ENGINEERING PLASTIC SDN BHD**	**FACILITI**:
	PLOT 71, LORONG PERINDUSTRIAN BUKIT MINYAK 14, BUKIT MERTAJAM, P. PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone: 04-508 4557	
	Fax: 04-508 6557	
24	**PETROMINE (M) SDN BHD (LOT 25)**	**FACILITI**:
	LOT 300735, NO 25, KAWASAN PERINDUSTRIAN GOPENG, FASA 3, 31600 GOPENG, IPOH, PERAK	Pemerolehan Kembali Luar Tapak
	State: PERAK	
	Phone:	
25	**PREFERENCE MEGACYCLE SDN. BHD. (PLOT 80A)**	**FACILITI**:
	PLOT 80A, LORONG PERINDUSTRIAN BUKIT MINYAK 16 KAWASAN PERINDUSTRIAN BUKIT MINYAK, BUKIT MERTAJAM , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-5086027	
	Fax:04-5076027	
26	**RECLAIMTEK (M) SDN. BHD.**	**FACILITI**:
	PLOT 88A, JALAN PERINDUSTRIAN BUKIT MINYAK KAWASAN PERINDUSTRIAN BUKIT MINYAK , BUKIT MERTAJAM , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-5088571	
	Fax:04-5088577	

27	**SHAN POORNAM METALS SDN. BHD.**	**FACILITI**:
	PLOT 34 (NO. 1479), LORONG PERUSAHAAN MAJU 6 KAWASAN PERUSAHAAN PERAI, FASA 4, PERAI , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-5084841	
	Fax:04-5084843	
28	**SMC TECHNOLOGY SDN BHD**	**FACILITI**:
	PLO 31, JLN PERINDUSTRIAN PONTIAN, PONTIAN, JOHOR	Pemerolehan Kembali Luar Tapak
	State: JOHOR	
	Phone:07-6862088	
	Fax:07-6862066	
29	**SUN SOON YIK RECYCLE PLASTIC & METAL SDN. BHD.**	**FACILITI**:
	LOT 137249 & 137250 HALAL PERUSAHAAN MENGLEMBU 16, IPOH, PERAK	Pemerolehan Kembali Luar Tapak
	State: PERAK	
	Phone:05-2829321	
	Fax:	
30	**SYP RECOVERY & RECYCLING SDN. BHD.**	**FACILITI**:
	LOT 2833-2834, KAWASAN PERINDUSTRIAN BUKIT RAMBAI, MUKIM TANJUNG MINYAK, MELAKA, MELAKA, MELAKA	Pemerolehan Kembali Luar Tapak
	State: MELAKA	
	Phone:06 - 351471	
	Fax:06 - 3515199	
31	**TES-AMM (MALAYSIA) SDN. BHD.**	**FACILITI**:
	NO 2005, TINGKAT PERUSAHAAN 1 KAWASAN PERUSAHAAN PERAI, PERAI , PULAU PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-3991896	
	Fax:04-3993221	
32	**TWINKLE METAL (M) SDN. BHD.**	**FACILITI**:
	No 1449, Lorong Perusahaan Maju 8, Plot 96, kawasan Perusahaan Prai 4, PERAI, P.PINANG	Pemerolehan Kembali Luar Tapak
	State: PULAU PINANG	
	Phone:04-5084557	
	Fax:04-5086557	
33	**VICTORY RECOVERY SDN. BHD.**	**FACILITI**:
	LOT 2211, 2212, 2213 & 2214, 2215,2216 JALAN PK 11 KAWASAN PERINDUSTRIAN KRUBONG, KERUBONG , MELAKA	Pemerolehan Kembali Luar Tapak
	State: MELAKA	
	Phone:06 - 3345336	
	Fax:06 - 3344589	

34	**VITA RECYCLE SDN BHD**	**FACILITI**:
	LOT 1227, BLOK 8, DEMAK LAUT INDUSTRIAL PARK, PHASE 11 A, JALAN BAKO, 93050 KUCHING SARAWAK , KUCHING , SARAWAK	Pemerolehan Kembali Luar Tapak
	State:SARAWAK	
	Phone:082-450031	
	Fax:082-573136	
35	**XANTARA SDN BHD (PYDT BT)**	**FACILITI**:
	LOT NO. 3992 & 3993, NO. 21 & 22 LORONG 3/1 KAWASAN PERINDUSTRIAN SENAWANG , SENAWANG , NEGERI SEMBILAN	Pemerolehan Kembali Luar Tapak
	State:NEGERI SEMBILAN	
	Phone:06-6751548	
	Fax:06-6794931	

APPENDIX G

List of Other Partners (E-waste Alam Alliance Partners)

State	No	Company Name	Address	Contact
PERLIS	1	Iyan Trading Sdn Bhd	Lot 5, Kawasan Perindustrian Mukim Jejawi, 02600 Arau, Perlis.	012-4750210
	2	Senheng Electric (KL) Sdn Bhd	No. 1A, Persiaran Jubli Emas, 01000 Kangar, Perlis.	012 – 611 2440
	3	Suria Jerai Electrical Sdn Bhd	No. 45, 47,49 Jalan Jubli Perak, 01000 Kangar, Perlis.	014 – 629 6747
KEDAH	1	Pen Green Global Trading	Sungai Petani, Kedah Darul Aman	019 – 458 1595
	2	Senheng Electric (KL) Sdn Bhd	2&2A, 3&3A, Pekan Simpang Kuala off Lebuh Raya Sultan Abdul Halim, 05400 Alor Setar, Kedah	012 – 658 1695
	3	Senheng Electric (KL) Sdn Bhd	34, Pekan Jitra 3, 06000 Jitra, Kedah	012 – 404 1044
	4	Senheng Electric (KL) Sdn Bhd	207 & 208, Jalan Legenda 7, Legenda Heights, 08000 Sungai Petani, Kedah	012 – 658 1784
	5	Senheng Electric (KL) Sdn Bhd	Lot No. F10 & F11, First Floor, Tesco Sungai Petani Mutiara No. 368, Jalan Bakar Arang, 08000 Sungai Petani, Kedah	012 – 657 9365
	6	Senheng Electric (KL) Sdn Bhd	Lot No. F1, First Floor, Tesco Mergong, No. 1 Lebuhraya Sultanah Bahiyah, 05100 Alor Setar, Kedah	012 – 493 1404
PENANG	1	MSV Metal (M) Sdn Bhd	No. 3675, Jalan Permatang Pauh, 13400 Butterworth, Penang.	04 – 323 4306
	2	ICT Komtar (Venice Gateway Sdn Bhd)	Unit No. 1B & 1D, 1.01-4.01, Komtar, Jalan Penang, 10000 Penang	04 – 250 8662
	3	Northern Electronics Services	Blok A-G-08, Lebuh Nangka 1, Taman Desa Damai, 14000 Bukit Mertajam, Penang	019 – 412 3392
	4	Ex Tech Enterprise	146, 4th Floor, Bukit Jambul Complex, Jalan Rumbia 11900 Bayan Lepas, Penang	04 – 643 5312
	5	Yayasan Humanistik	No. 58, Lorong Tambun Indah 10, Taman Tambun Indah, 14100 Simpang Ampat, Penang.	016 – 543 6077
	6	Senheng Electric (KL) Sdn Bhd (SenQ)	S23 Second Floor, Sunway Carnival Mall, 3068, Jalan Todak, Pusat Bandar, 13700 Seberang Jaya, Penang	04 – 390 0040
	7	Senheng Electric (KL) Sdn Bhd	No. 112, 114, 116 Jalan Raja Uda, Pusat Perniagaan Raja Uda, 12300 Butterworth, Penang.	04 – 323 5040

PENANG	8	Senheng Electric (KL) Sdn Bhd	Tesco Bukit Mertajam Jalan Rozhan, Pusat Perniagaan Seri Impian, Bukit Mertajam, Penang.	012 – 658 1596
	9	Senheng Electric (KL) Sdn Bhd	Fortune Court, 288 B-1-10 & 11 Ground Floor, Jalan Thean Teik, Farlim, 11500 Penang.	04 – 829 4140
	10	Senheng Electric (KL) Sdn Bhd (SenQ)	Gurney Plaza, 170-07-08, Plaza Gurney, Persiaran Gurney, 10250 Penang.	04 – 229 4040
	11	Senheng Electric (KL) Sdn Bhd (SenQ)	Queensbay Mall 2F-07, second Floor, Queensbay Mall 100, Persiaran Bayan Indah, Sungai Nibong, 11900 Bayan Lepas, Penang.	04 – 641 1052
	12	Senheng Electric (KL) Sdn Bhd	Tesco Tg Pinang Lot No. F4, F5 & F6, 1st Floor, Kawasan Tebusguna Bandar Tg Pinang, Jalan Tg Tokong, Jalan Seri Tg Pinang, Daerah Timur Laut, 10470 Penang.	04 – 890 4370
	13	Senheng Electric (KL) Sdn Bhd	Bukit Jambul No. 12J, 12K & 12L, Jalan Tun Dr. Awang G27, Bukit Jambul, 11900 Penang.	04 – 646 3040
	14	Pusat Pengumpulan Kitar Semula	No. 7, Tingkat Binjai 20, Taman sri Rambai, 14000 Bukit Mertajam	012-4857789
PERAK	1	Enviro Metal Sdn Bhd	No. 85, Pt 38902, Hala Perusahaan Menglembu 15, Kawasan Perindustrian Menglembu, 31450 Ipoh, Perak	05 – 282 6003
	2	Senheng Electric (KL) Sdn Bhd	No. 9 & 9A, 11 & 11A, 13 & 13A, Jalan Pengkalan Utama 1, Taman Pengkalan Utama 31650 Ipoh, Perak	012 – 484 9440
	3	Senheng Electric (KL) Sdn Bhd	431 & 432, Jalan Silibin, Taman Seri Tahan, 30100 Ipoh, Perak	012 – 658 1482
	4	Senheng Electric (KL) Sdn Bhd	No. 505 – 507, Jalan Pasir Puteh, Pasir Puteh, 31650 Ipoh, Perak	012 – 657 9034
	5	Senheng Electric (KL) Sdn Bhd	40 – 42, Lebuh Medan Ipoh, Bandar Baru Medan Ipoh, 31400 Ipoh, Perak	012 – 658 1649
	6	Senheng Electric (KL) Sdn Bhd	No. 1-3, Jalan Medan Taiping, Medan Taiping, 34000 Perak	012 – 658 1624
	7	Senheng Electric (KL) Sdn Bhd	No. 13,15,17,19 Ground Floor, Jalan Kamunting, 34600 Taiping, Perak	012 – 658 8635
	8	Senheng Electric (KL) Sdn Bhd	No. 11A, 15, Jalan Keli, Taman Damai, 34200 Parit Buntar, Perak	012 – 657 9602
SELANGOR	1	Shan Poornam Metals (Selangor) Sdn Bhd	No. 1, Jalan Pendamar 27/90, Seksyen 27, Shaha Alam, 40400 Shah Alam, Selangor	012 – 483 9211
	2	Tan Boon Ming Sdn Bhd	Shah Alam No. 37 & 39, Jalan Mewah 25/63, Taman Sri Muda, 40400 Shah Alam, Selangor	03 – 5121 4122

	3	Senheng Electric (KL) Sdn Bhd	Sri Kembangan No.7, Jalan 7/3A, Kawasan Perindustrian Seri Kembangan, 43000 Serdang, Selangor	012 – 658 2654
	4	Senheng Electric (KL) Sdn Bhd	Shah Alam No. 2A-Jalan 31/54, Kota Kemuning, 40460 Shah Alam	012 – 658 2749
	5	Senheng Electric (KL) Sdn Bhd	Batu Caves No. 10, Jalan Industri Batu Caves 1/1, Taman Perindustrian Batu Caves, 68100 Batu Caves	012 – 703 1440
	6	Senheng Electric (KL) Sdn Bhd	No. 105, Jalan Pelabur B 23/B, Section 23, 40300 Shah Alam, Selangor	012 – 658 0697
	7	Senheng Electric (KL) Sdn Bhd	21, Jalan USJ 10/1F, 47620 UEP Subang Jaya,Selangor	012 – 658 1450
	8	Senheng Electric (KL) Sdn Bhd	1012 & 1014, Jalan Meru, 41050 Klang, Selangor	012 – 658 0957
	9	Senheng Electric (KL) Sdn Bhd	No. 39-G, 39-I, 40-G & 40-I, Jalan Nautika U20/A, Sekyen U20, Pusat Komersil TSB, 40160 Shah Alam, Selangor	012 – 695 4840
	10	Senheng Electric (KL) Sdn Bhd	127, 129 Jalan Sultan Abdul Samad, 42700 Banting, Selangor	012 – 658 0961
	11	Senheng Electric (KL) Sdn Bhd	No. 9 & 11, Jalan SBBC 3, Sungai Besar, Business Centre, 45300 Sungai Besar, Selangor	012 – 337 3440
	12	Senheng Electric (KL) Sdn Bhd	Lot No. F36, F37, F38 & F39, Giant Hypermarket Bandar Kinrara Lot 449, Jalan BK 5A/1, Bandar Kinrara, 47100 Puchong, Selangor	012 – 268 1040
	13	Senheng Electric (KL) Sdn Bhd	Lot F.08, 1st Floor Selayang Mall Shopping Centre, Jalan S U 9, Taman Selayang Utama, 68100 Batu Caves, Selangor	03 – 9285 4544
	14	Senheng Electric (KL) Sdn Bhd	Lot No LG 25A, Lower Ground Floor, Alamanda Putrajaya Shopping Centre, Jalan Alamanda, Precinct 1, 62000 Putrajaya	012 – 657 9745
SELANGOR	15	Senheng Electric (KL) Sdn Bhd	No. 53, 55 & 57, Jalan Bandar Rawang 2, 48000 Rawang, Selangor Darul Ehsan	012 – 658 1264
	16	Senheng Electric (KL) Sdn Bhd	7G & 8G, Plaza Citra, Jalan Citra, Kajang, 43000 Kajang	012 – 657 9721
	17	Senheng Electric (KL) Sdn Bhd	Lot 465 & 493, Mukim of Cheras, Jalan Balokong, 43200 Batu 11 Cheras, Selangor	03 – 9285 4555
	18	Senheng Electric (KL) Sdn Bhd	35 & 36G, Jalan Medan PB4, Seksyen 9 Pusat Bandar Baru Bangi, 43650 Selangor	012 – 631 1040
	19	Senheng Electric (KL) Sdn Bhd	F14 & F15 Giant Hypermarket, Kelana Jaya Jalan SS6/12, 47301 Petaling Jaya.	012 – 658 0854
	20	Senheng Electric (KL) Sdn Bhd	Lot 3F-18A, 3F-23A and F-25, 3rd Floor SACC Mall, Precint 1.1 & Precint 1.2, Jalan Perbadanan 14/9, Seksyen 14, 40000 Shah Alam.	012 – 658 1094

	21	Senheng Electric (KL) Sdn Bhd	Lot F23-23A, IOI Mall, Batu 9, Jalan Puchong, Bandar Puchong Jaya, 47100 Selangor	012 – 658 0715
	22	Senheng Electric (KL) Sdn Bhd	No 29C, 29D, 29E, Jalan Dinar G U3/G, Taman Subang Perdana, Seksyen U3, 41050 Shah Alam, Selangor	012 – 694 2440
KL	1	Tan Boon Ming Sdn Bhd	Jalan Klang Lama PS-1, Taman Evergreen,Batu 4, Jalan Klang Lama,58100 Kuala Lumpur	03 – 7983 2020
	2	Tan Boon Ming Sdn Bhd	Bangsar Village Unit No. LG-6, Lower Ground Floor, Jalan Telawi Satu, Bangsar Baru, 59100 Kuala Lumpur	03 – 2287 4818 /4819
	3	Tan Boon Ming Sdn Bhd	Cheras Furniture City Lot No. 51449, Block A1 & A2, Batu 5/12, Jalan Cheras, 56100 Kuala Lumpur	03 – 9132 1975
	4	Tan Boon Ming Sdn Bhd	KL Festival City Lot No. F-27, First Floor, Jalan Taman Ibu Kota, Taman Danau Kota, Setapak , 53300 K. Lumpur	03 – 4131 6263
	5	Senheng Electric (KL) Sdn Bhd	Lot L2-7, Level 2, Cheras Leisure Mall, Jalan Manis 6, Taman Segar Cheras, 56100 Kuala Lumpur	012 – 658 0734
	6	Senheng Electric (KL) Sdn Bhd	Lot No. F1, F2, F3, First Floor, Hartamas Shopping Centre 60, Jalan Sri Hartamas 1, Sri Hartamas, 50480 Kuala Lumpur	012 – 657 9350
	7	Senheng Electric (KL) Sdn Bhd	40 & 40-1, 42&42-1, Block C, Vista Magna, Batu 7, Jln Kepong, Kepong, 52100 Kuala Lumpur	012 – 658 0794
KL	8	Senheng Electric (KL) Sdn Bhd	LG 8, Parkson Grand, The Mall, 100 Putra Place, Jalan Putra, 50350 Kuala Lumpur	012 – 658 0287
	9	Senheng Electric (KL) Sdn Bhd	36-38, Jalan Pandan 2/1, Pandan Jaya, 55100 Cheras, Kuala Lumpur	012 – 658 0197
	10	Senheng Electric (KL) Sdn Bhd	171 & 173, Jalan Sarjana, Taman Connaught, off Jalan Cheras, 56000 Kuala Lumpur	012 – 658 0276
	11	Senheng Electric (KL) Sdn Bhd	Lot F49 & F50, First Floor, AEON AU2 Shopping Centre No.6, Jalan Taman Setiawan (Jln 37/56), AU2 Taman Keramat, 54200 Kuala Lumpur	012 – 618 5440
	12	Senheng Electric (KL) Sdn Bhd	Diamond Square No. 15 & 17, Jalan 2/50, Jalan Gombak, BT 3 1/2 Setapak, 53000 Kuala Lumpur	012 – 658 0542
	13	Senheng Electric (KL) Sdn Bhd	55 & 57, Jalan Radin Bagus, Sri Petaling, 57000 Kuala Lumpur	012 – 658 1462
	14	Senheng Electric (KL) Sdn Bhd	61-63, Jalan 46A/26, Rampai Town Centre, 53300 K. Lumpur	012 – 658 0571
	15	Senheng Electric (KL) Sdn Bhd	No. 15-0 & 13A-0 (Ground Floor), Platinum Walk, No. 2, Jalan Langkawi, Setapak, 53000 Lake City, KL	012 – 659 4404

MELAKA	1	Senheng Electric (KL) Sdn Bhd	NO 105-107 Jalan PM2, Taman Perindustrian Merdeka, Batu Berendam 75350 Melaka	012 – 658 3251
	2	Senheng Electric (KL) Sdn Bhd	16-18, Jalan Seri Mangga 1/2, Taman Seri Mangga, 75250 Melaka	012 – 657 9457
	3	Senheng Electric (KL) Sdn Bhd	No. 43, 43-1 & 43-2, Jalan BBP 1, Taman Bt Berendam Putra, 75350 Melaka	012 – 657 9465
	4	Senheng Electric (KL) Sdn Bhd	No. G-3 & 1-3, (PT7711, 7712 & 7713), Mukim Cheng, Jalan Cheng Perdana 1/1, Taman Desa Cheng Perdana 1, Cheng, 75250 Melaka	012 – 657 9325
JOHOR	1	Shan Poornam Metals (Johor) Sdn Bhd	No. 39, Jalan Murni 4, Taman Perindustrian Murni Senai, 81400 Senai, Johor	07 – 590 9863
	2	Green Future Enterprise	No.6, Jalan Keembong 27, Taman Johor Jaya, 81100 Johor Bahru	
	3	DST Solution Sdn Bhd	L3-35, 36, 37, Level 3 Danga City Mall , Jalan Tun Razak, 80000 Johor Bahru	07-221 0976
	4	Senheng Electric (KL) Sdn Bhd	LOT AT09, Giant Hypermarket, Jalan Masai Lama, Plentong, 81750 Johor Baru, Johor	017-7978977
	5	Senheng Electric (KL) Sdn Bhd	L2-036 Sutera Mall, No. 1 Jalan Sutera Tanjung 8/4, Taman Sutera Utama, 81300 Skudai, Johor Bahru.	012 – 728 8404
JOHOR	6	Senheng Electric (KL) Sdn Bhd	No. 63, 64, 65, Jalan Sejambak 14, Taman Bukit Dahlia, 81750 Pasir Gudang, Johor	012 – 524 0409
	7	Senheng Electric (KL) Sdn Bhd	No. 1, Jalan Sultan, 86000 Kluang, Johor	012 – 657 9654
	8	Senheng Electric (KL) Sdn Bhd	No. 16, 16A, 18,18A, 20, 20A, Jalan Setia 7/18, Taman Setia Indah, 81100 Johor Bahru	012 – 658 8171
	9	Senheng Electric (KL) Sdn Bhd	Lot No. M21 & M22, Tesco Kulai, No. 52 Taman Desamas, Batu 22½ Jalan Kulai – Air Hitam, 81000 Kulai, Johor	012 – 740 2440
	10	Senheng Electric (KL) Sdn Bhd	No. 12 (Ground Floor) & No. 13 (Ground & First Floor), Jalan Susur 2/1 Taman Utama, Bandar Baru, 85000 Segamat, Johor	012 – 681 6040
	11	Senheng Electric (KL) Sdn Bhd	Lot F01, First Floor, Jusco Tebrau City Shopping Centre, No. 1, Jalan desa Tebrau, Taman Desa Tebrau, 81100 Johor Bahru	012 – 657 9415
	12	Senheng Electric (KL) Sdn Bhd	Lot No. 1.61, First Floor, 303B, Jalan Kluang, 83000 Batu Pahat, Johor	012 – 658 3462
PAHANG	1	Senheng Electric (KL) Sdn Bhd	No. 90, 91 & 92, Jalan Tengku Ismail, 28000 Temerloh, Pahang	012 – 658 2415
	2	Senheng Electric (KL) Sdn Bhd	S-19, S-20 & S-21 (Tgkt Bawah), & C-21 (Tgkt Atas), Jalan Benom, Bandar Baru, Jerantut, Pahang.	012 – 658 2495

	3	Senheng Electric (KL) Sdn Bhd	B102, B104, B106, B108, Jalan Tun Ismail, Sri Dagangan Kuantan, 25000 Kuanatan	012 – 658 2395
	4	Senheng Electric (KL) Sdn Bhd	Ground Floor B897, 899, 901, Jalan Bukit Ubi, 25000 Kuantan	012 – 981 0443
	5	Senheng Electric (KL) Sdn Bhd	No. 34, Jalan 1M 3/3, Mahkota Industrial Park, Bandar Baru Indera Mahkota, 25200 Kuantan	012 – 658 3076
NEGERI SEMBILAN	1	Senheng Electric (KL) Sdn Bhd	1F-29-30, 1st Floor Seremban Palm Mall, Jalan Toman 1, Kemayan Square, 70200 Seremban, Negeri Sembilan	06 – 765 6322
	2	Senheng Electric (KL) Sdn Bhd	F21 &F22, Tesco Seremban 2, PT2374, Pekan Bukit Kepayang, Daerah Seremban, 70300 Negeri Sembilan	012 – 657 7885
	3	Senheng Electric (KL) Sdn Bhd	1st Floor 31, Jusco Seremban 2 Shopping Centre, 112 Persiaran S2 B1 Seremban 2, 70300 Seremban	012 – 657 9516
	4	Senheng Electric (KL) Sdn Bhd	Lot 12176 & 12177, Jalan BBN 1/1F, Putra Point, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan	012 – 658 2591
TERENGGANU	1	Senheng Electric (KL) Sdn Bhd	1049-I, G/Floor, Wisma Ladang, Jalan Sultan Sulaiman, 20000 Kuala Terengganu	012 – 658 2534
	2	Senheng Electric (KL) Sdn Bhd	Lot-9941/9942 Sura Gat, Business Centre, Jalan Yahaya Ahmad, 23000 Dungun, Terengganu	012 – 658 2514
	3	Senheng Electric (KL) Sdn Bhd	PT 11268 (G), Tingkat 1129 (G), Tingkat 1 & 2, Taman Cukai Utama, Jalan Kubang Kurus, 24000 Kemaman, Terengganu	012 – 658 2436
KELANTAN	1	Senheng Electric (KL) Sdn Bhd	1857-8, Paya Bemban, Jalan Hospital, 15400 Kota Bahru, Kelantan	012 – 981 2440
	2	Senheng Electric (KL) Sdn Bhd	Lot 678, Jalan Kampung Teluk Panji, 16100 Kota Bahru, Kelantan	012 – 981 2440
	3	Senheng Electric (KL) Sdn Bhd	L/341, T/B Kedai Jalan Padang Garong, Bnagunan MBSB, 15000 Kota Bahru, Kelantan	
	4	Senheng Electric (KL) Sdn Bhd	Lot 243, Jalan Hospital, 17500 Tanah Merah, Kelantan	012 – 658 0291
	5	Senheng Electric (KL) Sdn Bhd	PT1607 & PT 1608 (Ground Floor), Jalan KK 6, Bandar Baru Kubang Kerian, 16150 Kota Bharu, Kelantan	012 – 985 7440
	6	Senheng Electric (KL) Sdn Bhd	Lot 41A & 1.61A, 1st Floor, 1-888 KB Mall Jalan Hamzah, 15050 Kota Bharu, Kelantan	012 – 658 2584

HAZARDOUS SUBSTANCES DIVISION
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添付資料４

家庭系 E-waste のリサイクル･ガイドライン

GUIDELINE

Recycling of Scheduled E-waste in Malaysia

Department of Environment (DOE) Malaysia

Japan International Cooperation Agency (JICA)

1

TABLE OF CONTENTS

Guideline on Recycling of Scheduled E-waste in Malaysia

1.0 PREAMBLE

Electrical and electronic waste (commonly known as E-waste), is growing exponentially worldwide because of tremendous growth of the demand on the use of electrical and electronic equipment. The disposal of E-waste is of big concern discussed at international arena, because of the nature of hazardousness of the waste and drastically increased volume of its disposal in a globalized world.

Note:

"E-waste" referred to SW110 as stipulated in the First Schedule of Environment Quality (Scheduled Waste) Regulations 2005.

"Electrical and electronic equipment "means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in First Schedule of the regulations;

Improper handling of E-waste poses high risk of pollution, health impacts and causes incidents of illegal disposal. The lack of proper environmental precaution measures in E-waste management could cause enormous environmental issues such as release of chlorofluorocarbon (CFC) gases that cause ozone depletion, global warming and contaminations from other hazardous/toxic substances.

In Malaysia, E-waste is generally divided by two main types of generation sources, i.e. E-waste generated from the industrial sectors, and E-waste generated from the non-industrial sectors, mainly households, commercial and institutional entities.

E-waste from industrial sector is categorized as Scheduled Wastes under the Code SW110, First Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005. The categories of E-waste defined under this coding are only covering E-waste generated from the industrial sectors, including electrical and electronic industries, as well as other industrial generators.

The management of E-waste generated from non-industrial sectors, especially household and other entities such as commercial and institutional entities is now regulated under a newly enacted regulation known as the Environmental Quality (Scheduled E-Waste) Regulation 20XX, which defines scheduled E-waste in which the six targeted categories of E-waste are designated.

Scheduled E-waste requires a different management system as compared to the E-waste generated from the industrial sector, particularly from the financial perspective where significant costs are required for collection and transportation, as well as to comply with the proper environmental precaution standards. Therefore, scheduled E-waste shall only be processed or treated by scheduled E-waste recyclers, which are licensed by the DOE.

This Guideline shall be read together with the Environmental Quality (Scheduled E-waste) Regulations 20XX.

2.0 ABOUT THE GUIDELINE

Under the framework of the Environmental Quality (Scheduled E-Waste) Regulations 20XX, it is emphasized that all the scheduled E-wastes shall be channeled, collected and delivered through a formal/authorized flow of stakeholders to the final destination of proper treatment, recycling and recovery in an environmentally sound system. Each respective player has their own roles and responsibilities, and the cost involved in the entire system shall be shared among all the stakeholders.

This Guideline provides a list of requirements for the users, who are directly involved in specific activities dealing with scheduled E-waste, particularly on the activities of recycling. It provides practical guidance to the recyclers how to comply with the Environmental Quality (Scheduled E-waste) Regulations 20XX.

The categories of E-waste covered under this Guideline are the list of Scheduled E-waste under the First Schedule of the Environmental Quality (Scheduled E-waste) Regulations 20XX including:

(a) Televisions;
(b) Air Conditioners;
(c) Computers;
(d) Refrigerators;
(e) Washing Machines/Cloth Dryers; and
(f) Mobile phones and tablet PCs.

The users of this Guideline shall always refer to the Environmental Quality (Scheduled E-Waste) Regulations 20XX as the main text to ensure complete understanding of the entire requirements under the regulations, as well as the clauses of the Environmental Quality Act (1974) as the Mother Act.

2.1 Scope of the Guideline

This guideline shall apply to all those who are engaged in recycling of the scheduled E-waste, regardless of whether they are individual persons, companies, organizations, or any other entities. The term “Recycling” is defined, in this Guideline, as follows:

For the purpose of this Guideline **“Recycling of scheduled E-waste”** means the following acts:

i. The act of separating and/or dismantling components and/or materials from electric and electronic appliances which have become waste and using them as components or raw materials for products; and
ii. The act of separating and/or dismantling components and/or materials from electric and electronic appliances that have become waste and converting them into a state in which they may be transferred with or without charge to a person who uses them as components or raw materials for products.

In the definition of “Recycling” above, “Thermal Recycling” is excluded. “Thermal Recycling” is defined as:

i. The act of producing heat from components and/or materials separated from the scheduled E-waste, or
ii. The act of converting components and/or materials separated from the scheduled E-waste into a state in which they may be transferred with or without charge to a person who produces heat from them.

The acts of “Reuse” and “Repair”, as defined below respectively, are not subject to control under this Guideline.

For the purpose of this Guideline, **“Reuse”** means the act of using again the second-hand electric and electronic appliances for its original purpose (conventional reuse) or for a different function without any separation and/or dismantling of components and/or materials.

For the purpose of this Guidelines, **“Repair”** means the act of fixing or mending a broken, damaged, or non-working electric and electronic appliances to an acceptable operating, working, or usable condition or state.

2.2 Description of Stakeholders

The users of this Guideline are expected to be all relevant stakeholders who are involved in recycling of the scheduled E-waste as listed in the section 2.0 above.

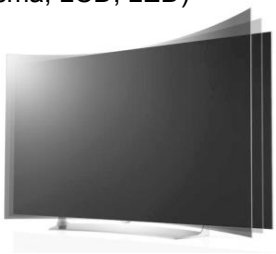
The table below clarifies the relevance of the existing stakeholders that may be partially or fully engaged in recycling of scheduled E-waste in terms of the compliance with this Guideline.

Types of Stakeholders	Relevance to the Recycling Guideline
Collectors	▪ Any activities of separation or dismantling of the components and/or materials from the E-waste are subject to control under this Guideline.
Repair shop	▪ In case the shop cannot repair the received electric and electronic appliances and keep them in the shop, they will be regarded as E-waste. Therefore, any activities of separation or dismantling of the components and/or materials from them are subject to control under this Guideline. ▪ In case the shop repaired a still working or broken electric or electronic appliance and return it to the customer or resale it, such activities are not subject to the control under this Guideline. ▪ When the shop replaces some parts or components of the electric and electronic appliances for the purpose of repair, such activity is not subject to control under this Guideline. However, the remaining parts and/or components after dismantling the reusable ones may be regarded as E-waste to be properly handled in accordance with this Guideline and the Environmental Quality (Scheduled E-waste) Regulations 20XX, depending on their types. ▪ Any separation and/or dismantling of components and/or materials not for repair/reconditioning purpose is subject to the control under this Guideline.
Secondhand shop	▪ Resale of the used electric and electronic appliances is not subject to the control under this Guideline. ▪ Any activities of repair/reconditioning of the used electric and electronic appliances before resale is not subject to the control under this Guideline. ▪ The remaining parts and/or components after dismantling the reusable ones may be regarded as E-waste to be properly handled in accordance with this

Types of Stakeholders	Relevance to the Recycling Guideline
	Guideline and the Environmental Quality (Scheduled E-waste) Regulations 20XX, depending on their types. ▪ Any separation and/or dismantling of components and/or materials not for repair/reconditioning purpose is subject to the control under this Guideline.
Partial/Full recovery facility	▪ As far as the scheduled E-waste defined in the Environmental Quality (Scheduled E-waste) Regulation 20XX is concerned, both partial and full recovery facilities currently authorized by DOE are required to follow this Guideline.

2.3 Categories of Scheduled E-waste

The target categories of scheduled E-waste subject to this Guideline are basically the 6 main categories specified in the First Schedule of the Environmental Quality (Scheduled E-waste) Regulations 20XX, excluding the small appliances, fluorescent lamps and rechargeable batteries. The 6 main categories of scheduled E-waste are listed as follows with their sub-categories:

No	Categories	Sub-categories
1	Televisions	CRT Televisions  
		Flat Televisions (Plasma, LCD, LED)  
2	Air-conditioners	Window Units  

No	Categories	Sub-categories
		Split units Ceiling Unit 
		Mobile units 
3	Computers	LCD Desktop CRT Desktop 
		Laptop 
4	Refrigerators	Refrigerators 

No	Categories	Sub-categories
		Freezers 
		Chillers 
5	Washing Machines/ Cloth Dryers	Washing machines 
		Cloth Dryers 
6	Mobile phones and Tablet PCs	Mobile phones 

No	Categories	Sub-categories
		Tablet PCs 

2.4 Principal Framework of Scheduled E-waste Management

Scheduled E-waste management is regulated under the Environmental Quality (Scheduled E-waste) Regulations 20XX, which emphasizes the concept of "shared responsibilities" among the players, with implementation of the principle of Extended Producer's Responsibility (EPR).

Under the framework of scheduled E-waste management, the manufacturers and importers of electrical and electronic appliances have the financial obligation to pay the "Recycling Fee (contribution)" which is to be determined by the Department of Environment (DOE) in accordance with the mandate provided in EQA. The "Recycling Contribution" shall be channeled to the "Environment Fund" which is established under EQA and utilized to cover the cost of scheduled E-waste collection, transportation, recycling, or any other purposes in accordance with the requirement to be determined by the Director General of DOE.

The Department of Environment (DOE) shall have the primary responsibility for environmentally sound and sustainable management of scheduled E-waste under their authority of controlling all the relevant stakeholders.

All the households and business entities, who generate scheduled E-waste defined in the Environmental Quality (Scheduled E-waste) Regulations 20XX, have the responsibility to make sure they hand over their E-waste to the authorized collectors.

The legal framework of scheduled E-waste management consists of 3 (three) key flows, namely "E-waste", "Fee (Money)", and "Information (Reporting)", as summarized below.

E-waste Flow	Determines the right channel of scheduled E-waste that starts with collection from generation points to authorized collection centers, collectors, retailers, and ends with the licensed scheduled E-waste recycling facilities or final disposal. The regulation requires all the collectors of scheduled E-waste to register with DOE while all the recyclers to apply for the licenses to manage scheduled E-waste.
Fee (Money) Flow	Determines how the recycling fee (contribution) is collected and channeled to the "Environmental Fund" for various purposes of disbursements to ensure environmentally sound and sustainable management of scheduled E-waste.
Information (Reporting) Flow	Determines the information / data flow through proper reporting by relevant players (manufacturers/importers, collectors, transporters, and recyclers) The scheduled E-waste manifest system is introduced for actual flow tracking of E-waste from collectors to the recyclers. The reporting and manifest system integrally avoid leaking of E-waste into the informal sectors, and ensure that proper data is captured for determination of total recycling fees to be collected and proper amount of subsidy to be provided.

Detailed description of the 3 (three) key flow is respectively given below.

2.4.1 Scheduled E-waste Flow

The sources of scheduled E-waste include households, commercial, industrial, and institutional entities, and any other sources that generate the same categories of scheduled E-waste, listed in Section 2.3 of this guideline.

Under the framework of scheduled E-waste management, all generators are required to discard their scheduled E-waste to the collectors authorized by DOE, which could be a retailer shops, recycling centers, NGOs, municipal waste collection concessionaire companies, local government, or any other authorized persons. Any flow of scheduled E-waste from generators to unauthorized collectors is prohibited.

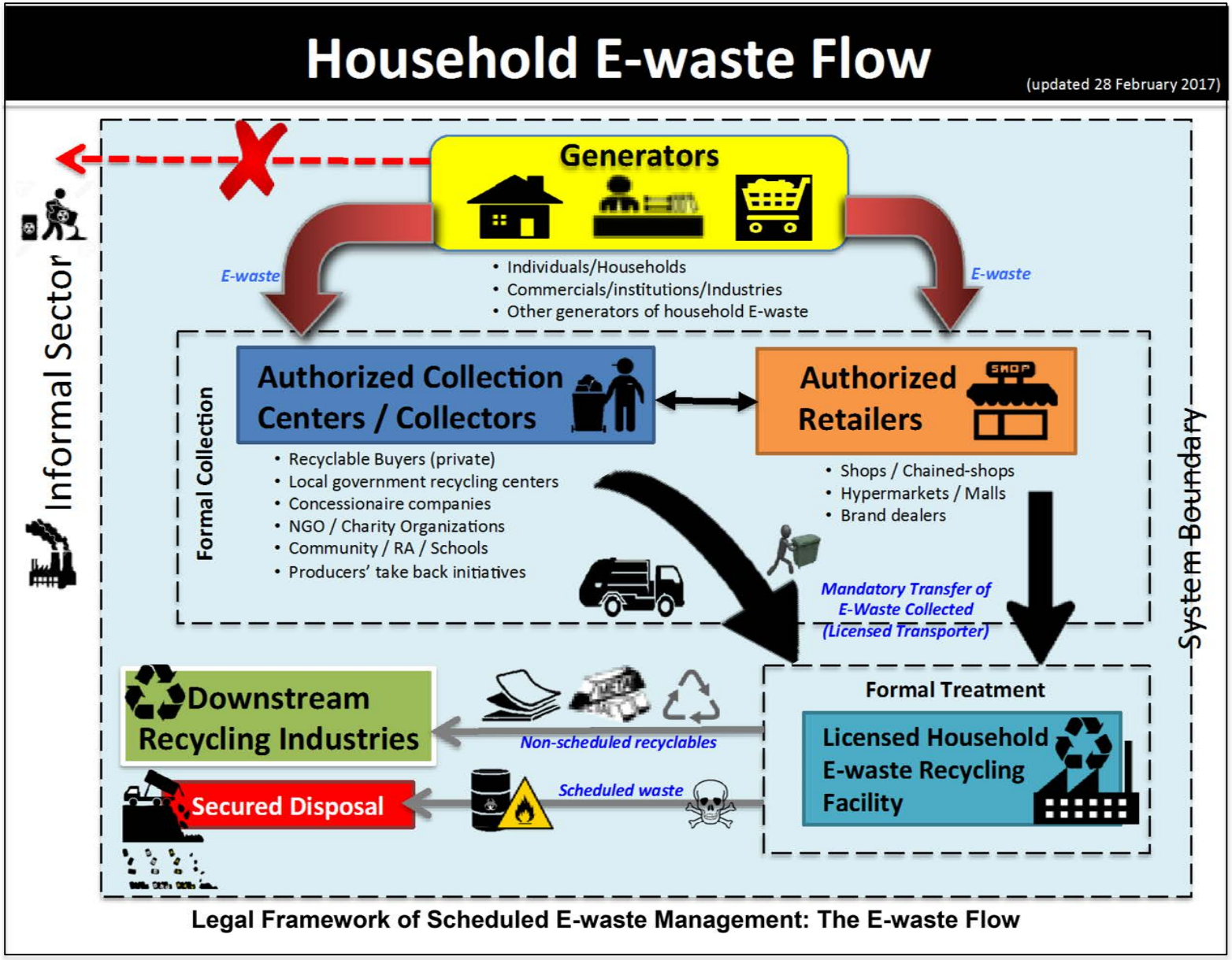
The collected scheduled E-waste by the authorized collectors must be channeled to the scheduled E-waste recyclers licensed by the DOE, to ensure proper treatment and recycling of scheduled E-waste in an environmentally sound manner. In case where the authorized collectors are not able to channel the collected scheduled E-waste directly to the licensed recyclers due to logistic or any other factors such as small retailers, the collected scheduled E-waste shall be delivered to another authorized collectors that have capability to channel the E-waste in larger volume to the licensed scheduled E-waste recyclers.

The licensed scheduled E-waste recyclers shall fulfill the requirements set in this Recycling Guideline in their recycling operation. The first requirement of the Recycling Guideline is to ensure proper management of “Focused Materials” for each scheduled E-waste item. Focused Materials are the specific components or parts of or substances contained in scheduled E-waste items that are defined as potentially hazardous to human health and/or environment if they are improperly handled. Examples of such materials include funnel glass of cathode-ray tube (CRT) TV, printed circuit board, refrigerant used in air conditioners and refrigerators, lithium ion batteries, and so forth. The Recycling Guideline provides handling methods of focused materials in recycling process of each scheduled E-waste.

Another requirement set in the Recycling Guideline is the minimum recycling rate to be fulfilled by the licensed scheduled E-waste recyclers. For each type of scheduled E-waste, the Guideline set different minimum weight-based recycling rate target that each licensed recycler must comply in its recycling operation.

Under the scheduled E-waste management mechanism, the scheduled E-waste is expected to flow from the generation points into proper recycling system run by the authorized collectors and licensed recyclers. Any outflow of household E-waste from the new mechanism will be considered illegal and subject to legal punishment.

The chart on next page illustrates the E-waste flow under the new scheduled E-waste management mechanism.



Legal Framework of Scheduled E-waste Management: The E-waste Flow

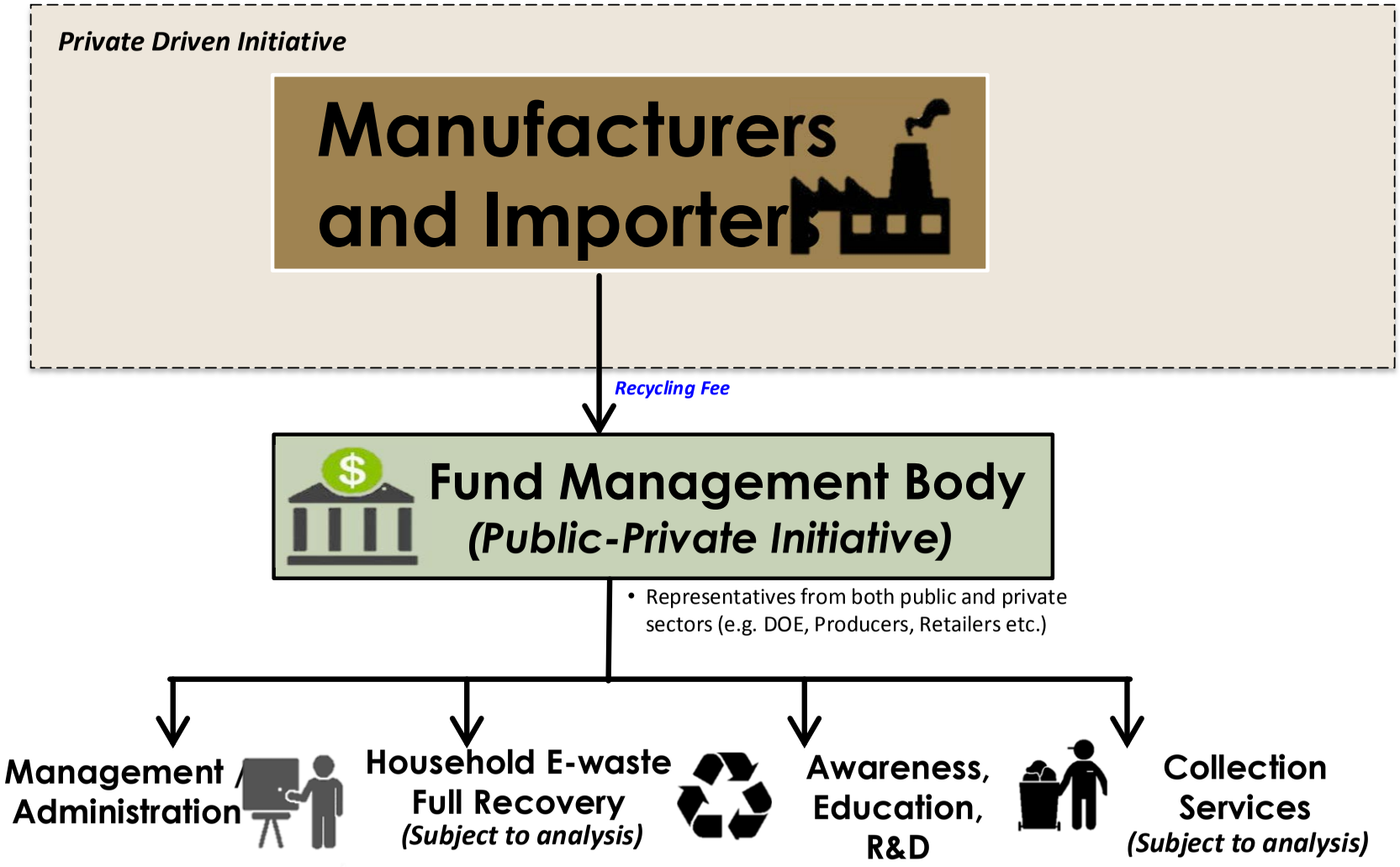
2.4.2 Fee Flow

It is important to understand that recycling of scheduled E-waste does not always yield revenues but it involves significant costs particularly when taking into consideration the logistic cost and environmental protection cost such as destruction of chlorofluorocarbon (CFC) gases, various pollution control measures, as well as treatment and disposal of hazardous substances. The overall cost required to ensure that the scheduled E-waste is properly channeled and processed in an environmentally sound manner shall be shared among all those who receive benefits from the relevant E-appliances.

Under the new scheduled E-waste management mechanism, the manufacturers and importers or any other individuals and entities who put the designated E-appliances into the Malaysian market shall pay the "Recycling Fee (Contribution)" to represent all the stakeholders to be benefited from proper management of the scheduled E-waste. The Recycling Fee (Contribution) will be collected by the so-called "Recycling Contribution Management Body (RCMB)", which is established as the independent organization to finance overall mechanism of scheduled E-waste management in Malaysia including provision of subsidy to the necessary activities of the licensed scheduled E-waste recyclers, authorized collectors, and other possible stakeholders of the new scheduled E-waste management mechanism, which will be determined by RCMB.

In accordance with the principle of "Shared Responsibilities", the required cost for proper management of scheduled E-waste should be shared among all the relevant stakeholders who receive benefits from the relevant E-appliances, including manufacturers, importers, wholesalers, retailers, and consumers. In this scheduled E-waste management mechanism, the manufacturers and importers temporarily shoulder this cost by paying the recycling fees. Therefore, it is given to the individual decisions of manufacturers and importers whether and how they would share this financial responsibilities with other stakeholders.

The recycling fee (contribution) determined for each item of scheduled E-waste will be different, reflecting various cost factors involved in their collection and recycling. Details of fee structures to be paid by the manufacturers and importers by each scheduled E-waste are described in Recycling Fee Guideline.



Legal Framework of Scheduled E-waste Management: The Recycling Fee Flow

2.4.3 Reporting Flow

Proper reporting system is an essential tool to monitor and ensure proper scheduled E-waste flow and recycling fee flow as elaborated in Section 2.4.1 and 2.4.2 above.

The new scheduled E-waste management mechanism mainly consists of two types of reporting system. i.e. reporting by the manufacturers and importers of the designated E-appliances and reporting by the stakeholders involved in collection and recycling of scheduled E-waste.

The purpose of reporting by the manufacturers and importers is to identify the volume and amount of the designated E-appliances put into the Malaysian market. The manufacturers and importers have the obligation to periodically report to the RCMB on the volume of designated E-appliances put on the Malaysian market by each item. This data will be the baseline for forecasting the present and future generation of E-waste in the long run while it will be also used as an important factor in determining the recycling fee to be paid by the manufacturers and importers (Detail formula of determining the recycling fee is provided in the "Recycling Fee Guideline".)

On the other hand, the reporting by the collectors and recyclers aims at ensuring proper flow of the scheduled E-waste from generation sources to their final destinations. The new scheduled E-waste management mechanism introduced the so-called "E-waste manifest system" to trace the flow of each E-waste item from collection points to their final destinations. The manifest system comprises 6-ply of manifest forms, which shall be filled out and kept by respective stakeholders following the methods as detailed in "E-waste Reporting Guideline". Reporting mechanism under the manifest system is summarized as below:

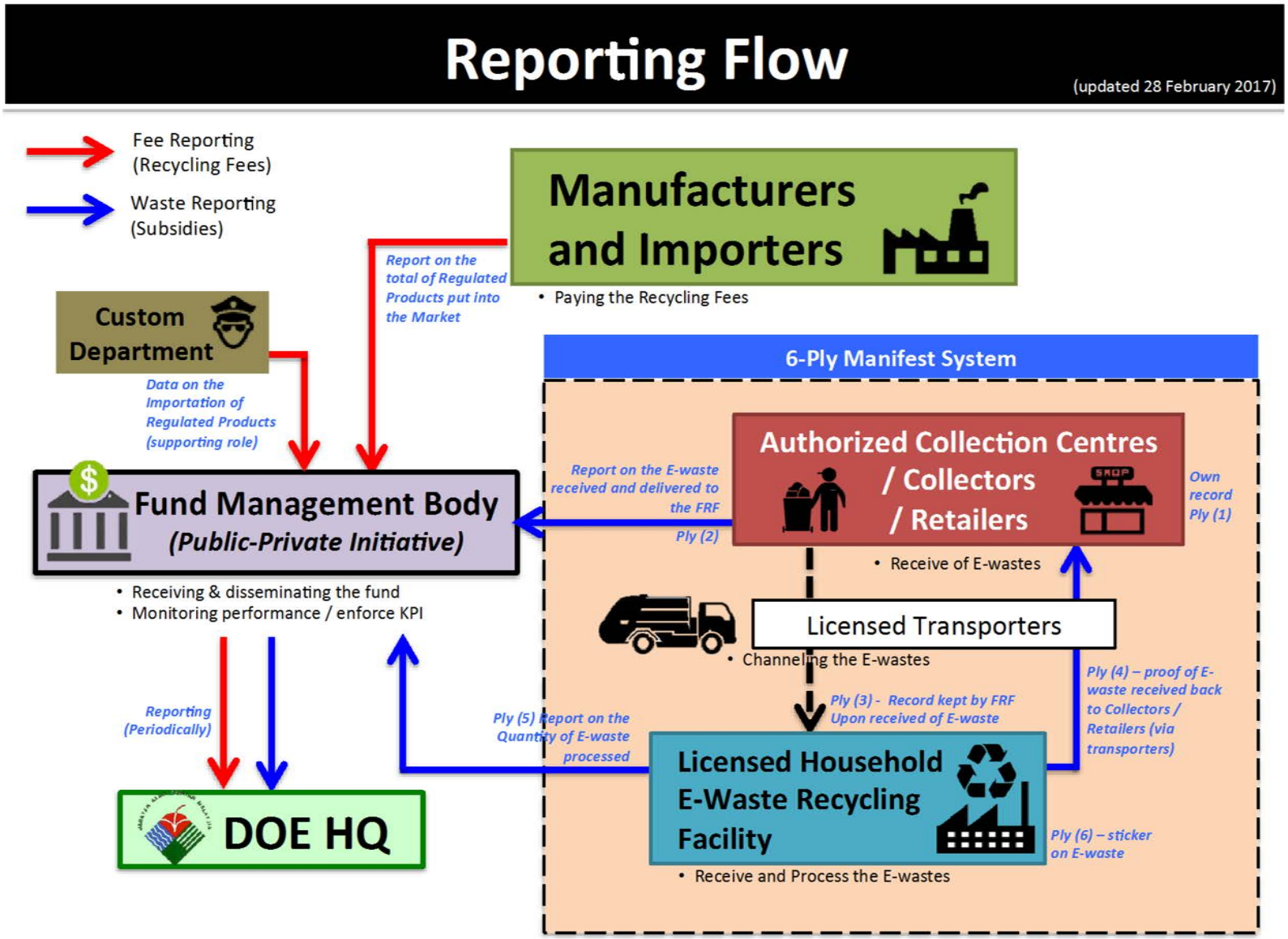
a) The authorized collectors shall fill out one manifest form for each of E-waste item collected. At the time of handing it over to the authorized transporters or licensed recyclers, they return 1-ply of manifest to the RFMB while keeping one copy and attaching the remaining copies to each E-waste item to be handed over.

b) When the authorized transporters receive E-waste with manifest form attached, they shall fill out the necessary parts of the manifest form. At the time of sending out the received E-waste to the licensed recyclers, they shall return 1-ply of manifest to RFMB while keeping one copy and attaching the remaining copies to each E-waste item they sent out.

c) When the licensed scheduled E-waste recyclers receive scheduled E-waste from authorized collectors or transporters with their manifest forms attached to each E-waste item, they shall fill out the necessary parts of the manifest forms. After completing all the recycling and treatment process, the licensed recyclers shall return to RFMB 1-ply of manifest form of each E-waste item they recycled while keeping 1 copy under their hand for each E-waste item.

d) RFMB shall cross-examine the manifest forms returned by collectors, transporters and recyclers to ensure proper flow of each scheduled E-waste from primary collectors to the recyclers. After confirmation on completion of the overall flow, RFMB will make disbursement of the fund (subsidy) to the relevant stakeholders above.

The manifest system directly links with subsidy disbursement mechanism run by RFMB. RFMB shall make disbursement of the subsidy only upon reception of all manifest forms from relevant stakeholders. Manifest form is utilized as the written evidence of proper recycling of each E-waste.



Legal Framework of Scheduled E-waste Management: The Reporting Flow

3.0 REQUIREMENT FOR SCHEDULED E-WASTE RECYCLERS

In general, the Environmental Quality (Scheduled E-waste) Regulations 20XX outlines the responsibilities of different stakeholders throughout the entire flow of scheduled E-waste management from generation to final destinations. Any person who contravenes the regulation shall be guilty of an offence and shall be liable to a fine or to a term of imprisonment for a period as stipulated in the Regulations.

This Guideline focuses particularly on the stakeholders involved in recycling of the scheduled E-waste. It is to ensure that the scheduled E-waste is recycled in an environmentally sound and sustainable manner and in maximizing the use of recyclable resources in each E-waste.

Any individual or entity involved in recycling of the scheduled E-waste is defined in this Guidelines as "Scheduled E-waste Recycler".

3.1 Requirement for obtaining the License of Scheduled E-waste Recycler

Any individual or entity intending to carry out recycling of the scheduled e-waste defined in "Scheduled E-waste Regulations 20XX" must obtain the license of scheduled E-waste recycler from the Department of Environment (DOE) before starting its recycling operation.

In accordance with the "Scheduled Waste Regulation 2005", the scheduled E-waste recycler must hold the license of dealing with the schedule waste categorized as SW 110 in the Regulation above.

3.1.1 Licensing Procedure

(1) Submission of license application form

Any applicant of scheduled E-waste recycler must submit to DOE the prescribed application form for the review and decision by DOE on issuance of the license. The applicant must clearly describe how to comply with the Recycling Guideline by filling out the application form in accordance with the requirement and guidance in the form (See Appendix A of this Guideline).

(2) Review and evaluation of the application by DOE

Every application form shall be reviewed and evaluated by DOE to make decisions regarding issuance of the license. DOE may conduct interview to the applicant as well as on-site inspection of the recycling facilities in this review and evaluation process. In case the submitted applications does not satisfy the requirement to be scheduled E-waste recyclers, DOE may request applicants revision of the applications and shall not issue the license until such request is met by the applicants.

(3) Issuance of license

If DOE decides that the applicant has sufficient capacity and capability to recycle scheduled E-waste, it will officially issue the written license to the applicant. At the time of issuing the license, license fee will be charged to the applicant to cover the cost of document processing and control.

The above license shall be granted by each E-waste item. Therefore, the applicant can apply for obtaining the license by each item discretely or collectively.

3.1.2 Duration and renewal of licenses

The license of scheduled E-waste recycler is valid for 1 (one) year from the date of its issuance and may be renewed every year upon request of the license holder and review of the recycling performance by DOE.

3.2 Requirement regarding Focused Materials management

The licensed scheduled E-waste recyclers must follow the requirement regarding the handling and management of so-called focused materials defined in this Guideline for each E-waste item. Any violation of this requirement shall result in no disbursement of recycling subsidy from RFMB and even legal punishment depending upon its severity in accordance with the relevant laws and regulations.

3.2.1 Focused Materials (FMs) in Scheduled E-waste

FMs are the specific components or parts of or substances contained in scheduled E-waste items that are defined as potentially hazardous to human health and/or environment if they are improperly handled. The Guideline provides the rules of handling these focused materials in each targeted E-waste item. The table below provides the types of focused materials with the potentially hazardous substances contained in each E-waste item.

E-waste Items	Focused Materials	Hazardous Substances
Television	CRT monitor	▪ Lead (Pb)
	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	Capacitor (old type)	▪ Polychlorinated biphenyl (PCB)
	Florescent tube (flat TV)	▪ Mercury (Hg)
	Liquid-crystal display	▪ Antimony (Sn), Arsenic (As)
	Plasma display	▪ Lead (Pb)
Refrigerator	Refrigerant (in compressor)	▪ Fluorocarbon
	Foaming agent for heat insulating material	▪ Fluorocarbon
	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
Air conditioner	Refrigerant	▪ Fluorocarbon
	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	Capacitor (old type)	▪ Polychlorinated biphenyl (PCB)
Washing machine/dryer	Refrigerant (heat pump type dehumidifier or dryer)	▪ Fluorocarbon
	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	Capacitor (old type)	▪ Polychlorinated biphenyl (PCB)
Personal computer	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	CRT monitor	▪ Lead (Pb)
	Florescent tube (flat TV)	▪ Mercury (Hg)
	Liquid-crystal display	▪ Antimony (Sn), Arsenic (As)
	Plasma display monitor	▪ Lead (Pb)
	Rechargeable battery	▪ Cadmium (Cd), Lead (Pb)
	Button batteries	▪ Mercury (Hg)
Mobile Phone	Printed circuit board	▪ Lead (Pb), Cadmium (Cd), etc.
	Rechargeable battery	▪ Cadmium (Cd), Lead (Pb)
	Florescent tube	▪ Mercury (Hg)
	Liquid-crystal display	▪ Antimony (Sn), Arsenic (As)

3.2.2 Handling and Management Rules of Focused Materials

(1) CRT Monitor (TV, PC monitor)

① **Prohibition of recycling funnel part of CRT glass**

As the funnel glass of CRT monitor contains lead, it must be sent to the licensed schedule waste treatment/disposal facilities. Other parts of CRT monitor, such as panel glass of CRT monitor and plastic casing can be recycled as long as the recycler can properly separate (such as by cutting) it from lead-containing funnel glass. In case the recycler cannot completely separate funnel part of CRT glass, it must send all the CRT glass or monitor to the licensed schedule waste treatment/disposal facilities.

② **Reuse of Cathode Ray Tube (CRT)**

If the recycler transfer Cathode Ray Tube without any physical change or treatment to those who properly reuse it as the rebuilt or refurbished CRT monitor or TV, it shall be regarded as recycled.

(2) Printed Circuit Board (All 6 items)

① **Obligation of dismantling printed circuit boards**

The printed circuit boards embedded in E-waste must be properly dismantled and handled as the scheduled waste in accordance with the Scheduled Waste Regulations 2005.

② **Removal of button batteries**

Button-type batteries are sometimes embedded in printed circuit boards. In such a case, the recycler must dismantle them before entering into further recycling process or sending out the printed circuit boards to other recyclers and/or treatment facilities.

③ **Obligation of proper handling of hazardous substances in further separation process of recyclable materials from dismantled printed circuit boards**

If the recycler further separates recyclable materials from dismantled printed circuit boards with any processes (manual/physical, mechanical, chemical, etc.), it must take proper measures to control emissions of hazardous substances in accordance with the relevant laws and regulations. Printed circuit boards may contain potentially hazardous heavy metals such as lead, tin, antimony, chromium, beryllium, cadmium, and so forth. Plastic components in the print circuit boards may contain brominated flame retardants of which some types such as PBDE (Polybrominated Diphenyl Ether) are designated as Persistent Organic Pollutants (POPs) under Stockholm Convention.

Especially in applying mechanical shredding process or chemical process for further separation of recyclable materials from printed circuit boards, proper pollution control and occupational health and safety measures must be taken to avoid exposure of these hazardous substances to the workers as well as to the environment.

④ **Transfer of dismantled printed circuit boards to the other licensed Recyclers**

In case the recycler transfer the dismantled printed circuit boards to the other licensed recyclers for further processing of separating recyclables, that printed circuit boards are regarded as recycled.

(3) Capacitor (TV, Air Conditioner, Washing Machine)

The recycler must properly dismantle the PCB-containing capacitors from the E-waste and transfer them to the licensed scheduled waste treatment/disposal facilities. Any recycling or processing of the PCB-containing capacitors is strictly prohibited. However, since PCB is utilized mainly in old-type capacitors, the recycler does not have to send them to the licensed scheduled waste treatment/disposal facilities if it can prove with clear documented evidence that no PCB is utilized in the specific capacitors.

(4) Florescent Tube (Flat TV, PC monitor, Tablet PC)

① **Handling rule of mercury-containing backlights of LCD-display panel**

Mercury-containing fluorescent tubes are utilized as the backlights in Liquid-Chrystal Displays of TVs, PC monitors and Tablet PCs. The recycler must properly dismantle these florescent tubes with no crack or break of glass and send them to the licensed scheduled waste treatment/disposal facilities unless it has proper technologies or processes of separating mercury from them. To avoid leakage of mercury due to crack or break of fluorescent tubes during dismantling process, the recycler must have equipment of suction and mercury adsorption equipment. If no such equipment is available, the recycler is not allowed to dismantle the LCD display from the TVs, PC monitors or tablet PCs, but must send it to the licensed scheduled waste treatment/disposal facilities.

② **Reuse of Flat TV, PC monitor**

If the recycler transfers the LCD monitor without any physical change or treatment to those who properly reuse it as the rebuilt or refurbished LCD monitor or TV, it shall be regarded as recycled.

(5) Liquid-Chrystal Display (TV, PC monitor, Tablet PC)

As the LCD display glass contains arsenic and antimon, the recycler must send LCD glass to the licensed scheduled waste treatment/disposal facilities unless it has proper technologies and processes to properly remove and treat them. Crashing and/or shredding of LCD display glass is strictly prohibited without such technologies and processes.

(6) Plasma Display (TV, PC monitor)

As the panel of plasma display contains hazardous substances in its sealing glass, the recycler must send it to the licensed scheduled waste treatment/disposal facilities unless it has proper technologies and processes to properly remove and treat them. Crashing and/or shredding of display panel glass is strictly prohibited without such technologies and processes.

(7) Rechargeable Batteries (PC, Mobile Phone, Tablet PC)

In personal computers, mobile phones, and tablet PCs, rechargeable batteries are installed as the power source. Depending upon types, they include nickel, cadmium, cobalt, and lead, that are precious/rare metals while are sometimes hazardous when exposed to the environment.

① **Dismantling and handling rules of rechargeable batteries**

The recycler must properly dismantle rechargeable batteries when conducting any process of recycling PCs, mobile phones, and tablet PCs. The dismantled rechargeable batteries must be separately stored depending upon types. It is also required to prevent exposure to excessive heat, water, or any crushing or physical

damage during handling, sorting, and storage so as not to bring any fire, rupture, or overheating of the batteries.

(8) Refrigerant (Refrigerator, Air Conditioner, Heat-pump Type Dehumidifier/Dryer)

① Obligation of refrigerant collection

The recycler must properly collect refrigerant from refrigerators, air conditioners and heat-pump type dehumidifiers/dryers in its dismantling and/or recycling process with no leakage of refrigerant to the environment. The types of refrigerant controlled under this Guideline with obligation of its collection are as follows:

Type	Refrigerant name
CFC	R11, R12, R113, R114, R502
HCFC	R22, R123, R141b, R142b, R225
HFC	R134a, R152a, R32, R125, R404A, R410A, R407C
Non-fluorocarbon	R600a

In collecting the remaining refrigerant from the compressors installed in refrigerators, air-conditioners and heat-pump type dehumidifiers/dryers, the recycler must utilize proper vacuum aspiration device/equipment in order to avoid any leakage of refrigerant during the collection process. As the remaining refrigerant machine oil also absorbs refrigerant gas, the recycler must collect it as well to avoid its spillage to the environment. The collected refrigerant oil can be reused as fuel.

② Storage of refrigerant by types

In case the refrigerant is collected for the purpose of reuse, it must be separately collected/vacuumed by types and stored in different cylinders. Mixed collection, storage and transfer of refrigerant by the recyclers is prohibited unless it is transferred to the licensed treatment facilities for its destruction.

③ Exceptional handling of flammable refrigerants (R134a and Isobutane)

Flammable refrigerants such as R134a and R600a (containing isobutane) must be separately collected, stored and handled with proper care as flammables regardless of whether they are recycled or destroyed.

(9) Foaming Agent for Heat Insulation Material (Refrigerator)

As CFC or HCFC gas is used as foaming agent for heat insulation urethane of refrigerators, the recycler must properly collect them with the dedicated device and equipment to avoid its leakage into the environment. Any recycling of refrigerators without proper collection and leakage prevention of CFC and HCFC from the heat insulation urethane is strictly prohibited.

(10) Prohibition on the reuse of compressors

Dismantling and reuse of the compressors installed in refrigerators, air conditioners、and heat-pump type dehumidifier/dryers is prohibited.

3.2.3 Standard Recycling Process by Regulated Items

As a reference to the potential recyclers, this section describes the standard recycling process of scheduled E-waste by each item.

(1) CRT-TV

Recycling of CRT-TV usually start with manual dismantling, sorting, and separation of its major components such as printed circuit boards, cabinet, and cathode-ray tube. The dismantled printed circuit boards may be further mechanically shredded and separated into valuable materials (metal scraps and plastics) unless the recycler sell and transfer them to other downstream recyclers without any further treatment. TV cabinet may be sold as plastic materials with or without shredding.

The dismantled cathode-ray tube is usually mechanically separated into two parts, i.e. panel and funnel glass with special device/equipment. Panel glass can be recycled while funnel glass must be transferred to the scheduled waste management facilities as it contains lead. The figure below illustrates the standard recycling process of CRT TV.

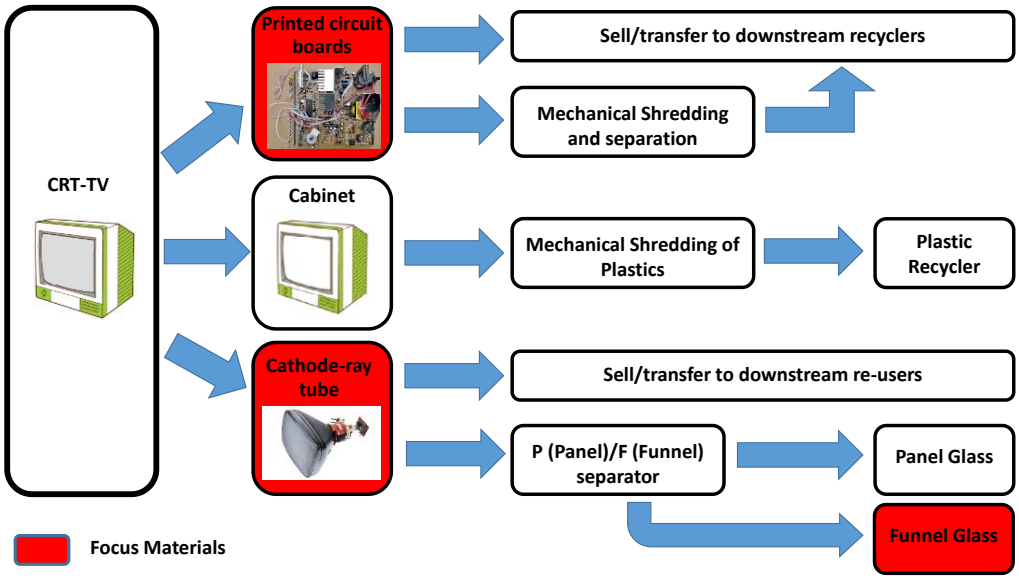


Figure 1: Standard recycling process of CRT-TV

(2) LCD/Plasma TV

Recycling of LCD/Plasma TV begins with dismantling of the cabinet. The dismantled cabinet may be further shredded for volume reduction and transfer as plastic materials. The remaining components after dismantling the cabinet consists of printed circuit boards, TV panel, florescent tubes (in the case of LCD-TV), and chassis. Printed circuit boards can be dismantled for recycling in the same way as CRT TVs. The dismantled chassis can be recycled as iron scrap. Special handling is required for the panel and florescent tubes installed as backlight. Florescent tubes installed in the panel must be carefully dismantled and separated and sent to the licensed scheduled waste treatment/disposal facilities.

The TV panel can be further dismantled and separated into panel glass and other valuable materials such as acrylic resin (PMMA) and some precious metals. The remaining panel glass must be sent to the licensed scheduled waste treatment/disposal facilities. The figure below illustrates the typical flow of recycling LCD/Plasma TV.

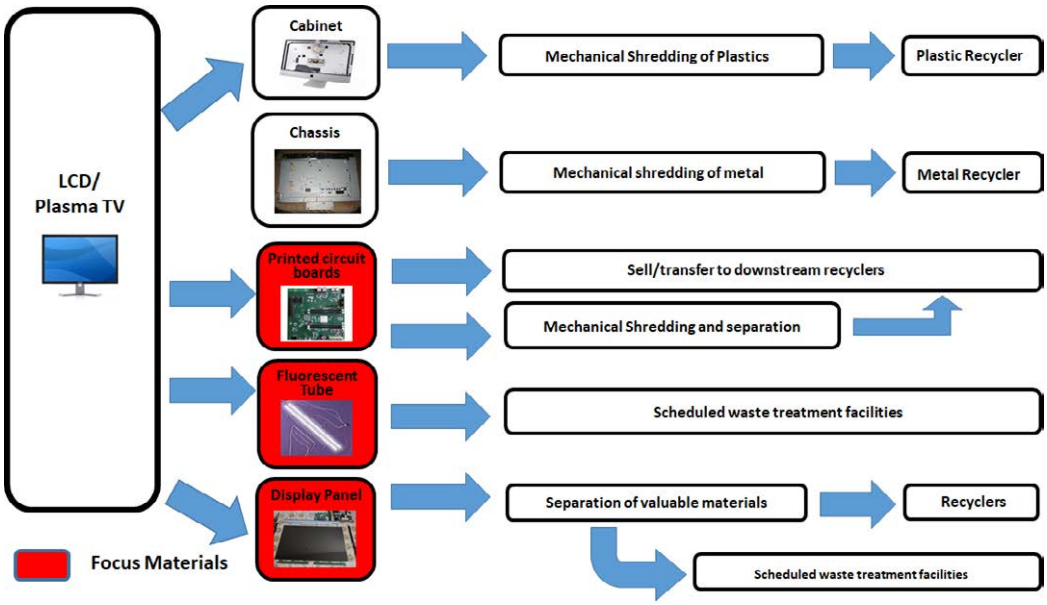


Figure 2: Standard recycling process of LCD/Plasma TV

(3) Refrigerator/Freezer

Before dismantling the refrigerators/freezers, door packing and plastic cases inside them shall be removed as recyclable materials. Subsequently, refrigerant in the compressor must be collected by making use of special vacuuming device/equipment to avoid its leakage to the environment. The collected refrigerant may be recycled or destroyed by the licensed recyclers or treatment facilities. In case the collected refrigerant is sold or transferred for recycling, the recycler must separately store refrigerant in cylinders by types.

As the refrigerant is also absorbed into the refrigerant oil in the compressors, the recycler must collect the refrigerant oil before recycling the compressor. After that, the compressor can be recycled with or without further separation of scrap metals.

The cabinet of refrigerators/freezers are not allowed to be shredded or dismantled unless the recycler has proper device or equipment to collect fluorocarbon contained in heat insulating urethanes installed in the cabinet.

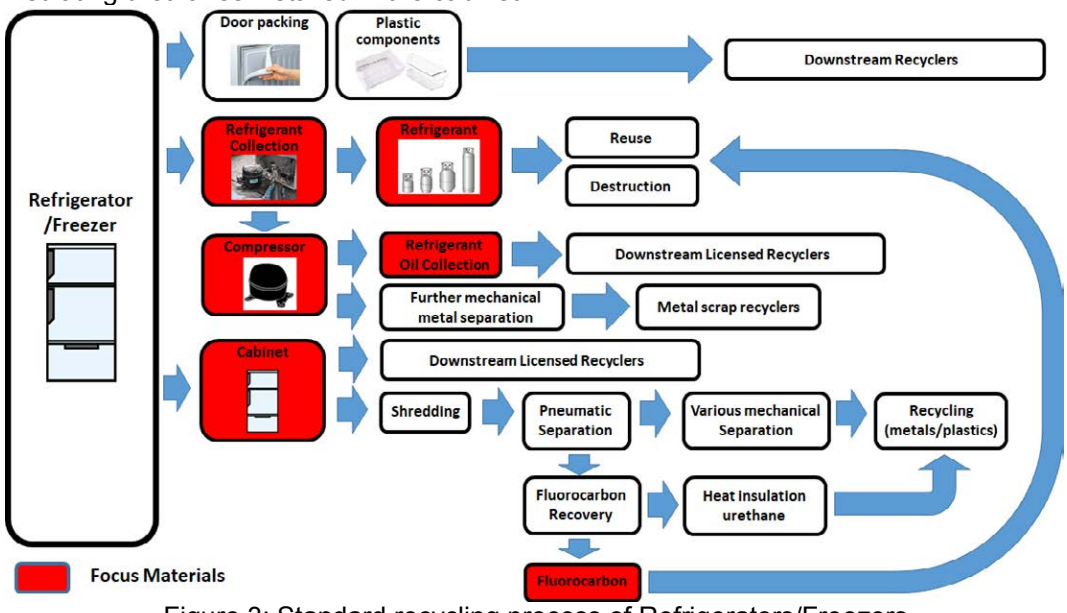


Figure 3: Standard recycling process of Refrigerators/Freezers

(4) Air Conditioner

A complete set of air conditioner usually consists of indoor and outdoor units except for window-type units. As the compressor installed in the outdoor unit includes refrigerant it must be properly collected with no leakage to the environment before dismantling. In the same manner as refrigerant in the compressor of refrigerators, the collected refrigerant may be recycled or destroyed by the licensed recyclers or treatment facilities. Likewise, in case the collected refrigerant is sold or transferred for recycling, the recycler must separately store refrigerant in cylinders by types.

Also, as the refrigerant is also absorbed into the refrigerant oil in the compressors, the recycler must collect the refrigerant oil before recycling the compressor. After that, the compressor can be recycled with or without further separation of scrap metals.

The heat exchangers and remaining cabinets of outdoor/indoor units of air conditioners may be manually as well as mechanically separated for recycling of ferrous/non-ferrous metals and plastics.

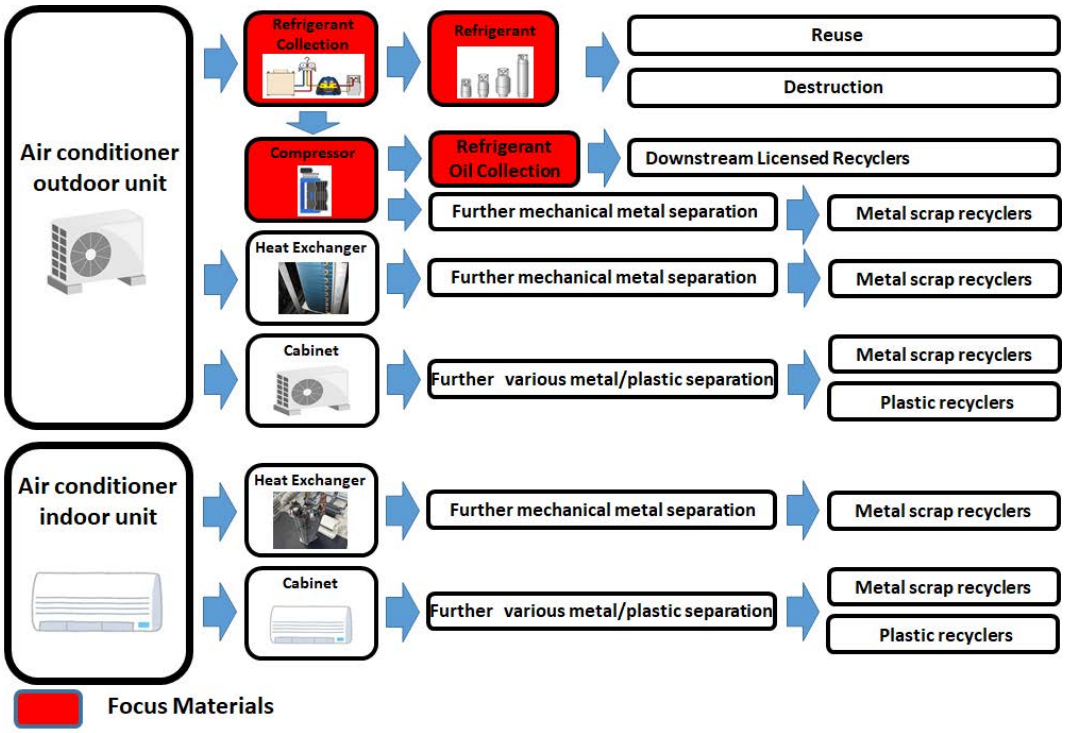


Figure 4: Standard recycling process of Air Conditioners

(5) Washing Machine/Dryers

Printed circuit boards are usually installed for controlling washing/drying modes of washing machines and dryers. The recycler must dismantle the printed circuit boards and may further mechanically shred and separate them into valuable materials (metal scraps and plastics) unless the recycler sell and transfer them to other downstream recyclers without any further treatment. Subsequently, motor and stainless tank maybe manually dismantled and further processed for recycling.

Remaining cabinet may be shredded and mechanically separated for collection of recyclable metals and plastics unless the recycler transfer it to other licensed recyclers. In case the recycler applies shredding and mechanical separation process in recycling the remaining cabinet, it is recommended to take out saltwater included in the ring element at the top of the washing tank lest the shredding machines and recycled metals be rusted.

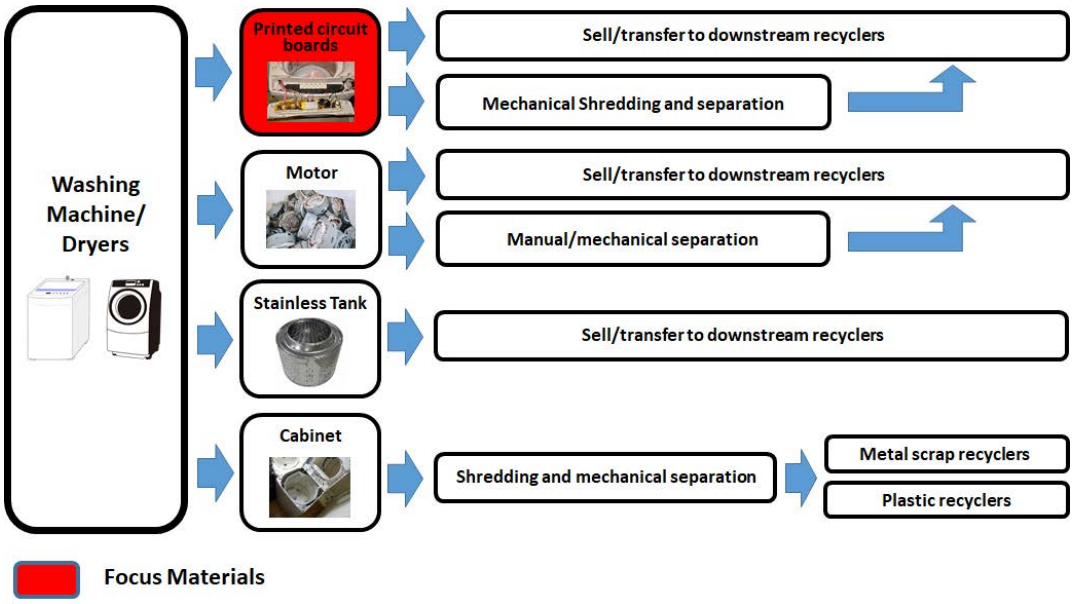


Figure 5: Standard recycling process of Washing Machines/Dryers

In the case of recycling the washing machine/dryers with heat pump installation, the recycler must collect refrigerant from the compressor in addition to the recycling process above.

(6) Personal Computers (Desktop/Laptop)

The standard recycling process of personal computers is different between desktop and laptop types.

① Desktop computers

A complete set of desktop computers usually consists of a display monitor, tower unit, and keyboard. Display monitors are further categorized into CRT and LCD types. The standard recycling process of CRT and LCD monitors are similar with CRT and LCD TVs respectively although printed circuit boards are generally not installed in display monitors.

Regarding the printed circuit boards installed in tower units of desktop computers, the recycler must remove button batteries before proceeding to next recycling process such as mechanical shredding and separation. The removed button batteries must be sent to the licensed scheduled waste treatment/disposal facilities after insulating the electrodes with insulating materials such as plastic tapes in order to avoid accidental energization and ignition. Button batteries are usually installed in motherboards of tower units as so-called CMOS (Complementary Metal Oxide Semiconductor) batteries. The remaining printed circuit boards shall be sold/transferred to the licensed recyclers with or without further mechanical shredding and/or separation of recyclable materials.

Housing, keyboard, and other components of inside tower units shall also be sold/transferred to the licensed recyclers with or without further mechanical shredding and/or separation of recyclable materials.

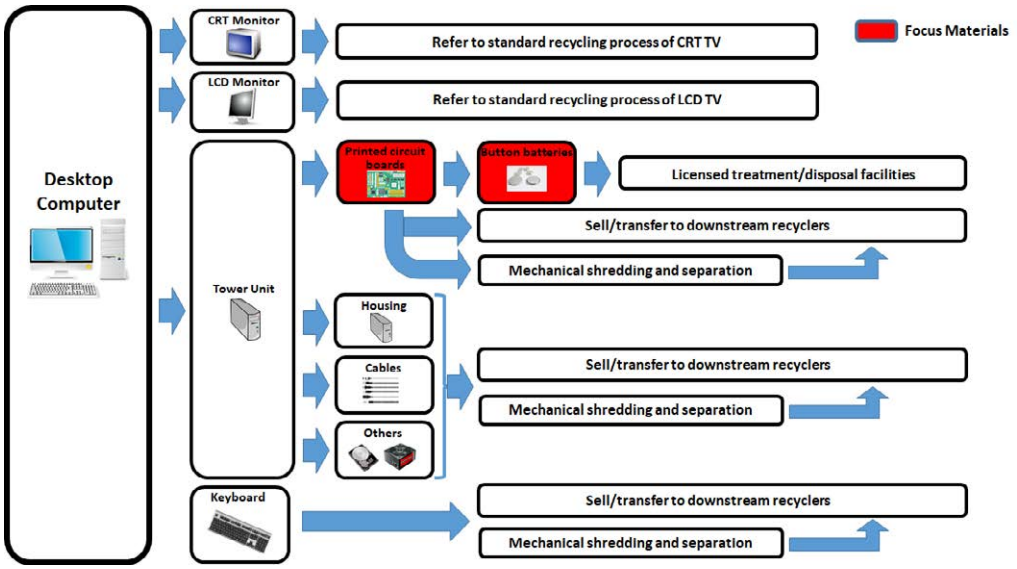


Figure 6: Standard recycling process of Desktop Computers

② Laptop computers

Recycling of laptop computers starts with removing the installed rechargeable battery. It must be sent to the licensed scheduled waste treatment/disposal facilities without any further dismantling or recycling unless the recycler has the license to do so. In their transportation, the recycler must properly store them with proper insulation of electrodes to avoid possible energization and ignition.

As to the printed circuit boards, the standard recycling process is same as the case of desktop computers. The recycler may also dismantle housing, chassis, and other components of laptop computers for recycling in the same manner as desktop computers.

Regarding LCD panel, the recycler must carefully dismantle, without any breakage, fluorescent tubes installed at the back side of the panel and send it to the licensed scheduled waste treatment/disposal facilities. The remaining panel shall be handled in the same fashion as regulated LCD TVs and monitors.

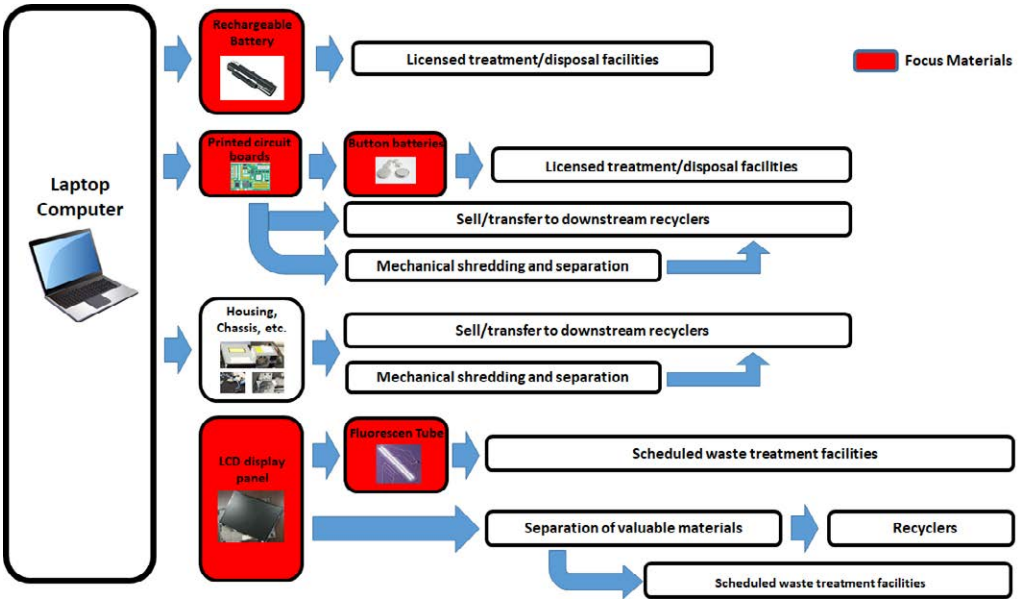


Figure 7: Standard recycling process of Laptop Computers

(7) Mobile Phones/Tablet PCs

In a similar way as laptop computers, rechargeable batteries installed in the mobile phones and table PCs must be first removed before starting any other process of recycling. The removed batteries must be sent/transferred to the licensed scheduled waste treatment/disposal facilities with proper insulation of batteries.

Housing, chassis, and other components of mobile phones and tablet PCs can be dismantled and separated as recyclable materials.

If LCD display panel is utilized in mobile phones and/or tablet PCs, the recycler must confirm whether fluorescent tubes are embedded at the back side of the panels as backlight. The recycler must carefully dismantle fluorescent tubes and send them to the licensed scheduled waste treatment/disposal facilities unless the recycler has the license to do so.

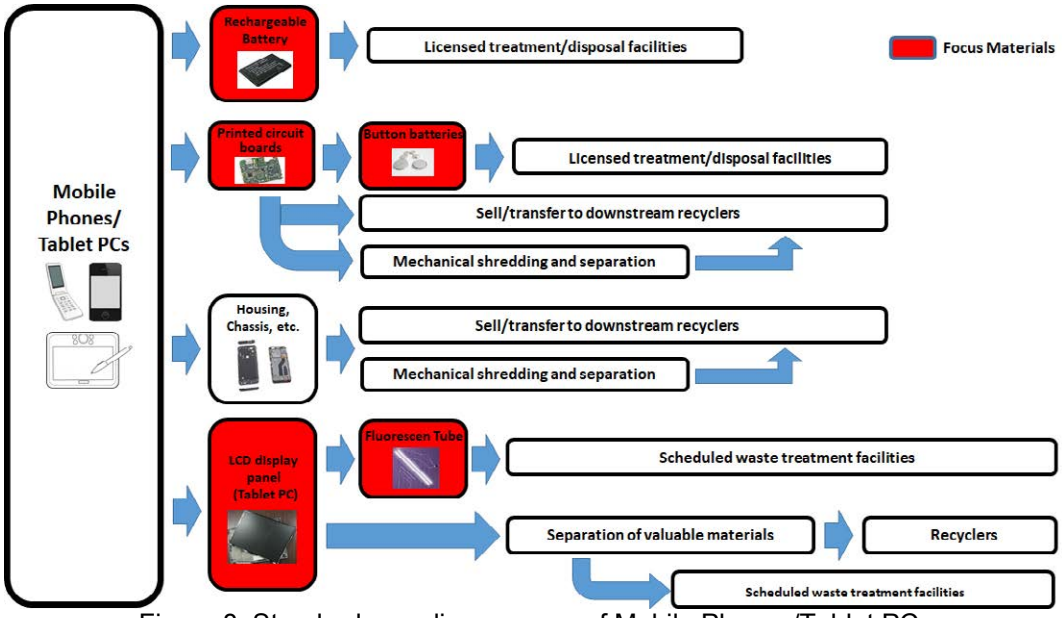


Figure 8: Standard recycling process of Mobile Phones/Tablet PCs

3.3 Minimum Recycling Rate Targets by Each Item

To promote recycling of as many recyclable fractions in the scheduled E-waste as possible, the recycling guideline set the “Minimum Recycling Rate Targets” by each regulated item to be complied by the licensed scheduled E-waste recyclers. Non-compliance with the minimum recycling rate targets may result in no provision of subsidy with legal caution, admonition, and even disqualification of the license depending upon its seriousness in accordance with the relevant laws and regulations.

3.3.1 Definition of Recycling Rate Targets

Recycling rate, in this guideline, is defined as the weight-based fraction (percentage) of recycled components/materials from each regulated E-waste item. The minimum recycling rate targets are set by each item in view of their components structure, composition of materials, development levels of dismantling, separation and recycling technologies, existing conditions of downstream recycling market, and so forth.

In determining the minimum recycling rate targets, the Government, in cooperation with the local recyclers, conducted a series of so-called "Recycling test", in which all 6 types of regulated E-waste items are dismantled and separated into recyclable and non-recyclable materials on the premises of selected scheduled waste recyclers. Each of the separated materials are weighed and recorded by each E-waste item to identify the fraction of potentially recyclable components and materials. The detailed analysis of components and materials for each regulated E-waste is given in Annex XX to this guideline.

3.3.2 Calculation Method of Recycling rate

All the licensed recyclers are required to comply with the minimum recycling rate targets set by each regulated item so that they can be qualified to be subsidized by the Recycling Fund Management Body. Recycling rate is calculated in accordance with the equation below.

$$RR(x) = \frac{WR(x)}{TW(x)} * 100$$

Where:

RR(x):	Recycling rate of E-waste type x (%)
WR (x):	Total weight of materials recycled from E-waste type x (tons)
TW (x):	Total weight of E-waste x received (tons)

To demonstrate its compliance with the recycling rate above, every licensed recycler must measure and periodically report the total weight of E-waste received and materials recycled for each type of regulated E-waste with the actual recycling rate in its recycling operations calculated in accordance with the equation above. Detailed reporting requirement in relation to this requirement is shown in the Annex B to this guideline.

3.3.3 Review of the minimum recycling rate targets

The minimum recycling rate targets set for each regulated E-waste item shall be annually reviewed by the Recycling Rate and Fee Review Committee (RFRC) to be organized as the advisory committee to RFMB. RFRC shall be organized by Government agencies (DOE, MITI, MOF and KPDNKK), industry representatives (manufacturers/importers, retailers, recyclers), environmental NGOs, consumer associations and experts in hazardous waste management sector. RFRC shall review and make recommendations regarding the revision of the minimum recycling rate targets in consideration of the annual performance of household E-waste collection and recycling under the mechanism, trend of development and applications of recycling technologies, market conditions of recyclable components and materials, change in components and materials utilized in the E-appliances, and so forth.

3.4 Reporting Requirement for Scheduled E-waste Recyclers

To be eligible for disbursement of subsidy by RFMB, the licensed recyclers must demonstrate themselves by reporting that they have recycled the scheduled E-waste in compliance with the requirement in this guideline. To do this, they must clearly document their recycling operations with the data and information by each scheduled E-waste item as indicated below.

3.4.1 Data and information to be provided in the report

(1) Total volume of E-waste items recycled

The recycler must report the total volume of E-waste items recycled at their own premises. The volume is to be given in weight as well as number of units for each regulated E-waste. As the minimum recycling rate targets are separately set for PC monitors and tower units in the case of desktop computers, their volumes must be distinctly reported as well. To comply with this requirement, the recycler must measure and record the weight of each E-waste received before entering into recycling process in their premises. However, at the time of reporting the total volume of E-waste items recycled, the recycler is not allowed to include the volume of E-waste items that are received but not yet finished all the process of recycling (The E-waste received and temporarily stored for recycling is not allowed to be included in this total volume.). The volume or number of E-waste items received but transferred for reuse with no processing is strictly prohibited to be included in this total volume of E-waste items recycled. It is also required for the licensed household E-waste recyclers to report the volume and number of units transferred for reuse by each regulated item.

(2) Total volume of focused materials collected and their methods of treatment and disposal

For each regulated E-waste item, the recycler is required to measure and record the weight of focus materials separated/collected with their methods of treatment and disposal by each type of materials. In case the recycler contracts out treatment and disposal of focused materials to other licensed scheduled waste treatment/disposal facilities, it must clearly states the receivers of those focus materials with the documented evidence of sending out the focused materials to them.

(3) Total volume of materials collected for recycling and remaining non-recyclable residues with their destinations.

After completing the recycling process in its premise, the recycler must measure the weight of materials to be recycled by types for each regulated E-waste item. As to the recyclable materials, the recycler must clearly identify their destinations and/or their final use.

Likewise, the recycler is also required to measure the weight of remaining non-recyclable residues from its recycling process while clearly stating their final destinations for further treatment and/or disposal.

(4) Recycling rate achieved

Based on the result of measurement conducted in (3) above, the recycler shall calculate and record the recycling rate achieved for each regulated E-waste item.

3.4.2 Frequency of reporting by the licensed recyclers

Reporting shall be made monthly by the licensed recyclers to RFMB. RFMB shall assess and verify the report to make decisions on disbursement of the subsidy from the fund.

HAZARDOUS SUBSTANCES DIVISION
DEPARTMENT OF ENVIRONMENT
MINISTRY OF NATURAL RESOURCE AND ENVIRONMENT
Level 1-4, Podium 2 & 3, Wisma Sumber Asli
No. 25, Persiaran Perdana
Precint 4 Putrajaya
62574 PUTRAJAYA

www.doe.gov.my/household-ewaste
Tel: +603-88712000 / 2200; Fax: +603-88886120 / 9987
Email: ewaste_hh@doe.gov.my

FORM

APPLICATION FOR LICENSING AS SCHEDULED E-WASTE RECYCLER UNDER SECTION OF ENVIRONMENTAL QUALITY (SCHEDULED ELECTRICAL AND ELECTRONIC EQUIPMENT WASTE) REGULATIONS 20xx

A.	PENGENALAN / IDENTIFICATION

1. Nama Pemohon : _____
   Name of Applicant
2. Alamat Pemohon : _____
   Address of Applicant
3. No. Telefon : _____ No. Faks : _____
   Telephone No. Fax No
4. Warganegara : _____
   Nationality
5. Nama Premis : _____
   Name of Premises
6. Alamat Premis : _____
   Address of Premisses

   _____

7. Nyatakan tarikh kelulusan yang diberikan oleh JAS ke atas laporan EIA untuk cadangan kemudahan pemerolehan kembali. (sila sertakan salinan surat kelulusan).
   Indicate the date of approval of the EIA report for the proposed household E-waste recycling facility given by the DOE. (Please attach a copy of the approval letter)
8. Describe your license information as SW110 Recovery Facility that already obtained from DOE

9. Describe the previous experience for recycling E-waste by your entity(name of the E-waste, its origin,quantity, processed outputs, etc)
   Name of E-waste ( )
   Origin/source( )
   Quantity per annum( )
   Treating process( )
   Processed outputs( )
   Output products mainly sold to( )

B. **MAKLUMAT OPERASI**
OPERATIONAL INFORMATION

8. Cadangan tarikh menduduki atau mengguna premis :
Proposed date for starting the operation at premises :

_____

9. Jadual Operasi/ Schedule of Operation :

(i) Bilangan syif sehari : Purata _____
Number of shift per day : Average
Maksimum _____
Maximum

(ii) Jam operasi : Purata : _____ Maksimum : _____
Hours of operation Average Maximum

(iii) Bilangan hari operasi : Seminggu
Number of operating days Per week _____
Sebulan
Per month _____
Setahun
Per year _____

(iv) Jadual bermusim : Daripada Hingga
Seasonal schedule From _____ To _____

10. In this form, we are applying for a license for treating the following E-waste.

Name of E-wastes	Code	Select if applying for a license
TV(CRT)		
TV(LCD)		
Washing machine		
Refrigerator		
Air Conditioner		
Laptop PC		
Desktop PC		

10. List down the plan for E-waste to be treated by your facility per month and per annum.

Name of E-wastes	Quantity to be treated(units)
	/month
	/year
	/month
	/year
	/month
	/year
	/month
	/year
	/month
	/year
	/month
	/year
	/month
	/year
	/month
	/year

11. Describe the detail recycling flow diagram of the all E-wastes to be processed by type at your facility (Attach all detailed engineering design plans of the facility in the A1 size drawing with Professional Engineer Signatory Certification).

Recycling flow 1 (Name of the E-waste to be processed by this flow:)
Recycling flow 2 (Name of the E-waste to be processed by this flow:)
Recycling flow 3 (Name of the E-waste to be processed by this flow:)

* Untuk pemerolehan kembali atau kitar semula bekas bahan buangan, sila nyatakan jenis, saiz dan kandungan sisa kimia. (Lampirkan carta alir bagi setiap proses yang digunakan). For recycling of waste containers, please indicate their type, size and chemical residue contained. (Attach a flow sheet of each process applied).

12. List of emission/ discharges to be generated from the process mentioned in para 12 as well as its pollution controlling measures. Describe the measures for possible spillage of the refrigerant machine oil used

(i) Proses Process	Jenis keluaran/pelepasan(gas, cecair, separa pepejal, pepejal) Types of emission/discharges (gaseous,liquid,semisolid,solid)	Kuantiti Sebulan Quantity/Month	Pollution control measures(name of equipment)

(ii) Jelaskan kualiti keluaran atau pelepasan (dalam mg/nm 3 atau mg/l atau melainkan sekiranya dikhususkan)

Parameter Parameters	Unit Units

* Sila kemukakan produk catalog bagi setiap peralatan yang akan digunakan di dalam proses.
Please attached all the product catalog intended to be used in the process.

14. Jelaskan program kecemasan yang menggariskan langkah tebatan untuk mengawal pelepasan/tumpahan yang tidak sengaja daripada tapak.
Describe the emergency program outlining mitigative measures to control discharges/accidental spillages from the site.

15. Jelaskan program kecemasan yang menggariskan langkah tebatan untuk mengawal pelepasan/tumpahan yang tidak sengaja daripada tapak.
Describe the emergency program outlining mitigative measures to control discharges/accidental spillages from the site.

16. Jelaskan pelan penutupan yang memperincikan langkah- langkah yang perlu untuk menutup premis sama ada sementara atau menamatkan operasi.
Describe the closure plan which details the step necessary to close the premises temporarily or to cease operation.

C.	MAKLUMAT PENSTORAN BUANGAN TERJADUAL E-WASTE STORAGE INFORMATION

20. Nyatakan kategori dan kuantiti buangan yang akan distor.
Specify category (ies) and quantities of E-wastes to be stored

Kod buangan Waste code	Nama buangan Name of E-waste	Kuantiti/Bulan Quantity/units of waste

21. Senaraikan semua bekas, pembungkusan dan kemudahan penstoran seperti format di bawah.
List all containers, packaging and storage facilities to be made available as outlined in the format below

Jenis Bekas/Pembungkusan/ Kemudahan Penstoran Type of Container/Packaging/ Storage Facility	Kategori Buangan Distor Dikendalikan Category of Waste Stored/Handled	Kapasiti (M)3 Capacity (M)3

21. Describe how to store the Fluorocarbon gas collected from the process and preventive measures for possible leakage of the gas

	Storage method	Preventive measure
Refrigerant gas		
Gas from the system(insulation)		

24. Lampirkan kaedah penstoran, keluasan kawasan penstoran dan pelan kejuruteraan terperinci mengenai rekabentuk kemudahan penstoran.
Attach method of storage, size of storage area and detailed engineering design plans of the storage facility

D.

FOCUSED MATERIALS MANAGEMENT

13. Describe the plan for handling, treating, and disposing (including usage as recyclable materials) of Focused Materials(FM)

FM	Handling process	Treating process	Disposing/selling to where
1			
2			
3			
4			
5			
6			
7			

E.

RECYCLING RATE ACHEIVEMENT PLAN

13. Describe the plan how to achieve the recycling rates of each item to be processed at the facility. Quantitative evidence such as the result data of recycling test for calculation of recycling rate needs to be submitted. Annex of *Guidelines on recycling of household E-waste in Malaysia* can be referred for recycling rate calculation procedure.

TV(CRT)

COMPONENTS	FRACTION	WEIGHT,kg (D)	RECYCLING (R) for recyclable fractions *Mark "R"	WASTE(W) for disposing fractions *Mark "W"	TOTAL OF RECYCLABLE FRACTIONS (F=1+2) (count only (R))	
Glass			R			
			R			
			R			
				W		
Plastic			R			
				W		
				W		
Metal				W		
			R			
			R			
			R			
Other				W		
				W		
				W		
				W		
	SubTOTAL(A)	***0.00***	**-**	**-**	#DIV/0!	1
	(After further process of CRT)					
	Panel and funnel separation					
Glass			R			
				W		
				W		
Metal			R			
			R			
			R			
Other				W		
				W		
	SubTOTAL(B)	***0.00***	**-**	**-**	#DIV/0!	2
	WHOLE WEIGHT TOTAL(C=A+B)	**0.00**			#DIV/0!	F
	ORPHAN / RESIDUE ((1)-(C))	0.00				
	INPUT WEIGHT(1)	0.00				
					RECYCLING RATE ,% (F/C x 100)	

TV(LCD)

COMPONENTS	FRACTION	WEIGHT,kg (D)	RECYCLING (R) for recyclable fractions *Mark "R"	WASTE(W) for disposing fractions *Mark "W"	TOTAL OF RECYCLABLE FRACTIONS (F) (count only (R))
Glass			R		
			R		
			R		
				W	
Plastic			R		
				W	
				W	
Metal				W	
			R		
			R		
			R		
Other				W	
				W	
				W	
				W	
WHOLE WEIGHT TOTAL(C=A+B)		**0.00**			#REF!
ORPHAN / RESIDUE ((1)-(C))		0.00			
INPUT WEIGHT(1)		0.00			
					RECYCLING RATE ,% (F/C x 100)

Washing Machine

COMPONENTS	FRACTION	WEIGHT,kg (D)	RECYCLING (R) for recyclable fractions *Mark "R"	WASTE(W) for disposing fractions *Mark "W"	TOTAL OF RECYCLABLE FRACTIONS (F) (count only (R))
Glass			R		
			R		
			R		
				W	
Plastic			R		
				W	
				W	
Metal				W	
			R		
			R		
			R		
Other				W	
				W	
				W	
				W	
WHOLE WEIGHT TOTAL(C=A+B)		**0.00**			#REF!
ORPHAN / RESIDUE ((1)-(C))		0.00			
INPUT WEIGHT(1)		0.00			
					RECYCLING RATE ,% (F/C x 100)

Refrigerator

COMPONENTS	FRACTION	WEIGHT,kg (D)	RECYCLING (R) for recyclable fractions *Mark "R"	WASTE(W) for disposing fractions *Mark "W"	TOTAL OF RECYCLABLE FRACTIONS (F) (count only (R))
Glass			R		
			R		
			R		
				W	
Plastic			R		
				W	
				W	
Metal				W	
			R		
			R		
			R		
Other				W	
				W	
				W	
				W	
WHOLE WEIGHT TOTAL(C=A+B)		**0.00**			#REF!
ORPHAN / RESIDUE ((1)-(C))		0.00			
INPUT WEIGHT(1)		0.00			
					RECYCLING RATE ,% (F/C x 100)

Air Conditioner

COMPONENTS	FRACTION	WEIGHT,kg (D)	RECYCLING (R) for recyclable fractions *Mark "R"	WASTE(W) for disposing fractions *Mark "W"	TOTAL OF RECYCLABLE FRACTIONS (F) (count only (R))
Glass			R		
			R		
			R		
				W	
Plastic			R		
				W	
				W	
Metal				W	
			R		
			R		
			R		
Other				W	
				W	
				W	
				W	
WHOLE WEIGHT TOTAL(C=A+B)		**0.00**			#REF!
ORPHAN / RESIDUE ((1)-(C))		0.00			
INPUT WEIGHT(1)		0.00			
					RECYCLING RATE ,% (F/C x 100)

Notebook PC

COMPONENTS	FRACTION	WEIGHT,kg (D)	RECYCLING (R) for recyclable fractions *Mark "R"	WASTE(W) for disposing fractions *Mark "W"	TOTAL OF RECYCLABLE FRACTIONS (F) (count only (R))
Glass			R		
			R		
			R		
				W	
Plastic			R		
				W	
				W	
Metal				W	
			R		
			R		
			R		
Other				W	
				W	
				W	
				W	
WHOLE WEIGHT TOTAL(C=A+B)		**0.00**			#REF!
ORPHAN / RESIDUE ((1)-(C))		0.00			
INPUT WEIGHT(1)		0.00			
					RECYCLING RATE ,% (F/C x 100)

Desktop PC

COMPONENTS	FRACTION	WEIGHT,kg (D)	RECYCLING (R) for recyclable fractions *Mark "R"	WASTE(W) for disposing fractions *Mark "W"	TOTAL OF RECYCLABLE FRACTIONS (F) (count only (R))
Glass			R		
			R		
			R		
				W	
Plastic			R		
				W	
				W	
Metal				W	
			R		
			R		
			R		
Other				W	
				W	
				W	
				W	
WHOLE WEIGHT TOTAL(C=A+B)		**0.00**			#REF!
ORPHAN / RESIDUE ((1)-(C))		0.00			
INPUT WEIGHT(1)		0.00			
					RECYCLING RATE ,% (F/C x 100)

C.

DOWNSTREAM CHANNEL INFORMATION

20. Describe the downstream channel of each fraction that to be recycled at your facility

Fraction	Information of facility that recieves the fraction(name, location)	Operation of the facility(recovery, disposal, recyclable raw material use)	Quantity/Month	Provide license information such as DOE license number

F.

E-WASTE COLLECTION INFORMATION

20. Describe the E-waste collection channel of each type and the quantity that planned to be procured

Information of collector/channel that your facility procure from(name, location)	Type of E-waste	Quantity/Month
1		
2		
3		
4		
5		

11. Describe the method of transporting the waste from the generator to your factory. (contractor/own transport).

Saya sahkan bahawa maklumat yang diberikan adalah benar dan betul sepanjang pengetahuan saya.
I certify that all information provided is true and correct to the best of my knowledge.

Tandatangan Pegawai Pelapor
Signature of Reporting Officer
Nama :
Name
Nombor K/P :
I/C No
Jawatan :
Designation
Organisasi/Syarikat :
Organisation/Company
Tarikh :
Date

Nota: Sila gunakan lampiran tambahan jika perlu.
Note: Please use additional sheets if necessary

SENARAI SEMAK PERMOHONAN CHECKLIST OF APPLICATION				
Bil.. No.	Perkara Subject	Ada Yes		Tiada No
		Lengkap Complete	Tidak Lengkap Incomplete	
1.	The location plan (scale 1:2500) and layout plan (scale 1:500) size A1 drawing are attached			
2.	A copy of the approval letter given by DOE on the EIA report of the proposed recovery facility is attached			
3.	A flow diagram of the all E-wastes to be processed by type at your facility (Attach all detailed engineering design plans of the facility in the A1 size drawing with Professional Engineer Signatory Certification).			
4.	All detailed engineering design plans of the facility and storage indicated in the drawing are attached			
5.	Please attached all the product catalog intended to be used in the process.			
6.	Processing Fee for Written Permission Section 19, Environmental Quality Act 1974 payable to Director General Environmental Quality of Malaysia			

ANNEX 3
Proposed Target Recycling Rate
(by each of 6 items)

Summary Recycling Rate

Item		Recycling rate	Recycling rate (without panel glass)	Recycling rate (without plastic)	Recommendable Recycling rate (80%)
Television (TV)	CRT	79.7%	46.9%	33.8%	**27%**
	Flat Screen	76.6%	-	52.3%	**42%**
Washing machine (currently top/front loading type combined)		81.4%	-	52.8%	**42%**
Air-conditioning		98.9%	-	85.1%	**68%**
Refrigerator		92.6%	-	76.5%	**61%**
Personal Computer (PC)					
Desktop PC	CPU + monitor (CRT monitor & flat screen)	85.8%	71.9%	57.2%	**46%**
	CPU	88.0%	-	81.7%	**65%**
	CRT monitor	79.7%	50.2%	36.3%	**29%**
	Flat screen	75.9%	-	46.4%	**37%**
Notebook PC		64.3%	-	43.6%	**35%**
Mobile phone	smart phone	59.6%	-	38.3%	**31%**
	old type	66.6%	-	39.7%	**32%**

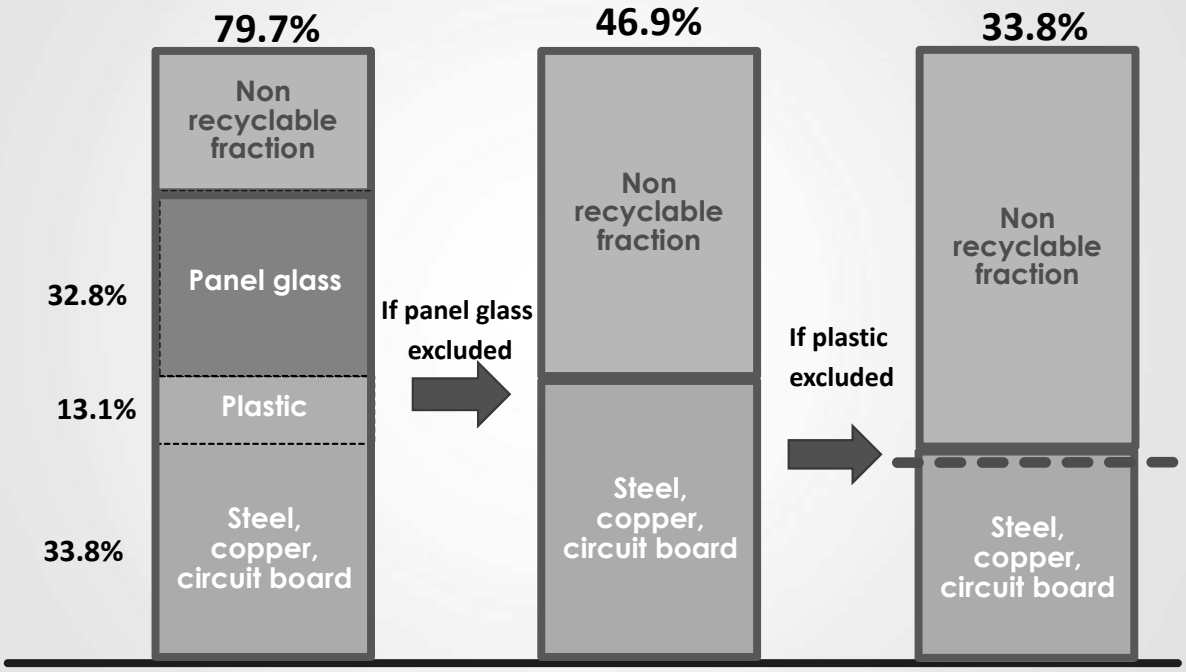
Summary Comparison of Recycling Rate with Other Country

Item		Japan (%)	Hong Kong (%)	Taiwan (%)	EU (%)	Recommendable Recycling rate (80%)
Television (TV)	CRT					**27%**
	Flat Screen					**42%**
Washing machine (currently top/front loading type combined)						**42%**
Air-conditioning						**68%**
Refrigerator						**61%**
Personal Computer (PC)						
Desktop PC	CPU + monitor (CRT monitor & flat screen)	85.8%	71.9%	57.2%		**46%**
	CPU	88.0%	-	81.7%		**65%**
	CRT monitor	79.7%	50.2%	36.3%		**29%**
	Flat screen	75.9%	-	46.4%		**37%**
Notebook PC		64.3%	-	43.6%		**35%**
Mobile phone	smart phone	59.6%	-	38.3%		**31%**
	old type	66.6%	-	39.7%		**32%**

TV-CRT

Total input weight: 2,760kg/ 110pcs

Recommendable Recycling rate = 27% (33.8*0.8)

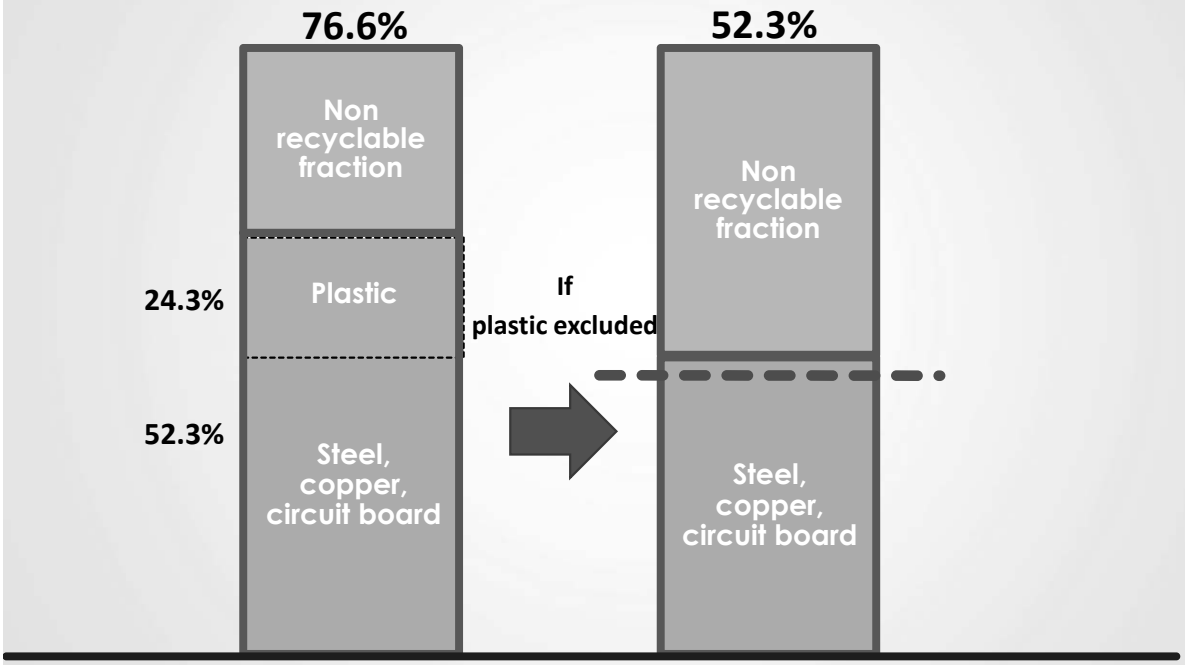


- **CRT glass should be separated from CRT monitor and disposed separately.**
- **Plastic recycling market is only limitedly available for PP and TV plastic is excluded.**

Flat TV

Total input weight: 959kg/ 90pcs

Recommendable Recycling rate = 42% (52.3*0.8)



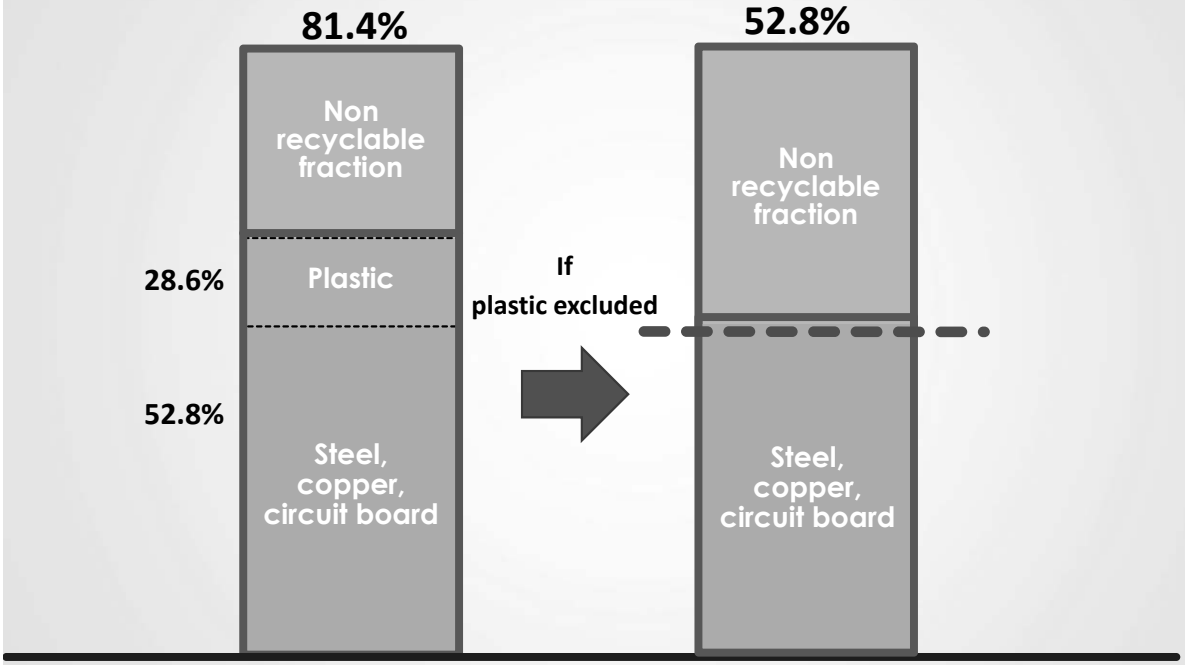
- Plastic recycling market is only limitedly available for PP and TV plastic is excluded.
- LCD panel recycling is not widely possible.

5

Washing machine

Total input weight: 1,259kg/ 31pcs

Recommendable Recycling rate = 42% (52.8*0.8)



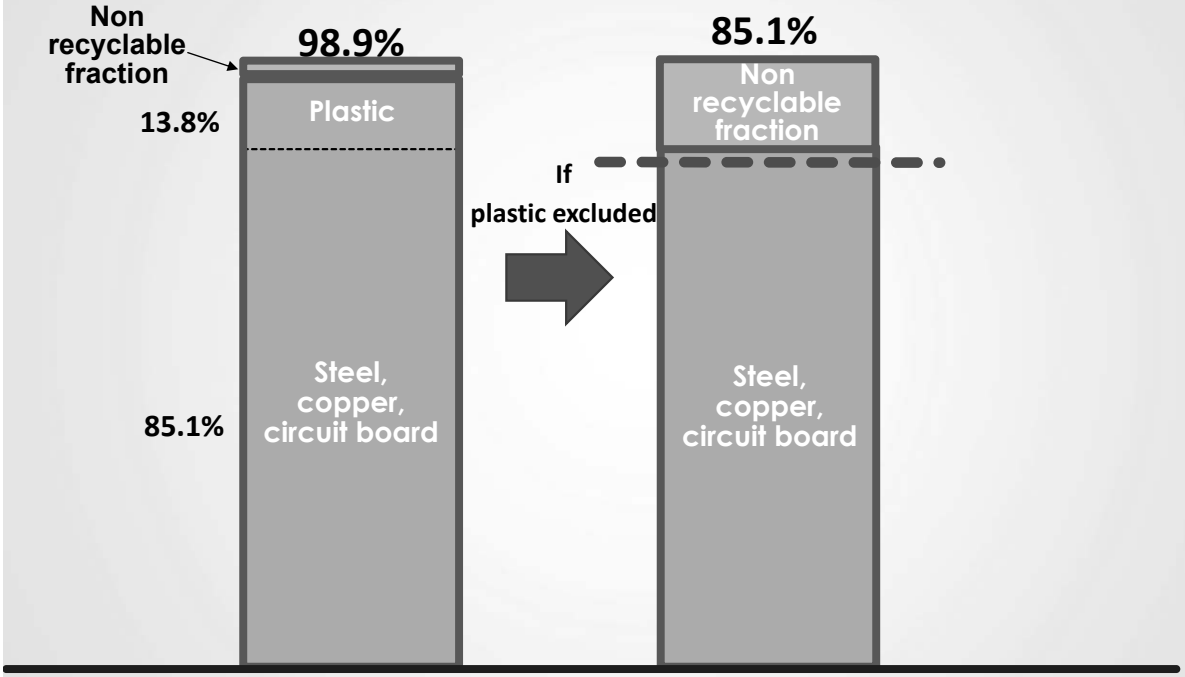
- Plastic recycling is only available for PP in Malaysia and market is small yet. Some WM originating PP can be recycled.
- Segregating efficiency can be increased.

6

Air conditioner

Total input weight: 1,258kg/ 25pcs

Recommendable Recycling rate = 68% (85.1*0.8)



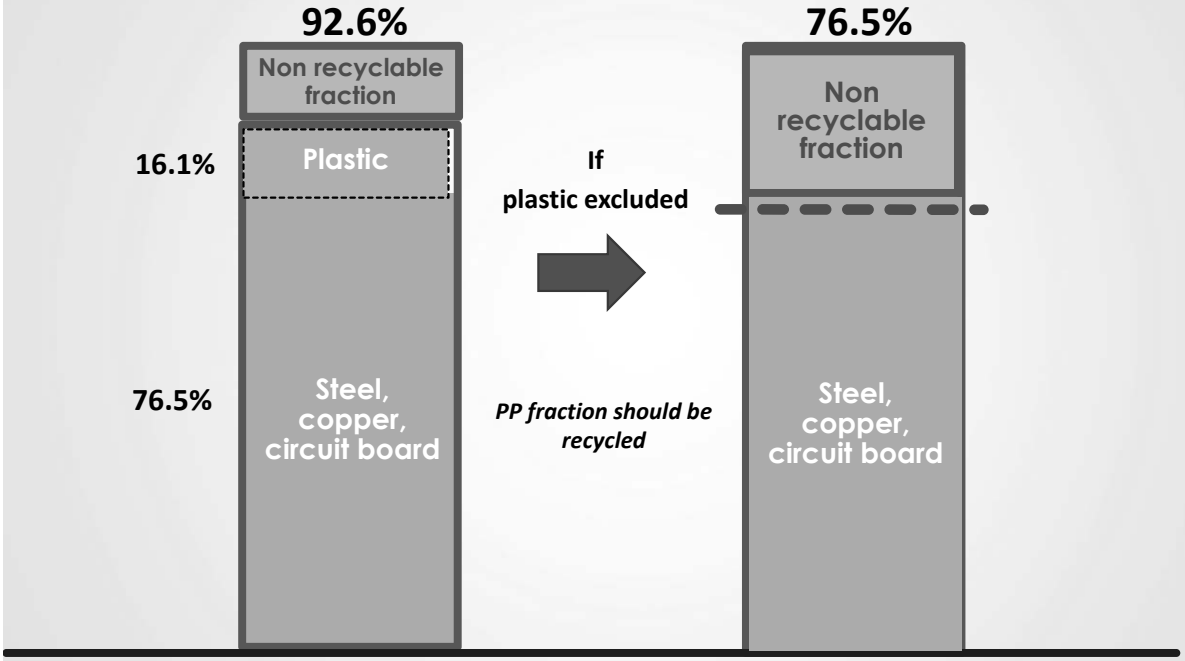
- **Plastic recycling market is only limitedly available for PP and air conditioner plastic is excluded.**

7

Refrigerator

Total input weight: 3,563kg/ 60pcs =59kg

Recommendable Recycling rate= 61% (76.5*0.8)



- **Plastic recycling market is only limitedly available for PP and thus PP fraction among mixed plastic should be segregated and recycled.**

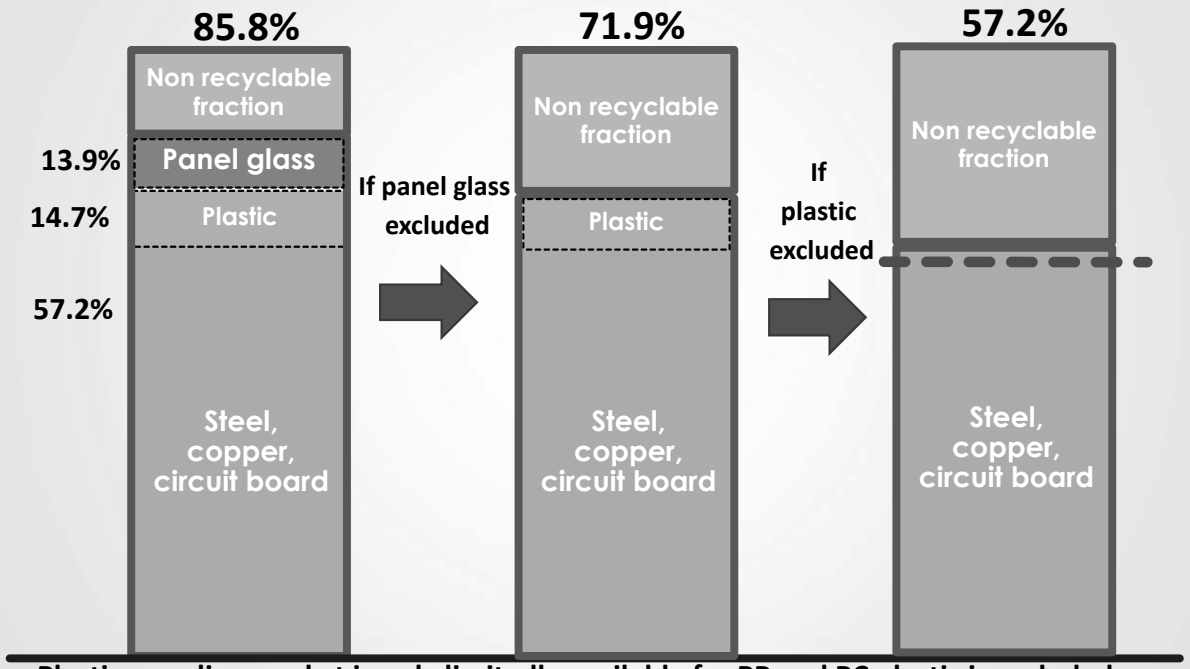
8

Desktop PC (CPU + monitor)

Total input weight: 1377kg/ 118pcs

(Monitor accompanied with CPU = 50% is CRT and 50% is flat screen)

Recommendable Recycling rate = 46% (57.2*0.8)

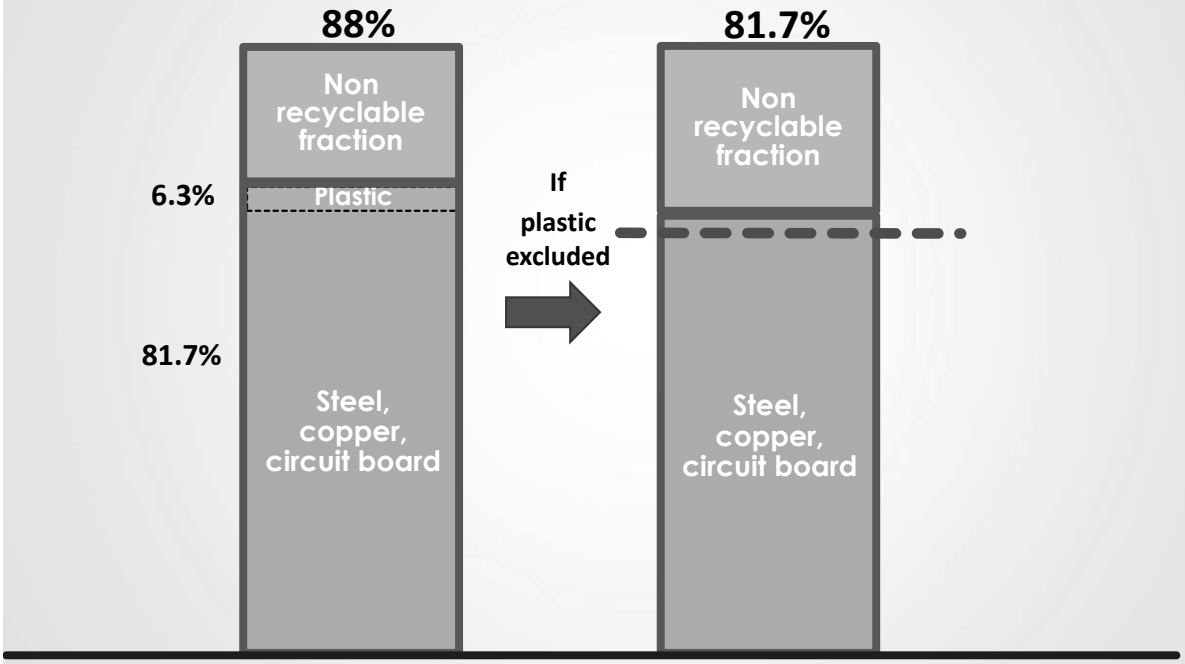


- **Plastic recycling market is only limitedly available for PP and PC plastic is excluded.**
- **Panel glass should be separated from CRT monitor and disposed separately and LCD panel recycling is not widely possible.**

Desktop PC (CPU)

Total input weight: 1377kg/ 118pcs

Recommendable Recycling rate = 65% (81.7*0.8)

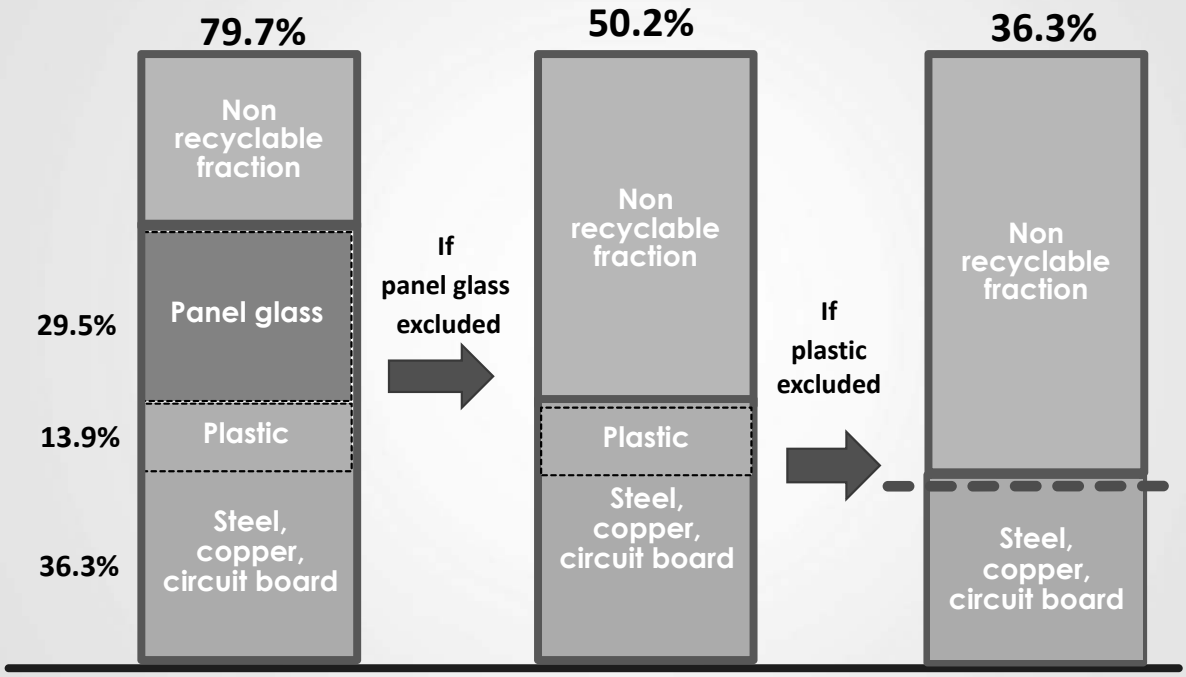


- **Plastic recycling market is only limitedly available for PP and PC plastic is excluded.**

Desktop PC CRT monitor

Total input weight: 1,706kg/ 120pcs

Recommendable Recycling rate = 29% (36.3*0.8)



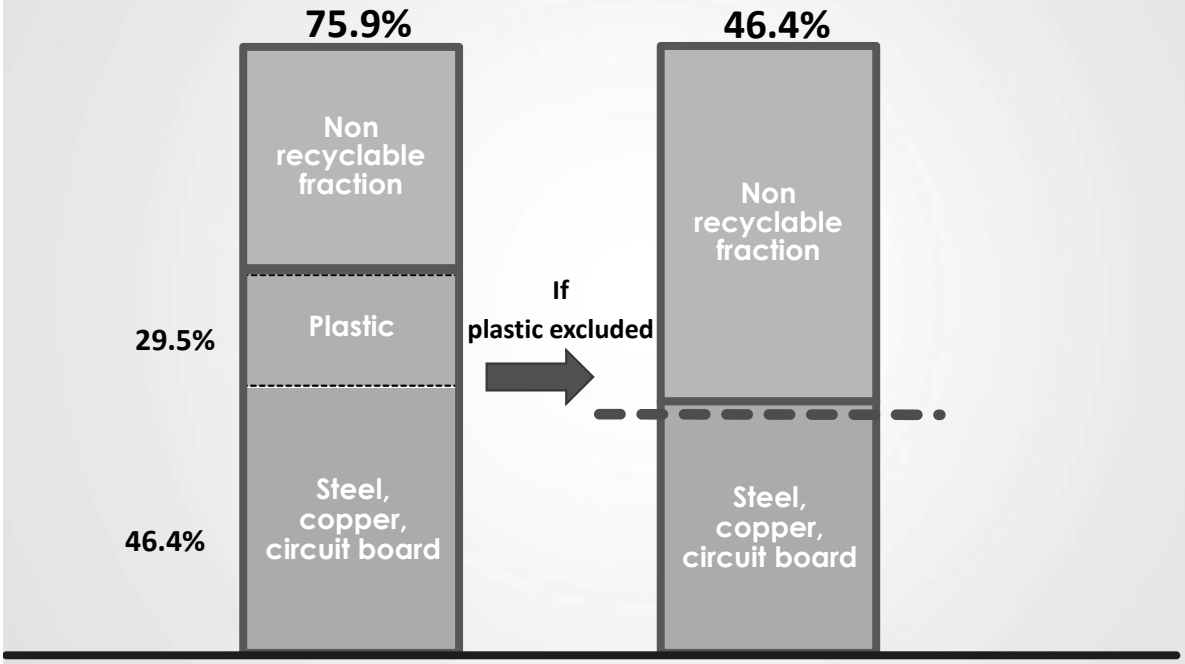
- Panel glass should be separated from CRT monitor and disposed separately.
- Plastic recycling market is only limitedly available for PP and PC plastic is excluded.

11

Desktop PC Flat monitor

Total input weight: 712kg/ 132pcs

Recommendable Recycling rate = 37% (46.4*0.8)



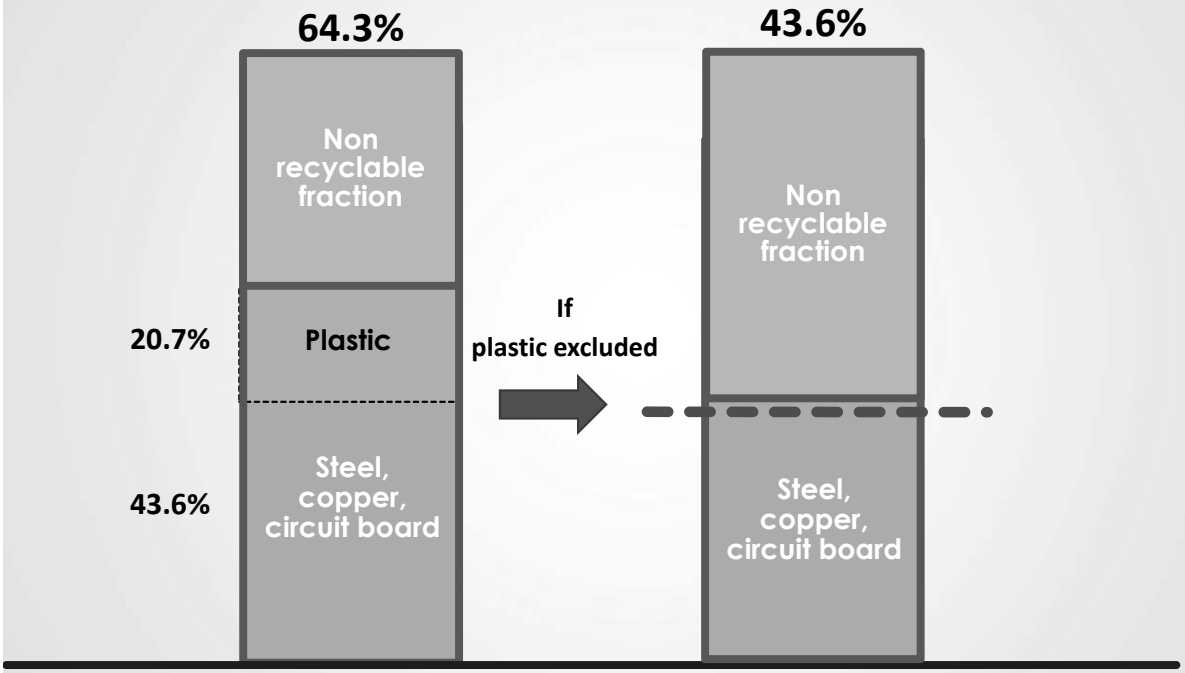
- Plastic recycling market is only limitedly available for PP and PC plastic is excluded.
- LCD panel recycling is not widely possible.

12

Notebook PC

Total input weight: 313kg/ 137pcs

Recommendable Recycling rate = 35% (43.6*0.8)

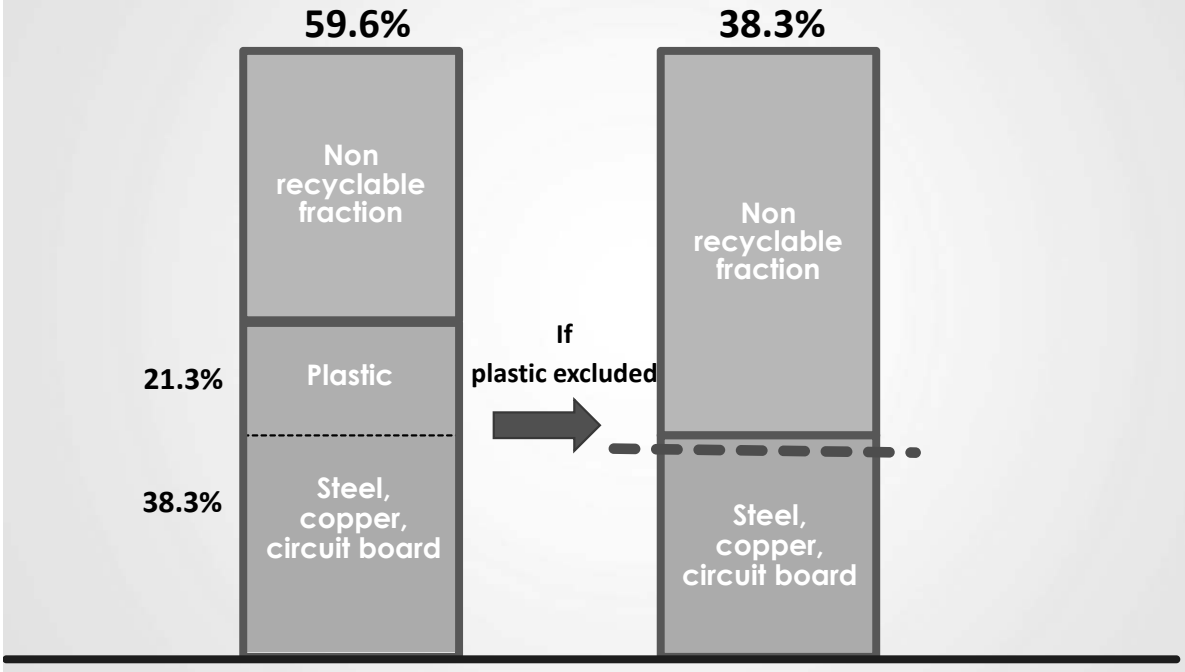


- Plastic recycling is only available for PP in Malaysia and market is small yet.

Mobile phone (smartphone)

Total input weight: 15.18kg/ 115pcs

Recommendable Recycling rate = 31% (38.3*0.8)

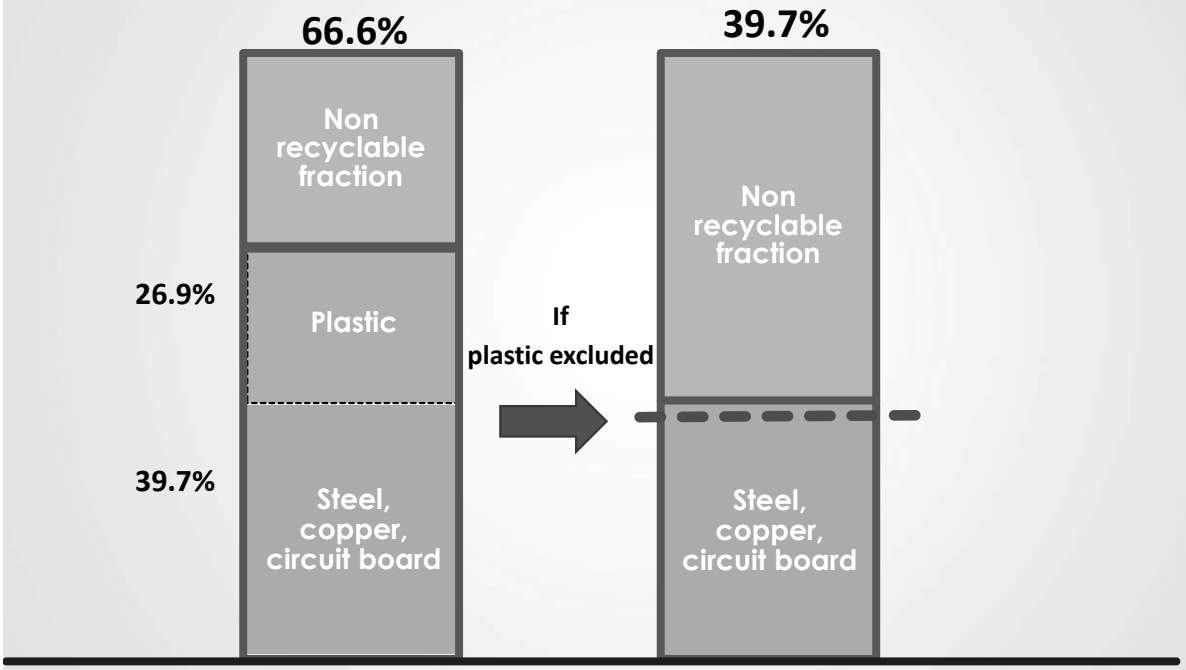


- Plastic recycling is only available for PP in Malaysia and market is small yet.

Mobile phone (old type)

Total input weight: 8.48kg/ 85pcs

Recommendable Recycling rate = 32% (39.7*0.8)



- **Plastic recycling is only available for PP in Malaysia and market is small yet.**

15

添付資料５

家庭系 E-waste のフィー･ガイドライン

GUIDELINE

Fee and Subsidy for Scheduled E-waste Management in Malaysia

Published by:

Department of Environment (DOE) Malaysia

Supported by:

Japan International Cooperation Agency (JICA)

TABLE OF CONTENTS

1.0 PREAMBLE

Electrical and electronic waste (commonly known as E-waste), is growing exponentially worldwide because of tremendous growth of the demand on the use of electrical and electronic equipment. The disposal of E-waste is of big concern discussed at international arena, because of the nature of hazardousness of the waste and drastically increased volume of its disposal in a globalized world.

Note:

"E-waste" referred to SW110 as stipulated in the First Schedule of EQ (Scheduled Waste) Regulations 2005.

"Electrical and electronic equipment "means equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in First Schedule of the regulations;

Improper handling of E-waste poses high risk of pollution, health impacts and causes incidents of illegal disposal. The lack of proper environmental precaution measures in household E-waste management could cause enormous environmental issues such as release of chlorofluorocarbon (CFC) gases that cause ozone depletion, global warming and contaminations from other hazardous/toxic substances.

In Malaysia, E-waste is generally divided by two main types of generation sources, i.e. E-waste generated from the industrial sectors, and E-waste generated from the non-industrial sectors, mainly households, commercial and institutional entities.

E-waste from industrial sector is categorized as Scheduled Wastes under the Code SW110, First Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005. The categories of E-waste defined under this coding are only covering E-waste generated from the industrial sectors, including electrical and electronic industries, as well as other industrial generators.

The management of E-waste generated from non-industrial sectors, especially household and other entities such as commercial and institutional entities is now regulated under a newly enacted regulation known as the Environmental Quality (Scheduled E-Waste) Regulations 20XX, which defines scheduled E-waste in which the six targeted categories of E-waste are designated.

Scheduled E-waste requires a different management system as compared to the E-waste generated from the industrial sector, particularly from the financial perspective where significant costs are required for collection and transportation of household E-waste, as well as to comply with the proper environmental precaution standards. Therefore, household E-waste shall only be processed or treated by household scheduled waste recycling facilities, which are licensed by the DOE.

This Guideline shall be read together with the Environmental Quality (Scheduled E-waste) Regulations 20XX.

2.0 ABOUT THE GUIDELINE

Under the framework of the Environmental Quality (Scheduled E-Waste) Regulations 20XX, it is emphasized that all the scheduled E-wastes shall be channeled, collected and delivered through a formal/authorized flow of stakeholders to the final destination of proper

treatment, recycling and recovery in an environmentally sound system. Each respective player has their own roles and responsibilities, and the cost involved in the entire system shall be shared among all the stakeholders.

This Guideline provides the overall financial mechanism of scheduled E-waste, which mainly consists of Recycling fee collection and recycling subsidy provision mechanism to be run by the Recycling Contribution Management Body (RCMB). It also specifies the methodology of making calculation/computation of recycling fee rate and subsidy rate respectively for each scheduled E-waste item.

The main categories of scheduled E-waste covered under this Guideline are the list of E-waste under the First Schedule of the Environmental Quality (Scheduled E-Waste) Regulations 20XX including:

(a) Television;
(b) Air conditioner;
(c) Personal Computer (Desktop and laptop including monitor); and
(d) Refrigerator/freezer, chiller;
(e) Cloth washing/drying machine;
(f) Mobile phone (Old type and smartphone)/tablet PC.

The users of this Guideline shall always refer to the Environmental Quality (Scheduled E-Waste) Regulations 20XX as the main text of this Guideline to ensure complete understanding of the entire requirements under the regulations, as well as the clauses of the Environmental Quality Act (1974) as the Mother Act.

2.1 Scope of the Guideline

This guideline provides the details of overall financial mechanism of the scheduled E-waste management comprising of:

(1) Overall financial mechanism of the scheduled E-waste management,
(2) Mechanism of scheduled E-waste recycling fee (contribution) collection,
(3) Mechanism of scheduled E-waste recycling subsidy, and
(4) Methodology of making calculation/computation of recycling fee (contribution) and subsidy rates.

The stakeholders to be involved in and relevant to this guideline are all those who take their own roles and responsibilities in the entire mechanism of scheduled E-waste management in Malaysia. The table below specifies their respective roles and responsibilities related to implementation of this guideline

Types of Stakeholders	Relevance to the Fee Guideline
Manufacturers and importers of E-appliances	▪ Manufacturers, importers, and any other persons who put their E-appliances that are regulated in the Environmental Quality (Scheduled E-Waste) Regulations 20XX to the Malaysian market shall be subject to payment of the recycling fee based on the volume/amount of the regulated E-appliances.
Generators (consumers of E-appliance)	▪ Although the recycling fee is not collected from each consumer of E-appliance directly, it shall shoulder its own financial responsibility of environmentally sound scheduled E-waste management at the time of purchasing new E-appliances.
Authorized household E-waste collectors	▪ Authorized scheduled E-waste collectors are entitled as the receivers of subsidy in accordance with the volume/amount of scheduled E-waste that are collected in compliance with the collection guideline.
Licensed household E-waste recyclers	▪ Licensed scheduled E-waste recyclers are entitled as the receivers of subsidy in accordance with the volume/amount of scheduled E-waste that are recycled in compliance with the recycling guideline.
Recycling Contribution Management Body (RCMB)	▪ RCMB is responsible for the entire financial mechanism of scheduled E-waste management including collection of scheduled E-waste recycling fee (contribution), provision of scheduled E-waste subsidy, management and operation of the fund raised from the collected recycling fee.

2.2 Categories of Scheduled E-waste

The target categories of scheduled E-waste subject to this Guideline are basically the 6 main categories specified in the First Schedule of the Environmental Quality (Scheduled E-waste) Regulations 20XX, excluding the small appliances, fluorescent lamps and rechargeable batteries. The 6 main categories of scheduled E-waste are listed as follows with their sub-categories:

No	Categories	Sub-categories
1	Televisions and Monitors	CRT Televisions 
		Flat Televisions (Plasma, LCD, LED) 
2	Air-conditioners	Window Units 
		Split units Ceiling Unit 
		Mobile units 

No	Categories	Sub-categories
3	Computers	LCD Desktop CRT Desktop 
		Laptop 
4	Refrigerators	Refrigerators 
		Freezers 
		Chillers 

No	Categories	Sub-categories
5	Washing / Dryer machines	Washing machines 
		Cloth Dryers 
6	Mobile phones and Tablet PCs	Mobile phones 
		Tablet PCs 

2.3 Principal Framework of Scheduled E-waste Management

Scheduled E-waste management is regulated under the Environmental Quality (Scheduled E-Waste) Regulations XXXX, which emphasizes the concept of "shared responsibilities" among the players, with implementation of the principle of Extended Producer's Responsibility (EPR).

Under the framework of scheduled E-waste management, the manufacturers and importers of electrical and electronic appliances have the financial obligation to pay the "Recycling Fee (contribution)" which is to be determined by the Department of Environment (DOE) in accordance with the mandate provided in EQA. The "Recycling Fee (contribution)" shall be channeled to the "Environment Fund" which is established under EQA and utilized to cover scheduled E-waste collection, transportation, recycling, or any other purposes in accordance with the requirement to be determined by the Director General of DOE.

The Department of Environment (DOE) shall have the primary responsibility for environmentally sound and sustainable management of scheduled E-waste under their authority of controlling all the relevant stakeholders.

All the households and business entities, who generate scheduled E-waste defined in the Environmental Quality (Scheduled E-Waste) Regulations 20XX, have the responsibility to make sure they hand over their E-waste to the authorized collectors.

The legal framework of household E-waste management consists of 3 (three) key flows, namely "E-waste", "Fee (Money)", and "Information (Reporting)", as summarized below.

E-waste Flow	Determines the right channel of scheduled E-waste that starts with collection from generation points to authorized collection centers, collectors, retailers, and ends with the licensed scheduled E-waste recycling facilities or final disposal. The regulation requires all the collectors of scheduled E-waste to register with DOE while all the recyclers to apply for the licenses to manage scheduled E-waste.
Fee (Money) Flow	Determines how the recycling fee is collected and channeled to the "Environmental Fund" for various purposes of disbursements to ensure environmentally sound and sustainable management of scheduled E-waste.
Information (Reporting) Flow	Determines the information / data flow through proper reporting by relevant players (manufacturers/importers, collectors, transporters, and recyclers) The scheduled E-waste manifest system is introduced for actual flow tracking of E-waste from collectors to the recyclers. The reporting and manifest system integrally avoid leaking of E-waste into the informal sectors, and ensure that proper data is captured for determination of total recycling fees to be collected and proper amount of subsidy to be provided.

Detailed description of the 3 (three) key flow is respectively given below.

2.3.1 Scheduled E-waste Flow

The sources of scheduled E-waste include households, commercial, industrial, and institutional entities, and any other sources that generate the same categories of scheduled E-waste, listed in Section 2.3 of this guideline.

Under the framework of scheduled E-waste management, all generators are required to discard their scheduled E-waste to the collectors authorized by DOE, which could be a retailer shops, recycling centers, NGOs, municipal waste collection concessionaire companies, local government, or any other authorized persons. Any flow of scheduled E-waste from generators to unauthorized collectors is prohibited.

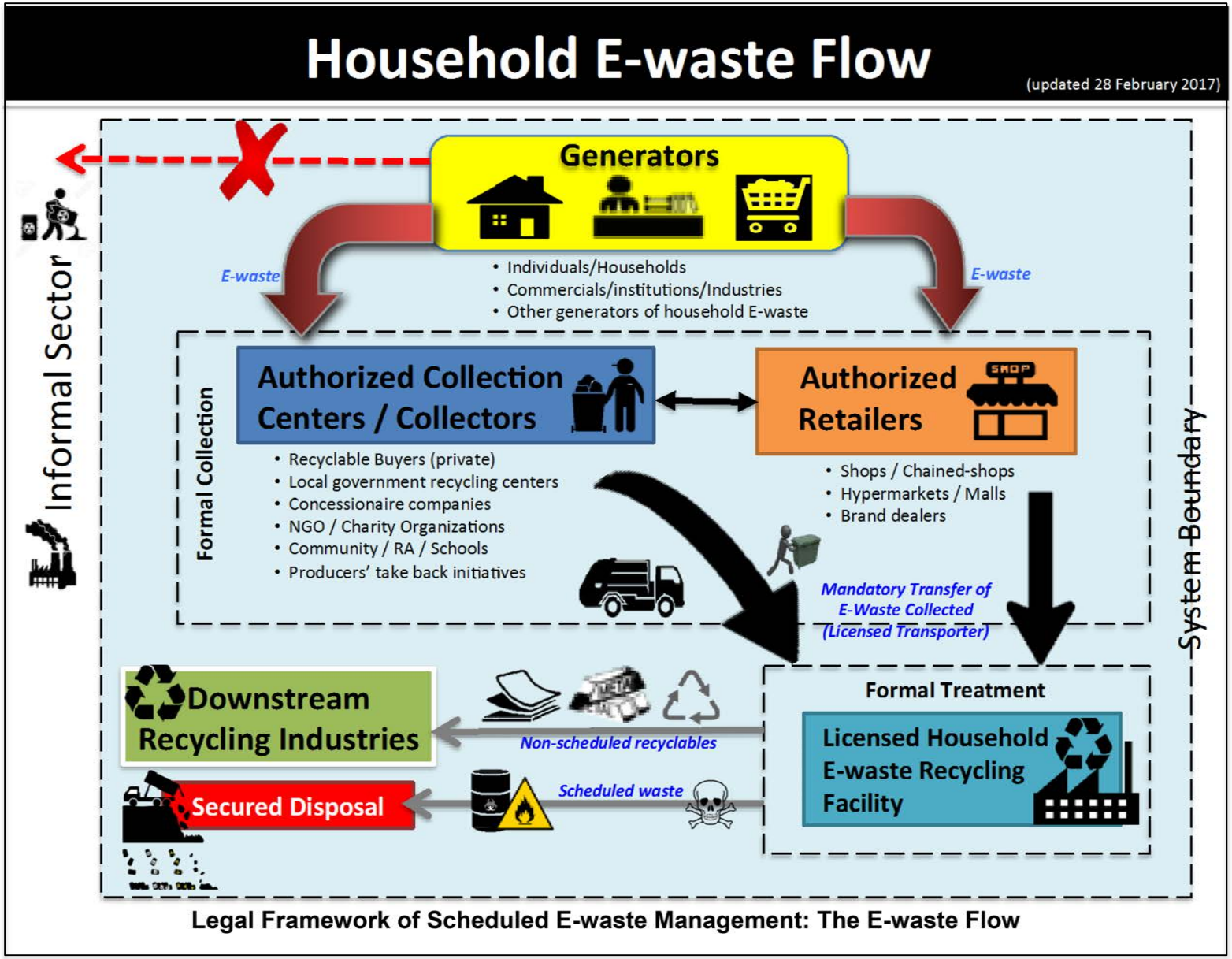
The collected scheduled E-waste by the authorized collectors must be channeled to the scheduled E-waste recyclers licensed by the DOE, to ensure proper treatment and recycling of scheduled E-waste in an environmentally sound manner. In case where the authorized collectors are not able to channel the collected scheduled E-waste directly to the licensed recyclers due to logistic or any other factors such as small retailers, the collected scheduled E-waste shall be delivered to another authorized collectors that have capability to channel the E-waste in larger volume to the licensed scheduled E-waste recyclers.

The licensed scheduled E-waste recyclers shall fulfill the requirements set in this Recycling Guideline in their recycling operation. The first requirement of the Recycling Guideline is to ensure proper management of “Focused Materials” for each scheduled E-waste item. Focused Materials are the specific components or parts of or substances contained in scheduled E-waste items that are defined as potentially hazardous to human health and/or environment if they are improperly handled. Examples of such materials include funnel glass of cathode-ray tube (CRT) TV, printed circuit board, refrigerant used in air conditioners and refrigerators, lithium ion batteries, and so forth. The Recycling Guideline provides handling methods of focused materials in recycling process of each scheduled E-waste.

Another requirement set in the Recycling Guideline is the minimum recycling rate to be fulfilled by the licensed scheduled E-waste recyclers. For each type of scheduled E-waste, the Guideline set different minimum weight-based recycling rate target that each licensed recycler must comply in its recycling operation.

Under the scheduled E-waste management mechanism, the scheduled E-waste is expected to flow from the generation points into proper recycling system run by the authorized collectors and licensed recyclers. Any outflow of household E-waste from the new mechanism will be considered illegal and subject to legal punishment.

The chart on next page illustrates the E-waste flow under the new scheduled E-waste management mechanism.



Legal Framework of Scheduled E-waste Management: The E-waste Flow

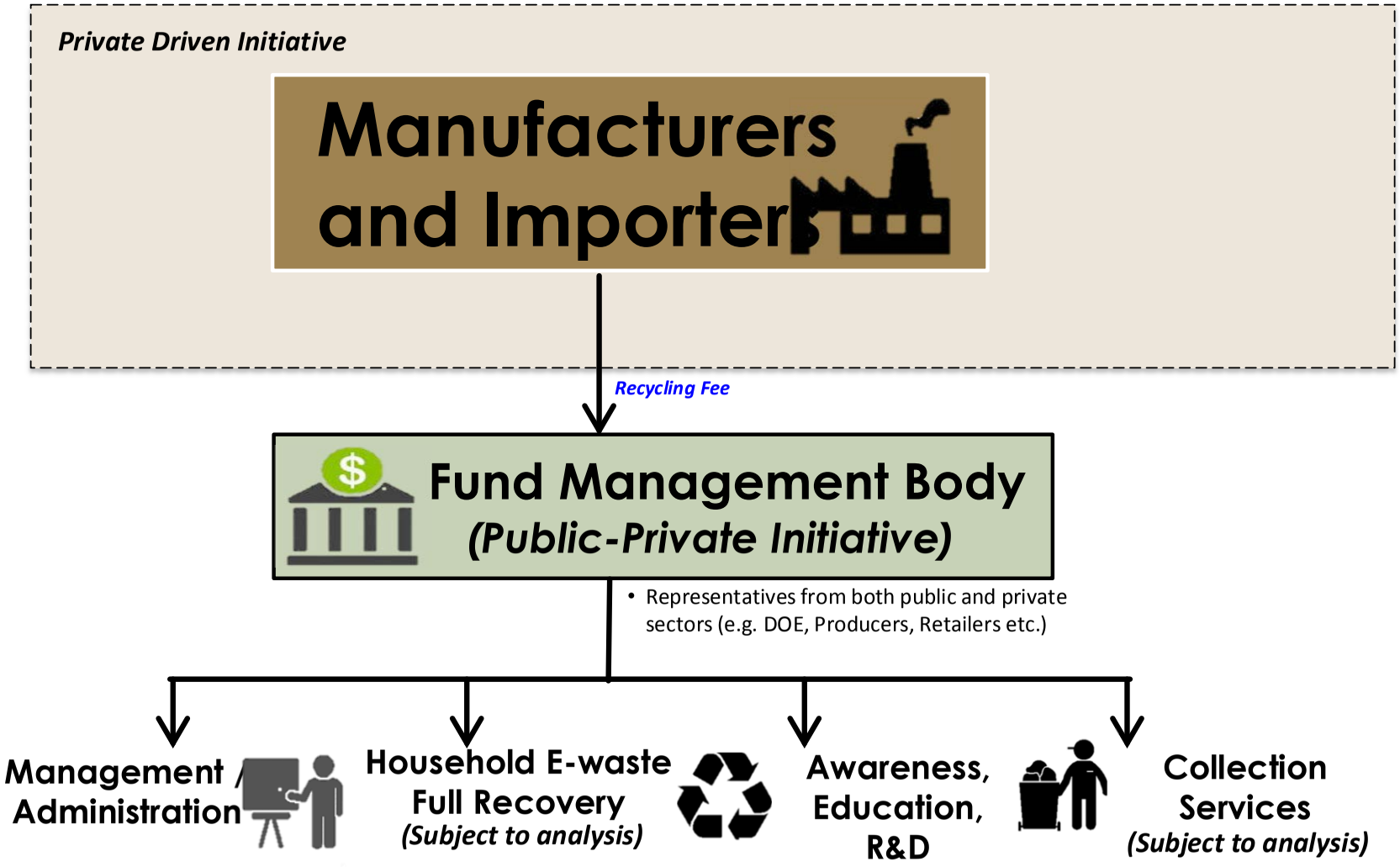
2.3.2 Fee Flow

It is important to understand that recycling of scheduled E-waste does not always yield revenues but it involves significant costs particularly when taking into consideration the logistic cost and environmental protection cost such as destruction of chlorofluorocarbon (CFC) gases, various pollution control measures, as well as treatment and disposal of hazardous substances. The overall cost required to ensure that the scheduled E-waste is properly channeled and processed in an environmentally sound manner shall be shared among all those who receive benefits from the relevant E-appliances.

Under the new scheduled E-waste management mechanism, the manufacturers and importers or any other individuals and entities who put the designated E-appliances into the Malaysian market shall pay the "Recycling Fee (Contribution)" to represent all the stakeholders to be benefited from proper management of the scheduled E-waste. The Recycling Fee (Contribution) will be collected by the so-called "Recycling Contribution Management Body (RCMB)", which is established as the independent organization to finance overall mechanism of scheduled E-waste management in Malaysia including provision of subsidy to the necessary activities of the licensed scheduled E-waste recyclers, authorized collectors, and other possible stakeholders of the new scheduled E-waste management mechanism, which will be determined by RCMB.

In accordance with the principle of "Shared Responsibilities", the required cost for proper management of scheduled E-waste should be shared among all the relevant stakeholders who receive benefits from the relevant E-appliances, including manufacturers, importers, wholesalers, retailers, and consumers. In this scheduled E-waste management mechanism, the manufacturers and importers temporarily shoulder this cost by paying the recycling fees. Therefore, it is given to the individual decisions of manufacturers and importers whether and how they would share this financial responsibilities with other stakeholders.

The recycling fee (contribution) determined for each item of scheduled E-waste will be different, reflecting various cost factors involved in their collection and recycling. Details of fee structures to be paid by the manufacturers and importers by each scheduled E-waste are described in Recycling Fee Guideline.



Legal Framework of Scheduled E-waste Management: The Recycling Fee Flow

2.3.3 Reporting Flow

Proper reporting system is an essential tool to monitor and ensure proper scheduled E-waste flow and recycling fee flow as elaborated in Section 2.4.1 and 2.4.2 above.

The new scheduled E-waste management mechanism mainly consists of two types of reporting system. i.e. reporting by the manufacturers and importers of the designated E-appliances and reporting by the stakeholders involved in collection and recycling of scheduled E-waste.

The purpose of reporting by the manufacturers and importers is to identify the volume and amount of the designated E-appliances put into the Malaysian market. The manufacturers and importers have the obligation to periodically report to the RCMB on the volume of designated E-appliances put on the Malaysian market by each item. This data will be the baseline for forecasting the present and future generation of E-waste in the long run while it will be also used as an important factor in determining the recycling fee to be paid by the manufacturers and importers (Detail formula of determining the recycling fee is provided in the "Recycling Fee Guideline".)

On the other hand, the reporting by the collectors and recyclers aims at ensuring proper flow of the scheduled E-waste from generation sources to their final destinations. The new scheduled E-waste management mechanism introduced the so-called "E-waste manifest system" to trace the flow of each E-waste item from collection points to their final destinations. The manifest system comprises 6-ply of manifest forms, which shall be filled out and kept by respective stakeholders following the methods as detailed in "E-waste Reporting Guideline". Reporting mechanism under the manifest system is summarized as below:

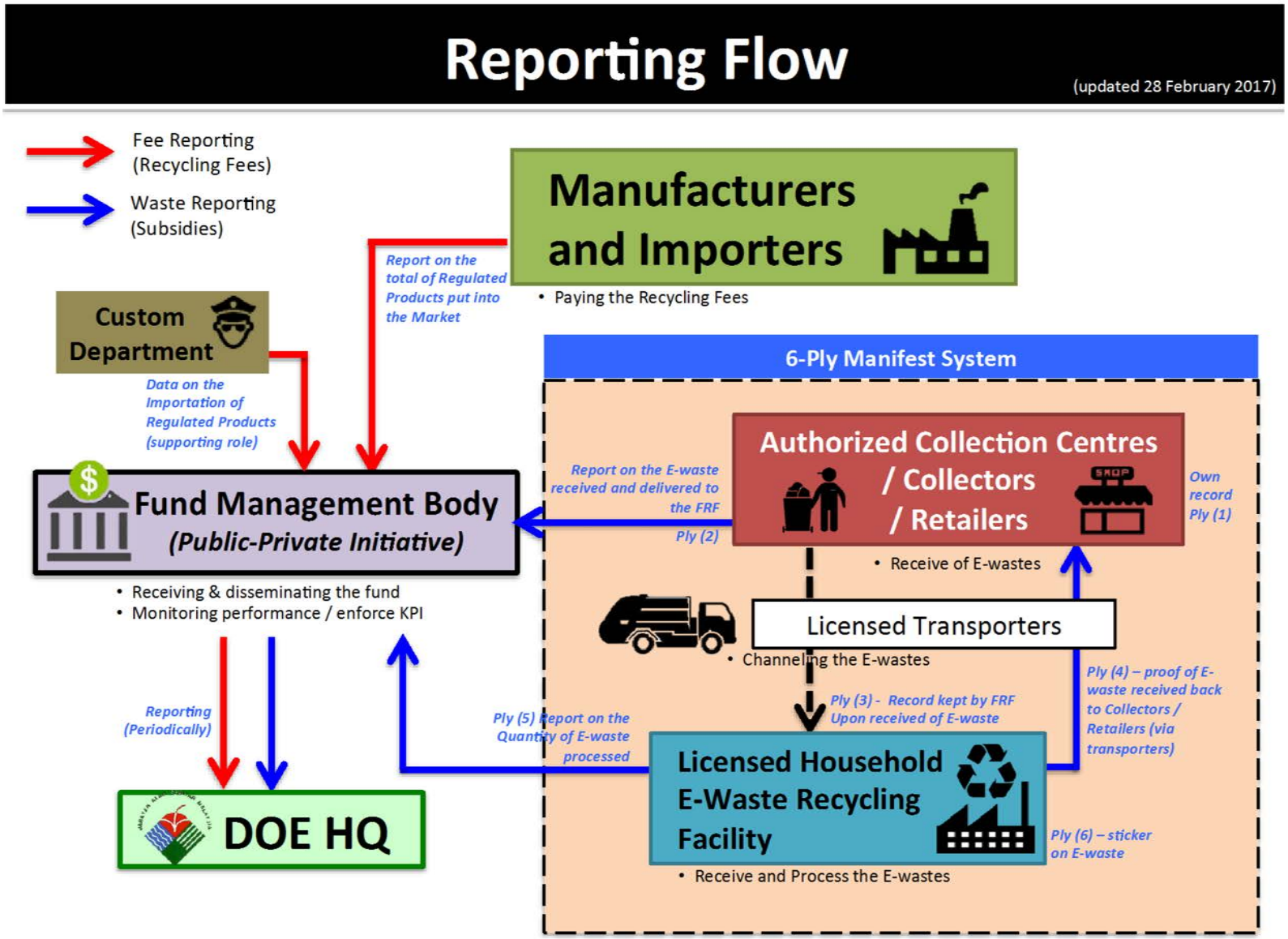
a) The authorized collectors shall fill out one manifest form for each of E-waste item collected. At the time of handing it over to the authorized transporters or licensed recyclers, they return 1-ply of manifest to the RFMB while keeping one copy and attaching the remaining copies to each E-waste item to be handed over.

b) When the authorized transporters receive E-waste with manifest form attached, they shall fill out the necessary parts of the manifest form. At the time of sending out the received E-waste to the licensed recyclers, they shall return 1-ply of manifest to RFMB while keeping one copy and attaching the remaining copies to each E-waste item they sent out.

c) When the licensed scheduled E-waste recyclers receive scheduled E-waste from authorized collectors or transporters with their manifest forms attached to each E-waste item, they shall fill out the necessary parts of the manifest forms. After completing all the recycling and treatment process, the licensed recyclers shall return to RFMB 1-ply of manifest form of each E-waste item they recycled while keeping 1 copy under their hand for each E-waste item.

d) RFMB shall cross-examine the manifest forms returned by collectors, transporters and recyclers to ensure proper flow of each scheduled E-waste from primary collectors to the recyclers. After confirmation on completion of the overall flow, RFMB will make disbursement of the fund (subsidy) to the relevant stakeholders above.

The manifest system directly links with subsidy disbursement mechanism run by RFMB. RFMB shall make disbursement of the subsidy only upon reception of all manifest forms from relevant stakeholders. Manifest form is utilized as the written evidence of proper recycling of each E-waste.



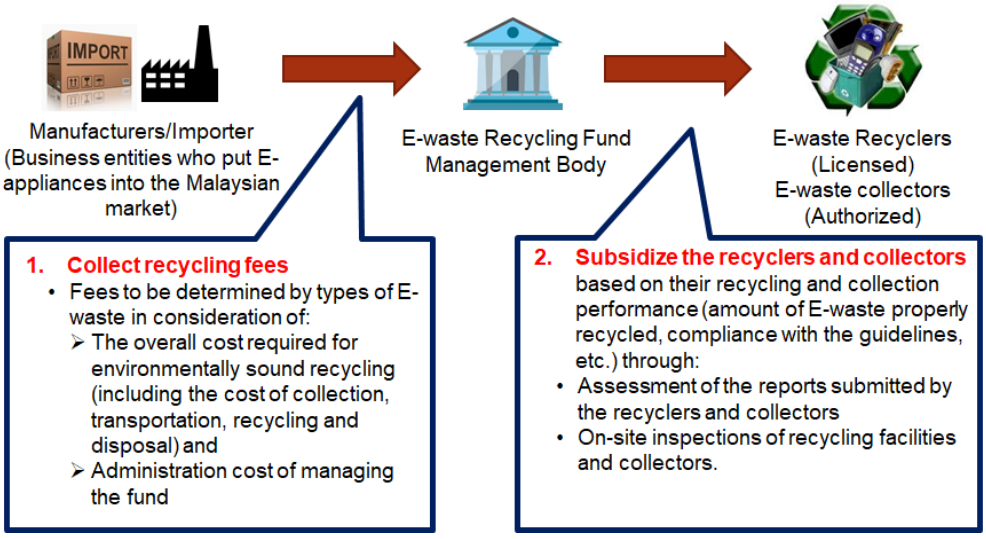
Legal Framework of Scheduled E-waste Management: The Reporting Flow

3.0 FINANCIAL MECHANISM OF SCHEDULED E-WASTE MANAGEMENT

3.1 Recycling Contribution Fund Management Body

Recycling Contribution Management Body (RFMB) is the public entity responsible for the entire mechanism of scheduled E-waste management in accordance with the Environmental Quality (Scheduled E-Waste) Regulations 20XX. The details of the roles and responsibilities of RCMB is provided in the schedule of RCMB attached to the Environmental Quality (Scheduled E-Waste) Regulations 20XX.

Regarding the implementation of this guideline, the main roles and responsibilities of RCMB is as shown in the figure below.



The operation of RCMB shall be supervised by the third-party organizations, i.e. Recycling Rate & Fee Review Committee (RFRC) and Auditing and Verification Committee (AVC), organized by the representatives of pubic as well as private stakeholders involved in the entire household E-waste management mechanism. The members of RFRC and AVC are provided in the schedule of RCMB.

3.2 Recycling Fee (Contribution) Collection Mechanism

3.2.1 Basic Structure of Recycling Fee (Contribution)

The purpose of collecting recycling fee is to cover the cost required for entire implementation of scheduled E-waste management mechanism, including:

- Total logistic cost required for proper collection and transportation from generators to the licensed recyclers by the authorized collectors,
- Total recycling cost required for environmentally sound recycling, treatment, and disposal cost by the licensed recyclers, and
- Total cost of RCMB required for the operation of the entire household E-waste management mechanism.

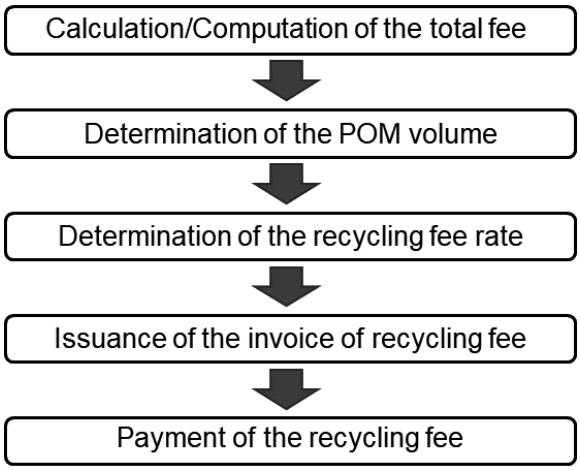
Therefore, the total amount of recycling fee collected has to be enough to cover the above costs as illustrated in the formula below.

(The total amount of fee collected)
= (Total logistic cost required) + (Total recycling cost required) + (RFMB cost)

Considering the difference in cost of collection and recycling depending upon types of regulated items, the total amount of fee collected shall be determined by each type of E-waste items. Detailed methodology of making calculation/computation of recycling fee is given in Section 3.4 of this guideline.

3.2.2 Recycling Fee collection Procedure

The basic procedure for collection of recycling fee is as shown in the chart below.



(1) Calculation/Computation of the total fee

In accordance with the formula shown in Section 3.2.1 above, The total amount of recycling fee required to cover the sum of the total logistics cost, recycling cost, and RCMB cost is to be calculated by each regulated E-waste item. The detailed methodology of making computation of each cost above is specified in Section 3.4 of this guideline.

(2) Determination of the put on market (POM) volume

So called "Put-On-Market (POM)" volume of each regulated E-appliance in the previous year is to be determined based on the reporting of POM volume by each manufacturer, importer and all those who put their own regulated E-appliances on the Malaysian market. To do this, they are required to be registered at RCMB as manufactures and/or importers of the regulated E-appliances. The POM volume shall be reported in total number of units as well as total tonnage for each regulated E-appliance. In reporting the total POM volume, the volume manufactured or imported for export may be excluded. POM is, in principle, equal to yearly shipment (sell-in) volume to the Malaysian market for sale in Malaysia.

The reported POM volume shall be cross-examined with the relevant information and data from other sources such as Custom Department, Statistic Agency, and so forth. False or no registration as well as reporting shall be subject to penalties in accordance with the relevant laws and regulations.

(3) Determination of the recycling fee rate

Based on the total fee calculated in (1) above and POM determined in (2) above, the recycling fee rate shall be determined for each regulated E-appliance by applying the equation below.

Recycling Fee Rate (RM/per unit)

= Total amount of recycling fee (RM/year) / POM volume (units/year)

RCMB shall be responsible for conducting all the procedures above (from (1) to (3)) to come out with the draft recycling fee rate for each regulated E-appliance. Once the draft recycling fee rate is determined, the Recycling Rate & Fee Review Committee (RFRC) shall review the entire procedure to finalize the recommended recycling fee rate for submission to the Chairman of RCMB. The chairman of RCMB shall make the final decision and official announcement of the recycling fee rate in the form of the schedule of recycling fee rate as a part of the Environmental Quality (Scheduled E-Waste) Regulations 20XX.

(4) Issuance of the invoice of recycling fee

In accordance with the final decision of recycling fee rates by the Chairman of RCMB, Invoices of recycling fee shall be issued for each of manufacturers, importers, and all those who put their own regulated E-appliances on the Malaysian market. RCMB shall be responsible for all this procedure. The invoice shall detail out the breakdown of the fee, manner of payment, and due date for payment. The invoice shall be sent once a year to manufacturers, importers, and all those who put their own regulated E-appliances on the Malaysian market.

(5) Payment of the recycling fee

Upon receiving the invoice form RCMB, the manufacturers, importers, and all those who put their own regulated E-appliances on the Malaysian market shall make their payment to RCMB in accordance with the manner and term of payment stated in the invoice. The delay or non-payment of the fee as well as shortage of the payment amount may be subject to penalties in accordance with the relevant laws and regulations.

3.3 Recycling subsidy disbursement mechanism

3.3.1 Basic structure of recycling subsidy

The recycling subsidy is to be provided for the purpose of covering the logistic and recycling cost required for proper collection and recycling of the regulated E-waste in accordance with the Environmental Quality (Scheduled E-Wastes Regulations 20XX and the attached guidelines. In principle, the authorized collectors and licensed recyclers of the regulated E-waste are entitled to receive the recycling subsidy. The amount of subsidy to be provided to authorized collectors and licensed recyclers will be determined by applying the equation below.

The amount of subsidy (RM)

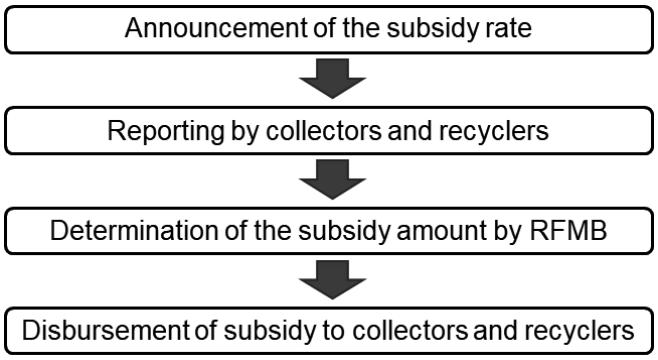
= Subsidy rate (RM/unit) ∗ Number of units collected or recycled (Units)

The subsidy rate shall be separately determined for each regulated E-waste item in accordance with the calculation of per unit logistic and recycling cost required. Detailed methodology of making calculation/computation of recycling subsidy rate is given in Section 3.4 of this guideline.

Number of units collected or recycled shall be determined based on the reporting by the authorized collectors and recyclers in accordance with the collection, recycling, and reporting guidelines. Non-compliance with these guidelines may result in no or discounted provision of subsidy. False reporting may be subject to penalties in accordance with the laws and regulations depending upon its seriousness.

3.3.2 Subsidy disbursement procedure

The basic procedure for disbursement of subsidy is as shown in the chart below.



(1) Announcement of subsidy rate

Based on estimation of the total logistic and recycling cost in the process of making calculation/computation of recycling fee rate mentioned above, RCMB shall determine the draft subsidy rate to authorized collectors and recyclers respectively for each regulated E-waste item. The draft subsidy rate shall be entirely reviewed of its estimation procedure by the Recycling Rate & Fee Review Committee (RFRC) for final recommendation to the Chairman of RCMB. Once the RCMB Chairman make his final decision, subsidy rate to be applied in the relevant year(s) shall be officially announced in the form of the schedule of recycling subsidy rate as a part of the Environmental Quality (Scheduled E-Waste) Regulation 20XX.

(2) Reporting by collectors and recyclers

To be entitled as the receivers of this subsidy, the authorized collectors and licensed recyclers must submit their report (monthly or quarterly) of the volume collected and/or recycled to RCMB. The volume shall be reported in number of units and tonnage. The reporting must be made with the reporting forms for collectors and recyclers in accordance with the relevant guidelines (Collection, recycling, and reporting guidelines). The authorized collectors and licensed recyclers may submit their report to be attached with their own copy of manifest form as a proof of their collection and recycling performance.

(3) Determination of the subsidy amount by RCMB

Upon receiving the reports from authorized collectors and licensed recyclers, RCMB shall make their entire review to decide subsidy amount to respective collectors and recyclers.

RCMB shall first cross-check the volume claimed in the report with the actual copies of manifest sent. If there is an inconsistency between them, RCMB shall notify them revision and resubmission of the report until the volume is matched. False reporting may be subject to disbursement of no or discounted subsidy or even subject to penalties depending upon its seriousness in accordance with the

Regarding the authorized collectors, collection and transportation of incomplete sets of regulated E-waste items may be subject to discount of subsidy amount to avoid leakage of E-waste outside this mechanism that may result in incidental environmental pollution. Non-compliance with the collection guideline may also be subject to payment of no or discounted subsidy or even penalties depending upon its seriousness such as dismantling of valuable materials and selling them to non-licensed recyclers.

As to the licensed recyclers, non-compliance with the recycling guideline may result in disbursement of no or discounted subsidy as well as be subject to penalties depending

upon its seriousness such as illegal handling of focused materials, overstatement of recycling rate, and so forth.

(4) Disbursement of subsidy to collectors and recyclers

Upon determination of the subsidy amount, RCMB shall notify it in a written form to authorized collectors and recyclers. On reception of the notification, they may issue invoices for disbursement of subsidy by RCMB. Depending upon frequency of reporting and request by authorized collectors and licensed recyclers, the subsidy shall be paid monthly or quarterly.

3.4 Methodology of making calculation/computation of recycling fee and subsidy rates

3.4.1 Recycling fee rate calculation/computation

The basic formula of recycling fee rate calculation/computation is as shown below.

Recycling Fee rate (RM/unit) × Put on market volume (units/year) = Total logistic cost (RM/year) + Total recycling cost (RM/year) + RFMB cost (RM/year) ± Adjustment of fund management surplus (RM/year)

The methodology for each factor described in the formula above is as specified respectively below.

(1) Recycling fee rate

The recycling fee rate shall be determined in the form of RM/unit by each regulated E-waste item. The unit utilized shall be per complete unit or per ton of each E-waste item.

(2) Put-On-Market (POV) Volume

Put-On-Market (POM) volume of each regulated E-appliance shall be determined based on the reporting of POM volume by each manufacturer, importer and all those who put their own regulated E-appliances on the Malaysian market in the previous year.

The POM volume shall be reported in total number of units as well as total tonnage for each regulated E-appliance. In reporting the total POM volume, the volume manufactured or imported for export may be excluded. POM is, in principle, equal to yearly shipment (sell-in) volume to the Malaysian market for sale in Malaysia.

The reported POM volume shall be cross-examined with the relevant information and data from other sources such as Custom Department, Statistic Agency, and so forth.

(3) Total logistic cost

The total logistic cost is defined as the cost for entire collection and transportation of regulated E-waste items from their generation sources to final destinations, i.e. licensed recyclers. The total logistic cost shall be estimated for each regulated E-waste item. The basic formula of estimating the total logistic cost is as shown below.

The total logistic cost (RM/year)
= Unit cost of collection and transportation (RM/ton· km) ∗Total distance of collection and transportation (ton· km/year)

(a) Unit cost of collection and transportation
Unit cost of collection and transportation shall be determined by types of transportation mode as well as standard loading capacity of each transportation mode. In the case of Malaysia, road transportation by trucks (including container trucks) shall be assumed as the main mode of transportation for Peninsular Malaysia while combination of land and sea transportation shall be assumed for the region of Sabah and Sarawak in estimating the unit cost of collection and transportation.

(b) Total distance of collection and transportation
The total distance of collection and transportation shall be calculated by applying the following equation.

Total distance of collection and transportation (ton· km)
= Average distance of collection and transportation by mode of transportation per trip (ton · km/trip) ∗ Number of trips per year

The estimation above shall be made for each type of transportation mode as well as by levels of loading capacity of transport means (e.g. types and scale of trucks and cargo ships).

More detailed procedure for estimating the total logistic cost is given in Annex1 of this guideline as an example.

(4) Total recycling cost

The total recycling cost shall be estimated for each type of regulated E-waste item by applying the following equation.

Total recycling cost (RM/year)
= Recycling cost per unit (RM/unit) ∗ Number of units recycled (units/year)

The unit to be applied in the equation above shall be tonnage as well as per E-waste item (e.g. per TV set, refrigerator, etc.).

(a) Recycling cost per unit
Recycling cost per unit shall be estimated by so-called capacity cost accounting (RM/unit). On the other hand, as the recycler shall obtain revenue from selling recyclable materials, it shall be subtracted from the gross recycling cost to obtain the net recycling cost. Thus, the standard equation of recycling cost estimation shall be as follows:

The total recycling cost (RM/unit)
= Capital cost (RM/unit) + Operation cost (RM/unit) – Revenue (RM/unit)

i. Setting the standard E-waste recycling operation
To estimate the recycling cost in accordance with the equation above, the standard e-waste recycling operation shall be set for each type of regulated E-waste items. It shall also be designed to comply with the handling rules of focused materials and the minimum recycling rate targets determined in the household E-waste recycling guideline.

ii. Capital cost
Capital cost shall include the cost of machinery and equipment to be required for recycling of regulated E-waste items in accordance with the household E-waste recycling guideline. It shall mainly consist of the machinery and equipment cost for proper separation and handling of focused materials and compliance with the minimum recycling rate targets.

iii. Operation cost

Operation cost shall include the cost of manpower, utility, consumables and other miscellaneous cost required for recycling operations. It shall also include the cost of treatment and disposal of focused materials in accordance with the household E-waste recycling guideline.

iv. Revenue

To obtain the net cost of recycling, the revenue from selling the recyclable materials processed from recycling operation shall be estimated.

(b) Number of units recycled

Number of units recycled shall be estimated for each regulated E-waste item taking into account the past trend of domestic sales of relevant E-appliances and their durable years to project their annual generation as E-waste and assumption on the collection ratio of E-waste by the authorized collectors.

More detailed procedure for estimating the total recycling cost is given in Annex 2 of this guideline as an example.

(5) RCMB cost

The RCMB cost shall include the capital and operation cost of RCMB in accordance with the schedule of RCMB attached to the Environmental Quality (Scheduled E-Waste) Regulation 20XX. It shall include the capital cost of basic equipment such as the computers for controlling manifest system, database for controlling all the information of stakeholders and their reports and operation cost including manpower, utility, consumables, and other miscellaneous expenses. More detailed estimation of RCMB cost is given in Annex 3 of this guideline.

(6) Adjustment of fund management surplus

In the entire financial operation of RCMB, there may be surplus of the fund on annual basis because of the discrepancy between the amount of recycling fee collected and the amount of subsidy disbursement. RCMB shall adjust this surplus in determining the fee rate for the subsequent year. This adjustment shall be made in annual review of fee and subsidy rate by RFRC.

3.4.2 Subsidy rate calculation/computation

Subsidy rate shall be annually determined in the process of making calculation /computation of recycling fee rate discussed in Section 3.4.1 above. There shall be two types of subsidies, i.e. E-waste collection subsidy and E-waste recycling subsidy. For both types of subsidies, subsidy rate shall be set for each type of regulated E-waste.

(1) E-waste collection subsidy

E-waste collection subsidy shall be provided to the authorized household E-waste collectors for the purpose of covering the collection and transportation cost of household E-waste. The authorized collectors shall be entitled as the receivers of subsidy by reporting the collection amount of regulated household E-waste items in accordance with the reporting guideline. The subsidy rate for E-waste collection shall be determined by applying the equation below.

Subsidy rate (RM/unit)

= Collection/transportation cost (RM/unit) ∗ Adjustment Factor (%)

(a) Collection/transportation cost

The collection/transportation cost per unit shall be converted from the total logistic cost determined in the process of making calculation/computation of recycling fee rate in Section 3.4.1 above. The cost shall be separately estimated for Peninsular Malaysia and the region of Sabah and Sarawak, taking into consideration of the transport distance and the use of different transportation mode.

(b) Adjustment factor

To encourage authorized collectors to collect more regulated E-waste items in complete set with no missing of valuable components and parts, different subsidy rate shall be set for complete and incomplete set of E-waste items by making use of adjustment factor. For incomplete sets of collected E-waste items, this adjustment factor shall be applied to discount its subsidy rate. The adjustment rate shall be determined for each of regulated E-waste item considering the types of components and parts that can potentially be missing and their market values.

(2) E-waste recycling subsidy

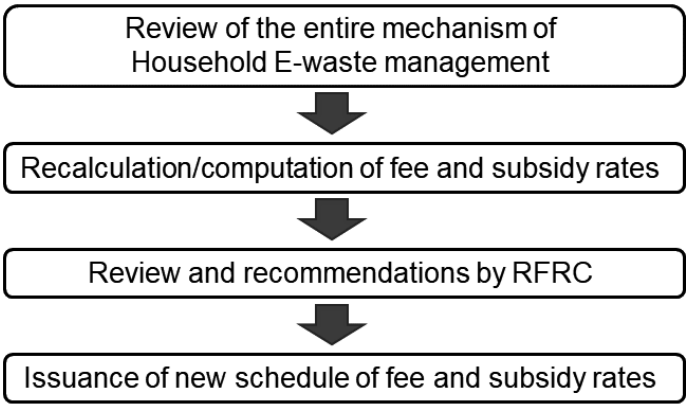
E-waste recycling subsidy shall be provided to the licensed scheduled E-waste recyclers for the purpose of covering recycling cost of scheduled E-waste. The licensed recyclers shall be entitled as the receivers of subsidy by reporting the recycled amount of regulated scheduled E-waste items in accordance with the reporting guideline. The subsidy rate for E-waste recycling shall be determined by applying the equation below.

Subsidy rate (RM/unit) = Recycling cost (RM/unit)

The recycling cost per unit shall be converted from the total recycling cost determined in the process of making calculation/computation of recycling fee rate in Section 3.4.1 above. The cost shall be separately estimated for each regulated E-waste item.

3.5 Review mechanism of recycling fee rate and subsidy rate

RCMB shall, on annual basis, conduct a comprehensive review of the entire mechanism of household E-waste management to determine the fee and subsidy rates for subsequent years. The standard procedure for this review shall be as shown in the chart below.



(1) Review of the entire mechanism of scheduled E-waste management

As the first step of the annual review process, RCMB shall compile all information and data on relevant stakeholders' performance into an annual report. The report shall also include financial statements of RCMB to clarify its revenue and expenditure.

(2) Recalculation/computation of fee and subsidy rates

As a part of the annual report or in another document, RCMB shall provide the results of recalculated/computed fee and subsidy rates based on the previous year's performance of scheduled E-waste management. RCMB also provide information and data on the market trend of recyclable materials, the trend of technology development in E-waste recycling, variation in components, parts, and materials used in regulated E-appliances, and so forth to be considered in this recalculation/computation process.

(3) Review and recommendations by RFRC

Upon submission of the recalculated/computed fee and subsidy rates by RCMB, RFRC shall review all the process with submitted information and data to make recommendations to the Chairman of RCMB on the fee and subsidy rate for the subsequent year.

(4) Issuance of new schedule of fee and subsidy rates

Receiving recommendations from RFRC, the Chairman of RCMB shall make final decision on the fee and subsidy rate for the subsequent year and issue the new schedule of fee and subsidy rates.

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ANNEX:

Proforma Calculation of the Total Cost (logistic, recycling and RCMB Cost), Fee and Subsidy

Cost calculation procedure

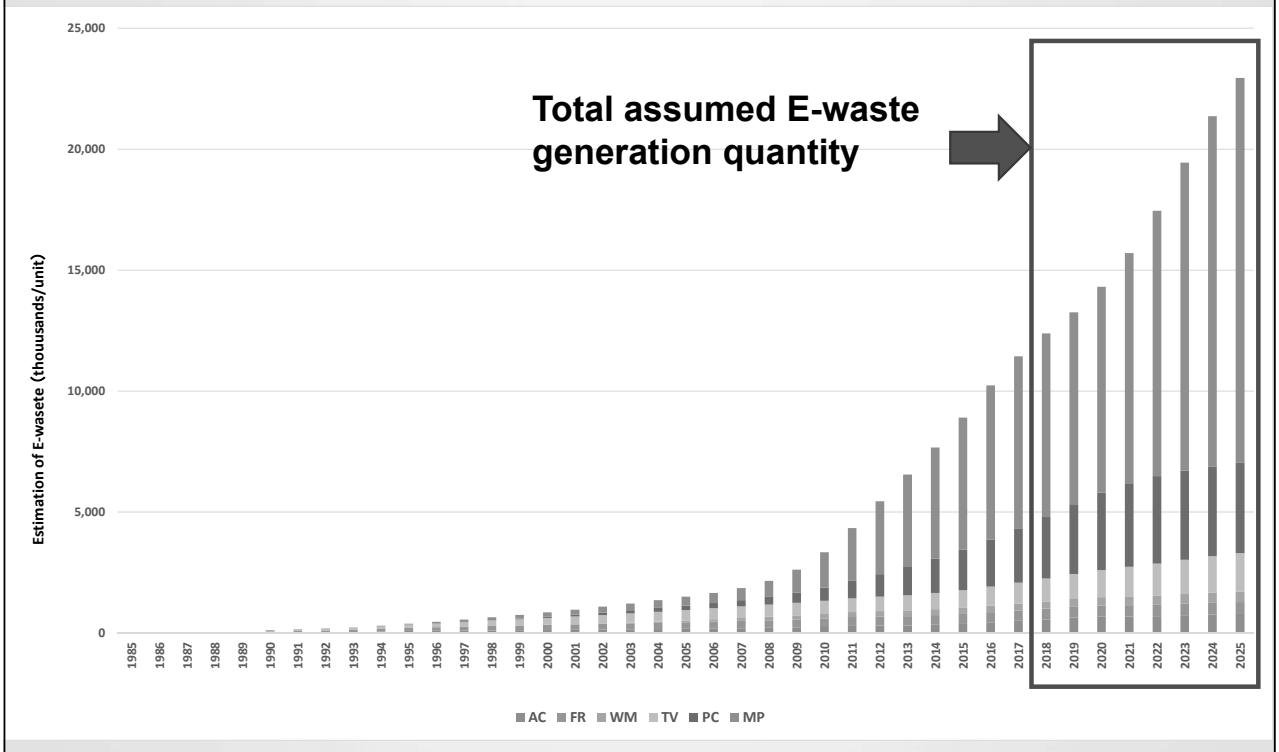
-Total logistic cost (RM/year)-

5. How to estimate the collection cost by item

(Determining collection rate)

- Collection volume is assumed to determine the scale of recycling facility as well as the E-waste to be collected and transported.
- Assumption is made based on the Household E-waste Inventory conducted in 2016 to estimate the potential household E-waste generation in Malaysia.
- It is assumed the collection rate out of the generation volume becomes 10%, 20%, 40%, 60% at first year, second year, 5th year, 10th year respectively.
- It is expected the collection amount is different from the POM amount. FMB considers the disparity and determines the recycling fee amount to be collected in coming years.

(Assuming future generation and collection amount of E-waste)



(Logistical cost: Factors to be considered in the estimation)

- Depending upon the difference in the distance between the locations of generators and recyclers due to its geographical distribution (such as the case of Sabah and Sarawak) current market mechanism may discourage collection and transportation, leading to lower collection rate from such areas.
- Also, the bulky E-waste with low market value of materials (e.g. refrigerators and washing machine) may also discourage the collectors and recyclers to collect and handle.
- Therefore, logistical cost needs to be taken into account when setting the recycling fee.

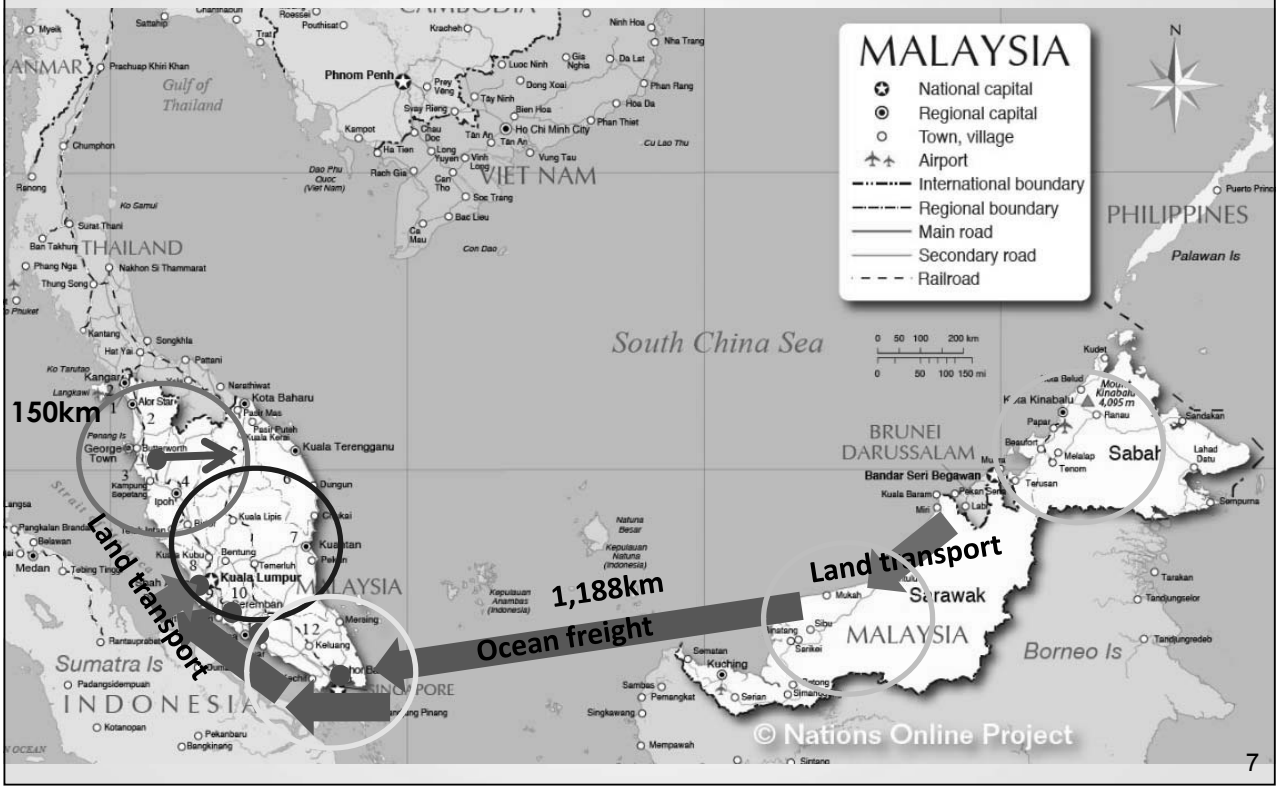
(Logistical cost)

- Assumed collection volume is divided regionally to know the state wise volume. By knowing the state wise volume, logistical cost is calculated.
- Basically E-waste transported and treated at recycling facilities in major regions(Penang, Klang Valley, N Sembilan, Melaka, and Johor) except East Malaysia. Initially all generated E-wastes shipped to Peninsular Malaysia.
- E-wastes generated in other regions are assumed to be transported and treated also at the recycling facilities.

Total assumed E-waste collection volume **X** **Region wise population**

Region wide population	2010 Census Population	
Region	mil	Ratio
Penang	1.9	6.8%
Klang Valley	7.2	26.0%
(KL)	(1.6)	(5.7%)
Melaka	0.82	3.0%
N Sembilan	1.02	3.6%
Johor	3.6	12.7%
Sabah/Sarawak	5.6	20.0%

Household E-waste logistical plan



(State wise assumed collection volume in 2024)

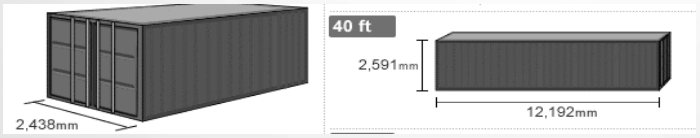
(Unit)

	CRT TV	Flat TV	WM	AC	FR	PC (Desktop)	PC (Note)	MP
Penang	20,441	20,441	11,533	20,808	13,138	55,292	45,239	394,182
Klang Valley (KL+ Selangor)	78,156	78,156	44,096	79,560	50,232	211,411	172,973	1,507,168
N Sembilan	10,822	10,822	6,106	11,016	6,955	29,272	23,950	208,685
Melaka	9,018	9,018	5,088	9,180	5,796	24,394	19,958	173,904
Johor	38,176	38,176	21,539	38,862	24,536	103,266	84,491	736,194
Other states	83,867	83,867	47,318	85,374	53,903	226,860	185,613	1,617,307
Sub TOTAL	**240,480**	**240,480**	**135,680**	**244,800**	**154,560**	**650,495**	**532,224**	**4,637,440**
Sabah & Sarawak	60,120	60,120	33,920	61,200	38,640	162,624	133,056	1,159,360
TOTAL	**300,600**	**300,600**	**169,600**	**306,000**	**193,200**	**813,119**	**665,280**	**5,796,800**

- West Malaysia
  - Logistical cost: RM 500/ 1day(5 ton truck, 8 hour land transportation fee) (Source: Standard transport rates)

Assumed loadable amount on truck

- East Malaysia
  - Logistical cost: RM 12,611/trip (40 ft container sea freight fee) (Source: Average sea freight fare)



Assumed loadable amount in container

- Assumed 5 ton truck can make 300km trip/day(8 hours) and calculated loadable amounts for each item by that size of truck.

Loadable E-waste amount

Item	Average weight (kg/unit)	Loadable amount (unit/truck)
CRT TV	25	50
Flat TV	10	100
WM	40	20
AC	46 (Outdoor 36kg, indoor 10kg)	30
Fridge	58*1	13
PC*2 (desktop)	21.7	20
Laptop	2.3	120
MP	0.1	4,000

***1: Used the average weight obtained in the pilot project on recycling except fridge as most of received fridge lacking compressor. Instead used the average weight from Japan home appliance recycling data**

***2: For desktop PC, CPU weight is 12kg, CRT type monitor is 14kg and flat type is 5.4kg. Thus used average weight of CPU + average weight of both CRT and flat type monitors**

- Assumed 40 ft container from East Malaysia to Peninsular can accommodate following amount per trip
- Included land transportation in East Malaysia and Peninsular after and before the sea freight

Loadable E-waste amount

Item	Average size(cm)	Loadable amount (unit/container)
CRTTV	55 x 80 x 55	240
Flat TV	50 x 90 x 5	2,000
WM	1040 x 58 x 70	120
AC	80 x 80 x 30	360
Fridge	150 x 66 x 66	100
PC(desktop)*1	38 x 53 x 38 38 x 39 x 38	860
Laptop	4 x 28 x 21	29,000
MP	120 x 90 x 90*2	210,600

***1: For desktop PC, CPU and monitor combined size considered. For monitor, CRT and flat type ration is 1:1. Upper and lower figure shows CPU+CRT and CPU and flat monitor respectively**

***2: For mobile phone, jumbo bag is used and 8,100 pcs accommodated per bag and 26 bags assumed to be loaded per container**

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(Logistical cost: formula)

- Logistical cost is for the collection and transportation of Household E-waste. It covers the cost from the generators to recycling facility.
- Logistical cost is calculated by following parameters
  - RM/ton, km: carryable quantity by truck or container
  - Collection and transportation ton, km: regional assumed collection quantity by population distribution ratio
- Basic formula is
  - Logistical cost= RM/ton,km x collection and transportation ton,km.
- This is the source for subsidizing registered collectors.
- Logistical cost is to be set by considering the transaction activity in the market.

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(Unit cost)

- Considered all the parameters and conditions, unit cost for carrying **1 ton for 1 km so-called ton kilo unit cost** for both land and sea freight transportation are calculated
- Ton kilo cost for Peninsular is 1.47(500/1.25=440/300) x weight and average transporting distance per trip
- Total collection cost is RM 19,846K as shown below

Assumed logistical cost for Peninsular

				(0)	(1)	(2)	(3)	(0)x(1)x(2)x(3)
	Logistics rate(RM)	Carry amount(unit)	Distance (km)	ton km(RM)	Collection amount(unit)	Weight (t)	Average distance(km)	Total collection cost(RM)
CRTTV	550	50	300	1.47	240,480	0.025	150	1,322,640
Flat TV	550	100	300	1.83	240,480	0.01	150	661,320
WM	550	20	300	2.29	135,680	0.04	150	1,865,600
AC	550	30	300	1.33	244,800	0.046	150	2,244,000
Fridge	550	13	300	2.43	154,560	0.058	150	3,269,538
PC(desktop)	550	20	300	4.17	650,495	0.022	150	8,944,306
Laptop	550	120	300	6.64	532,224	0.0023	150	1,219,680
MP	550	4,000	300	4.58	4,637,440	0.0001	150	318,824
					6,836,159	0.2034		**19,845,909**

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- For East Malaysia, inland transportation before and after sea freight transportation are calculated by using the parameters
- Ton kilo cost for East Malaysia is 1.77(12,611/6=2,101/1,198) x weight and average transporting distance per trip
- For inland transportation, same unit cost is used
- Total collection cost is RM 101,462K as shown below

Assumed logistical cost for East Malaysia

							(0)	(1)	(2)	(3)	(0)x(1)x(2)x(3)
	Logistics rate(RM)	Carry amount(unit)	Distance (km)	Sea freight	Land(A)	Land(B)	ton km(RM)	Collection amount(unit)	Weight (t)	Average distance (km)	Total collection cost(RM)
CRTTV	12,611	240	1,188	1.77	1.47	1.47	4.7	60,120	0.025	1,338	9,456,901
Flat TV	12,611	2000	1,188	0.53	1.83	1.83	4.2	60,120	0.01	1,338	3,376,438
WM	12,611	120	1,188	2.21	2.29	2.29	6.8	33,920	0.04	1,338	12,335,375
AC	12,611	360	1,188	0.64	1.33	1.33	3.3	61,200	0.046	1,338	12,422,801
Fridge	12,611	100	1,188	3.03	2.43	2.43	7.9	38,640	0.035	1,338	14,287,723
PC(desktop)	12,611	860	1,188	0.56	4.17	4.17	8.9	162,624	0.022	1,338	42,577,478
Laptop	12,611	29,000	1,188	0.16	6.64	6.64	13.4	133,056	0.0023	1,338	5,504,939
MP	12,611	210,600	1,188	0.504	4.58	4.58	9.67	1,159,360	0.0001	1,338	1,500,145
								1,709,040	0.18		**101,461,799**

(Total collection cost)

- Following is the total collection cost required both for Peninsular and East Malaysia

Total collection cost

	Total collection cost(RM)	per unit(RM)	per ton(RM)	Total collection cost(RM)	per unit(RM)	per ton(RM)
CRTTV	1,322,640	5.5	220.0	9,456,901	157.3	6,292
Flat TV	661,320	2.75	275.0	3,376,438	56.2	5,616
WM	1,865,600	13.75	343.8	12,335,375	363.7	9,092
AC	2,244,000	9.17	199.3	12,422,801	203.0	4,413
Fridge	3,269,538	21.15	364.7	14,287,723	369.8	10,565
PC(desktop)	8,944,306	13.75	625.0	42,577,478	261.8	11,901
Laptop	1,219,680	2.29	996.4	5,504,939	41.4	17,988
MP	318,824	0.07	687.5	1,500,145	1.3	12,939
	19,845,909	2.90	396.4	101,461,799	59.37	8,725

Assumed logistical cost for Peninsular

Assumed logistical cost for East Malaysia

Cost calculation procedure

-Total Recycling cost (RM/year)-

6. How to estimate recycling cost by item

(Recycling cost formula)

- Recycling cost covers the followings;
  - Cost for proper dismantling and segregation of hazardous substances in E-waste(a)
  - Cost for proper treatment and disposal for hazardous substances(b)
  - Cost for dismantling and segregation of recyclables in E-waste(c)
  - Cost for proper disposal of the residual materials(d)
- Revenue to be obtained by selling recyclable fractions will be deducted to have net cost of recycling which becomes the source of the subsidy for licensed E-waste recycling facility.
- Basic formula is Recycling cost = (a)+(b)+(c)-(d)
- Recycling cost is to be determined as RM/unit and also converted to RM/ton by using the standard weight of the E-waste, obtained in the pilot recycling test.

(Setting recycling facility scale)

- Considering the E-waste collection amount, scale of the facility is assumed to treat each item hourly, daily and yearly
- Treating volume data is based on the pilot project on recycling conducted in July 2017
- Assumed recycling facility basically operates 8 hours/day, 20 days /month, 240 days /year

Scale of E-waste quantity recycled

Item	Hourly treating units	Daily treating units	Yearly treating units
CRT TV	20	160	38,400
Flat TV	20	160	38,400
WS	50	400	96,000
AC	15	120	28,800
Fridge	50	400	96,000
PC(desktop)	60	480	115,200
PC(Laptop)	60	480	115,200
Mobile phone	90	720	172,800

(Setting standard recycling process)

- Standard recycling process is set for each item to fulfill recycling rate and to ensure environmentally sound management for Focused Materials

Item	Recycling process
CRT TV	•CRT monitor panel funnel part separation—(A) •CRT brushing, roller conveyer, air screwdriver •Phosphor vacuum cleaner
Flat TV	•Back light mercury dust collecting chamber—(B) •Roller conveyer, air screwdriver
WM	•Roller conveyer, air screwdriver, tool for washing tub •Shredder –(C) •Salt water collection equipment—(D)
AC	•Refrigerant fluorocarbon gas and oil capturing devise—(E) •Fluorocarbon gas pipe severance •Roller conveyer, air screwdriver •Shredder for heat exchanger shredding and segregation
Fridge	•Refrigerant fluorocarbon gas and oil capturing devise—(F) •Fluorocarbon gas pipe severance •Roller conveyer, air screwdriver •Shredder (G) +fluorocarbon gas capturing equipment—(H)
PC (desktop)	•Roller conveyer, air screwdriver •Monitor processing equipment
Laptop	•Roller conveyer, air screwdriver, manual dismantling—(I)
MP	•Dismantling table •Roller conveyer, air screwdriver •Shredder—(J)

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(Setting standard recycling process)


(A)RT PF cutting


(B)Back light separation


(C)Shredder


(D)Salt water collection


(E)Fluorocarbon gas sucking


(F)Refrigerant fluorocarbon gas collection


(G)Fridge shredder


(H)Fluorocarbon insulation capturing


(I)Manual dismantling


(J)Shredder

(Setting standard recycling process cost estimation)

- Estimation is made by collecting cost data from existing E-waste recyclers in Malaysia and overseas and quotations from suppliers according to the set standard recycling process
- Process cost covers the equipment and rely both manual and mechanical process. Does not cover the asset property cost such as land, building, shed, etc

Equipment cost

Item	Equipment cost (RM)	Converted JPY (,000yen)
CRTTV	115,000	3,100
Flat TV	97,800	2,640
WM	2,564,520	69,240
AC	3,650,000	98,550
Fridge	13,770,000	371,800
PC(desktop)	105,600	2,850
Laptop	105,600	2,850
MP	210,000	5,670

(Recycling process and number of workers estimation)

Item	#of workers	Requiring number for each process
CRT TV	7	3: PF separation, 4: Dismantling casing, monitor, wire, PCB=total 7
Flat TV	12	10: Back cover, LCD monitor, PCB, cable, monitor separation, 2: Back light separation=total 12
WM	10	8: Top cover, washing tub, cable separation, 2: Washing tub dismantling and collecting salt water from balancer=total 10
AC	17	4: Capturing refrigerant fluorocarbon gas and oil from outdoor unit 10: outdoor unit dismantling(main body, heat exchanger, PCB, compressor and remaining oil capture, Indoor unit segregation (main body fan, motor, PCB, harness cable) =total 17
Fridge	10	1: Type segregation(fluorocarbon or hydro carbon type) prior to process, 4: Capturing refrigerant fluorocarbon gas and oil and dismantling compressor, 4: Segregating main body(plastic, gasket, PCB, cable, 1: Monitoring shredding process =total 1
PC (desktop)	15	8: Segregating main body(casing, PCB, HD, optical disk, harness) 5: CRT monitor PF separation, LCD monitor separation(monitor and back light separation)=total 15
Laptop	15	8: Segregating main body(casing, PCB, HD, optical disk, harness) 5: PF separation, 4: LCD monitor separation(monitor and back light separation), lithium ion battery separation and sealing=total 15
MP	20	15: Segregating main body(casing, PCB, screen, memory, harness), 3: PF separation, 5:lithium ion battery separation and sealing=total 20

(Operational cost estimation for the recycling process)

- Operational cost covers workers cost and utilities
- Workers cost is RM9/hour by considering the workers monthly pay at existing recyclers
- For maintenance and spare parts, 10% of the equipment cost is included

Total workers cost

Item	Workers cost（RM）
CRT TV	120,960
Flat TV	207,360
WM	120,960
AC	293,760
Fridge	207,360
PC(desktop)	259,200
Laptop	259,200
MP	345,600

Utility cost

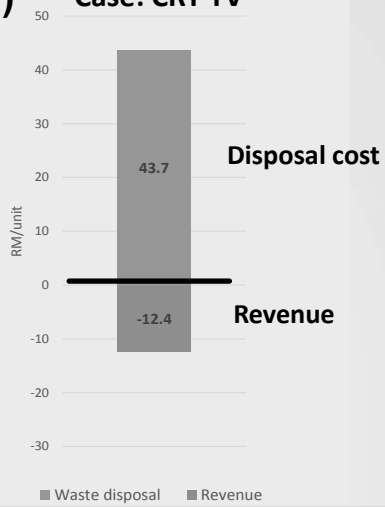
	Unit cost	Source	Usage
Electricity	0.334 MYR/KWh	Tenaga Nasional Berhad 「Tariff Rates」	For powering overall equipment
Fuel	2.18 MYR/liter	Diesel oil price as of April, 2018	For lifting devise in process
Water	2.28 MYR/m3	Suruhanjaya Perkhidmatan Air Negara 「Water Tariff」	For generating steam for activated carbon to capture insulation fluorocarbon

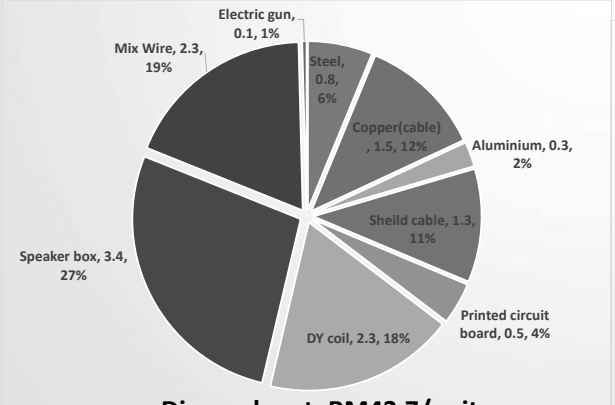
(Cost and revenue for segregated fractions)

Cost and revenue for processed fractions

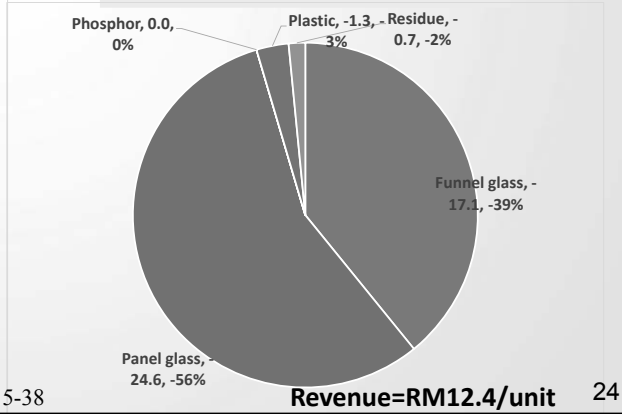
Item	Disposal cost (RM/unit)	Revenue (RM/unit)
CRT TV	43.7	12.4
Flat TV	9	5.4
WM	37	31
AC	11.3	65.3
Fridge	20	39
PC (desktop)	34	19.2
Laptop	2.7	3
MP	0.13	0.03

Case: CRT TV





Disposal cost=RM43.7/unit



Revenue=RM12.4/unit

(Cost and revenue for segregated fractions and general expense)

- Cost for fractions treated at the recycling process is also estimated
- Disposal cost for non recyclable fractions is identified and revenue to be obtained by selling recyclable fraction such as metal and non-ferrous metal are deducted to estimate net recycling cost
- Composition of the fractions in each items is based on the pilot project on recycling
- General expense is also estimated to be used for bags, boxes and containers for proper segregation and storage, insurance and managing material balance data including downstream channel facilities

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(Total recycling cost estimation)

- Following is the total recycling cost required for Malaysia
- There is no difference between Peninsular and East Malaysia in the recycling cost

Total recycling cost

Item	Total recycling cost(RM)
CRT TV	1,555,966
Flat TV	475,857
WM	1,528,085
AC	1,019,245
Fridge	9,059,420
PC (desktop)	6,130,807
Laptop	2,408,045
MP	613,152

(Estimated Recycling cost per item)

- Recycling cost (Equipment cost + operational cost + disposal cost + general expense – revenue) is converted to the unit cost
- For CRT TV case, 10 recycling facilities treating the set quantity are to be deployed. Meaning the total recycling cost is RM 15,560K.
- Unit recycling cost of CRT TV is RM 41/unit (15,560K/384K) and likewise other items are estimated

Recycling cost per unit

Item	Recycling cost per unit (RM/unit)
CRT TV	41
Flat TV	12
WM	16
AC	5
Fridge	49
PC (desktop)	8
Laptop	3
MP	3

7. RFMB cost

(RFMB cost: administration cost of fund management body)

- Recycling Fund Management Board (RFMB) cost as shown below is to be used for proper household E-waste management and operation of the entire mechanism including license application evaluation on behalf of DOE and E-waste recyclers auditing
- POM Information obtained from manufacturers and importers is to be used for determining the fee rate after RFMB cross-examines the accuracy
- RFMB cost is converted to the unit cost by considering the ratio of the item in the estimated total collection volume

Total RFMB cost

Item	Budget (MYR/Yr)
Human resource	9,946,500
Office facilities	3,388,000
Audit expenses	7,051,340
Report, awareness raising	1,150,000
Fee and rate review committee related	48,400
Legal fee	109,000
General admin expenses	3,525,540
TOTAL	25,218,780

8. Providing the subsidy

- Recycling Fee is a source of the subsidy to be provided to the licensed recycling facility and collectors.
- Discount rate factors are applied when providing the subsidy to the collectors and recyclers. 100% of the Recycling Fee will not be provided. Because some collectors sell E-waste to recyclers especially for the E-waste in good conditions with the functionality.
- Discount rate also applies to collectors who bring E-waste missing valuable parts. This is to prevent so called “Cherry picking” activity.
- Different subsidy applies to the E-waste collection from East Malaysia where currently no E-waste recyclers. In future it is ideal to pursue the possibility for local recycling and even pretreatment before shipping entire units for the sake of reducing the cost.
- Subsidy is to be provided every month. RFMB receives the collected, received and treated quantity report from the licensed recyclers and collectors by the end of a month and verifies the accuracy of the data. Afterwards, the payment is done by the end of the next month.

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9. How to charge the Recycling Fee

- Recycling fee is to be charged to the manufacturers and importers of E-products by product types based on their POM amount.
- Manufacturers and importers of E-products are requested to report the POM amount of the previous year(January through December) by the end of January.
- POM amount report can be done either by unit or volume. Conversion figure is to be determined.

(POM estimation)

- Put On Market quantity is estimated with available estimation sources. Figures are used to calculate the unit recycling fee

POM quantity estimation

Item	POM assumed (,000 units)	Source
CRT TV	850	Reed Electronics Research assumed generation as of 2015(CRT and LCD is 1:1)
Flat TV	850	Reed Electronics Research assumed generation as of 2015(CRT and LCD is 1:1)
WM	555	JEMA(Japan Electrical Manufacturers' Association) assumed White goods demand as of 2013
AC	790	JARAC(Japan Association of Refrigeration and Air-Conditioning Contractors) assumed A/C demand as of 2015
Fridge	500	JEMA(Japan Electrical Manufacturers' Association) assumed White goods demand as of 2013
PC (desktop)	552	BMI Research assumed generation as of 2018
Laptop	1,849	BMI Research assumed generation as of 2018
MP	10,770	BMI Research assumed generation as of 2015
TOTAL	16,716	-

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10. Recycling fee

- For setting the recycling fee, total collection cost + total recycling cost + RFMB cost / POM (Put On Market)
- Total collection cost for Peninsular and East Malaysia is converted to the unit cost through weight average calculation considering the population ratio in the region

Unit collection cost

	Total collection cost(RM)	per unit(RM)	per unit(RM)
CRT TV	1,322,640	5.5	157.3
Flat TV	661,320	2.75	56.2
WM	1,865,600	13.75	363.7
AC	2,244,000	9.17	203.0
Fridge	3,269,538	21.15	369.8
PC(desktop)	8,944,306	13.75	261.8
Laptop	1,219,680	2.29	41.4
MP	318,824	0.07	1.3
	19,845,909	2.90	59.37

Population ratio 80% : 20%

Logistical cost		
West Malaysia	East Malaysia	Entire Malaysia average
5.5	108.2	26
2.8	31.6	9
13.8	241.0	59
9.2	121	32
21.2	255.9	68
13.8	139.2	39
2.3	20.9	6
0.1	0.7	0.2

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10. Recycling fee

- Recycling fees to be imposed on manufacturers and importers are shown in the following table

Recycling fee (RM/ unit)

	(1)	(2)	(3)	((1)+(2))*(3)=(4)		(5)	(4)+(5)=(6)	(7)	(6)/(7)
Item	**Collection cost(RM)**	**Recycling cost(RM)**	**Collection amount(unit)**	**Sub TOTAL**	**FMB Total cost (RM)**	**Allocated FMB cost**	**TOTAL(RM)**	**POM(unit)**	**Recycling Fee(RM/unit)**
CRTTV	36	41	300,600	23,146,200	25,218,780	2,277,820	25,424,020	850,000	**29.9**
Flat TV	13	12	300,600	7,515,000	25,218,780	2,277,820	9,792,820	850,000	**11.5**
WM	84	16	169,600	16,960,000	25,218,780	1,285,157	18,245,157	555,000	**32.9**
AC	48	5	306,000	16,218,000	25,218,780	2,318,739	18,536,739	790,000	**23.5**
Fridge	91	49	193,200	27,048,000	25,218,780	1,463,988	28,511,988	500,000	**57.0**
PC(desktop)	63	8	813,119	57,731,449	25,218,780	6,161,473	63,892,922	552,000	**115.7**
Laptop	10	3	665,280	8,648,640	25,218,780	5,041,211	13,689,851	1,849,000	**7.4**
MP	0.3	3	5,796,800	19,129,440	25,218,780	4,392,571	23,522,011	10,770,000	**2.2**
			8,545,199					**16,716,000**	

11. Adjustment of fund management surplus

- Recycling fee is collected based on the POM amount by each manufacturers and importers. Quantity of household E-waste to be recycled at household recycling facilities is not equal to the POM because of various factors such as deadstock and leakage of E-waste.
  - Recycling fee to be charged
    - Collection amount for the fee to be determined considering the assumed collection volume, Instead of 100% of POM equivalent fully charged
- Therefore, there might be the surplus of the fee collected and this needs to be taken into consideration for setting the recycling fee.
- When setting the recycling fee, the cost eventually needed in the future, considering the life span of the E-appliances need also to be taken into consideration.

12. Fee review mechanism

- Recycling Fee rate is to be reviewed periodically
- Fee review is conducted, considering the market trend of recyclable materials, relevant technology development, change in the components and materials used in the designated E-appliances and other factors.
- In the initial stage E-waste amount to be collected and recycled may not be large enough to expect scale of economy. When more amount collected and recycling facility has become more experienced and efficient, cost for recycling is supposed to be reduced. Additionally, when it becomes more efficient, it leads creating more market and producing more revenue for some fraction which may not exist without enough volume. Therefore, it is important for RFMB to monitor the cost and revise it on regular basis.
- RFMB also closely monitors how the fee collected is utilized to ensure for avoiding over charge and false reporting and improper spending.

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